# REVISED ENGINEERING EVALUATION AND COST ANALYSIS (EE/CA) REPORT

Garland Road Landfill Site
Miami County, Ohio

EPA Region 5 Records Ctr.
269550

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April 4, 2007

Reference No. 007043-90

Mr. Matthew J. Ohl
Remedial Project Manager
U.S. EPA Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Dear Mr. Ohl:

Re: Final Revised EE/CA
Garland Road Landfill, Miami County, Ohio
Administrative Order on Consent (AOC), Docket No. VW-95-C-296

Please find enclosed five (5) copies of the Final Revised EE/CA Report (Report) for the Garland Road Landfill. We are also sending two (2) complete copies to Ohio EPA. The Report has been revised as requested in U.S. EPA's letter dated March 7, 2007 (attached) to remove the legend and provide hard copies of the appendices. The remainder of the Report is unchanged.

Should you have any questions on this document, please do not hesitate to contact us.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Michael R. Tomka, P.E.

JP/ev/18
Encl.

c.c.: Wendy Carney, U.S. EPA (w/o encl.)
Terry Branigan, U.S. EPA (w/o encl.)
Mark Allen, OEPA (2 copies)
Bob Gable, ODNR (w/o encl.)
Rick Herseman, Tetra Tech (w/o encl.)
William McFarland, GM (w/o encl.)
Jean Caufield, GM (1 copy)
Ed Peterson, GM (1 copy)
Cassandra Weaver, GM (w/o encl.)
Robert Rule, *de maximis* (1 copy)
Jerome Maynard, Dykema (1 copy)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

**March 7, 2007**

REPLY TO THE ATTENTION OF:
SR-6J

Via Fax and Certified Mail

Mr. Robert Rule
De Maximis, Inc.
450 Montbrook Lane
Knoxville, TN 37919
Fax (865) 691-6485

Re: Garland Road Landfill, near West Milton, Miami County, Ohio
Administrative Order on Consent, Docket No. VW-95-C-296
Modification and Approval of the Draft Revised EECA Report

Dear Mr. Rule:

Thank you for providing the draft Revised Engineering Evaluation/Cost Analysis ("EECA") Report for the Garland Road Landfill Site ("Site"), dated June 30, 2006. The United States Environmental Protection Agency ("U.S. EPA") and the Ohio Environmental Protection Agency ("Ohio EPA") have reviewed the draft EECA Report that was prepared by Connestoga-Rovers and Associates ("CRA") on behalf of GM. While the draft EECA Report contains opinions and estimates with which U.S. EPA does not necessarily agree, U.S. EPA believes that the draft EECA Report as modified by this letter is adequate to support the selection of a response action alternative.

A. **Modifications to Site Characterization**

1. The draft EECA Report indicates that the Site is located in the city of West Milton. (*See, e.g., page i, Executive Summary, and p. 4*).[1] While the Site is near West Milton, it is our understanding that the City of Union may have annexed the property including the Site.

2. The draft EECA Report states that the Site is 24 acres, while previous documents have stated that it is 15 acres. (*See, e.g., p. i, Executive Summary, and p. 4*). The draft EECA Report is modified to indicate that the correct size of the Site will be clarified during the pre-design investigation.

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[1] Page numbers refer to the draft EECA Report dated June 30, 2006, that was submitted by letter dated June 30, 2006 from Michael R. Tomka, CRA. While references to the Draft EECA Report by specific page number are included throughout this letter, the analysis in this letter should - unless otherwise indicated - be regarded as generally applicable throughout the draft EECA Report, and not merely limited to the text of the draft EECA Report at the page referenced.

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3. The draft EECA Report incorrectly states – relying on limited information from the Ohio Department of Natural Resources ("Ohio DNR") dating to 1984 - that the Site is located above a "[c]layey till overlying non-waterbearing Ordovician shaly limestone bedrock. . . ." (*See, e.g., p. 5*). The draft EECA Report is modified to reflect the fact that borings completed at and near the Site indicate that it is underlain by sand and gravel. More recent information from Ohio DNR, including their report titled, "Groundwater Pollution of Miami County, Ohio," dated October 1995, correctly indicates that the Site is located above the same sand and gravel aquifer that the City of Union uses several thousand feet to the south. U.S. EPA has identified this aquifer as a "sole-source aquifer." Given that the Site is located above this productive aquifer, there is the potential for future groundwater use at or near the Site.

4. The draft EECA Report states (*see, e.g. p. 5*) that the City of Union has no plans to install new wells further to the north in the foreseeable future; that the City's Master Plan will not be ready until 2007; and that the city manager did not foresee the need for expansion of the well-field based on current growth numbers. The draft EECA Report also states (*see, e.g. p. 5*) that the City of Union's well-fields are not expected to draw water from the Site due to the extensive distance away from the Site and the significantly different geologic units (e.g., silty sands) in the area of the Site compared to the area closer to the wellfield (e.g., sands and gravels). Since no supporting documentation was provided for any of these assertions, the draft EECA Report is revised to eliminate the first paragraph after the bullets on page 5 and the third paragraph after the bullets on page 5, and to substitute the following paragraph:

> By letter dated January 10, 2006, addressed to the Ohio Environmental Protection Agency, the City Manager of the City of Union, John P. Applegate, stated that the City of Union "continues to be concerned with the Garland Road Landfill's potential effect on groundwater quality in [the city's] well field. The landfill is the City's **Number 1** potential contaminate source listed in the City of Union's Wellhead and Source Water Protection Plan." [2] [Emphasis in the original].

5. The draft EECA Report states (*see, e.g., pp. 9 – 10, 18, 24*) that groundwater flows toward and discharges into the Stillwater River. There is significant uncertainty about the groundwater flow within and from the Site and therefore, the groundwater contours depicted in Figure 2.7 must be regarded as hypothetical. U.S. EPA expects that some of these uncertainties will be addressed by the plan for additional pre-design groundwater investigation outlined in the draft EECA Report. (*See paragraph 38 below.*) The presence of a contaminant plume (including trichloroethene ("TCE") and other contaminants) migrating south of the Site, however, has been documented and seems to

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[2] The City of Union has assigned a "Low" Hazard Potential Priority Rating to the Garland Road Landfill as a potential contaminant source, and has also assigned it a "D.R.A.S.T.I.C." rating of 180. "Wellhead Protection Area Delineation and Potential Pollution Source Inventory Report," Table 1 (Potential Contaminant Source (PCS) Listing) , p. 19; attached as Appendix A to "City of Union, Ohio, Wellhead and Source Water Protection Program," November 2002, prepared by Hardin ESE, Inc., Miamisburg, OH for City of Union, Ohio.

be clear evidence of a strong southerly component to groundwater flow within and from the Site. In addition, it is likely that some Site contaminants, especially the heavy, chlorinated volatile organic compounds like TCE, would migrate downward to deeper levels of the aquifer as they flow away from the Site, where any hydraulic connection to Stillwater River, which is comparatively shallow, becomes much weaker and more uncertain.

6. Section 2.3.4 of the draft EECA Report describes a sampling event conducted by the Ohio EPA in 2003 during which Ohio EPA collected and split with GM 14 soil samples collected from the Site and 12 sediment samples collected from the Stillwater River. The draft EECA Report summarizes the results of analysis conducted on GM's portions of the split samples, but not the results of analysis conducted on Ohio EPA's portions. The summary of analytical results in section 2.3.4 should have included a summary of Ohio EPA's analytical results. Any references to the summary provided in section 2.3.4 should also include a reference to the analogous Ohio EPA results that are listed in Appendix H.

7. The draft EECA Report states that waste in the landfill is impacted by seasonal fluctuations in the water table as much as by infiltration of precipitation (*see p. 36*). U.S. EPA believes it is inappropriate to make this statement because there is no data or evidence to support it.

8. The draft EECA Report states, "[v]isual surveying along the riverbank indicates evidence of minor past and possibly ongoing erosion in select areas." (*See p. 41*). During a September 2005 site visit, the visual survey of the riverbank indicated erosion, failed banks, downed trees, waste in the slope, downed chainlink fence, and other potential problems.

9. The draft EECA Report is modified to recognize that debris exhibiting the hazardous waste characteristic of toxicity for vinyl chloride was placed back in the landfill. (*See p. 18*).

**B. <u>Modifications to the Discussion of Removal Alternatives</u>**

***Scope of the Response Action and RAOs.***

10. The draft EECA Report states that the "scope of the response action is to provide long-term mitigation of any remaining risk at the Site in a manner that is appropriate considering the existing and planned future uses of the Site and property adjacent to the Site." (*See p. 29*). U.S. EPA notes that the scope is properly determined by reference to the RAOs in the Administrative Order on Consent ("AOC"), the final EECA Report, and modifications made following public comment or in the action memorandum for the removal action, together with the NCP and relevant U.S. EPA guidance. The Administrative Order on Consent provides the following minimum response action objectives ("RAOs") to be included in the draft EECA Report:

a) prevention or minimization of the release of hazardous substances so that they do not migrate to cause danger to present or future public health or welfare or the environment;
b) prevention or abatement of actual or potential exposure to nearby populations, animals, or the food chain from hazardous substances, pollutants, or contaminants;
c) prevention or abatement of actual or potential contamination of drinking water supplies or sensitive ecosystems;
d) stabilization or elimination of hazardous substances in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release;
e) treatment or elimination of high levels of hazardous substances, pollutants, or contaminants in soils or sediments largely at or near the surface that may migrate;
f) elimination of threat of fire or explosion; and
g) mitigation or abatement of other situations or factors that may pose threats to public health, welfare, or the environment.

The draft Report also identifies several factors that may pose threats to human health or the environment (*see pp. 29 – 30*), including:

a) Allowing development of the Site in accordance with its expected future land use, which is expected to be passive recreational.

This factor is hereby modified to read as follows: "Allowing use of the Site in accordance with its expected future land use, which may include passive recreational use. Future land use will be more fully articulated during the design phase and shall be consistent with the goals of the response action, including maintenance of engineered components, such as the cap."

***Comments on Caps.***

11. The draft EECA Report states: "To protect the GCL at least 18 inches of soil (geonet layer, 12 inches of soil and 6 inches of topsoil) is placed on top to hold the GCL in place and to encourage vegetation growth." (*See p. 35*). The geonet layer may not be required with a geosynthetic clay liner. In addition, while the draft EECA Report doesn't include a geonet layer in its discussion of the current Ohio solid waste cap (*see p. 47 -48*), caps utilizing an FML are usually constructed with a genonet under the drainage layer.

12. While the draft EECA Report indicates that landfilling has not occurred along the riverbank based upon aerial photography (*see, e.g., pp. 42, 48, 53, 58*), the topographic maps of the Site indicate that such landfilling may indeed have occurred.[3] If waste is found outside the anticipated limit of the waste, the draft EECA Report provides that one

[3] The early USGS maps suggest that the site was fairly flat along the river bank before landfilling began at the site and that the 810-foot contour interval was located approximately 250 feet from the river's edge. Based on the aerial survey in 2006, the current 810-foot interval is located on a steep slope along the river's edge referred to in the EECA report as the buffer zone. This suggests that landfilling activities may have occurred much closer to the river than is suggested in the EECA Report.

of the following will be completed: (i) the cap will be extended over the waste, (ii) the waste will be excavated and consolidated under the cap, or (iii) the significance of the situation will be assessed with U.S. EPA. (*See p. 48*). While U.S. EPA would expect to assess the situation in consultation with Ohio EPA and the party performing the response action, such an assessment alone is not expected to be an adequate response. The draft EECA Report is modified by this comment to replace the third option with the following: "(3) other action will be taken, as determined by U.S. EPA in consultation with Ohio EPA and the party performing the response action." U.S. EPA adds that principal threat wastes, e.g., drums of TCE, discovered beyond the expected boundary of the cap will not be reconsolidated under the cap, but will be transported for off-site disposal.

13. While not discussed in the draft EECA Report, Figures 5.2, 5.11, and 5.12 include depictions of potential edge details or terminations for the proposed cap. These details will be determined by U.S. EPA during the design phase and may be vary from the figures in the EECA report, i.e., anchor trenches may be included where the cap components will be terminated or secured.

14. The draft EECA Report incorrectly states that the current Ohio solid waste cap (RCRA Subtitle D) is typically applied to new sanitary landfills, giving the impression that it is not ever applied to existing landfills. (*See p. 35*). The Ohio EPA takes the position that the current Ohio solid waste cap requirements apply both to new sanitary landfills and to the closure of any existing sanitary landfill that has not previously been closed under Ohio law. The draft EECA Report also states that ". . . 1 x 10 (-7) cm/sec is customarily used as the performance standard for construction of landfill caps to account for small variations in composition and actual construction techniques and conditions." (*See p. 36*). It should state that "1 x 10 (-7) cm/sec is customarily used as the performance standard (i.e., the maximum allowable permeability) for construction of clay landfill caps to account for small variations in composition and actual construction techniques and conditions."

15. The presumptive remedy guidance states that the presumptive remedy "relates primarily to containment of the landfill mass and collection and/or treatment of landfill gas," but may also include "measures to control landfill leachate, affected groundwater at the perimeter of the landfill [i.e. source area groundwater controls to mitigate contaminant migration and inhibit the plume], and/or upgradient ground-water that is causing saturation of the landfill mass. . . ." The draft EECA Report indicates that the presumptive remedy [as applied to this landfill] includes the following components: caps or covers, leachate/groundwater collection; leachate/groundwater treatment, leachate gas collection and treatment; and institutional controls. (*See, e.g., p. iv, Executive Summary.*) Leachate/groundwater collection and treatment is a measure that can be used to control source area groundwater. While not expressly discussed in the presumptive remedy guidance, other source area groundwater control measures might also include *in situ* treatment of source area groundwater, sheet pile walls, and others. This draft EECA Report evaluates in situ leachate/groundwater treatment and sheet pile walls as measures to control source area groundwater.

16. The draft EECA Report states that Alternatives 2 through 4 would all meet chemical-, action-, and location-specific ARARs. (*See p. vii*). In addition, the draft EECA Report states that Alternative 3 (*see p. 56*) and Alternative 4 (*see p. 64*) "comply with state and federal ARARs for capping . . . ." The draft EECA Report is modified to acknowledge that the caps proposed for Alternatives 3 and 4 do not meet the capping requirements in Ohio's current solid waste closure regulations (i.e., OAC 3745-27-11) and that a waiver of or variance from the capping requirements would be required for both Alternatives 3 and 4. In the case of both Alternatives 3 and 4, an ARAR waiver of these capping requirements appears to be justifiable based upon an equivalent standard of performance given site-specific characteristics, the extensive removal action previously completed at the Site and the nature of the response actions included in Alternatives 3 and 4.

17. The draft EECA Report indicates that the caps proposed as remedy components under Alternatives 2, 3, and 4 are roughly or essentially "equivalent" and provide the same degree of protection (*see, e.g., pp. vi, vii, 36, 67, 69*). U.S. EPA expects, however, that a solid waste cap designed and constructed to meet Ohio's current solid waste closure regulations (i.e., the cap proposed under Alternative 2), would provide the greatest reduction in the infiltration of precipitation downward through the waste located above the water table. Such a reduction in infiltration is expected to reduce the amount of leachate emanating from these wastes. Infiltration of precipitation is not expected to have a significant impact on wastes that are saturated with water before the precipitation event, i.e., wastes while they are located below the water table or when they have become saturated during flood events. Alternative 4, which includes source area groundwater treatment and a clay cover, would be expected to perform as well as or better than Alternative 2 without a groundwater treatment component in terms of achieving the RAOs. If the groundwater treatment proposed as a component of Alternative 4 were added to Alternative 2, the two alternatives would be expected to have equivalent performance since the treatment requirements will be the decisive factor for determining when groundwater cleanup goals are met. (*See paragraph 34 below*). Alternative 3 may provide protection that is similar to Alternative 4, although it would be expected to have a significantly higher cost over time.

18. The draft EECA Report states that Alternatives 1 and 2 have no active groundwater treatment, but rely on natural attenuation to reduce off-site migration of contaminants exceeding the Maximum Contaminant Levels ("MCLs"). (*See p. vii*). In fact, Alternatives 2 through 4 all include measures to reduce migration of contaminants to the south. While Alternative 2 does not include active source area groundwater control measures, it does include an impermeable cap that will reduce off-site migration of contaminants by minimizing infiltration of precipitation through the landfill contents. Alternative 3 includes an impermeable cap and a source area groundwater control measure (*i.e.*, sheet pile walls). Alternative 4 includes an impermeable cap and a different source area groundwater control measure (*i.e.*, source area groundwater treatment).

19. The draft EECA Report states that "[b]ased on conditions at the Site, a Current Ohio Solid Waste Cap would not provide additional benefit as compared to a GCL or clay cap." (*See p. 36*). The Report is modified to state that "based on conditions at the Site, a current Ohio Solid Waste Cap would not provide significant additional benefit as compared to a GCL or clay cap."

20. The draft EECA Report states that "[l]ining the swales with FML provides relatively minimal incremental benefit compared to the cost and similar benefits that may be recognized in the actual design by optimizing the configuration of the cap, including the location of the crest and swales. Therefore, the FML is not included in the Alternatives." (*See, p. 36*). U.S. EPA's evaluation of the need for FML in the swales will depend upon additional data collected in pre-design and the design details of the swales (e.g., length, slope, and shape). The draft EECA Report is modified to state that the need for an FML in the swales will be re-evaluated during the pre-design and design phases and that the final design of the cap under the swales will be determined by U.S. EPA on the basis of the re-evaluation.

***Comments on Monitored Natural Attenuation.***

21. The draft EECA Report does not formally include Monitored Natural Attenuation (as specified in Agency guidance) as a component of any of the response action alternatives for the contaminant plume in groundwater south of the Site. A groundwater monitoring program will, however, be included as part of Alternatives 2, 3, and 4. U.S. EPA expects that any response action selected based on the draft EECA Report will result in a return to MCLs throughout the contaminant plume south of the Site within a reasonable period of time. The groundwater monitoring program will ensure that the selected response action alternative is performing as expected.

***Comments on Performance of In Situ Treatment Included in Alternative 4.***

22. The draft EECA Report estimates that MCLs could be met at the waste management boundary through natural attenuation without any groundwater treatment within 26 years from the time of the removal work, and then states that "[m]eeting MCLs at the WMB in 26 years from the time of the removal work, or by 2023, is reasonable." (*See p. 59*). The draft EECA Report also states that MCLs would be met at the river to the south of the Site within an additional 11.5 years. (*See p. 59*). The draft EECA Report then states that "it is not cost effective to try to reach MCLs sooner, and there is no unacceptable risk to human health or the environment under current and reasonably expected land and groundwater use." (*See p. 59*). U.S. EPA disagrees with the judgments expressed in the excerpts within quotes and they are hereby deleted from the draft EECA Report.

23. The draft EECA Report states that ". . . GM proposes groundwater treatment in the source area to reduce TCE concentrations in groundwater within the WMB and beyond by 50 percent . . . ." ( *see p. 59*) and that "[t]he objective of the ozone sparging operation is to achieve a 50 percent reduction in the mean average groundwater

concentration of TCE at existing monitoring wells, based on the 2002 data . . . ." (*See p. 60*). The draft EECA Report also states that "[w]hen the average concentration in monitoring wells D-2, D-3, and S-4 reduces to 80 $\mu g/L$ for two consecutive monitoring events, the groundwater treatment objective will have been met." (*See p. 60*). Alternative 4 is modified by completely replacing these requirements. Instead, groundwater treatment will be conducted within the waste management area to ensure that MCLs are achieved:

a) at the waste management boundary within 8.5 years from the initiation of full-scale treatment (or within 9.5 years from the initiation of the initial pilot test, whichever is earlier), and

b) at all monitoring points beyond the waste management boundary within 20 years from the initiation of full-scale treatment (or within 21 years from the initiation of the initial pilot test, whichever is earlier).

Compliance with the performance standards will be measured at and beyond the waste management boundary in locations necessary or appropriate to determine whether contaminants are migrating or accumulating south of the Site in concentrations exceeding MCLs. The technology used initially for full-scale treatment will be ozone sparging (as more fully described in the draft EECA Report and elsewhere in this letter); unless the field pilot test demonstrates that ozone treatment of the groundwater within the waste management area will not be effective in ensuring that the performance standards of this paragraph will be achieved. (*See paragraphs 25 and 29 below*).

24. Success in achieving and maintaining the performance standards in paragraph 23 above will be determined by U.S. EPA based on analytical data from actual samples, and not on the results of modeling.

25. The draft EECA Report states:

> A field pilot test is proposed for the south end of the Site in order to confirm delivery of ozone to the impacted media as well as provide data to allow for optimization of well spacing . . . . Based on the results of the pilot test, GM would evaluate whether the groundwater objective (i.e., 50 percent reduction of the mean average concentration of the 2002 data) is achievable within 2 years using the ozone sparging methods proposed. . . . If the desired 50 percent reduction could not be achieved within the agreed reasonable timeframe, GM would propose a contingency plan." (*See p. 60*).

The draft EECA Report is modified to provide that instead of evaluating the results of the pilot test to determine whether a 50 percent reduction could be achieved within 2 years, the results of the pilot test would be evaluated to determine whether the performance standards in paragraph 23 above could be met using the proposed ozone sparging methods. The draft EECA Report also states that at the end of the pilot study, information from the study will be analyzed and full-scale implementation will be

initiated. (*See p. 62*). The draft EECA Report is modified to provide that upon conclusion of the pilot study, the pilot study data will be analyzed and reported to U.S. EPA and Ohio EPA and that full-scale implementation will be initiated upon U.S. EPA concurrence and approval.

26. Figure 5.10 of the draft EECA Report includes a depiction of the proposed limit of ozone sparging. The draft EECA Report also states that "if the pre-design groundwater flow assessment concludes groundwater from the northern portion of the Site is or will flow to the south at levels in excess of the MCLs, additional ozone sparging will be performed in those areas." (*See pp. 58-59*). U.S. EPA agrees that the pre-design groundwater investigation activities may reveal circumstances that require additional *in situ* treatment in areas of the Site north of the proposed limit of ozone sparging depicted in Figure 5.10. As part of the design process following the conclusion of the pre-design groundwater investigation, U.S. EPA will evaluate the proposed extent of ozone sparging.

***Treatment Contingencies for Alternative 4.***

27. Each calendar year following the initiation of full-scale treatment, the party conducting the response action shall estimate (using computer software modeling tools acceptable to U.S. EPA and using a methodology reviewed and approved by U.S. EPA) the remaining time necessary for concentrations of contaminants to meet the performance standards of paragraph 23 above. If the modeled time exceeds any performance standard in paragraph 23, additional treatment including *in situ* chemical oxidation or other treatment as determined by U.S. EPA (after consultation with Ohio EPA and the party performing the response action) will be conducted on an accelerated basis to meet this requirement. The annual modeling described in this paragraph 27 must be based on analytical data from groundwater samples collected at and near the Site. Analytical data from samples collected before the pre-design groundwater investigation may not be used in such annual modeling, except as specifically approved by U.S. EPA.

28. If the annual modeling described in paragraph 27 above does not show adequate progress (as determined by U.S. EPA based on analytical data from groundwater sampling and the results of annual modeling) from year to year in achieving the performance standards of paragraph 23 above, additional treatment including in-situ chemical oxidation and other treatment as required by U.S. EPA (after consultation with Ohio EPA and the party performing the response action) will be conducted on an accelerated basis to achieve and maintain the cleanup goals.

29. The draft EECA Report states that GM would present the results of the pilot study to U.S. EPA and if the desired 50% reduction could not be achieved within the "agreed reasonable timeframe," GM would propose a contingency plan. (*See p. 60*). As noted above, the draft EECA Report is modified to replace the requirement for a 50% reduction in contaminant concentrations by the performance standards in paragraph 23 above. The draft EECA Report is further modified to provide that if results of the pilot study indicate, *as determined by* U.S. EPA, that the performance standards in paragraph 23 above cannot

be met through *in situ* ozone treatment, additional treatment options including in-situ chemical oxidation or other treatment or actions, as approved by U.S. EPA (after consultation with Ohio EPA and the party performing the response action) will be evaluated and field pilot-tested as appropriate on an accelerated basis to determine whether they could meet the standards in paragraph 23 above. Following accelerated field pilot testing, pilot study data will be analyzed and reported to U.S. EPA and Ohio EPA. If the data demonstrate that using the alternative technology meeting the performance standards of paragraph 23 above would be practicable, full-scale implementation will be initiated upon U.S. EPA concurrence and approval.

30. The draft EECA Report states that if desirable results are not achieved with Alternative 4 within a reasonable timeframe, GM would propose a contingency plan. "GM would evaluate potential modifications to this treatment system and/or research other potential treatment technologies and their cost and present the evaluation to U.S. EPA to determine whether additional treatment activities were warranted based on costs and benefits." (*See, e.g., pp. vii, 60-61, 70*). This draft EECA Report is modified by deleting that sentence and specifying that if any of the requirements in paragraph 23 above is not met, additional treatment including in-situ chemical oxidation or other treatment or actions as required by U.S. EPA (after consultation with Ohio EPA and the party performing the response action) will be conducted on an accelerated basis to achieve and maintain the requirement. Such treatment shall be designed to meet the performance standards in paragraph 23 above.

31. Once a performance standard in paragraph 23 above has been achieved, compliance with MCLs shall be maintained from year to year, as demonstrated based on groundwater data collection during the monitoring program. (*See paragraph 39 below*). Additional treatment including in-situ chemical oxidation and other treatment may be required by U.S. EPA (after consultation with Ohio EPA and the party performing the response action) as necessary or appropriate to maintain compliance with MCLs.

32. The draft EECA Report states that "[w]hen the water level is below the top of [the] screen, air/ozone will move through the screen and sand pack, entering the formation in small bubbles." (*See p. 39*). U.S. EPA notes that in this situation, some of the ozone will be quickly lost to the sand pack and soils instead of treating the groundwater. This is because, as the draft EECA Report subsequently explains, the "landfill material is likely to contain a large amount of Natural Oxygen Demand ("NOD"), which will compete with the TCE and reduce the effectiveness of the ozone for TCE degradation." (*See p. 39*). U.S. EPA notes, however, that there is little or no landfill waste in the southern areas of the Site where the *in situ* treatment will be concentrated. Ozone lost to the soils in the southern areas of the Site may react with the organic carbon content of the soils and thus be ineffective.

***Comments on Response Action Alternatives.***

33. The draft EECA Report identifies a no action alternative and three response action alternatives to achieve the RAOs. Alternative 1, the no action alternative, is not expected

to meet any of the RAOs. Alternatives 3 and 4 could be designed and constructed to address the RAOs. Alternative 2 could be designed and constructed to meet most of the RAOs, however, its ability to minimize the release and migration of hazardous substances and abate potential contamination of drinking water supplies would depend on the volume and concentration of the source area groundwater contamination that continues to migrate away from the Site after construction of the remedy. Important factors to consider in this case would include, without limitation: the volume of waste above and below the water table; the rate of dissipation of mounded contaminated groundwater/leachate; and the effect of infiltration of surface water or fluctuations in water table elevation during flood events.

34. Alternative 2 includes a cap that complies with the current Ohio solid waste closure capping requirements, but does not include other measures to contain or control source area groundwater, as Alternatives 3 and 4 do. If the *in situ* groundwater treatment (with contingencies) that has been proposed as a component of Alternative 4 were added to Alternative 2, we expect that the two alternatives would have equivalent performance in that (i) both caps would eliminate threats to human health from direct contact, and (ii) since the *in situ* treatment requirements will be the determining factor for when groundwater cleanup goals are met, both caps would achieve groundwater cleanup goals within similar reasonable periods of time. Alternative 2 without treatment is expected to cost significantly more than Alternative 4, and the cost differential would be higher if *in situ* treatment were added to Alternative 2. Therefore, a response action alternative that combines the compliant cap with *in situ* treatment has not been included for comparison in the draft EECA Report.

35. The State of Ohio is not expected to agree with the selection of Alternative 2 as the preferred response action alternative. The State of Ohio would also be unlikely to agree fully with the selection of either Alternative 3 or Alternative 4 as the preferred response action alternative.

***Comments on Gas Venting System.***

36. The draft EECA Report states (*see p. 41*) that "[b]ecause buried drums and grossly impacted soils were previously removed from the Site, passive gas vents are expected to be appropriate for meeting RAOs at the Site." The draft EECA Report is modified by adding that active landfill gas collection and treatment will replace passive gas vents and treatment if pre-design data collection and analysis reveals levels of landfill gas that: 1) pose a potential inhalation risk; 2) present a potential fire or explosion risk; 3) inhibit reasonably expected future land uses; or 4) prevent passive gas venting systems from meeting the requirements of ARARs regarding landfill gas (e.g., regulations regarding the control of landfill gas).

37. The draft EECA Report states that the gas venting system would consist of a "number of gas vents at the high points in the cap extending vertically from the waste through the low permeability cover to approximately 4 feet above the finished grade."

(*See p. 48*). U.S. EPA adds that the gas venting system shall be designed so that no flood waters enter the landfill waste through the vents during flood events.

***Comments on Additional Pre-Design Groundwater Investigation.***

38. The draft EECA Report includes a proposal for additional groundwater data collection in a pre-design groundwater investigation. (*See, e.g., pp. x, 50 – 51, 55, 63, and 74.*) If alternative 4 is selected, the pre-design investigation shall be conducted before the pilot test for the ozone treatment system. U.S. EPA expects to evaluate and determine the frequency of sampling activities and water level measurements, the location and number of additional monitoring wells and other monitoring points,[4] borings to confirm the extent of the waste, etc., as part of a pre-design data collection plan. March 2006 survey results provided by CRA conflict with 1995 survey results. Specifically, the elevations of well casings were much lower in March 2006 than they were previously. Additional surveying will need to be conducted during the pre-design groundwater investigation to resolve the conflicts.

***Comments on Groundwater Monitoring Program.***

39. The draft EECA Report includes 2 years of quarterly groundwater monitoring as part of response action in Alternatives 2, 3 and 4. (*See pp. 51, 55, and 63 and Table 5.2*). For Alternative 4, the draft EECA Report states that "[u]pon termination of the treatment system, quarterly VOC monitoring of wells just outside the WMB will be conducted for 2 years . . ." (*See p. 63*). U.S. EPA expects, however, to evaluate and determine the parameters of the quarterly groundwater monitoring program for these alternatives in the post removal site control plan that will be subject to approval, modification and approval, or disapproval by U.S. EPA. Quarterly monitoring following termination of treatment for Alternative 4 would involve monitoring more wells and other monitoring points than the monitoring wells just outside the waste management boundary.

The draft EECA Report also includes a program of long-term groundwater monitoring as part of Alternatives 2, 3, and 4. (*See pp. 51, 55, and 63 and Table 5.2*). U.S. EPA expects to evaluate and determine the parameters of the long-term groundwater monitoring program, including the number and location of monitoring wells and other monitoring points (including the need for additional monitoring wells and other monitoring points south of the Site on the south side of the river), staff gauges, and piezometers, as part of the post-removal site control plan. U.S. EPA expects that groundwater may need to be monitored for up to 30 years or longer after the completion of the cap to satisfy federal and state regulations. Long-term groundwater monitoring shall be consistent with the requirements of CERCLA, the NCP, and other applicable state and federal laws, if any.

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[4] The discussion on pp. 50 -51 of the draft EECA Report regarding the number and location of new borings, piezometers, and monitoring wells, and Figure 5.5 showing the location of proposed monitoring wells, represents a proposal by GM that is subject to modification by U.S. EPA during review and approval of the pre-design groundwater investigation data collection plan.

The draft EECA Report states that groundwater "[m]onitoring wells will be removed from the program and abandoned following four consecutive events reporting all parameters below MCLs. No monitoring will be required once MCLs are achieved for all monitoring wells located outside the WMB." (*See p. 51*). U.S. EPA expects to evaluate and determine the criteria for abandonment of monitoring wells and other monitoring points and the termination of the long-term groundwater monitoring program as part of the post–removal site control plan.

***Comments on Riverbank Stabilization.***

40. While the draft EECA Report states (*see p. 42*), that GM found that "only a small number of small trees had toppled over," trees along the river will continue to fall down from a variety of reasons, including ice storms, high winds, lightning strikes, disease and old age. Maintenance of the riverbank, including removal of toppled trees along the riverbank will be an important part of post-removal site controls. In addition, while the draft EECA Report speaks only of a potential for erosion to expose waste along the riverbank, waste has already been exposed in some areas.

41. The draft EECA Report states that "[p]revention of riverbank erosion, preservation or the environment, and maintenance of the appearance of the Stillwater River are considered to be of equal concern." (*See p. 68*). Because of potential risks to human health and the environment, prevention of riverbank erosion takes precedence over maintaining the appearance of the Stillwater River.

***Comments on Fencing and Signage.***

42. The draft EECA Report further indicates that fencing around the Site will be removed. U.S. EPA expects to evaluate the need to maintain physical barriers, such as fencing and gates, and signage as part of the design and the post-removal site control plan.

***Comments on Institutional Controls.***

43. Institutional controls will be needed to supplement the engineered controls proposed under Alternatives 2, 3, and 4. The institutional controls will need to be applied to areas of the Site where waste/contaminated soils will remain in place and to areas (whether on-site or off-site) where site-linked contaminants have contaminated the underlying groundwater. The consent of the property owner will be necessary for the imposition of such institutional controls. Such areas will include "buffer areas" referred to in the draft EECA Report. Traditional institutional controls may include zoning, property use restrictions, etc.; however, they do not include fencing or monitoring as indicated in the draft EECA Report. (*See p. 43-44*). The State of Ohio enacted the Uniform Environmental Covenants Act in 2004, which is expected to simplify the task of imposing institutional controls at the Site.

*Comments on Waste Consolidation.*

44. Excavation of the waste from the southern portion of the Site and its reconsolidation under the cover for the Site is a component of all alternatives except the no action alternative. (*See, e.g., pp. 48, 53, and 58*). To help ensure that the performance standards are achieved, a functional wetland will be created in this area to provide treatment for any residual contamination that may remain after waste reconsolidation. For purposes of measuring compliance (*see paragraph 23 above*), the waste management boundary encompasses a waste management area that includes the capped landfill, the treatment wetland, and any portions of the Site directly between the cap and wetland. The party performing the response action must demonstrate ownership or control of the property through enforceable institutional controls. Principal threat wastes, e.g., drums with TCB, that are discovered during waste reconsolidation, will not be placed under the cap, but will be transported off-site for appropriate disposal.

C. <u>Modifications to the Comparison of Alternatives</u>

45. See comments in paragraph 17, above, comparing the caps proposed for Alternatives 2, 3, and 4.

46. The draft EECA Report unfavorably compares (*see pp. vii – viii*) the leachate/groundwater extraction and treatment component of Alternative 3 as more passive and longer term than the *in situ* ozone treatment component included in Alternative 4. The draft EECA Report also states (*see p. viii*) that Alternative 4 is expected to be completed within 2 years reducing the inherent hazards on-site in a shorter time frame compared to Alternative 3, which is expected to operate for more than 30 years. U.S. EPA does not regard the leachate/groundwater extraction and treatment system in Alternative 3 as more passive than the *in situ* treatment component in Alternative 4. Given the inclusion of treatment contingencies in Alternative 4, the in situ treatment in Alternative 4 could take significantly more than 2 years to complete. The sheet pile wall and leachate/groundwater extraction and treatment system of Alternative 3 would also quickly result in minimizing the migration of contaminants across the waste management boundary but at greatly increased cost as compared with Alternative 4; the *in situ* treatment option in Alternative 4 would also minimize the migration of contaminants across the waste management boundary, but in a somewhat longer timeframe than the sheet pile wall.

47. The draft EECA Report states that Alternative 4 will provide a greater reduction in mobility of contaminants than Alternative 3. (*See p. viii*). U.S. EPA expects that the opposite may be true considering that extent of the sheet pile wall and pump and treat system proposed in Alternative 3.

48. The draft EECA Report unfavorably compares Alternative 3 with Alternative 4 (*see, e.g., pp. vii – viii*) by stating that the leachate/groundwater extraction and treatment of Alternative 3 is a groundwater treatment technology whereas the *in situ* ozone treatment included in Alternative 4 is a source treatment technology. Since *in situ* ozone

treatment is primarily aimed at destroying contaminants in source area groundwater and may have only a limited effect on contaminants in those portions of the landfill situated atop the groundwater, U.S. EPA regards both the leachate/groundwater extraction and treatment and the *in situ* ozone treatment as source area groundwater treatment technologies.

49. The draft EECA Report states (*see, e.g., p. viii*) that the leachate/groundwater extraction and treatment component of Alternative 3 would be expected to be necessary for at least 30 years (a period equal to the period over which the sheet pile walls are expected to need to be maintained) while the *in situ* ozone treatment of Alternative 4 would be expected to be needed for as little as two years. The draft EECA Report also states that, given the difference in operational periods and the frequent flooding of the Site, the leachate/groundwater extraction and treatment will require additional maintenance. These advantages will be reduced to the extent that additional *in situ* treatment is necessary under the treatment contingencies included in Alternative 4. In addition, the effect of flooding will be minimized given that the treatment building would be located on high ground in the northern portion of the Site.

50. U.S. EPA does not necessarily agree with the statements in the draft EECA Report that the sheet pile wall in Alternative 3 would remove both floodway and floodplain storage, as stated by the draft EECA Report (*see, e.g., pp. x and 74*). The impact on floodplain storage would depend upon the design and construction of sheet pile wall. The ACM included in Alternatives 2 and 4, however, may remove such storage unless a volume of soil equivalent to the volume of the ACM is removed from the floodplain.

51. The draft EECA Report states (*see p. ix*) that Alternatives 1 and 2 are estimated to achieve MCLs at the waste management boundary and beyond in the same period of time. U.S. EPA believes that it is unlikely that Alternative 2 will not achieve MCLs at the waste management boundary and beyond more quickly than Alternative 1.

**D. Preferred Response Action Alternative**

52. Alternative 4 is the preferred response action alternative. Since Alternative 4 does not meet state capping ARARs, a variance from or waiver of those ARARs would be necessary before Alternative 4 could be selected as the removal action for this Site. Given site-specific characteristics and the extensive removal action previously completed at the Site, U.S. EPA believes that such a waiver would be justifiable based upon equivalent performance of the alternative compared to ARARs.

**E. Appendices**

53. U.S. EPA has previously sent correspondence with comments on many of the appendices to the draft EECA Report. None of this correspondence has been included in the appendices. To the extent these comments have not already been incorporated, they

are hereby incorporated by reference in the corresponding appendix, except as inconsistent with this letter.

This approval letter does not extend to appendices to the draft EECA Report to the extent such appendices are inconsistent with this letter.

**F. Conclusion and Submission of Final EECA Report**

54. U.S. EPA understands that further revisions of the draft EECA Report may not best serve the interest of timely progress toward cleanup of the Site. Therefore, U.S. EPA hereby modifies and approves the draft EECA Report in accordance with the comments provided in this letter and pursuant to paragraph 2.2.B of Section V of the AOC. No modifications are necessary in the text of the draft EECA Report in preparing the final EECA Report, with the exception of the following modifications:

- The draft EECA Report is marked with a legend that states: "Confidential – Submitted as Part of Settlement Negotiations This Document or Its Contents May Not Be Used For Any Purpose Other Than Settlement Negotiations Reference No. 7043-90". Please remove this legend from the final EECA Report.

- Appendices in the draft EECA Report were provided only on a compact disc. Please submit paper copies of all appendices with the final EECA Report.

GM may of course incorporate the comments above into the final EECA Report to facilitate the public comment process. Please do not make any other revisions in the final EECA Report. Please submit the final EECA Report with the modifications noted in this letter no later than thirty (30) days of receipt of this letter, as required by Task 5 of Attachment 1 of the Administrative Order by Consent. U.S. EPA and Ohio EPA should receive complete, final paper copies of the final EECA Report including the necessary appendices on or before this date. The number of copies should include five copies to U.S. EPA and two copies to Ohio EPA. U.S. EPA plans to start the public comment period promptly after receiving the final EECA Report.

If you have any questions regarding this letter, please contact me at (312) 886-4442 or ohl.matthew@epa.gov.

Sincerely,

Matthew J. Ohl

Matthew J. Ohl
Remedial Project Manager

cc via e-mail: Jean Caufield, GM
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Mark Allen, Ohio EPA
Ann Fishbein, Ohio EPA

Under penalty of law, I certify that, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this EE/CA Report, the information submitted is true, accurate and complete.

Robert W. Rule, Project Coordinator

# REVISED ENGINEERING EVALUATION AND COST ANALYSIS (EE/CA) REPORT

## Garland Road Landfill Site
## Miami County, Ohio

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## EXECUTIVE SUMMARY

General Motors Corporation (GM) has prepared this Revised Engineering Evaluation and Cost Analysis (EE/CA) Report for the Garland Road Landfill Site in West Milton, Miami County, Ohio (Site) in accordance with the requirements of Administrative Order V-W-'95-C-296 (Order) entered into by GM and U.S. Environmental Protection Agency (U.S. EPA) on June 7, 1995. U.S. EPA directed GM to streamline the EE/CA report by focusing on a limited range of practical alternatives for the Site that protect human health and the environment and meet the response action objectives (RAO) stated in the Order.

The Site is an inactive, approximately 24-acre landfill located in a rural agricultural and residential area. The Site is bordered on the north by Frederick Garland Road, on the east by the Stillwater River, and on the south and west by farm fields. The Site lies within the annual and 10-year flood plains. The Site was operated as a landfill between the early 1960s and 1970 and was used for disposal of domestic, commercial, and industrial wastes.

The surface materials at the Site consist of soils and waste materials. Most of the surface soils are covered with relatively heavy vegetation, including trees, shrubs, and grass. In general, the stratigraphic units encountered at the Site are as follows:

1. Fill/waste unit (not present across the entire Site);
2. Till unit (not present across the entire Site);
3. Sand/gravel unit; and
4. Limestone bedrock.

Attention was drawn to the Site in March 1991 when a Site inspection was conducted by the Ohio Environmental Protection Agency (OEPA). A number of environmental investigations were subsequently completed at the Site by U.S. EPA, OEPA, and GM. In addition, GM completed a significant Removal Action in 1997. On June 7, 1995, U.S. EPA and GM entered into the Order requiring completion of an EE/CA for the Site.

As part of the Removal Action and EE/CA investigation, GM installed six shallow and three deep monitoring wells in 1995 and 1996 to evaluate groundwater conditions at the Site. Sample analytical results indicated that the shallow and deep groundwater was contaminated, primarily with volatile organic compounds (VOCs). Contaminants in the shallow groundwater were migrating laterally toward the Stillwater River and vertically into the deep groundwater.

In 1998, U.S. EPA determined that additional deep overburden groundwater investigations were required to characterize the deep groundwater off-Site and determine whether Site contaminants were migrating under the Stillwater River toward downgradient groundwater receptors. GM installed and sampled nine deep monitoring wells just east, south, and north of the Stillwater River from 1999 to 2002 under Deep Overburden Investigation Work Plans approved by U.S. EPA. Sample analytical results indicated that a groundwater contaminant plume was migrating south from the Site toward the Stillwater River. Trichloroethene was detected above its maximum contaminant level (MCL) in monitoring well MW-6 located just north of the Stillwater River.

The distribution of contaminants at the Site is summarized below.

- Soil
  - Acetone, methylene chloride, and trichloroethene were reported consistently. Other VOCs were reported occasionally.
  - Various semivolatile organic compounds (SVOC) were reported occasionally.
  - Pesticides and polychlorinated biphenyls (PCB) were reported occasionally.
  - Various inorganics were reported.
- Groundwater
  - The VOCs cis-1,2-dichloroethene; trichloroethene; and vinyl chloride were reported consistently. Other VOCs were reported occasionally.
  - Various SVOCs were reported occasionally.
  - No pesticides or PCBs were reported.
  - Various inorganics were reported.
- Waste
  - Test pits were excavated to define the extent of waste.
  - Screened debris samples were analyzed for toxicity characteristic leaching procedure (TCLP) parameters. GM's analytical results indicated that the debris was non-hazardous, but U.S. EPA's analytical results indicated that hazardous concentrations of vinyl chloride were present in the debris.
- Stillwater River sediment
  - Toluene was reported consistently. Other VOCs were reported occasionally.

- Several SVOCs were reported inconsistently.
- Pesticides were reported occasionally and PCB Aroclor 1221 was reported in three samples (one collected upstream of the Site and two collected adjacent to the Site).
- Various inorganics were reported.

GM evaluated and screened potential response action technologies that meet the following RAOs for the Site specified in the Order:

- Prevention or minimization of the release of hazardous substances so that they do not migrate and cause dangers to present or future public health or welfare or the environment;
- Prevention or abatement of actual or potential exposure of nearby human populations, animals, or the food chain to hazardous substances, pollutants, or contaminants;
- Prevention or abatement of actual or potential contamination of drinking water supplies or sensitive ecosystems;
- Stabilization or elimination of hazardous substances in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release;
- Treatment or elimination of high levels of hazardous substances, pollutants, or contaminants in soils or sediments largely at or near the surface that may migrate;
- Elimination of the threat of fire or explosion; and
- Mitigation or abatement of other situations or factors that may pose threats to public health, public welfare, or the environment.

Also, the response action alternative evaluation process was focused toward the presumptive remedy identified by U.S. EPA as being appropriate for municipal landfill sites. The presumptive remedy includes the following components:

- Caps or covers;
- Leachate/groundwater collection;
- Leachate/groundwater treatment;
- Landfill gas collection and treatment; and
- Institutional controls.

Riverbank stabilization, Site access restriction, and the "no action" scenario were also evaluated. All the components were evaluated with respect to their advantages and disadvantages. The following technologies were selected for incorporation into response action alternatives:

- Caps and covers
  - Current Ohio Solid Waste Cap
  - GCL with 18 inches of soil
  - 2-foot 1 x $10^{-7}$ cm/sec clay cap with frost protection
- Leachate/groundwater collection
  - Extraction wells
- Leachate/groundwater treatment
  - Ex situ Air stripping and discharge to river
  - In situ Ozone sparging
- Landfill gas collection and treatment
  - Passive gas vents with contingency for activated carbon treatment
- River bank stabilization
  - Steel sheet piling and bank restoration
  - Riverbank restoration using Articulated Concrete Mats (ACM), permanent turf reinforcement, and vegetative seeding
- Institutional controls
  - Deed restrictions
  - Groundwater monitoring

Based on its evaluation of response action technologies, GM developed four Site-wide alternatives. The following response action alternatives were developed using technologies that meet RAOs specified in the Order:

- Alternative 1: No action
- Alternative 2: Source Containment with Current Ohio Solid Waste Cap, Riverbank Stabilization, Groundwater Monitoring, and Institutional Controls

- Alternative 3: Source Containment with Impermeable Cap, Sheet Piling along east side and south end of Site, Leachate Extraction and Treatment, Groundwater Monitoring, and Institutional Controls
- Alternative 4: Source Containment with Impermeable Cap, River Bank Stabilization, Source area Groundwater Treatment, Groundwater Monitoring, and Institutional Controls

GM evaluated the four alternatives with respect to three broad criteria including (1) effectiveness, (2) implementability, and (3) cost. Alternative 1, "no action," would not provide overall protection of human health and the environment under current or future land-use scenarios because the risks posed by direct contact with the contaminants at the Site would remain. Trichloroethene concentrations at the Site also currently exceed MCLs, however, the groundwater at the Site is not used for potable drinking water or other purposes. Future groundwater use is expected to be consistent with current groundwater use. Residents in the area utilize City water. In addition, off-Site migration of groundwater contamination, exposed waste, and riverbank erosion would not be addressed.

Under Alternatives 2 through 4, the landfill would be capped. These alternatives would therefore offer similar degrees of protection of human health and the environment from direct contact with the landfill's contents. Each of these alternatives protects human health and the environment by isolating the waste, thus preventing any future direct contact. All of the capping alternatives will result in a removal of existing habitat within the cap footprint, including mature trees, however this should be minimal as the more ecologically valuable trees are located in the riparian zone along the riverbank. Furthermore, improved stormwater management for each of the capping alternatives would result in decreased sediment loading to the Stillwater River during precipitation and snowmelt runoff.

To ensure waste on the eastern margin of the landfill (i.e., the margin adjacent to the Stillwater River) does not erode into the river in the future, engineered controls are included in Alternatives 2 through 4. These erosion controls include Articulated ACM riverbank stabilization in select areas for Alternatives 2 and 4 and sheet piling for Alternative 3. During riverbank stabilization, all existing habitat and the existing aesthetic characteristics of the riverbank would be destroyed during sheet pile wall construction; therefore, habitat restoration to reduce these effects is also a necessary component of Alternative 3. The ACM riverbank stabilization would involve much less destruction of habitat and aesthetic appearance and a portion of that loss would be short term as the articulated blocks allow vegetation other than substantive trees to grow

through the engineered voids. In addition, the ACM approach would only be installed in select areas, which show signs of erosion or bank instability, thus preserving a portion of the riparian zone in those areas where no controls are needed.

Alternatives 2 to 4 address current groundwater contamination and its continued off-Site migration in the future. While all of the caps are roughly equivalent, the Alternative 2 cap would allow marginally less infiltration of precipitation, theoretically allowing less leaching of contaminants from remaining waste. However, any measurable, observable difference resulting from less infiltration under Alternative 2 is anticipated to be inconsequential due to the small volumetric differences between the alternative caps and the prior removal of drummed waste and associated contaminated soil. Furthermore, Alternative 2 does not include leachate/groundwater treatment, which could enhance the existing natural attenuation of current groundwater contamination. A leachate collection and treatment system is included in Alternative 3 and ozone sparging is included in Alternative 4 to reduce concentrations within the Waste Management Boundary (WMB) and allow groundwater outside the WMB to naturally attenuate to levels less than the MCLs within a reasonable period of time. Thus groundwater contamination outside the WMB may remain for a longer period of time under Alternative 2.

Alternatives 2 through 4 all include the same institutional controls necessary to protect human health at the Site during future land use as well as the environment under current and future land-use conditions. These controls will ensure that contact with the waste materials and contaminated groundwater will not occur into the future.

Alternatives 2 through 4 would all meet chemical-, action-, and location-specific applicable or relevant and appropriate requirements (ARARs).

Alternatives 2 through 4 would be equally effective with respect to the caps installed and riverbank stabilization. All of the cap designs are essentially equivalent in long-term effectiveness and permanence in that they will prevent direct contact with the waste, significantly reduce infiltration through the cap and, with periodic maintenance, will maintain effectiveness over time. The bank stabilization measures should similarly achieve long term effectiveness with periodic maintenance.

Alternatives 1 and 2 have no active groundwater treatment, but rely on natural attenuation to reduce off-Site migration of contaminants exceeding MCLs. Once achieved, this natural reduction would be permanent, although the period of time necessary to achieve the reduction will be longer than for Alternatives 3 or 4.

For Alternatives 3 and 4, leachate extraction wells, air stripping and ozone sparging are all reliable, proven technologies that provide permanent protection with regular inspections and maintenance. However, the leachate/groundwater extraction and treatment in Alternative 3 is more passive and long term than the in-situ ozone treatment in Alternative 4, and since the Site is prone to extensive flooding, additional maintenance is expected for Alternative 3 versus Alternative 4 where the groundwater treatment objectives are expected to be met within 2 years. The effectiveness of the ozone sparging technology is dependent on the ability to target the areas where the highest levels of VOCs are present that may migrate off-Site to the south. Ozone sparging is a source treatment technology whereas the leachate extraction wells and air stripping is a groundwater treatment technology. Success of the ozone sparging will eliminate the source in the area that was treated, whereas the leachate/groundwater extraction treatment does not address the source which could result in a longer-term treatment system. Although Alternatives 2 and 4 differ from Alternative 3 with respect to leachate/groundwater treatment, they would have the same long-term effectiveness because if the desired results are not achieved within the reasonable timeframe for Alternatives 2 and 4, GM would propose a contingency plan. GM would evaluate potential modifications to this treatment system and/or research other potential treatment technologies and their cost and present the evaluation to U.S. EPA to determine whether additional treatment activities were warranted based on costs and benefits.

Alternatives 1 and 2 would not reduce the toxicity, mobility, or volume of contaminants through treatment because no treatment is included.

Alternative 4 would provide better reduction of the toxicity, mobility, and volume of contaminated groundwater through treatment than Alternative 3. Ozone sparging proposed in Alternative 4 is a source treatment technology that destroys the source whereas the leachate/groundwater extraction treatment technology proposed in Alternative 3 does not treat the source but only the leachate/groundwater. Both treatments are irreversible, breaking down the products into non-harmful constituents (carbon dioxide and water). Treating the source as opposed to the leachate/groundwater will decrease the amount of residuals after treatment and will reduce the overall treatment timeframe. Alternative 4 is expected to be completed within 2 years reducing the inherent hazards on-Site in a shorter time frame compared to Alternative 3, which is expected to operate for more than 30 years.

All the alternatives except Alternative 1 would pose some degree of short-term risk during their implementation. The significance of the risk would depend on the nature and duration of response action. For example, a field crew might be exposed to

contaminants during remedial activities. In addition, under Alternatives 2 through 4, there would be increased traffic in the community and some destruction of Stillwater River habitat as well.

The short-term risks associated with Alternatives 2 through 4 would be similar with respect to construction of the landfill cap, although there may be somewhat more habitat destruction along the riparian zone in Alternative 2 where the slide slope of the cap terminates. The riverbank stabilization in Alternative 3, involving construction of the sheet pile wall, would be more extensive, involve more risk to worker safety during installation, involve greater potential of riverbank/landfill failure into the river following vegetation removal and prior to sheet pile completion, and more short term habitat destruction than the riverbank stabilization using ACM in Alternatives 2 and 4. Most of the short-term risk to worker health associated with the components of Alternatives 2 through 4 would result from waste consolidation and fugitive dust emissions during construction activities. There might also be some risks to the environment associated with potential discharges of Site soils and waste to the Stillwater River during bank stabilization and grading activities along the riverbank. Engineering practices such as dust suppression techniques and use of silt fencing would be fairly effective in minimizing short-term impacts during construction activities. Alternatives 3 and 4 include leachate/groundwater collection and/or treatment, whereas Alternatives 1 and 2 do not have leachate/groundwater treatment. Thus, the groundwater component of Alternatives 3 and 4 would be more intrusive and labor-intensive and would require more support equipment and on-Site activities.

Alternatives 1 and 2 are estimated to achieve MCLs at the WMB and beyond in approximately 37.5 years (from 1997) based on the calculations for monitored natural attenuation presented in Section 5.2.4, since neither alternative includes groundwater/leachate treatment. With ozone treatment of the source in Alternative 4, the expectation is to achieve MCLs at the WMB and beyond in approximately 33.5 years (from 1997) as detailed in Section 5.2.4. It is estimated that leachate/groundwater extraction treatment in Alternative 3 will be somewhere between 33.5 and 37.5 years to achieve MCLs at the WMB and beyond, since leachate/groundwater extraction treatment is not a source treatment but does treat leachate/groundwater.

Alternative 1 would require no technical implementation and would therefore be the easiest alternative to implement. Alternatives 2 through 4 all include proven technologies that have been used at numerous sites. Alternatives 2 through 4 all include a cap and riverbank stabilization. The caps in Alternatives 2 through 4 are roughly similar to implement, although the transition at the edge of the cap for the Alternative 2 cap could be somewhat challenging due to the blending of a think cap into existing

grades. The sheet pile wall in Alternative 3 would be the most difficult and labor intensive riverbank stabilization component to implement. Implementing the work without slope failure or accidental discharge to of soil into the Stillwater River may be difficult.

The ability to technically implement Alternatives 4 is easier than Alternative 3 with respect to leachate/groundwater collection and/or treatment. Since the Site is within the floodplain of the Stillwater River, which inundates the Site on average once every 2 years, the potential for flooding of the systems required for leachate/groundwater extraction and treatment system proposed in Alternative 3 is greater than the ozone sparging system proposed in Alternative 4 because of the length of treatment (2 years for ozone treatment and 30 plus years for leachate/groundwater extraction and treatment). The leachate extraction system and air stripper would also require regular long-term inspection and maintenance. Iron fouling of the air stripper is a common technical challenge in treating anoxic landfill leachate and groundwater. The ozone sparging system included in Alternative 4 would require regular inspection and maintenance, but for a much shorter time period and with few anticipated complications. The effectiveness of the ozone sparging is related to the ability to adequately disperse the ozone into the effected areas of the aquifer. Therefore, a pre-design assessment of groundwater conditions will be implemented. Alternatives 1 and 2 do not provide for groundwater treatment.

The ability to monitor the effectiveness of the leachate containment system in Alternative 3 would be limited to a degree by the presence of the Stillwater River immediately downgradient of the Site. Because monitoring wells could not be installed immediately downgradient of the sheet pile wall, the effectiveness of the containment system would be indirectly evaluated by monitoring the water levels in the extraction wells to ensure that they are lower than the level of the Stillwater River. The effectiveness of leachate treatment would be evaluated by sampling air stripper influent and effluent. The effectiveness of the ozone sparging would be evaluated by the collection of samples from the monitoring wells installed downgradient of the ozone treatment. The effectiveness of the cap and of riverbank stabilization would be evaluated by direct observation during inspections. Groundwater monitoring would be critical for evaluating the effectiveness of groundwater remediation south of the landfill. Under Alternative 3, groundwater monitoring would be used to verify the groundwater extraction system's capture zones and to evaluate the changes in VOC concentrations over time. Under Alternative 4 groundwater monitoring would be used to evaluate the effectiveness of ozone sparging and to determine whether it is necessary to initiate contingent groundwater extraction.

Alternative 1 would be relatively easy to implement administratively because no active work is required. Alternatives 2 through 4 include riverbank stabilization components, and although no permits are required it would be necessary to coordinate activities along the riverbank with state agencies such as OEPA and Ohio Department of Natural Resources (ODNR), Miami Conservancy District (MCD), as well as with the U.S. Army Corps of Engineers. The sheet pile wall in Alternative 3 would provide the most administrative challenges because it would be removing both floodway and floodplain storage from the watershed. Alternatives 2 through 4 include the same institutional controls (access and deed restrictions); thus, they would have the same administrative implementability in that regard. Alternative 2 through 4 also include additional investigation, which includes construction of monitoring wells within the neighbor's farmland. The neighbor must be notified of the locations of the monitoring wells within his field to ensure their safety.

The present-worth costs for the alternatives, from highest to lowest, are as follows: (1) Alternative 3 at **$16,453,691**; (2) Alternative 2 at **$6,506,965**; (3) Alternative 4 at **$5,578,621**.-

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## ACRONYMS, ABBREVIATIONS, AND SYMBOLS

| | |
|---|---|
| µg/kg | Microgram per kilogram |
| µg/L | Micrograms per liter |
| ACM | Articulated Concrete Mat |
| AMSL | Above mean sea level |
| ARAR | Applicable or relevant and appropriate requirement |
| ASTM | American Society for Testing and Materials |
| bgs | Below ground surface |
| CAA | Clean Air Act |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act of 1980 |
| CFR | Code of Federal Regulations |
| cm/sec | Centimeter per second |
| COC | Chemicals of Concern |
| CPVC | Chlorinated Polyvinyl Chloride |
| CRA | Conestoga-Rovers & Associates |
| CWA | Clean Water Act |
| EE/CA | Engineering Evaluation and Cost Analysis |
| FEMA | Federal Emergency Management Agency |
| FIT | Field Investigation Team |
| FML | Flexible Membrane Liner |
| GAC | Granular activated carbon |
| GCL | Geosynthetic Clay Liner |
| GM | General Motors Corporation |
| gpm | Gallon per minute |
| HDPE | High-density polyethylene |
| LTTD | Low-temperature thermal desorption |
| MCD | Miami Conservancy District |
| MCL | Maximum contaminant level |
| mg/kg | Milligram per kilogram |
| mg/L | Milligram per liter |
| NCP | National Oil and Hazardous Substances Pollution |
| NOD | Natural Oxygen Demand |

## ACRONYMS, ABBREVIATIONS, AND SYMBOLS

| | |
|---|---|
| O&M | Operation and maintenance |
| OAC | Ohio Administrative Code |
| ODNR | Ohio Department of Natural Resources |
| OEPA | Ohio Environmental Protection Agency |
| ORC | Ohio Revised Code |
| Order | Administrative Order V-W-195-C-296 |
| OSC | On-scene coordinator |
| OSHA | Occupational Safety and Health Act |
| PAH | Polynuclear aromatic hydrocarbon |
| PCB | Polychlorinated biphenyl |
| PID | Photoionization detector |
| POTW | Publicly owned treatment works |
| ppm | Part per million |
| PRC | PRC Environmental Management, Inc. |
| PRSC | Post removal site control |
| psi | pounds per square inch |
| PVC | Polyvinyl chloride |
| QAPP | Quality assurance project plan |
| QC | Quality control |
| RAO | Response action objective |
| RCRA | Resource Conservation and Recovery Act |
| RPM | Remedial project manager |
| SARA | Superfund Amendments and Reauthorization Act of 1986 |
| SOW | Scope of work |
| SRE | Streamlined risk evaluation |
| START | Superfund Technical Assessment and Response Team |
| SVOC | Semivolatile organic compound |
| TAL | Target analyte list |
| TAT | Technical Assistance Team |
| TBC | To be considered |
| TCE | Trichloroethene |
| TCL | Target compound list |
| TCLP | Toxicity characteristic leaching procedure |

## ACRONYMS, ABBREVIATIONS, AND SYMBOLS

| | |
|---|---|
| Tetra Tech | Tetra Tech EM Inc. |
| U.S. DOI | U.S. Department of the Interior |
| U.S. EPA | U.S. Environmental Protection Agency |
| UAO | Unilateral Administrative Order |
| USC | *U.S. Code* |
| VOC | Volatile organic compound |
| WMB | Waste Management Boundary |

## 1.0 INTRODUCTION

General Motors Corporation (GM) has prepared this Revised Engineering Evaluation and Cost Analysis (EE/CA) Report (Report) for the Garland Road Landfill Site (Site) in West Milton, Miami County, Ohio, in accordance with the requirements of Administrative Order V-W-'95-C-296 (Order).

Since 1991, various environmental investigations and removal actions have been conducted at the Site. GM, the participating respondent for the Site, tasked Conestoga-Rovers & Associates (CRA) to prepare and implement an EE/CA Work Plan for the Site pursuant to the requirements of the Order, which was entered into by GM and U.S. Environmental Protection Agency (U.S. EPA) on June 7, 1995. CRA conducted EE/CA investigation activities and submitted an EE/CA Report to U.S. EPA in May 1998. U.S. EPA rejected the EE/CA Report and determined that additional deep overburden groundwater investigations were required to characterize the deep groundwater downgradient of the Site and determine whether Site contaminants were migrating under the Stillwater River toward downgradient groundwater receptors. GM completed Deep Overburden Groundwater Investigation activities from 1999 to 2002 in accordance with EPA approved Deep Overburden Groundwater Work Plan dated August 1999.

U.S. EPA tasked the Tetra Tech EM Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) to use the data collected during the Deep Overburden Groundwater Investigation activities to revise the EE/CA Report in accordance with the Scope of Work (SOW) in Attachment 1 of the Order. Also, U.S. EPA directed START to streamline the EE/CA Report by focusing on a limited range of practical alternatives that meet the Response Action Objectives (RAO) defined in the Order. The EE/CA prepared by START was submitted as a draft to U.S. EPA on December 16, 2002, however, U.S. EPA did not complete a full review.

U.S. EPA and GM have continued to discuss acceptable components and alternatives. Additional data has been collected and evaluated to support the discussion. This Report has been prepared in accordance with discussions with U.S. EPA and applicable U.S. EPA guidance.

The purpose and organization of this Report are discussed below.

## 1.1 STATEMENT OF PURPOSE

The purpose of this Report is to document the Revised EE/CA for the Garland Road Landfill Site by:

- Presenting removal action investigation results;
- Presenting Site characterization data collected in accordance with the EE/CA Work Plan and Deep Overburden Groundwater Investigation Work Plan;
- Incorporating the results of the U.S. EPA Site-specific streamlined risk evaluation (SRE);
- Identifying the response action scope, goals, and objectives;
- Identifying potentially applicable response action technologies;
- Screening and evaluating response action technologies;
- Assembling response action alternatives potentially applicable to the Site; and
- Presenting a detailed comparative analysis of the assembled alternatives.

## 1.2 REPORT ORGANIZATION

This Report consists of an executive summary and seven sections:

Section 1.0 Introduction.

Section 2.0 Site Characterization - presents a Site characterization based on the Removal Action Investigation, the EE/CA Investigation, Deep Overburden Groundwater Investigation, 2003 Ohio Environmental Protection Agency (OEPA) Expanded Site Investigation, and the SRE.

Section 3.0 Identification of RAOs - discusses the RAOs, the response scope and schedule, applicable or relevant and appropriate requirements (ARAR), and planned response activities.

Section 4.0 Identification of Response Action Technologies - describes potential response action technologies and summarizes preferred technologies used to develop response action alternatives.

Section 5.0 Description and Evaluation of Response Action Alternatives - describes and evaluates the response action alternatives.

Section 6.0 Comparative Evaluation of Response Action Alternatives - provides a comparative analysis of the alternatives based on their effectiveness, implementability, and cost.

Section 7.0 References - identifies references used to prepare this Revised EE/CA Report.

## 2.0 SITE CHARACTERIZATION

This section presents an overview of the current conditions at the Site. The overview is based on information collected during the Removal Action Investigation, the EE/CA Investigation, the Deep Overburden Groundwater Investigation, 2003 OEPA Expanded Site Investigation, and the SRE. Site description, background information, previous Site investigations, removal actions, chemical distribution at the Site, and the conclusions of the U.S. EPA SRE are also discussed.

### 2.1 SITE DESCRIPTION AND BACKGROUND

This section discusses the Site location and physical setting; present and past Site operations; the Site geology, hydrogeology, and hydrology; the surrounding land use and populations; sensitive ecosystems and sensitive and endangered species; and meteorology.

#### 2.1.1 SITE LOCATION AND PHYSICAL SETTING

The Site is located northwest of Dayton in West Milton, Miami County, Ohio. The Site covers approximately 24 acres and is located in a rural agricultural and residential area. The Site is bordered on the north by Frederick Garland Road, on the east by the Stillwater River, and on the south and west by farm fields. The Site location is presented on Figure 2.1 and the Site plan is presented on Figure 2.2.

The current local land use is primarily agricultural. The community nearest the Site is West Milton, which has a population of approximately 4,645. The population residing within 10 miles of the Site totals approximately 100,000.

The nearest community downstream of the Site is the City of Union. GM has had several discussions with Mr. John Applegate, (City Manager for the City of Union) regarding water demands of the City of Union. In the discussion with Mr. Applegate on December 12, 2005, he provided the following information on the two existing City of Union well fields:

- Well Field 1 - Consists of three wells south of Martindale Road (approximately 12,000 feet south of the Site). Each well has a normal pumping rate of 400 to 600 gallons per minute (gpm). The wells are screened from 80 to 120 feet below ground surface (bgs).

- Well Field 2 - Consists of one existing well and one proposed well north of Martindale Road (approximately 10,000 feet south of the Site). The existing well (300 feet North of Martindale) has a normal pumping rate of 400 to 600 gpm. The well is screened at 80 feet bgs. The proposed well (300 feet North of existing well) tested to 80 feet bgs at 900 gpm for 24 hours, and there was no drawdown at the existing well 300 feet to the south.

It is important to note that the City of Union indicated that they currently have no plans to install new wells further to the north in the foreseeable future. Residences located near the Site are currently supplied with City water. During a discussion with Mr. Applegate on December 21, 2005, he stated that currently there is no Master Plan for the City of Union. The Master Plan is expected to be completed sometime in 2007. Mr. Applegate did mention that he did not foresee the need for expansion of the well field based on current growth numbers.

Per Ohio Department of National Resources (ODNR) groundwater resources of Miami County, the Site is identified as an area of "Clayey till overlying non-waterbearing Ordovician shaly limestone bedrock (yields less than 2 gpm). "This unit extends more than 4,000 feet south of the Site. The Union Well Field is located in the "Thick Permeable Deposits of Sand and Gravel (may yield as much as 500 gpm)." The northern extent of this unit is more than 4,000 feet south of the Site.

The City of Union well fields are not expected to draw water from the Site due the extensive distance away from the Site and the significantly different geologic units (e.g., silty sands) in the area of Garland Road compared to the area closer to the wellfield (e.g., sands and gravels).

The Site lies on the western bank of the Stillwater River, within the annual and 10-year flood plains based on Federal Emergency Management Agency (FEMA) flood mapping. The Stillwater River is a State Scenic River used for canoeing and fishing. Ponds of standing water, possibly perched, are seasonally present in southern areas of the Site. These ponds are located above the level of the river. Precipitation may run off the Site to the river or infiltrate into subsurface soils.

The surface materials at the Site consist of soils and waste materials. Most of the surface soils are covered with relatively heavy vegetation, including trees, shrubs, and grass. In general, the stratigraphic units encountered at the Site are as follows:

1. fill/waste unit (not present across the entire Site);

2. till unit (not present across the entire Site);
3. sand/gravel unit; and
4. limestone bedrock.

A gravel road runs southward across the Site from its entrance point off Fredrick Garland Road to the southernmost point of the Site. Another gravel road runs adjacent to the western fenceline in the northern half of the Site and through the middle of the Site in the southern half. Access to the Site is restricted by a security fence that encloses the Site except for a steeply sloped area along the Stillwater River. Site entry is controlled at three locked gates, one at the northern and two at the southern fence lines

### 2.1.2 PAST AND PRESENT SITE OPERATIONS

The Site was operated as a landfill between the early 1960s and 1970 and was used for disposal of domestic, commercial, and industrial wastes. The landfill has been inactive since the early 1970s.

Attention was drawn to the Site in March 1991 when a Site inspection was conducted by the OEPA. A number of environmental investigations were subsequently completed at the Site by U.S. EPA, OEPA, and GM. On June 7, 1995, U.S. EPA and GM entered into the Order requiring completion of an EE/CA for the Site.

### 2.1.3 SITE GEOLOGY, HYDROGEOLOGY, AND HYDROLOGY

The Site geology, hydrogeology, and hydrology are described below.

#### 2.1.3.1 SITE GEOLOGY

The Site's geology and hydrogeology have been defined by installing 18 monitoring wells (S-1 through S-6, D-1 through D-3, and MW-1 through MW-9), advancing 14 soil borings (SB-1 through SB-8 and BH1-99 through BH6-00), advancing six slope stability borings (SLOPE-01 through SLOPE-06) at or near the Site, and completing a Seismic Refraction Survey at the Site and to the south and west of the Site. Four soil borings (B1 through B4) were also previously advanced by others north of the Site during a bridge foundation investigation. Well logs obtained from the ODNR Division of Water for residential wells RW-424 and RW-425 were also useful in defining the geology in the Site vicinity. In addition, two staff gauges were installed in the Stillwater River in 1995, one

north and upstream of the Site and one south and downstream of the Site. These staff gauges were destroyed during the winter of 1995 to 1996. Three new staff gauges were installed in the Stillwater River in 1999 as part of Deep Overburden Groundwater Investigation activities, one north and upstream of the Site, one just east of the Site, and one south and downstream of the Site. Over time, these staff gauges were destroyed by weather and/or river flow conditions. Three new staff gauges were recently installed in the Stillwater River in March 2006, two north and upstream of the Site on the bridge abutment and one east of the Site, approximately 1,700 feet south of the bridge. Monitoring wells MW-1 through MW-9 were also installed as part of the Deep Overburden Groundwater Investigation activities. Monitoring well, staff gauge, and soil boring locations are presented on Figure 2.3. Stratigraphic and completion details for monitoring well and boring logs are presented in Appendix A.

As indicated in Section 2.1.1, three major overburden stratigraphic units have been identified at the Site. They are the fill/waste unit, the till unit, and the sand/gravel unit. The distributions of these geologic units have been illustrated on two cross-sections. The cross-sections are based on soil boring and geophysical data collected during the Removal Action Investigation, EE/CA Investigation, and Deep Overburden Groundwater Investigation activities. The cross-section locations are presented on Figure 2.4. Figures 2.5, and 2.6 present the cross-sections depicting Site stratigraphy.

The uppermost unit over most of the Site is the fill/waste unit. This unit is not present across the entire Site, as presented on Figure 2.5. At the southern end of the Site, the sand/gravel unit occurs at the ground surface. The fill/waste unit has a maximum thickness of approximately 30 feet. In the central portion of the Site, the till unit occurs beneath the fill/waste unit. The till unit is lenticular in nature and therefore is not continuous across the Site. This unit has a maximum thickness of approximately 15 feet.

The sand/gravel unit is present across the entire Site and directly overlies the bedrock surface. This unit has a thickness of approximately 20 feet within the Site boundary and gradually increases in thickness (to a maximum of 50 feet) near the Stillwater River. In some places, the sand/gravel unit is the uppermost overburden unit (for example, at the southern end of the Site and beyond). In the central portion of the Site, this unit is overlain by the till unit. In other places, the fill/waste unit directly overlies the sand/gravel unit. Bridge foundation borings B1 through B4 and residential wells RW-424 and RW-425 indicate that the sand/gravel unit in the northern portion of the Site extends beneath the Stillwater River to the east. This sand/gravel unit slopes steeply upward, following the bedrock slope, and decreases in thickness as it extends to the east.

The limestone bedrock is encountered at depths ranging from about 8 to 80 feet bgs at the Site. The bridge borings lying north of the Site and residential wells RW-424 and RW-425 indicate considerable bedrock relief. A seismic refraction survey conducted as part of the Deep Overburden Groundwater Investigation in March and April 1999 confirmed that the limestone bedrock is present at elevations ranging from approximately 725 to 800 feet above mean sea level (AMSL). According to the survey, the bedrock elevation drops to 725 feet AMSL nearer to the Stillwater River.

#### 2.1.3.2 SITE HYDROGEOLOGY

A total of 18 monitoring wells (S-1 through S-6, D-1 through D-3, and MW-1 through MW-9) have been installed at or near the Site. Monitoring well S-3 was installed in the fill/waste unit; wells S-1, S-2, S-4, S-5, and S-6 were installed in the sand/gravel unit; well MW-7 was installed in the sand and gravel immediately above the clay till unit (bedrock is present below till); and wells D-1, D-2, D-3, MW-1 through MW-6, MW-8, and MW-9 were installed in the deep sand/gravel unit immediately above the bedrock. Groundwater levels were measured in available monitoring wells in July 1995, August 1995, August 1996, September 1997, September 1999, August 2000, June 2001, June 2002, and March 2006. Shallow and deep groundwater contours are presented in Appendix B. Single-well response tests were performed, and results are presented in Appendix C.

Groundwater contours for data collected on March 31, 2006 for the shallow overburden are presented on Figure 2.7. Based on the existing monitoring well network the groundwater flow direction in the shallow overburden in the northern part of the Site appears to be eastward toward the Stillwater River. Although unlikely, it is possible in this portion of the Site that there is some southerly component of groundwater flow in the shallow overburden. The groundwater flow direction in the shallow overburden in the southern part of the Site is to the south-southeast. Based on the March 2006 groundwater level measurements, the horizontal gradient in the shallow overburden ranges from 0.006 in the north to 0.011 in the south.

The following uncertainties or data gaps have been identified:

- Potential presence of bedrock between 725 and 740 feet AMSL south of the Site;
- Possibility that a portion of the deep groundwater may flow under the Stillwater River;

- Possibility that groundwater flows in a southerly direction within the Waste Management Boundary (WMB);
- Refinement of fate and transport analysis; and
- Need for groundwater quality compliance wells outside the WMB.

Additional groundwater investigation tasks are outlined in section 5.2.2 to address several of these uncertainties/data gaps.

The bedrock surface is encountered at elevations ranging from 750 to 780 feet AMSL. In March 2006, groundwater was encountered in the deep overburden immediately above the bedrock (that is, at monitoring wells D-1, D-2, D-3) at elevations ranging from 798.57 to 799.24 feet AMSL.

The groundwater elevations from 1995, 1996, 1997, 1999, 2000, 2001, 2002, and 2006 are presented in Table 2.1 and indicate that the groundwater levels in the shallow and deep wells in each well nest have been similar. Although there is a downward hydraulic gradient at well nest S-3/D-1, well S-3 is installed in the fill/waste unit, which is separated from the sand/gravel unit by the till unit at this location. The vertical hydraulic gradient at well nest S-4/D-2 is upward and had a value of 0.13 on March 31, 2006. There was no vertical hydraulic gradient at well nest S-6/D-3 on March 31, 2006.

No consistent downward hydraulic gradient exists in the sand/gravel unit. The impact of the deep overburden on the bedrock aquifer is unknown. However, regional hydrogeologic information obtained from ODNR indicates that the Site overlies a "non-water bearing ordovician shaly limestone bedrock" and that "meager supplies are developed".

A strong hydraulic connection between the Stillwater River and shallow overburden groundwater at the Site is indicated by the water table's response to changes in the river level. During drum excavation activities, the water table in an open excavation at the river level responded to an increase in the Stillwater River water level by producing rapid seepage into the open excavation. The strong hydraulic connection with the shallow overburden suggests that at least a portion of the groundwater flow discharges to the Stillwater River. Most deep overburden groundwater probably discharges to the Stillwater River, but there is a predominantly southern flow component that allows contaminated groundwater to migrate at least a limited distance from the Site.

### 2.1.3.3 SITE HYDROLOGY

The Stillwater River flows from north to south along the eastern boundary of the Site. The river channel's width ranges from approximately 100 to 200 feet, as shown on Figure 2.3. After flowing about 0.5 mile past the Site, the river meanders and flows from east to west for approximately 0.25 mile. Southwest of the Site, the river meanders again and flows to the south. The Site lies in the river's floodplain.

Other than some low lying areas within the southern-most portion of the Site, surface water runoff generally flows to the east towards the Stillwater River. An intermittent stream adjacent to but outside the southwestern corner of the Site flows south and enters the river approximately 1,000 feet south of the Site. Surface waters that do not flow directly off-Site are believed to infiltrate into the upper water table flow regime. Groundwater in this regime flows toward and discharges to the Stillwater River or migrates downward into the deep overburden groundwater.

### 2.1.4 SURROUNDING LAND USE AND POPULATIONS

The current land use around the Site is primarily agricultural. The nearest community is West Milton, which lies approximately 1 mile north of the Site. The available population estimates for communities within 10 miles of the Site in 2000 are summarized below.

| *Community* | *Population* |
|---|---|
| Arlington | 1,351 |
| Brookville | 5,289 |
| Clayton | 13,347 |
| Englewood | 12,235 |
| Laura | 487 |
| Ludlow Falls | 210 |
| Nashville | 172 |
| Phillipsburg | 628 |
| Pittsburg | 392 |
| Pleasant Hill | 1,134 |
| Potsdam | 203 |
| Tipp City | 9,221 |
| Troy | 21,999 |
| Union | 5,574 |
| Vandalia | 14,603 |
| Verona | 430 |
| West Milton | 4,645 |

An additional 10 communities are present within 10 miles of the Site for which population estimates are not available. Based on the assumption that a total of approximately 10,000 additional persons reside in these communities, the population of the area within 10 miles of the Site is approximately 100,000 (U.S. Census Bureau 2002).

### 2.1.5 SENSITIVE ECOSYSTEMS AND SENSITIVE AND ENDANGERED SPECIES

The Site lies on the west bank of the Stillwater River, a State Scenic River. A portion of the Site along the riverbank is a potential foraging habitat for the Indiana bat, which is an endangered species. However, the more critical roosting habitat is not present at the Site. The U.S. Department of the Interior (U.S. DOI) approved drum removal along the river-bank. Wetlands are present in the southeastern and southern parts of the Site. ODNR and U.S. DOI letters regarding ecological habitat of the Site are included in Appendix D.

### 2.1.6 METEOROLOGY

Meteorological conditions near the Site are monitored by the following weather stations:

| *Station* | *Distance from Site* |
|---|---|
| Bellefontaine | 40 miles northeast |
| Dayton | 14 miles southeast |
| Greenville | 20 miles northwest |
| London | 46 miles east |
| Marysville | 54 miles northeast |
| Urbana | 31 miles northeast |
| Wilmington | 43 miles southeast |
| Xenia | 27 miles southeast |

The average annual precipitation in the vicinity of the Site is 40 inches, and winds are generally from the south to southwest at an average velocity of 10 miles per hour.

## 2.2 PREVIOUS SITE INVESTIGATIONS AND REMOVAL ACTIONS

This section summarizes environmental investigations and removal actions completed at the Site from 1991 to 2003. Soil, waste, groundwater, and sediment sampling and analysis have been conducted by or for OEPA, U.S. EPA, and GM. Summaries of

sampling, investigation, and Removal Actions conducted at the Site are presented below. The analytical results are presented in Appendixes E, F, and G.

### 2.2.1 OEPA SAMPLING

In March 1991, OEPA conducted an inspection of the Site. OEPA returned to the Site in July 1992 in order to conduct container and soil sampling. Four waste samples from containers and four soil samples were collected by OEPA and analyzed by Betz Analytical Services. Figure 2.8 presents the locations of the samples collected in July 1992. Volatile organic compounds (VOCs) were reported in container samples DRM001, DRM002, and DRM003 and in soil samples S001, S002, and S003. Semi-volatile organic compounds (SVOCs) were reported in container samples DRM001, DRM002, and DRM003 and in soil samples S001 and S003. Pesticides were reported in container samples DRM001, DRM002, and DRM003 and in soil samples S001, S002, and S003. Polychlorinated biphenyls (PCB) were reported in soil sample S003. Various inorganics were reported in all the container and soil samples. Analytical results for the samples collected on July 1992 are presented in Appendix E.

### 2.2.2 U.S. EPA SAMPLING

On January 28, 1993, U.S. EPA performed a Site assessment. U.S. EPA returned on March 23, 1993, with the Technical Assistance Team (TAT) to conduct container and soil sampling. Five container samples (A, E, G, J-top, and J-bottom) and seven soil samples (B, C, D, F, H, I, and K) were collected in the northern, eastern, and southern parts of the Site. Figure 2.9 presents the locations of samples collected in March 1993. VOCs were reported in samples A, B, F, G, J, and K. SVOCs were reported in sample J. Pesticides were reported in samples H and I. PCBs were reported in samples A and J. Inorganics were reported in all samples except E, which was not analyzed for inorganics. Analytical results for the soil samples collected on March 23, 1993 are presented in Appendix E.

On April 7, 1993, additional sampling was conducted at the Site on behalf of the U.S. EPA by a Field Investigation Team (FIT) from PRC Environmental Management, Inc. (PRC). FIT collected one groundwater sample from a residential well north of the Site, four sediment samples (SD-01 through SD-04) from the Stillwater River, four soil samples (SS-01 through SS-04) from the southern part of the Site, and two background soil samples (SS-05 and SS-06) northwest of the Site. Figure 2.10 and Figure 2.11 present the on-Site and off-Site locations, respectively, for samples collected in April 1993.

The residential well sample was analyzed for inorganics to identify background concentrations. The sediment samples were analyzed for SVOCs and inorganics. SVOCs were reported in sediment samples SD-01 and SD-04, but the SVOC concentrations were qualified as estimated. Inorganics were identified in sediment samples SD-01 through SD-03 at concentrations comparable to those present in background sediment sample SD-04. The soil samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and inorganics. VOCs were reported in all the soil samples except SS-05 and SS-06, the background soil samples. SVOCs were reported in all the soil samples except SS-01 and SS-06. Pesticides were reported in all the soil samples except SS-05. The pesticide analytical results in samples SS-02 through SS-04 were qualified as estimated or unconfirmed. Inorganics were reported in all the soil samples. Chromium, copper, lead, magnesium, and nickel concentrations were an order of magnitude higher in samples SS-01 through SS-03 than in background samples SS-05 and SS-06. Inorganic results for sample SS-04 were generally higher than the background sample results but lower than the results from samples SS-01 through SS-03. Analytical results for the soil, groundwater, and sediment samples collected on April 7, 1993 are presented in Appendices E, F, and G, respectively.

### 2.2.3 U.S. DOI INVESTIGATION

The Site is located in an area of potential habitat for the Indiana bat, an endangered species. At the direction of U.S. DOI, a biologist specializing in endangered species reviewed the Site on July 20, 1995, to identify Indiana bat habitat. The only potential habitat area was identified adjacent to a small island in the middle of the Stillwater River. This area was further evaluated using a habitat suitability index model applied by 3D Environmental Services in a report dated August 11, 1995. The area was found to provide foraging habitat but no roosting habitat. As roosting habitat is more critical, U.S. DOI agreed that drum removal could proceed along the riverbank. The U.S. DOI-approval letter is presented in Appendix D.

### 2.2.4 REMOVAL ACTIONS

On November 8, 1993, U.S. EPA issued GM a Unilateral Administrative Order (UAO) pursuant to Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended (CERCLA), 42 *U.S. Code (USC)* §9606(a) to complete Removal Action activities at the Site. GM submitted a Removal

Action Work Plan that was approved by U.S. EPA on September 19, 1994, and a Riverbank Drum Removal Work Plan that was approved by U.S. EPA in August 1995.

Between September 1994 and June 1996, drum removal activities were conducted at the Site. The drum removal activities included:

- investigation of buried drum location by means of test pit excavations;
- drum excavation and inspection;
- drum sampling;
- drum over-packing and staging;
- waste consolidation; and
- drum transport and disposal.

A total of 8,830 surface and subsurface drums containing waste and 286 drums containing quartz were removed from the Site. An additional 240 drums of waste that had been released from damaged drums during inspection and over-packing were also removed.

Between September 1994 and September 1997, soil excavation and treatment activities were conducted at the Site. The soil excavation and treatment activities included:

- soil screening;
- excavation and staging of impacted soil;
- off-Site disposal of selected impacted soils;
- low-temperature thermal desorption (LTTD) treatment of impacted soil;
- regrading of residuals; and
- placement of soil cover over residuals.

Approximately 14,700 tons of impacted soil were treated and remain on Site. Debris screened from the soil and asbestos-containing material also remain on Site beneath a graded soil cover. The location of these materials is presented on Figure 2.12. The Removal Action activities completed by GM cost approximately $7 million.

## 2.3 SUMMARY OF SITE CHEMICAL DISTRIBUTION

This section summarizes the distribution of chemicals at the Site based on removal action, EE/CA, Deep Overburden Groundwater Investigation sampling, and 2003 OEPA sampling.

### 2.3.1 REMOVAL ACTION SAMPLING

This section summarizes the soil, waste, and groundwater sampling conducted during the Removal Actions at the Site. Figure 2.13 presents the removal action sample locations.

#### 2.3.1.1 SOIL SAMPLING

Following the surficial container removal, a study of the extent of soil contamination was conducted in areas where groups of containers were removed and at locations selected in conjunction with the U.S. EPA on-scene coordinator (OSC) or remedial project manager (RPM). The purpose of this study was to characterize residual soils and to determine whether additional removal activities were necessary to protect human health and the environment. As shown on Figure 2.5, the fill/waste unit has a maximum thickness of 30 feet and a maximum north-south extent of 2,200 feet. This unit's east-west extent was assumed to be equal to the Site extent of 250 to 400 feet. Therefore, using an average fill/waste unit depth of 20 feet; an east-west dimension of 350 feet; and a north-south extent of 2,200 feet, the volume of fill/waste was estimated to be approximately 570,000 cubic yards. Soil boring locations were selected based on observations made during the container removal activities and were focused in the areas most likely to have been impacted by container disposal.

A total of 15 soil borings were completed at the Site as part of Removal Action activities (SB-1 through SB-8, S-1 through S-5, D-1, and D-2). Soil boring locations are presented on Figure 2.3. All augured boreholes were drilled using hollow-stem augers. Soil samples were collected on a continuous basis using a split-spoon sampler in accordance with American Society for Testing and Materials (ASTM) standard penetration test Method D1586-84.

Soil samples were collected from multiple intervals (0 to 12 inches bgs, 12 to 36 inches bgs, 36 to 60 inches bgs, 60 to 84 inches bgs, and every other 24-inch interval to the boring termination depth) at each soil boring. Samples were selected for chemical

analysis based on visual evidence, photoionization detection (PID) readings, and field screening data. A total of 25 soil samples (excluding duplicate samples) were collected in July 1995 for chemical analysis for target compound list (TCL) VOCs, TCL SVOCs, TCL pesticides and PCBs, and target analyte list (TAL) inorganics.

Acetone, methyl chloride, and trichloroethene were the only VOCs reported consistently in soil samples collected at the Site. Acetone concentrations ranged from non-detect (<10 micrograms per kilogram [µg/kg]) to 125,000 µg/kg in boring S-4 (0 to 1 foot bgs). Methyl chloride concentrations ranged from non-detect (<5 µg/kg) to 40 µg/kg in boring SB-1 (0 to 1 foot bgs), and trichloroethene concentrations ranged from non-detect (<5 µg/kg) to 12,300 µg/kg in boring SB-7 (5 to 7 feet bgs). Additionally, 2-butanone methylethyl ketone; chlorobenzene; chloroform; 1,2-dichlorobenzene; 1,4-dichlorobenzene; 1,2-dichloroethane; 1,2-dichloroethene (cis and trans); naphthalene; tetrachloroethene; toluene; 1,1,1-trichloroethane; trichloroethene; and xylenes were reported to be present in the soil samples. SVOCs were reported at low concentrations in all borings except SB-8 (5 to 7 feet bgs). The most frequently reported SVOCs were polyaromatic hydrocarbons (PAH) at borings SB-1 (0 to 1 foot bgs), SB-5 (0 to 1 foot bgs), SB-7 (5 to 7 feet bgs), and S-5 (3 to 5 feet bgs). The only pesticide or PCB reported consistently was Aroclor 1254, which was reported in nine samples at concentrations ranging from 0.11 to 5.0 milligram per kilogram (mg/kg). Several inorganics were reported in all the soil samples. Some inorganic concentrations exceeded the calibration range of the laboratory instruments and are qualified as estimated. Analytical results for the soil samples collected in July 1995 are presented in Appendix E.

#### 2.3.1.2 WASTE SAMPLING

The presence of buried drums was investigated by completing 57 test pits in the main portion of the Site and four test pits along the riverbank. The test pits were visually inspected for signs of buried drums and were screened for VOCs with a PID. Soils with an organic vapor content greater than 50 parts per million (ppm) were considered to be impacted and were treated accordingly. Most of the test pits yielded buried debris and drums that were subsequently removed during removal action activities. An additional nine test pits (TPA through TPI) were excavated to further define the southern extent of waste at the Site and the limits of the landfill. Figure 2.13 presents the locations of the testing pits. Test-pit logs are included in Appendix A.

Prior to soil treatment by LTTD, 1,000 to 1,500 cubic yards of debris was screened from the soils. The debris was sampled and analyzed separately by GM and U.S. EPA. The toxicity characteristic leaching procedure (TCLP) results for vinyl chloride for the GM

samples collected from the material in the P-9 area were 0.15 and <0.01 milligrams per liter (mg/L). GM's samples were collected, analyzed, and validated in accordance with the U.S. EPA-approved Quality Assurance Project Plan (QAPP). GM's sample analytical results were provided to U.S. EPA. U.S. EPA's sample analytical results were received after GM's data had already been used to confirm that the debris was non-hazardous. However, U.S. EPA's data indicated that four of the five debris samples contained vinyl chloride concentrations ranging from non-detect to 0.58 mg/L and trichloroethene concentrations ranging from non-detect to 0.090 mg/L. These results indicate that the debris is hazardous waste (waste code D043 for vinyl chloride).

#### 2.3.1.3 GROUNDWATER SAMPLING

Shallow groundwater flow at the Site is toward the river under non-flood conditions. During flood conditions as river levels rise, there may be temporary reversals of the groundwater flow direction. Monitoring well locations were selected by or in conjunction with U.S. EPA and locations are presented on Figure 2.13. A total of seven groundwater monitoring wells were installed (S-1 through S-5, D-1, and D-2) during removal action activities. Five wells (S-1 through S-5) were shallow and were installed to the water table, and two wells (D-1 and D-2) were deeper and were installed above the bedrock. All the wells were appropriately developed, and there was no indication of grout permeation of the sand packs or screens. One of the shallow wells (S-1) was installed at a location expected to be upgradient of the surficial drum areas. The remaining six wells were installed at locations expected to be downgradient of these areas.

After development of the monitoring wells, one round of groundwater samples (nine samples, excluding duplicates) was collected between July 13 and 20, 1995. The samples were submitted for analysis for TCL and TAL parameters specified in the QAPP.

The sample analytical results indicated that only VOCs were detected at elevated levels in groundwater. Several VOCs were reported at concentrations above maximum contaminant limits (MCLs). Benzene concentrations ranged from non-detect to 6.06 micrograms per liter (µg/L) (at well S-3); 1,1-dichloroethene concentrations ranged from non-detect to 3,750 µg/L (at well S-4); cis-1,2-dichloroethene concentrations ranged from non-detect to 3,220 µg/L (at well S-4); trichloroethene concentrations ranged from non-detect to 6,730 µg/L (at well D-2); and vinyl chloride concentrations ranged from non-detect to 162 µg/L (at well S-4). The MCLs for these compounds are 5, 7, 70, 5, and 2 µg/L, respectively.

Several other VOCs were reported in groundwater samples. Acetone was found in several samples at concentrations ranging from non-detect to 1,380 µg/L (at well S-5). Also reported in the samples were methyl ethyl ketone (2-Butanone); carbon disulfide; chlorobenzene; 1,1-dichloroethane; trans-1,2-dichloroethene; 1,4-dichlorobenzene; ethylbenzene; 2-hexanone; methylene chloride; 4-methyl-2-pentanone; naphthalene; tetrachloroethene; toluene; 1,1,2-trichloroethane; and xylenes.

Several SVOCs were reported in groundwater samples (primarily at well S-5) including benzoic acid; 2,4-dimethylphenol; phenol; di-n-butyl phthalate; 1,2,4-trichlorobenzene; and various PAHs. No inorganics were reported at concentrations above primary MCLs in the groundwater samples, and no pesticides were reported in any groundwater samples. Analytical results for the groundwater samples collected in July 1995 are presented in Appendix F.

### 2.3.2 EE/CA SAMPLING

This section summarizes the soil, groundwater, and river sediment sampling conducted during the EE/CA investigation at the Site. Figure 2.14 presents the EE/CA sampling locations.

#### 2.3.2.1 SOIL SAMPLING

Three soil samples were collected from the soil boring for monitoring well D-3 on July 23, 1996. These samples were collected from depths of 0 to 1 feet bgs, 4 to 6 feet bgs, and 10 to 12 feet bgs. Figure 2.14 presents the location of well D-3. Acetone and trichloroethene were the only VOCs reported in the soil samples. Acetone was detected at an estimated concentration of 46 µg/kg and trichloroethene was detected at an estimated concentration of 2.1 µg/kg (10 to 12 feet bgs). The SVOC bis(2-ethylhexyl)phthalate was detected at an estimated concentration of 230 µg/kg at all three depths. No pesticides, cyanide, or PCBs were detected. Several inorganics were reported at concentrations ranging from non-detect to 131,000 mg/kg (calcium at 10 to 12 feet bgs). Analytical results for the soil samples are presented in Appendix E.

#### 2.3.2.2 GROUNDWATER SAMPLING

Two additional monitoring wells (D-3 and S-6) were installed at the Site on July 23 and 24, 1996. Forty-two groundwater samples [excluding duplicate and quality control

(QC) samples] representing four sample rounds were collected from monitoring wells D-1 through D-3 and S-1 through S-6 between August 6, 1996, and September 30, 1997. Figure 2.3 presents the locations of the monitoring wells. The compounds 1,2-dichloroethene and trichloroethene were the only VOCs consistently reported in samples of groundwater from all the monitoring wells at the Site. The maximum concentration of 1,2-dichloroethene was 1,100 µg/L in a groundwater sample collected from well D-2 on November 21, 1996. The maximum concentration of trichloroethene was 1,200 µg/L in a groundwater sample also collected from well D-2 on November 21, 1996. The VOCs 1,1-dichloroethane, 1,1-dichloroethene; acetone; benzene; chlorobenzene; chloroethane; chloroform; chloromethane; 1,2-dichloroethane; ethylbenzene; methylene chloride; 4-methyl-2-pentanone; toluene; trichloroethene; vinyl chloride; and xylenes were inconsistently reported in groundwater samples collected across the Site. Concentrations of four VOCs (1,2-dichloroethene; trichloroethene; benzene; and vinyl chloride) exceeded MCLs at several monitoring wells.

Most SVOCs were reported as non-detects in the groundwater samples. Only the SVOCs 2,4-dimethylphenol; bis(2-ethylhexyl)phthalate; diethylphthalate; 4-methylphenol; and phenol were occasionally reported in groundwater samples collected across the Site. Bis(2-ethylhexyl)phthalate was the only SVOC whose concentration exceeded the MCL. The pesticides 4,4'-DDD and Aldrin were reported in three of the September 1997 samples.

Several dissolved inorganics were reported in the groundwater samples. Their concentration ranges were as follows: aluminum from non-detect to 1.5 mg/L, antimony from non-detect to 0.0046 mg/L, arsenic from non-detect to 0.042 mg/L, barium from non-detect to 0.78 mg/L, calcium from 68.8 to 231 mg/L, chromium from non-detect to 0.0072 mg/L, cobalt from non-detect to 0.0023 mg/L, copper from non-detect to 0.0047 mg/L, iron from non-detect to 23.5 mg/L, lead from non-detect to 0.0029 mg/L, magnesium from 23.3 to 98.9 mg/L, manganese from non-detect to 0.82 mg/L, mercury from non-detect to 0.00013 mg/L, nickel from non-detect to 0.065 mg/L, potassium from non-detect to 32.5 mg/L, silver from non-detect to 0.00077 mg/L, sodium from non-detect to 44.9 mg/L, and zinc from non-detect to 0.0191 mg/L. No inorganic concentrations exceeded primary MCLs. Analytical results for the groundwater samples are presented in Appendix F.

#### 2.3.2.3 RIVER SEDIMENT SAMPLING

Five sediment samples were collected from the Stillwater River at locations selected by U.S. EPA on August 6, 1996. Figure 2.14 presents the sampling locations. The only VOC

reported was acetone in one sediment sample (SED-05, collected adjacent to the southern portion of the Site) at an estimated concentration of 15 µg/kg.

Several SVOCs were reported at low estimated concentrations in samples SED-02, SED-03, and SED-05, which were collected adjacent to the central and southern portions of the Site. No pesticides were reported, but the PCB Aroclor 1221 was reported at 51 µg/kg in SED-01 and 36 µg/kg in SED-04, which were collected upstream of the Site and adjacent to the southern portion of the Site, respectively.

Several inorganics were reported in all the samples. Their concentration ranges were as follows: aluminum from 1,250 to 3,640 mg/kg; arsenic from 2.5 to 3.3 mg/kg; calcium from 34,800 to 81,700 mg/kg; chromium from 3.0 to 6.3 mg/kg; iron from 3,410 to 6,800 mg/kg (but iron was present at a reportable level in the associated method blank); lead from 3.0 to 9.5 mg/kg; magnesium from 9,800 to 35,600 mg/kg; manganese from 144 to 183 mg/kg; and zinc from 13.6 to 31.2 mg/kg. Barium, copper, nickel, potassium, and vanadium were also reported in the samples. Analytical results for the sediment samples are presented in Appendix G.

### 2.3.3 DEEP OVERBURDEN SAMPLING

After the completion of EE/CA investigation activities, U.S. EPA determined that additional Deep Overburden Groundwater Investigations were required to characterize the deep groundwater downgradient of the Site and to determine whether Site contaminants were migrating under the Stillwater River toward potential downgradient groundwater receptors. CRA conducted Deep Overburden Groundwater Investigation activities from 1999 to 2002 under Deep Overburden Groundwater Investigation Work Plans (four Revisions) approved by U.S. EPA. This section summarizes the Deep Overburden Groundwater Investigation sampling conducted at the Site from 1999 to 2002

Under the Deep Overburden Groundwater Investigation Revision 3 Work Plan dated March 5, 1999, CRA conducted a seismic refraction survey at the Site from March 29 to April 5, 1999. The purpose of the seismic refraction survey was to identify the deepest portion of the buried bedrock valley near the Site in order to evaluate the possibility of groundwater flow along the bedrock surface. Also, the results of the seismic survey were to be used to help select soil boring and monitoring well locations for further characterization of deep groundwater migrating from the Site. The seismic refraction survey results were submitted to U.S. EPA on July 2, 1999. Upon reviewing the results,

U.S. EPA and OEPA determined that additional monitoring wells were needed east of the Stillwater River and south of the Site.

CRA submitted the Deep Overburden Groundwater Investigation Revision 4 Work Plan to U.S. EPA on August 19, 1999. U.S. EPA approved the Deep Overburden Groundwater Investigation Revision 4 Work Plan, and CRA conducted sampling activities from August 30 to September 9, 1999. Five soil borings were advanced south of the Site and for the purpose of conducting vertical aquifer sampling. Also, CRA installed three staff gauges on the Stillwater River. Three proposed borings could not be drilled east of the Stillwater River because access was denied by the property owners. At each of the five soil boring locations south of the Site (BH1A-99, BH2-99, BH3-99, BH4-99, and BH5-99), discrete interval sampling of groundwater was conducted from the top of the water table to the top of the bedrock surface. The samples were analyzed for TCL VOCs, TAL inorganics, ethane, and ethene to determine screened intervals and well depths for the installation of permanent monitoring wells at each location. Trichloroethene was detected at concentrations above the MCL of 5 µg/L in all five discrete groundwater samples collected from boring BH2-99, which was located southwest of the Site and just north of the Stillwater River. Trichloroethene was not detected in any of the discrete groundwater samples collected from borings BH3-99, BH4-99, and BH5-99, which were located southeast of the Site, and U.S. EPA determined that no further sampling or well installation was required at those locations. Trichloroethene was also not detected in any of the discrete groundwater samples collected from BH1A-99, which was located southwest of the Site. A monitoring well was installed at the BH1A-99 location to provide a clear western limit to the impacted groundwater from adjacent location BH2-99. Analytical results for the groundwater samples are presented in Appendix F.

CRA collected groundwater samples from five shallow on-Site monitoring wells (S-1, S-3, S-4, S-5, and S-6) and the three deep on-Site monitoring wells (D-1 through D-3) in September 1999 and had the samples analyzed for TCL VOCs, TAL inorganics, ethane, and ethene. No VOCs were detected at concentrations above MCLs in shallow upgradient monitoring well S-1. However, VOCs were detected at concentrations above MCLs in the other four shallow and in the three deep on-Site monitoring wells. Trichloroethene was detected at 3.7 µg/L in well S-3. Trichloroethene was detected at 300 µg/L and vinyl chloride was detected at 22 µg/L in well S-4. Trichloroethene was detected at 6.8 µg/L and vinyl chloride at 2.4 µg/L in well S-5. Trichloroethene was detected at 54 µg/L in well S-6, 98 µg/L in well D-1, 360 µg/L in well D-2, and 31 µg/L in well D-3. No inorganic concentrations exceeded MCLs except at well S-3, where arsenic was detected at 0.055 mg/L. Analytical results for the groundwater samples are presented in Appendix F.

Owners of properties east of the Stillwater River eventually granted access to their properties. CRA conducted additional Deep Overburden Groundwater Investigation sampling from August 8 to 22, 2000. CRA drilled three soil borings east of the Stillwater River; conducted discrete groundwater interval sampling; and installed monitoring wells MW-1, MW-2, and MW-3 (see Figure 2.3). Also, CRA installed monitoring well MW-4 in boring BH1-99 and monitoring well MW-5 in boring BH2-99. In addition, CRA advanced soil boring BH-6 between borings BH2-99 and BH3-99 to determine the extent of the impacted groundwater to the east of BH2-99, and conducted discrete groundwater interval sampling. Trichloroethene was not detected in the discrete interval groundwater samples collected from MW-1, MW-2, MW-3, and BH-6. However, concentrations of trichloroethene (6.5 µg/L) and cis-1,2-dichloroethene (96 µg/L) exceeded the MCLs in groundwater from monitoring well MW-5. Analytical results for the groundwater samples are presented in Appendix F.

CRA collected groundwater samples from the six shallow on-Site monitoring wells (S-1 through S-6) and the three deep on-Site monitoring wells (D-1 through D-3) in August 2000 and had the samples analyzed for TCL VOCs, TAL inorganics, ethane, and ethene. No VOCs were detected at concentrations above MCLs in shallow upgradient monitoring well S-1. However, VOCs were detected at concentrations above MCLs in four shallow and three deep on-Site monitoring wells. Benzene was detected at 5.4 µg/L in well S-3. Trichloroethene was detected at 150 µg/L; and vinyl chloride at 6.9 µg/L in well S-4. Trichloroethene was detected at 11 µg/L; cis-1,2-dichloroethene at 170 µg/L; and vinyl chloride at 37 µg/L in well S-5. Trichloroethene was detected at 39 µg/L in well S-6. Trichloroethene was detected at 120 µg/L and cis-1,2-dichloroethene at 350 µg/L in well D-1. Trichloroethene was detected at 210 µg/L in well D-2 and at 32 µg/L in well D-3. No inorganic concentrations exceeded MCLs. Analytical results for the groundwater samples are presented in Appendix F.

Based on a review of the Deep Overburden Groundwater Investigations data, U.S. EPA and OEPA identified that a groundwater contaminant plume could migrate south from the Site along a bedrock valley toward the Stillwater River. U.S. EPA requested that CRA install a monitoring well in boring BH-6, advance three additional soil borings south of the river on property owned by the Miami Conservancy District (MCD), and conduct discrete groundwater interval sampling to determine whether the groundwater contaminant plume was migrating to the south and under the Stillwater River. CRA conducted additional Deep Overburden Groundwater Investigation sampling from May 29 to June 8, 2001. CRA installed monitoring well MW-6 in boring BH-6; drilled three borings south of the Stillwater River and conducted discrete groundwater interval sampling; and installed monitoring wells MW-7, MW-8, and MW-9 south of the river at

locations selected by U.S. EPA (see Figure 2.3). With the exception of monitoring well MW-7, monitoring wells MW-1 through MW-9 were screened just above the top of the bedrock. Trichloroethene was detected at 6.5 µg/L in monitoring well MW-6, exceeding the MCL of 5 µg/L. No VOCs were detected at concentrations above MCLs in groundwater samples collected from wells MW-7, MW-8, and MW-9. Analytical results for the groundwater samples are presented in Appendix F.

CRA conducted additional Deep Overburden Groundwater Investigation sampling activities at the Site from June 17 to 19, 2002. CRA collected groundwater samples from the six shallow overburden on-Site monitoring wells (S-1 through S-6), the three deep overburden on-Site monitoring wells (D-1 through D-3), and the nine deep overburden off-Site monitoring wells (MW-1 through MW-9) shown on Figure 2.3. No VOCs were detected at concentrations above MCLs in shallow upgradient monitoring well S-1. VOCs were detected at concentrations above MCLs in the other five shallow on-Site monitoring wells. Trichloroethene was detected at 7.0 µg/L in monitoring well S-2. Vinyl chloride was detected at 27 µg/L in monitoring well S-3. Trichloroethene was detected at 190.0 µg/L in well S-4. Vinyl chloride was detected at 27 µg/L in monitoring well S-3. Trichloroethene was detected at 27 µg/L; vinyl chloride at 12 µg/L; and cis-1,2-dichloroethene at 84 µg/L in monitoring well S-5. Trichloroethene was detected at 62 µg/L in well S-6. VOCs were detected at concentrations above MCLs in the three deep on-Site monitoring wells and one deep off-Site monitoring well. Trichloroethene was detected at 130 µg/L and cis-1,2-dichloroethene at 350 µg/L in well D-1. Trichloroethene was detected at 170 µg/L in well D-2, at 120 µg/L in well D-3, and at 12 µg/L in monitoring well MW-6. Figure 2.15 presents the approximate extent of the trichloroethene plume using the most recent data. Analytical results for the groundwater samples are presented in Appendix F.

### 2.3.4 2003 OEPA SOIL AND SEDIMENT SAMPLING

OEPA conducted additional soil and sediment sampling activities in April 2003 to determine the potential for direct exposure of contaminants to the public and to determine the potential for migration of the contaminants to the Stillwater River.

#### 2.3.4.1 SOIL SAMPLING

OEPA collected and split with GM 14 soil samples at the southern portion of the Site to be analyzed for VOCs, SVOCs, TAL inorganics, pesticides, and PCBs (locations SO-1 to

SO-14). Please refer to Appendix H for the location of the soil samples. Analytical results for the OEPA and GM soil samples are presented in Appendix H.

The following summarizes GM's analytical results:

A summary of the VOC parameters detected in the soil samples collected in April 2003 are provided herein. Trichloroethene was detected in a number of soil samples ranging from non-detect to 250 µg/kg. Methylene chloride was detected in one soil sample at 22 µg/kg. Only estimated concentrations were reported for the following compounds cis-1,2-dichloroethene and tetrachloroethene. All other VOC parameters were not detected.

A summary of the SVOC parameters detected in the soil samples collected in April 2003 are provided herein. The following compounds were detected in a number of soil samples; phenanthrene non-detect to 1,800 µg/kg; anthracene non-detect to 450 µg/kg; fluoranthene non-detect to 3,500 µg/kg; pyrene estimated 21 µg/kg to 2,500 µg/kg; benzo (a) anthracene non-detect to 1,400 µg/kg; chrysene non-detect to 1,700 µg/kg; bis(2-ethylhexyl)phthalate estimated 22 µg/kg to 870 µg/kg; benzo(b)fluoranthene estimated 21 µg/kg to 1,500 µg/kg; benzo(k)fluoranthene non-detect to 1,200 µg/kg; benzo(a)pyrene estimate 12 µg/kg to 1,300 µg/kg; indeno(1,2,3-cd)pyrene non-detect to 820 µg/kg; and benzo(g,h,i)perylene non-detect to 510 µg/kg. Only estimated concentrations were reported for the following compounds 2, 2-oxybis (1-chloropropane), 4-methylphenol, 2, 4-dimethylphenol, 4-chloro-3-methylphenol, acenaphthylene, acenaphthene, dibenzofuran, fluorene, N-nitrosodiphenylamine (1), carbazole, and dibenzo(a,h)anthracene. All other SVOC parameters were not detected.

A summary of the pesticide and PCB parameters detected in the soil samples collected in April 2003 are provided herein. The following compounds were detected in a number of soil samples; dieldrin non-detect to 12 µg/kg; endosulfan II non-detect to 12 µg/kg; endrin aldehyde non-detect to 4.5 µg/kg; and PCB Aroclor 1254 non-detect to 740 µg/kg. Only estimated concentrations were reported for the following compounds 4,4-DDE, endrin, 4,4-DDD, and endosulfan sulfate. All other pesticide and PCB parameters were not detected.

Several inorganics were reported in all the soil samples. Some inorganic concentrations exceeded the calibration range of the laboratory instruments and are qualified as estimated.

### 2.3.4.2 SEDIMENT SAMPLING

OEPA collected and split with GM 12 sediment samples from various locations along the Stillwater River (locations SED-01-2003 through SED-12-2003) to be analyzed for TCL VOCs, TCL SVOCs, TAL inorganics, pesticides, and PCBs. One location was upstream of the Site, three locations were adjacent to the Site, and eight locations were downstream of the Site. The sediment sample locations are presented on Figure 2.16.

The following summarizes GM's analytical results:

A summary of the VOC parameters detected in the sediment samples collected in April 2003 are provided herein. Toluene was detected ranging from non-detect to 720 µg/kg at a number of locations. Only estimated concentrations were reported for the following compounds cis-1,2-dichloroethene and trichloroethene. All other VOC parameters were not detected. Analytical results for the sediment samples are presented in Appendix G; VOC results are summarized on Figure G.1.

A summary of the SVOC parameters detected in the sediment samples collected in April 2003 are provided herein. 4-methylphenol was detected ranging from non-detect to 3,000 µg/kg at a number of locations. Only estimated concentrations were reported for the following compounds acenaphthylene, acetophenone, anthracene, benzaldehyde, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, butyl benzylphthalate, carbazole, chrysene, dibenz(a,h)anthracene, di-n-butylphthalate, di-n-octyl phthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. All other SVOC parameters were not detected. Analytical results for the sediment samples are presented in Appendix G; SVOC results are summarized on Figure G.2.

Several inorganics were reported in all the sediment samples. Some inorganic concentrations exceeded the calibration range of the laboratory instruments and are qualified as estimated. Analytical results for the sediment samples are presented on Appendix G; inorganic results are summarized on Figure G.3.

A summary of the pesticide and PCB parameters detected in the sediment samples collected in April 2003 is provided herein. The following compounds were detected in a number of soil samples; 4,4-DDT non-detect to 44 µg/kg; Alpha-chlordane non-detect to 14 µg/kg; and beta-BHC non-detect to 4.6 µg/kg. Only estimated concentrations were reported for gamma-chlordane. All other pesticide and PCB parameters were not detected Analytical results for the sediment samples are presented in Appendix G; pesticide results are summarized on Figure G.4.

## 2.4 SRE CONCLUSIONS

The U.S. EPA SRE includes a human health risk evaluation and a streamlined ecological risk evaluation. The final U.S. EPA SRE dated November 13, 1997 is presented in Appendix I.

The SRE offers the following conclusions with respect to human health risks:

> *"The lack of analytical information for surface water, groundwater, and off-site soil precludes a quantitative assessment of risks posed to off-site receptors. Further characterization of conditions surrounding the site would be needed in order to identify contaminant migration pathways and potential off-site receptors. However, in accordance with U.S. EPA guidance (U.S. EPA 1993b), it is not necessary to conduct a quantitative risk assessment that addresses all exposure pathways to determine whether a response action is needed when contaminant concentration levels exceed standards that are potential chemical-specific applicable or relevant and appropriate requirements (ARARs) for the action. Where established standards for one or more contaminants in a given medium are clearly exceeded, remedial action is generally warranted. In this case, both groundwater and soils at the site exhibit concentration levels that exceed potential ARARs and/or risk based criteria. Containment alternatives should be evaluated in the EE/CA Report. Some practical considerations in developing containment alternatives include the following: regular flooding of the site; inundation of source materials by shallow groundwater during high river stage; and the location of the site immediately adjacent to a designated State Scenic River."*

The SRE offers the following conclusions with respect to ecological risks:

> *"Although several contaminants in soil are present above ecological concern levels, the low contaminant concentrations in sediments and the high quality fish and benthic macroinvertebrate analysis results from the Stillwater River indicate that GRL site soil contaminants are not negatively impacting the ecology of the Stillwater River. The Stillwater River is an ecologically significant habitat and preventing site impacts to it should be made a top priority for the selection of remedial alternatives for the GRL site.*
>
> *It is important to prevent the contaminants in soils from reaching the Stillwater River. Future actions at the site should take into account the ecological importance of the northern riverine forest as a crucial riparian zone to the Stillwater River and every effort should be made to limit the disturbance to this crucial habitat."*

## 3.0 IDENTIFICATION OF RAOS

This section identifies RAOs for the Garland Road Landfill Site. The scope of the response action, the response schedule, potential ARARs, and planned response activities are discussed below.

### 3.1 RESPONSE SCOPE

In general, the scope of the response action is to provide long-term mitigation of any remaining risk at the Site in a manner that is appropriate considering the existing and planned future uses of the Site and property adjacent to the Site. RAOs are detailed expressions of this goal. The purpose of establishing RAOs is to provide a benchmark for selecting remedial alternatives.

The following list of general RAOs is presented in the Order:

- Prevention or minimization of the release of hazardous substances so that they do not migrate and pose dangers to present or future public health or welfare or the environment;
- Prevention or abatement of actual or potential exposure of nearby human populations, animals, or the food chain to hazardous substances, pollutants, or contaminants;
- Prevention or abatement of actual or potential contamination of drinking water supplies or sensitive ecosystems;
- Stabilization or elimination of hazardous substances in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release;
- Treatment or elimination of high levels of hazardous substances, pollutants, or contaminants in soils or sediments largely at or near the surface that may migrate
- Elimination of the threat of fire or explosion; and
- Mitigation or abatement of other situations or factors that may pose threats to public health, welfare, or the environment.

The following situations or factors that may pose threats to public health, welfare, or the environment have been identified as being applicable to the Site based on existing conditions and the SRE conclusions:

- Allowing development of the Site in accordance with its expected future land use, which is expected to be passive recreational;
- Controlling erosion along the river bank, particularly during flooding conditions, to prevent destabilization of the Site and the release of any remaining non-hazardous waste materials from the Site;
- Maintaining the appearance qualities along the Stillwater River, which is a State Scenic River;
- Maintaining the recreational use of the Stillwater River, which is used for canoeing and fishing;
- Preventing Site soils from reaching the Stillwater River;
- Minimizing disturbance of the existing riparian zone along the river bank;
- Controlling contaminants in groundwater to prevent off-Site migration of contaminated groundwater to aquifers that are actual or potential drinking water supplies; and
- Reducing VOC concentrations at the Site to ensure that groundwater beyond the WMB attains MCLs within a reasonable timeframe (see Appendix J for Fate and Transport Analysis).

These RAOs are consistent with a long-term response because consideration of long-term effectiveness and controls is required. The riparian zone along the riverbank provides habitat, improves the river habitat by providing shade, stabilizes the riverbank, and provides a filtering strip for runoff.

## 3.2 RESPONSE SCHEDULE

The schedule for completion of the various remedial alternatives is presented in Section 6.4.

## 3.3 POTENTIAL ARARs

ARARs are used to develop RAOs and to scope and formulate response action technologies and alternatives. ARARs are cleanup standards, control standards, or other substantive environmental limitations promulgated under federal or state law. ARARs are considered to ensure that a long-term solution to an environmental problem is achieved. ARARs are defined below pursuant to the Superfund Amendments and Reauthorization Act of 1986 (SARA).

**Applicable Requirements.** Applicable requirements are cleanup standards; standards of control; and other environmental protection requirements, criteria, or limitations promulgated under federal or state law. These requirements specifically address a hazardous substance, pollutant, contaminant, removal action, location, or other circumstance at a site.

**Relevant and Appropriate Requirements.** Relevant and appropriate requirements are cleanup standards; standards of control; and other environmental protection requirements, criteria, or limitations promulgated under federal or state law that are not applicable to circumstances at a site but that do address problems or situations sufficiently similar to those encountered at the site.

**Other Requirements To Be Considered.** Requirements in the "to be considered" (TBC) category are other federal and state criteria, advisories, guidance, and proposed standards that are not legally binding but that may provide useful information or recommended procedures. For example, a TBC can be used to set cleanup levels when no ARAR exists for a particular situation or when an existing ARAR does not ensure protectiveness. TBCs generally fall within the following four categories:

- Health effect information;
- Technical information;
- Policy requirements; and
- Proposed rules and regulations.

U.S. EPA and OEPA identified potential federal and state ARARs for the Site. The potential ARARs for the Site are listed in Table 3.1.

The potential ARARs are divided into the following three categories defined in the revised National Oil and Hazardous Substances Pollution (NCP):

- Chemical-specific requirements;
- Action-specific requirements; and
- Location-specific requirements.

Chemical-specific ARARs are usually health- or risk-based requirements and are often expressed as numerical values that, when applied to site-specific conditions, establish the acceptable amount of a chemical that can be detected in or discharged to the environment. Action-specific ARARs are usually technology- or activity-based requirements triggered by the particular activities selected to accomplish a remedy, such

as capping, incineration, air stripping, or other remedies. Location-specific ARARs are requirements that place restrictions on either the concentrations of hazardous substances or on the performance of activities solely because the activities are carried out in specific locations (such as wetlands, flood plains, or historic places). Chemical-, action-, and location-specific ARARs and TBCs are discussed individually below.

**Chemical-Specific ARARs and TBCs.** Chemical-specific ARARs include federal and state requirements that regulate contaminant levels in various media. TBCs include proposed regulations and policy or guidance documents. Consideration of ARARs and TBCs is important in developing RAOs that comply with regulatory requirements or guidance (as appropriate). Summaries of potential chemical-specific ARARs and TBCs for the Site are presented in Table 3.1.

**Action-Specific ARARs.** Action-specific ARARs are regulatory requirements that define acceptable treatment and disposal procedures. This group of requirements includes ARARs that are action-specific for the management of hazardous substances, such as Resource Conservation and Recovery Act (RCRA) regulations for facility closures, Clean Air Act (CAA) standards for air contaminant emission sources, and Clean Water Act (CWA) standards for effluent discharges to surface water bodies and pretreatment standards for discharges to publicly owned treatment works (POTW). Summaries of potential action-specific ARARs for the Site are presented in Table 3.1.

**Location-Specific ARARs.** Location-specific ARARs are requirements for contaminant concentrations or removal activities associated with a site's physical location. For example, federal and state ARARs exist for sites where removal activities would impact wetlands, flood plains, critical habitats, wilderness areas, fault zones, or areas of historic or significant artifacts. Because the Site is bordered by the Stillwater River, a State Scenic River, the most significant location-specific ARARs are those established for the protection of flood plains, wetlands, and critical habitats. The location-specific ARARs are pertinent to the Site if activities are conducted in the flood plain of the Stillwater River. Summaries of potential location-specific ARARs for the Site are presented in Table 3.1.

## 3.4 PLANNED RESPONSE ACTIVITIES

Response activities will be conducted after U.S. EPA selects a remedy for the Site and after a public hearing on the selected remedy has been held.

## 4.0 IDENTIFICATION OF RESPONSE ACTION TECHNOLOGIES

This section describes potential response action technologies and identifies preferred technologies that are used to develop Site-wide response action alternatives in Section 5.0. U.S. EPA's guidance for conducting non-time-critical removal actions states that based on available site-specific information, only the most qualified technologies that apply to the media or source of contamination should be discussed in the EE/CA report. Additional U.S. EPA guidance prescribes a presumptive remedy approach for landfills that is applicable to the Site. Based on U.S. EPA's presumptive remedy guidance, the following presumptive remedy components are evaluated in this report:

- Landfill caps or covers;
- Leachate/groundwater collection and/or treatment;
- Landfill gas collection and treatment; and
- Institutional controls.

In addition to the standard presumptive remedy components listed above, Site-specific circumstances require that riverbank stabilization be part of the overall response action. The "no action" scenario is also presented as a reference scenario in which Site conditions remain as they are without any additional response actions occurring.

### 4.1 DESCRIPTION OF POTENTIAL RESPONSE ACTION TECHNOLOGIES

Potential response action technologies and various process options are discussed below along with their advantages and disadvantages relative to conditions at the Site.

#### 4.1.1 NO ACTION

The Order issued by U.S. EPA specifies that "no action" be included in the EE/CA to provide a scenario in which Site conditions remain as they are without any response action technologies being implemented. Given the Site conditions, "no action" is not appropriate for the Site because it does not meet any of the RAOs discussed in Section 3.0. Without any action, the continuing erosion of the riverbank would result in the continued loss of the riverbank's vegetation and perhaps the release of waste materials. Also, groundwater contamination exceeding MCLs would not remain on-Site but would continue to migrate off-Site to the south in the future. In addition, surface

soils posing risks would not be addressed and might migrate from the Site as a result of erosion.

### 4.1.2 CAPS AND COVERS

Landfill caps and soil covers are containment technologies that provide a physical barrier preventing direct contact with or incidental ingestion of soil. Caps, however, also reduce infiltration of precipitation through soil, thereby reducing leachate generation caused by percolating rainwater. Both caps and soil covers with adequate vegetation provide protection against erosion and subsequent transport of contaminants as a result of surface water runoff. Types of caps include the Current Ohio Solid Waste Cap (RCRA Subtitle D), Geosynthetic Clay Liner (GCL), and a clay cap [$10^{-7}$ centimeters per second (cm/sec)].

A Current Ohio Solid Waste Cap (RCRA Subtitle D) is typically applied to new sanitary landfills. A Current Ohio Solid Waste Cap has a bottom layer of 18 inches of clay [maximum permeability of $1 \times 10^{-6}$ cm/sec as under OAC 3745-27-08(D)(21)(g)]. Above the clay is a low-hydraulic-conductivity flexible membrane liner (FML) [40 mil High-density polyethylene (HDPE)] with a 12-inch drainage layer (minimum hydraulic conductivity of $1 \times 10^{-3}$ cm/sec). The top layer consists of a vegetative or soil layer that is at least 30 inches thick and has a minimum slope of 3 to 5 percent.

GCLs are typically used for the bottom of landfills but have also been used as a capping material. A GCL cap has a bottom layer of GCL with a hydraulic conductivity of $1 \times 10^{-9}$ cm/sec that is rolled out in sheets. To protect the GCL at least 18 inches of soil (geonet layer, 12 inches of soil, and 6 inches of topsoil) is placed on top to hold the GCL in place and to encourage vegetation growth.

A clay cap consists of a 2-foot thick bottom layer constructed of clay with a hydraulic permeability of $1 \times 10^{-7}$ cm/sec or less. An additional 2 feet of soil is placed on top of the clay to protect against frost damage. A topsoil layer of 6 inches is placed to encourage vegetation growth. A source of adequate clay has been identified in close proximity to the Site within the conservation district of the watershed. A permeability test was completed on a local clay source to determine the compacted hydraulic conductivity. The laboratory compacted and tested two clay samples, which produced hydraulic conductivities of $7.81 \times 10^{-9}$ and $3.97 \times 10^{-8}$ cm/sec (Appendix K). However, $1 \times 10^{-7}$ cm/sec is customarily used as the performance standard for construction of landfill caps to account for small variations in composition and actual construction techniques and conditions. In addition, the Hydrologic Evaluation of Landfill

Performance (HELP) modeling conducted for the evaluations of alternative cover systems, as described below, utilized 1 $x10^{-7}$ cm/sec clay and found them comparable to both the Current Ohio Solid Waste cap and a GCL cap. While lower permeability results may be achieved in practice, the criteria used in this analysis is 1 x $10^{-7}$ cm/sec.

The U.S. EPA approved HELP model was used to simulate precipitation infiltration through various cap scenarios. Below is a summary of the results for the existing conditions, Current Ohio Solid Waste Cap, the GCL cap, the clay cap, and the clay cap with FML under swales.

- Existing condition – 7.15 gpm
- Current Ohio Solid Waste Cap – 0.01 gpm
- GCL Cap – 1.60 gpm
- Clay (1 x $10^{-7}$ cm/sec) Cap – 1.66 gpm
- Clay (1 x $10^{-7}$ cm/sec) Cap and FML under swales – 1.44 gpm

The results show that the performance of the GCL cap and clay cap are essentially equivalent to the Current Ohio Solid Waste Cap since none of the caps allow significant volume of water through the caps. Lining the swales with FML provides relatively minimal incremental benefit compared to the cost and similar benefits that may be recognized in the actual design by optimizing the configuration of the cap, including the location of the crest and swales. Therefore, the FML is not included in the Alternatives. The HELP model analysis is summarized in Appendix L.

The Site lies next to the Stillwater River, and waste in the landfill is impacted by seasonal fluctuations of the water table (from high and low river stages) as much as by infiltration of precipitation. Because of these Site conditions and the significant removal action that was previously conducted, prevention of infiltration through the landfill surface is important but not critical. Based on the conditions at the Site, a Current Ohio Solid Waste Cap would not provide additional benefit as compared to a GCL or clay cap. Therefore, containment using either of the three caps would be appropriate to meet RAOs.

### 4.1.3 LEACHATE/GROUNDWATER COLLECTION AND TREATMENT

Waste and contaminated soil are present at the Site, which is adjacent to the Stillwater River. Because of the proximity of the Site to the river and the shallow water table at the Site, it is difficult to distinguish between leachate and groundwater within the landfill

boundary. For the purposes of this Report, leachate collection and treatment address both leachate and contaminated groundwater within or immediately adjacent to the boundary of the landfill. Based on this definition, leachate/groundwater collection and treatment technologies are discussed below.

#### 4.1.3.1 LEACHATE/GROUNDWATER COLLECTION

Options for collecting leachate/groundwater include an extraction well network designed to lower the water table and create an inward hydraulic gradient; extraction wells located at select locations and designed to remove impacted leachate and groundwater; and interceptor trenches designed to intercept groundwater flow, thereby preventing its off-Site migration.

Pumping groundwater from extraction wells can effectively control off-Site groundwater migration. If properly designed, constructed, and maintained, extraction wells are a reliable process option for pumping or extracting contaminated groundwater. Extraction wells are typically constructed of 6- to 8-inch diameter, polyvinyl chloride (PVC) or stainless-steel casings and screens. Each well screen is surrounded by a filter pack overlain by a bentonite seal. Submersible pumps are commonly used to collect groundwater from extraction wells. Pumping generally requires installation of several wells at a site and pumping of these wells at specified rates to manipulate the natural hydraulic gradient and thereby contain groundwater and the associated contaminant plume.

Construction of an interceptor trench involves excavating a trench and laying perforated pipe horizontally along the trench bottom. The pipe slopes toward a sump, and the trench is lined with geotextile fabric and backfilled with porous material, usually gravel, to provide added permeability for gravity-flow collection of groundwater. Shallow interceptor trenches can also be equipped with pumps to remove groundwater. The perforated pipe generally functions like a line of extraction wells; however, because the interceptor trench is a continuous sink, it creates a continuous zone of depression that causes groundwater to flow toward the subsurface trench. Subsurface interceptor trenches can perform many of the same functions as extraction wells and are effective in materials with highly variable hydraulic conductivities. Interceptor trenches, however, are limited to relatively shallow depths of less than 30 feet bgs. Types of interceptor trenches include pipe drains, gravel beds (French drains), and tile drains.

Because of the depth to a lower confining layer (about 30 to 40 feet bgs at the Site) and the Site's proximity to the Stillwater River, constructing an interceptor trench is possible

but might be more difficult than installing extraction wells. In addition, depending on the type of trenching equipment used, constructing an interceptor trench might be more intrusive in nature, and a large volume of soil and landfill waste might need to be disposed of during construction. Given the proximity of the Site to the river and the amount of soil generated during trench construction, installing extraction wells within the landfill would be appropriate for meeting RAOs at the Site.

#### 4.1.3.2 LEACHATE/GROUNDWATER TREATMENT

Options for treating leachate/groundwater include ex-situ/groundwater technologies such as air stripping and carbon adsorption with treated leachate/groundwater discharge to the Stillwater River or in-situ technologies such as ozone sparging. Air stripping effectively removes VOCs from aqueous waste streams. Various air stripping equipment configurations are available. Contaminated water in an air-stripping unit is exposed to large volumes of air, and VOCs are transferred from the water phase to the vapor phase. Air strippers are relatively simple to install, and system startup and shutdown can be accomplished fairly quickly. A disadvantage of the air stripping process option is that after treatment of contaminated water, VOCs in the vapor phase may require treatment before the vapor is discharged to the atmosphere and air strippers can require a significant amount of maintenance.

Carbon adsorption involves passing contaminated groundwater through granular activated carbon (GAC). Organic molecules contacting an activated carbon surface are held there by physical or chemical forces. Once the carbon is saturated with organics, it must be removed and either replaced with unused carbon or regenerated. Spent carbon must be disposed of at a licensed facility. Carbon adsorption is a proven method for treating dilute aqueous waste streams and is effective for treating water containing a wide range of organic compounds; however, it may not be very effective for treating vinyl chloride. Carbon adsorption is capable of achieving a very high level of hazardous substance removal. This process option requires frequent performance monitoring to detect hazardous substance breakthrough resulting from periodic carbon saturation.

In-situ leachate and groundwater treatment could be performed, eliminating the need for their collection.

In ozone sparging, an air/ozone mixture is injected through a diffuser placed at the bottom of the sparge point forcing the air/ozone mixture into the formation through a screened section. When the water level is below the top of screen, air/ozone will move through the screen and sand pack, entering the formation in small bubbles. The

air/ozone mixture must be pre-filtered to prevent plugging of the screen. The bubbles ideally flow to the top of the water table at a 45-degree angle, but the actual flowpath of the bubbles may vary depending on aquifer heterogeneity, groundwater flow conditions, and sparge pressure. The ozone sparging treatment process consists of contaminant destruction. The air increases the partitioning of dissolved and adsorbed phase halogenated solvents to the vapor phase and into the small bubbles. The extracted solvents react with the encapsulated ozone to form a carboxyl oxide. This reacts with water as it exits the bubble to yield the reaction end products of very dilute hydrochloric acid, water, and carbon dioxide. This process focuses the ozone reaction to air strippable compounds that invade the bubbles. The reaction in groundwater is impacted by factors such as pH [a pH range from 7.5 to 8.5 is ideal for Chemicals of Concern (COC) degradation by ozone, actual pH ranged from 6.74 to 9.07 in 2002], concentration of inorganics, concentration of natural organic carbon, and suspended solids.

Various VOCs have effectively been treated by ozone sparging, including trichloroethene (TCE), cis-1,2-Dichloroethene, and vinyl chloride. Ozone sparging would require the installation of an ozone generation and distribution system at the Site. Ozone is corrosive and typically ozone systems require a significant level of maintenance. The landfill material is likely to contain a large amount of Natural Oxygen Demand (NOD), which will compete with the TCE and reduce the effectiveness of the ozone for TCE degradation. Once the system is in place, ozone sparging is a relatively fast groundwater treatment remedy for dissolved constituents and system operation consumes only electricity.

Air stripping, carbon adsorption, and ozone sparging are all effective options for treating VOCs, which are the primary contaminants of concern at the Site. Air stripping is a proven technology, which requires a permanent extraction and collection system in order to treat the water. Air stripping is more effective than carbon adsorption in treating water containing vinyl chloride and requires less overall maintenance. Ozone sparging is a short-term in-situ treatment technology which does not require groundwater extraction, does not create a point source discharge, and destroys contaminants without concentrating flow. For these reasons, air stripping and ozone sparging would be appropriate for meeting RAOs at the Site. Discharging treated water to the Stillwater River would be appropriate as long as contaminant concentrations in the treated water are below surface water quality discharge criteria.

### 4.1.4 LANDFILL GAS COLLECTION AND TREATMENT

Landfills contain organic matter, including municipal solid waste, which undergoes biological decomposition under anaerobic conditions. This process generates landfill gas, which contains methane and carbon dioxide. Certain conditions favor more rapid degradation of waste materials into gas, including infiltration of oxygenated rainwater or the movement of groundwater through the waste. Landfill gas production increases and then decreases exponentially over time, such that landfills closed for several decades no longer produce significant volumes of landfill gas. Landfill gas generation at the Site is expected to be relatively small given the landfill has been inactive for 35 years and does not have a low permeability cap or bottom liner that would have extended the time frame from solid waste degradation.

Landfill gas management is sometimes necessary because the gas can accumulate within the landfill or migrate into nearby structures at unsafe levels. In addition, uncontrolled gas accumulation and venting can result in damage to a landfill cover system. Although landfill gas generation is expected to be very low currently and will decrease even further with time and there are no nearby buildings, gas management is nonetheless evaluated within this EE/CA.

Unless the landfill is capped with a relatively low permeability material, generated gases would be expected to vent directly to the atmosphere. However, because the Site may be capped or covered as part of the remedy, gases are less likely to naturally vent in the future. Therefore, in conjunction with installing an impervious landfill cap or cover, gas collection systems are typically installed to collect and potentially treat gases. Two options for collecting landfill gas include passive gas vents and active collection systems. A passive vent consists of a pipe installed in gravel beneath the cap or cover. The pipe extends through the cap or cover and is open to the air. The passive vent may allow gas to be preferentially removed from the waste material and discharged directly to the air. In some instances potentially hazardous constituents may be removed from the gas by activated carbon within the vent. An active gas collection system consists of vertically installed pipes placed in gravel beds. The pipes are connected to a manifold, and the gases are removed using a vacuum. Because buried drums and grossly impacted soils were previously removed from the Site, passive gas vents are expected to be appropriate for meeting RAOs at the Site.

### 4.1.5 RIVERBANK STABILIZATION

Visual surveying along the riverbank indicates evidence of minor past and possibly ongoing erosion in select areas. Evidence of erosion could include steep slopes with exposed waste, visual undercutting of slopes by river current, minor slumping and a lack of adequate vegetation. While historical photographs (Appendix M) of the Site and river channel do not indicate widespread, significant erosion along the entirety of the riverbank, select areas do show more evidence of erosion. Stabilization of the riverbank is evaluated as a means to reduce the likelihood of significant, adverse erosion in the future.

Riverbank stabilization requires protecting the existing riverbank from erosion, by installing sheeting or shoring to support the riverbank slope, installing erosion-resistant materials on the existing slope, or a combination of these methods. At a minimum, riverbank stabilization is needed in select areas. Changing the existing slope of the bank would involve intrusive earthwork such as waste consolidation and grading activities to either reduce the slope of the bank or terrace the slope in order to achieve more stability. Installing sheeting or shoring would be performed by driving sheet piling through unconsolidated materials and keying it into a lower confining layer in this case, the less permeable bedrock. Installing erosion-resistant materials would involve installing Articulated Concrete Mats (ACM), permanent turf reinforcement, and vegetative seeding to protect the riverbank from erosion and to "anchor" soils in place.

The comprehensive aerial photograph summary in Appendix M demonstrates that there is a buffer between the landfill and the river where no waste landfilling activities are evident. Therefore, stabilization technologies used must be capable of achieving a balance between protecting the natural habitat and meeting the RAOs presented in Section 3.0. The natural habitat of mature trees and other vegetation along the riverbank provide natural bank stabilization and erosion control as supported in OEPA's statement presented in U.S. EPA's SRE,

> *"Every attempt should be made at the Garland Road Landfill to preserve the mature trees lining the riverbank to stabilize the stream bank and provide riparian habitat. It would take decades for newly planted trees to provide the same functions that the trees currently provide the aquatic community. Erosion controls and bank stabilization need to be of primary concern in all actions taken during remediation activities" (OEPA 1995).*

GM has reviewed two U.S. EPA documents, Brownfields Technology Primer: Selecting and Using Phytoremediation for Site Cleanup dated July 2001 and Introduction to Phytoremediation dated February 2000 to assist in evaluating the environmental value of the trees growing on-Site. Based on the EPA documents it was found that the trees in

addition to their scenic value possess both evapotranspiration and remedial qualities. Poplars and willows are preferred in controlling groundwater migration and removing TCE from groundwater. During a Site visit on December 6, 2005, GM found that only a small number of trees had toppled over. Maintenance is proposed along the riverbank and would involve removing fallen trees and planting others as part of the stabilization activities.

Finally both U.S. EPA documents state that poplar trees have root systems as deep as 15 feet bgs. Roots of this depth would be able to perform evapotranspiration of the groundwater as well as provide stability to adjacent soils.

Although it is recognized that the Stillwater River is an ecologically significant habitat and a State Scenic River, the risks associated with not adequately stabilizing the riverbank outweigh the benefits of not disturbing the existing habitat. If the riverbank is not stabilized, the erosive forces of the river will continue to undercut the riverbank and over a long period of time it could reduce the clean buffer zone and potentially expose waste in select areas.

A sheet piling wall would be an effective technology for achieving bank stabilization. A sheet piling wall must be used in conjunction with a leachate extraction system to lower the hydraulic head behind (upgradient of) the wall; otherwise, groundwater would "accumulate" and flow around the sheet piling, reducing the effectiveness of the wall for containment purposes. If sheet piling is installed at the base of the riverbank, the landfill cap or cover could be extended over the debris currently present on the riverbank. Backfill and vegetation would also be placed on the eastern side of the sheet piling wall to maintain the natural slope of the land, conceal the sheet piling wall so that the river's natural appearance is not drastically changed, and replace habitat lost as a result of sheet piling installation. Steel sheet piling with interlocking joints is the most common type of sheet piling used. PVC may also be used and is lighter and easier to work with; however, its applicability depends on the type of subsurface materials present and the depth to which it is driven.

Providing erosion protection along the riverbank would be an effective technology for achieving riverbank stabilization. Erosion protection would also provide protection for the natural habitat and maintain the visual characteristics appropriate for a State Scenic River. Appropriate forms of erosion protection would include; mixed gravel and cobbles adjacent to the waterline, removal of slumping material, ACMs, bank and toe protection at the base, and permanent turf reinforcement. These measures to control erosion could be implemented along the entirety of the riverbank, or in select areas that appear to be more likely to be prone to erosion.

For the purposes of this Report, it is assumed that steel sheet piling and erosion protection of the riverbank using ACM, either along the entire bank or in select areas, are appropriate for meeting RAOs at the Site.

### 4.1.6 INSTITUTIONAL CONTROLS

Institutional controls are actions that are administrative in nature or that are peripheral in nature to the primary actions taken at a Site. Institutional controls alone would not achieve RAOs for the Site and would be implemented in conjunction with other technologies to form effective response action alternatives. Examples of institutional controls include implementing access restrictions such as Site security fencing; imposing deed, zoning, or building restrictions to limit future land use or to prevent intrusive activities in the future; and performing groundwater monitoring to evaluate changes in site conditions over time. Because the Site consists of a landfill and the presumptive remedy for a landfill is containment, deed restriction and groundwater monitoring options are appropriate institutional controls for meeting RAOs at the Site.

## 4.2 SUMMARY OF PREFERRED TECHNOLOGIES

Section 4.1 summarizes various technologies associated with each of the components of the presumptive remedy for the Site. The following technologies are retained for development of response action alternatives:

- Caps and covers:
  - Current Ohio Solid Waste Cap
  - 2-foot 1 x $10^{-7}$ cm/sec clay cap with frost protection
  - GCL with 18 inches of soil
- Leachate/Groundwater collection:
  - Extraction wells
- Leachate/Groundwater treatment:
  - In-situ Ozone Sparging
  - Air stripping and discharge to river
- Landfill gas collection and treatment:
  - Passive gas vents with contingency for activated carbon treatment

- Riverbank stabilization:
  - ACM and bank restoration
  - Steel sheet piling and bank restoration
- Institutional controls:
  - Deed restrictions
  - Groundwater monitoring

## 5.0 DESCRIPTION AND EVALUATION OF RESPONSE ACTION ALTERNATIVES

This section describes and evaluates four response action alternatives (including the "no action" alternative) for the Site. The focused alternatives discussed herein include only the technologies and process options that merit further evaluation based on the initial screening presented in Section 4.0. Each alternative has been developed to address the RAOs and to achieve the overall goal of protecting human health and the environment. The components of the four response action alternatives are summarized in Table 5.1. In this section, individual Site-wide alternatives are presented to address (1) source material (landfill contents and leachate within the landfill boundary), (2) riverbank stabilization, and (3) groundwater downgradient (south) of the landfill.

The alternatives presented in this section are evaluated with respect to three broad criteria: (1) effectiveness, (2) implementability, and (3) cost. A discussion of these three broad criteria is presented below, followed by a description and evaluation of each alternative developed.

### 5.1 EVALUATION CRITERIA

The purpose of evaluating response action alternatives based on three criteria is to ensure that each alternative developed would be effective in protecting human health and the environment, would be technically and administratively feasible, and would not be grossly excessive in cost compared to other alternatives that would result in an equal or greater degree of effectiveness. Evaluation based on these three broad criteria also helps to ensure that all alternatives considered achieve RAOs. Each criterion is discussed below.

#### 5.1.1 EFFECTIVENESS

Effectiveness refers to the ability of an alternative to be protective and to achieve overall RAOs. Protectiveness refers to whether an alternative would be protective of workers during implementation (short-term), would be protective of public health and the environment (long-term), and would comply with ARARs. Each alternative is also evaluated to determine whether it would reduce the toxicity, mobility, or volume of contaminants through treatment.

### 5.1.2 IMPLEMENTABILITY

Implementability refers to the ease with which an alternative can be constructed, operated, and maintained. This criterion addresses both the technical and administrative feasibility of implementing the alternative relative to site remediation goals, permitting, and related requirements.

### 5.1.3 COST

Cost analysis is used to eliminate high-cost alternatives that provide essentially the same level of protection as less expensive ones. A comparative evaluation of the alternatives was conducted based on estimates of their current dollar costs. The cost estimates are based on numerous assumptions and are expected to be revised, as additional information from pre-construction activities becomes available.

## 5.2 DESCRIPTION AND EVALUATION OF ALTERNATIVES

A total of four response action alternatives (including "no action") were developed for the Site. The components of the response action alternatives are summarized in Table 5.1. Each alternative is described and evaluated below.

### 5.2.1 ALTERNATIVE 1: NO ACTION

The "no action" alternative provides a reference against which other alternatives are evaluated. Under this alternative, no action would be taken to contain or remediate contaminated soil, waste, and groundwater at the Site.

#### 5.2.1.1 EFFECTIVENESS

If no action is taken at the Site, contaminated soil and waste still present in the landfill would not be contained and could come into contact with trespassers or be washed away by flood waters. Precipitation would continue to infiltrate through the impacted soil and into the waste, where additional leachate would be generated. The leachate would be allowed to migrate into groundwater beneath the landfill, which in turn would laterally migrate to the east or southeast, eventually discharging to the Stillwater River. In addition, without riverbank stabilization, continuing erosion of the riverbank

would result in the destruction of riverbank vegetation and possibly the release of waste materials. Seasonal rising and falling river water levels and heavy storms would continue to flush contamination from the landfill. Only natural attenuation and degradation processes would effect changes in contaminant concentrations in soil and groundwater.

#### 5.2.1.2 IMPLEMENTABILITY

The "no action" alternative would be easy to implement technically and administratively because no active work is included.

#### 5.2.1.3 COST

No capital or operation and maintenance (O&M) costs are associated with the "no action" alternative.

### 5.2.2 ALTERNATIVE 2: SOURCE CONTAINMENT WITH CURRENT OHIO SOLID WASTE CAP, RIVERBANK STABILIZATION, GROUNDWATER MONITORING, AND INSTITUTIONAL CONTROLS

Alternative 2 consists of source containment (i.e., landfill cap), riverbank stabilization, groundwater monitoring, and institutional controls. Figure 5.1 shows the approximate current limit of waste to be capped, as well as the different erosion protection scenarios for the riverbank stabilization. Source containment would be achieved by constructing a Current Ohio Solid Waste Cap.

The bottom layer of the Current Ohio Solid Waste Cap must be 18 inches of $1 \times 10^{-7}$ cm/sec clay, above the clay a low-hydraulic-conductivity FML (40 mil HDPE) would be placed with a 12-inch drainage layer above the FML to convey water off the FML. The top layer consists of a vegetative/soil layer that is at least 30 inches thick (including the 12-inch drainage layer) and has a minimum slope of 3 to 5 percent. Figure 5.2 presents a schematic of the proposed Current Ohio Solid Waste Cap and riverbank stabilization. Once the cap is constructed it will be seeded with native vegetation, as appropriate. The vegetation will not be impacted by groundwater since the cap is impermeable.

Consolidation of approximately 20,000 cubic yards of debris/waste located in the south portion of the Site will be performed prior to installation of the cap. This material will be moved from the south end of the Site to the central area and used as part of the sub-grade for the cap system. The area around the debris/waste removal location will be excavated below the final grade level to create a shallow depression. This shallow depression may be restored into a wetland area and/or used to accumulate stormwater. In general, the southern end of the Site outside of the capped area can be used to develop a buffer area comprised of larger trees.

The cap/cover would be continuous over the area where physical waste materials will remain. Figure 5.1 shows the extent of the cap. The current limit of waste is based on previous investigations and historical aerial photographs. If waste is identified beyond the anticipated limit during construction of the cap or bank one of the following will be completed: (1) extend cap to cover waste; or (2) consolidate waste under cap, or (3) assess the significance of the situation with U.S. EPA. Areas previously covered (treated soil with cover and screened debris with cover) will also be covered with the proposed cover system. The southern boundary of the Site will remain as the WMB.

Landfill gases are typically vented through a porous cover; however, a low-permeability landfill cap does not allow these gases to vent, and the pressure exerted by accumulating gases can cause cap damage. To protect the landfill cap at the Site from such damage, a passive gas venting system would be installed. This system would consist of a number of gas vents at the high points in the cap extending vertically from the waste through the low-permeability cover to approximately 4 feet above the finished grade. These vents would be located at the high points in the gas collection header. The vents would be constructed of PVC or HDPE, perforated pipe; wrapped in a silt sock; and backfilled with high-permeability material such as coarse sand and gravel. For cost estimating purposes, it is assumed that 10 gas vents would be needed for the 15.5-acre cap.

Due to observed erosion and modeled erosion potential, the existing riverbank has been separated into four situations that occur along various sections of the bank for the purpose of creating a conceptual design of the stabilized riverbank. Before any work is done on the bank it must be cleaned of exposed waste and cleared of any dead or dying trees and branches in areas where erosion protection is to be constructed. The four situations require different measures to ensure the stability of the existing slopes. These four situations, and the proposed stabilized riverbank components for each, are discussed below.

Situation 1

Situation 1 is characterized by a riverbank with no to low erosion potential and relatively steep slopes (approximately 1.5 or 2 to 1). The two areas of the riverbank at the Site that are characterized as Situation 1 are presented on Figure 5.1.

Any surficial waste in this area will be removed and placed under the impermeable landfill cover. No additional stabilization measures are proposed for Situation 1.

Situation 2

Situation 2 is characterized by a riverbank with low erosion potential and relatively steep slopes. The area of the riverbank at the Site that is characterized as Situation 2 is presented on Figure 5.1.

Any surficial waste in this area will be removed and placed under the impermeable landfill cover. A conceptual design of the stabilized riverbank for Situation 2 is presented on Figure 5.3. Proposed additional stabilization measures include a vegetative mat over the steep portion of the bank and a layer of mixed gravel and cobbles adjacent to the waterline.

Situation 3

Situation 3 is characterized by an eroded riverbank with mild shear stress and moderate water velocities. The area of the riverbank at the Site that is characterized as Situation 3 is presented on Figure 5.1.

Any surficial waste in this area will be removed and placed under the impermeable landfill cover. A conceptual design of the stabilized riverbank for Situation 3 is presented on Figure 5.3. Proposed additional stabilization measures include removal of soft slumping material, placement of structural fill, an articulating concrete mat and a vegetative mat over the steep portion of the bank and toe protection at the base of the slope.

Situation 4

Situation 4 is characterized by an eroded riverbank with high shear stress and high water velocities. The area of the riverbank at the Site that is characterized as Situation 4 is presented on Figure 5.1.

Any surficial waste in this area will be removed and placed under the impermeable landfill cover. A conceptual design of the stabilized riverbank for Situation 4 is presented on Figure 5.1. Proposed additional stabilization measures include removal of soft slumping material, placement of structural fill, an ACM and a vegetative mat over the steep portion of the bank and toe protection at the base of the slope. Figure 5.4 is a conceptual representation of the proposed riverbank stabilization.

Under Alternative 2, institutional controls would be necessary to limit inappropriate Site use (no camping/campfires), to maintain the integrity of the landfill cap, ensure that the public is notified of restrictions on groundwater usage, and monitor the effectiveness of the response action alternative.

An additional groundwater investigation is proposed and will include:

- Two additional soil borings BH-10 and BH-11 are proposed to determine if the bedrock surface exists between 725 and 740 feet AMSL;
- If soil borings at BH-10 and BH-11 show that bedrock is between 725 and 740 feet AMSL north of the river, piezometers will also be installed at the water table and above the bedrock. Two shallow and two deep piezometers will be installed south of the river (south of BH-10 and east of MW-9) to evaluate whether deep groundwater is flowing under the Stillwater River. Soil borings and piezometers will be located in an area that is accessible by an all-terrain drill rig.
- Eight new monitoring wells will be installed. Three monitoring wells will be installed north of S-5 to confirm the groundwater flow direction at the Site. Three monitoring wells will be installed south of the WMB to monitor compliance. One monitoring well will be installed south of the WMB and north of MW-6/BH-6 to further refine the accuracy of the groundwater fate and transport analysis. Finally, one monitoring well will be installed west of MW-5 at the request of the City of Union. The monitoring wells will be installed "In accordance with the Deep Overburden Groundwater Investigation Work Plan". Discrete Interval Sampling of groundwater will be conducted during completion of the soil borings and pending results, the appropriate screened interval will be selected (i.e., most impacted by COCs or, if no COCs are present, on top of bedrock) and a monitoring well will be installed. Concrete bollards will be placed around those monitoring wells located adjacent to or within farmer's fields. Each well will be 2 inches in diameter and constructed of stainless steel.

Figure 5.5 presents the locations of existing monitoring wells and proposed additional monitoring wells, piezometers, and boreholes. Table 5.2 provides a summary of the

groundwater monitoring activities proposed for the Site. The monitoring program includes quarterly sampling of VOCs for 2 years, then annually thereafter as necessary. Monitoring wells will be removed from the program and abandoned following four consecutive events reporting all parameters below MCLs. The purpose of the monitoring program is to ensure that the conditions at the Site are stable and contaminant concentrations are decreasing.

Monitoring wells will be removed from the program and abandoned following four consecutive events reporting all parameters below MCLs. No monitoring will be required once MCLs are achieved for all monitoring wells located outside the WMB.

#### 5.2.2.1 EFFECTIVENESS

Alternative 2 would be effective for preventing direct contact with contaminated soil and with waste in the landfill and for reducing infiltration of precipitation, thereby reducing leaching of contaminants from the unsaturated zone to groundwater. The cap would not reduce the toxicity or volume of contaminants; however, it would reduce the mobility of contaminants present in waste, soil, and groundwater, and the ACM riverbank stabilization would protect the riverbank from collapse, which would potentially result in a release of landfill waste. The short-term effectiveness of the alternative would be good because the cap and ACM riverbank stabilization would be minimally intrusive and thus protective of workers. The long-term effectiveness of this alternative would also be good because the engineering controls would be supported by institutional controls.

#### 5.2.2.2 IMPLEMENTABILITY

Alternative 2 would comply with state and federal ARARs for capping and containment actions. The alternative would be fairly easy to implement technically because it would employ proven technologies for which services and materials would be readily available. Administratively, this alternative would require acceptance from the state and community with regard to remediating and stabilizing the Stillwater Riverbank. In addition, access and deed restrictions would be required to limit access to the landfill cap as well as possible future land uses and development.

#### 5.2.2.3 COST

The cost estimate for Alternative 2 is presented in Table 5.3. The cost estimate includes capital (direct and indirect) and post-removal Site control (PRSC) costs. The major capital costs for Alternative 2 would be for the construction of the cap. The major O&M costs would be for groundwater monitoring. Also, groundwater monitoring is expected to be required for 30 years.

### 5.2.3 ALTERNATIVE 3: SOURCE CONTAINMENT WITH IMPERMEABLE CAP, SHEET PILING ALONG EAST SIDE AND SOUTH END OF THE SITE, LEACHATE EXTRACTION AND TREATMENT, GROUNDWATER MONITORING, AND INSTITUTIONAL CONTROLS

Alternative 3 consists of source containment, sheet piling along east side and south end of Site, leachate extraction and treatment, groundwater monitoring, and institutional controls. Figure 5.6 presents the approximate current limit of waste to be capped, the leachate extraction and treatment system, and the extent of the sheet pile wall. Source containment would be achieved by constructing an impermeable cap and installing a steel sheet piling wall along the east side and south end of the Site. A leachate extraction and treatment system would be installed to remove and treat impacted leachate.

The landfill cap would either be constructed of 2 feet of clay ($1 \times 10^{-7}$ cm/sec) with 2 feet of frost protection and 6 inches of topsoil or a GCL with a geonet for drainage plus 1 foot of soil and 6 inches of topsoil. Either alternative design, or a cap that includes a mixture of both types depending on considerations associated with implementation, design or cost (e.g., the GCL cap may be easier than the clay cap to implement near the riverbank because it has a lower profile), are acceptable. Figure 5.7 and Figure 5.8 present a schematic of the proposed clay cap and the GCL cap, respectively, as well as the sheet pile wall. Once the cap is constructed it will be seeded with native vegetation, as appropriate. The vegetation will not be impacted by groundwater since the cap is impermeable.

The 6 inches of topsoil required by both options is used to support proper growth of erosion control vegetation. Because the topsoil is the first layer of the cap it is susceptible to root penetration, earthworm activity, and other insect and burrowing animal activity. Also in order to allow for stormwater runoff the landfill cap would have to be properly sloped. This would likely require regrading the top of the landfill to obtain the necessary profile and to minimize the need for additional soil.

Consolidation of approximately 20,000 cubic yards of debris/waste located in the south portion of the Site will be performed prior to installation of the cap. This material will be moved from the south end of the Site to the central area and used as part of the sub-grade for the cap system. The area around the debris/waste removal location will be excavated below the final grade level to create a shallow depression. This shallow depression may be restored into a wetland area and/or used to accumulate stormwater. In general, the southern end of the Site outside of the capped area can be used to develop a buffer area comprised of larger trees.

The cap/cover would be continuous over the remaining waste areas. Figure 5.6 shows the extent of the cap. The current limit of waste is based on previous investigations and historical aerial photographs. If waste is identified beyond the anticipated limit during construction of the cap or bank one of the following will be completed: (1) extend cap to cover waste; or (2) consolidate waste under cap; or (3) assess the significance of the situation with U.S. EPA. Areas previously covered (treated soil with cover and screened debris with cover) will also be covered with the proposed cover system. The southern boundary of the Site will remain as the WMB.

To protect the cap from damage due to accumulating landfill gases, a passive gas venting system would be installed as described in Alternative 2. For cost estimating purposes, it is assumed that 10 passive gas vents would be needed for the 15.5-acre cap.

The landfill borders the river on the eastern side of the Site. Inspection of the riverbank yielded evidence of erosion in select areas. Bank stabilization would be constructed to prevent continuous eroding of the all or a portion of the eastern edge of the landfill into the river. Installation of a steel sheet piling wall along the riverbank would protect the riverbank from erosion and contain the landfill waste. This wall would also support construction of a stable landfill cap and provide leachate containment.

Steel sheet piling with interlocking joints would be driven to a depth of about 45 feet bgs and keyed into the limestone bedrock beneath the Site. The steel sheet piling would be installed away from the river's edge. The material between the steel sheet piling and the river would be excavated and placed on top of the landfill in areas requiring grade adjustment. The area between the river and the steel sheet piling would then be backfilled with clean soil and planted with native trees and shrubs to restore the natural appearance of the riverbank and provide some habitat for wildlife. Approximately 2,800 lineal feet of sheet piling would be installed as presented on Figure 5.6.

A series of leachate/groundwater extraction wells would be installed on the upgradient side of the steel sheet pile wall to collect and extract "mounded" leachate/groundwater

and to keep the groundwater at a level that would prevent it from building up and flowing around the wall. The actual number, construction, location, and pumping rates of extraction wells would be determined during a pre-construction phase of work prior to response action implementation. For cost estimating purposes, it is assumed that about ten 6-inch-diameter extraction wells with submersible pumps would be required. The wells would be constructed with Schedule 80 PVC, HDPE, or stainless-steel casings and screens. A 5-foot sediment sump would be installed at the bottom of each well. Each well would be equipped with a water level probe that would maintain a preset groundwater level below the bottom of the waste in the landfill by controlling the extraction pump. Each wellhead would be housed in a manhole constructed of HDPE, and the manhole would be made an integral part of the landfill cap. The manholes would also house flow control valves, sampling ports, electrical appurtenances, and instrumentation. Measurements of the extraction well liquid levels would be electronically transmitted to a groundwater treatment facility, where they would be displayed and recorded for reporting purposes.

It is also assumed that the average depth of the extraction wells would be about 45 feet bgs and that each well's extraction rate would be approximately 25 gpm. Extracted leachate/groundwater would be conveyed to a treatment facility that would be located in the northwestern corner of the Site near Frederick Garland Road. Each leachate/groundwater extraction well's submersible pump would discharge into a single force main. The force main would be constructed of HDPE and would be sized to minimize head loss. The force main would convey the leachate/groundwater to the treatment facility. The force main trench would be used for installation of electrical power lines for the submersible pumps and for routing of instrumentation cables.

The leachate/groundwater treatment facility would consist of a low-profile air stripper and GAC polishing filters (if required). Figure 5.9 presents a schematic of the leachate/groundwater treatment system. The treatment equipment would be housed in a pre-engineered building equipped with a space heater and air filters for conditioning of air for the air stripper. The treated effluent would be discharged by gravity (if possible) from the treatment facility to the river. The effluent pipeline would be approximately 8 to 10 inches in diameter and would be made of HDPE. The effluent pipeline would be installed in such a way as to take advantage of the natural slope in order to discharge to the river by gravity. If discharging by gravity is not feasible and discharge pumps are required, the effluent force main would follow the shortest route to the river. The discharge point in the river would be submerged. Provisions would be made for compliance sampling of the effluent pipeline.

An additional investigation is proposed as in Alternative 2. Table 5.2 provides a summary of the groundwater monitoring activities proposed for the Site. Figure 5.5 presents the locations of existing monitoring wells and proposed additional monitoring wells, piezometers, and boreholes. The monitoring program includes quarterly sampling of VOCs for 2 years, then annually thereafter as necessary. Monitoring wells will be removed from the program and abandoned following four consecutive events reporting all parameters below MCLs. The purpose of the monitoring program is to ensure that the conditions at the Site are stable and contaminant concentrations are decreasing.

Under Alternative 3, institutional controls would be necessary to limit inappropriate Site use (no camping/campfires), to maintain the integrity of the landfill cap, ensure that the public is notified of restrictions on groundwater usage, and monitor the effectiveness of the response action alternative.

#### 5.2.3.1 EFFECTIVENESS

Alternative 3 would be effective for preventing direct contact with contaminated soil and with waste in the landfill and reducing infiltration of precipitation, thereby reducing leaching of contaminants from the unsaturated zone to groundwater. The soil cover and steel sheet pile wall would not reduce the toxicity or volume of contaminants; however, they would reduce the mobility of contaminants present in waste, soil, and groundwater, and protect the riverbank from collapse, which would result in a release of landfill waste. The short-term effectiveness of the alternative would be good because soil cover, sheet pile wall, and extraction well installation would be completed in a reasonable timeframe. The long-term effectiveness of this alternative would be high because engineering controls would be supported by institutional controls. This alternative would require routine, periodic maintenance to ensure the integrity of the soil cover and sheet pile wall, which might be susceptible to weathering and erosion, thereby allowing more infiltration and leachate generation over the long term.

#### 5.2.3.2 IMPLEMENTABILITY

Alternative 3 would comply with state and federal ARARs for capping and containment actions. Leachate treatment using an air stripper is a proven technology and is expected to reduce contaminant concentrations in the extracted leachate and groundwater below state-mandated surface water quality discharge standards. The alternative would be fairly easy to implement technically because it would employ proven technologies. One

potential concern is slope stability when vegetation is removed prior to sheet pile wall completion. The services and materials needed are expected to be available; however, it is assumed that the volume of soil needed would be available locally and would not be prohibitively expensive. Administratively, the alternative would require acceptance from the state and community with regard to remediating and stabilizing the Stillwater Riverbank. In addition, access and deed restrictions would be required to limit access to the impermeable landfill cap, treatment facility, and extraction system as well as to limit possible future land uses and development.

#### 5.2.3.3 COST

The cost estimate for Alternative 3 is presented in Table 5.4. The cost estimate includes capital (direct and indirect) and PRSC costs. The major capital costs for Alternative 3 would be for the impermeable cap, steel sheet piling wall, and the extraction and treatment system. The impermeable cap costs for Alternative 3 would be lower than the Current Ohio Solid Waste Cap costs for Alternative 2. The major O&M costs for Alternative 3 would be for labor, electricity, and groundwater monitoring. Leachate extraction and treatment are expected to be needed for 30 years. Also, groundwater monitoring is expected to be required for 30 years. Additional O&M costs are expected associated with damage due to periodic flooding. Therefore, the O&M costs for Alternative 3 would be higher than those for Alternative 2 because leachate extraction and treatment and groundwater monitoring would last longer.

### 5.2.4 ALTERNATIVE 4: SOURCE CONTAINMENT WITH IMPERMEABLE CAP, RIVERBANK STABILIZATION, SOURCE AREA GROUNDWATER TREATMENT, GROUNDWATER MONITORING, AND INSTITUTIONAL CONTROLS

Alternative 4 consists of source containment, riverbank stabilization, groundwater treatment using ozone sparging, groundwater monitoring, and institutional controls. Figure 5.10 presents the approximate limit of waste to be capped, extent of the ozone sparging, as well as the different erosion protection situations for the riverbank stabilization . Source containment would be achieved by constructing a GCL cap or clay cap, as outlined in Alternative 3 and providing erosion protection, as in Alternative 2, along the riverbank to stabilize the bank and contain landfill waste and leachate. Figure 5.11 and Figure 5.12 present a schematic of the proposed clay cap and the GCL cap, respectively, as well as the proposed riverbank stabilization.

The landfill cap would either be constructed of 2 feet of clay ($1 \times 10^{-7}$ cm/s) with 2 feet of frost protection and 6 inches of topsoil or a GCL with a geonet for drainage plus 1 foot of soil and 6 inches of topsoil. Either alternative design, or a complete cap that includes a mixture of both types depending on considerations associated with implementation, design or cost (e.g., the GCL cap may be easier than the clay cap to implement near the riverbank because it has a lower profile), are acceptable. Figure 5.11 and Figure 5.12 present a schematic of the proposed clay cap and the GCL cap, respectively as well as the proposed riverbank stabilization. Once the cap is constructed it will be seeded with native vegetation, as appropriate. The vegetation will not be impacted by groundwater since the cap is impermeable.

The 6 inches of topsoil required by both options is used to support proper growth of erosion control vegetation. Because the topsoil is the first layer of the cap it is susceptible to root penetration, earthworm activity, and other insect and burrowing animal activity. Also in order to allow for storm water runoff the landfill cap would have to be properly sloped. This would likely require re-grading the top of the landfill to obtain the necessary profile and to minimize the need for additional soil.

Similar to Alternatives 2 and 3, consolidation of approximately 20,000 cubic yards of debris/waste located in the south portion of the Site will be performed prior to installation of the cap. This material will be moved from the south end of the Site to the central area and used as part of the sub-grade for the cap system. The area around the debris/waste removal location will be excavated below the final grade level to create a shallow depression. This shallow depression may be restored into a wetland area and/or used to accumulate stormwater. In general, the southern end of the Site outside of the capped area can be used to develop a buffer area comprised of larger trees.

The cap/cover would be continuous over the remaining waste areas. Figure 5.6 shows the extent of the cap. The current limit of waste is based on previous investigations and historical aerial photographs. If waste is identified beyond the anticipated limit during construction of the cap or bank one of the following will be completed: (1) extend cap to cover waste; or (2) consolidate waste under cap or (3) assess the significance of the situation with U.S. EPA. Areas previously covered (treated soil with cover and screened debris with cover) will also be covered with the proposed cover system. The southern boundary of the Site, constituting the current limit of waste, will remain as the WMB.

To protect the cap from damage due to accumulating landfill gases, a passive gas venting system would be installed as described in Alternative 2. For cost estimating purposes, it is assumed that 10 passive gas vents would be needed for the 15.5-acre cap.

Groundwater treatment includes ozone sparging in select areas of the on-Site source area to mitigate the migration of VOCs that would result in an exceedance of MCLs outside the WMB south of the Site. The proposed location for the pilot study as well as the limit of ozone sparging is presented on Figure 5.10.

Groundwater in the north portion of the Site flows directly to the Stillwater River and is not proposed for treatment since to date there is no evidence of adverse impact to the river. However, if the pre-design groundwater flow assessment concludes groundwater from the northern portion of the Site is or will flow to the south at levels in excess of the MCLs, additional ozone sparging will be performed in those areas.

An evaluation of the degradation time for TCE in groundwater to meet MCLs at the WMB and at the river, south of the Site was completed. The analysis evaluates the impact of different percent reductions in initial TCE concentrations on the time frame for meeting MCLs in combination with monitored natural attenuation (Appendix J). The memorandum titled Screening Level Groundwater Modeling Results at Garland Road Landfill Site, Miami County, Ohio dated September 7, 2005 (supporting document of Attachment J), provides a detailed assessment of fate, transport, and processes at the Site. Based on available information for the Site, the half-life of TCE in groundwater was conservatively calculated to be 4 years. Assuming an initial average source TCE concentration of 436 μg/L, which was the highest concentration detected in monitoring wells within the WMB in 1997, after the Removal Action, it would take approximately 6.5 half-lives (26 years) to achieve the MCL of 5 μg/L for TCE at the source, or within the WMB, through natural attenuation processes only. An additional 11.5 years would be required to reach the MCLs at the river, south of the Site. These processes have been enhanced by the previously implemented source control removal actions, which significantly and permanently reduced the sources of TCE and other hazardous substances to groundwater. It is important to note that this analysis does not include the expected additional groundwater benefits associated with consolidation of approximately 20,000 cubic yards of waste from the south end of the Site to the north end, where it will be placed beneath the planned landfill cap. This effectively creates a buffer of up to 250 feet from the southern boundary.

Meeting MCLs at the WMB in 26 years from the time of the removal work, or by 2023, is reasonable. Meeting the MCLs at the river, to the south of the Site, will take an additional 11.5 years (2035), which is less than 30 years from the completion of this Revised EE/CA Report. This timeframe could be achieved through the ongoing natural attenuation processes without any additional groundwater treatment. In addition, it is not cost effective to try to reach MCLs sooner, and there is no unacceptable risk to human health or the environment under current and reasonably expected land and

groundwater use. However, as part of this Report, GM proposes groundwater treatment in the source area to reduce TCE concentrations in groundwater within the WMB and beyond by 50 percent. Based on the available Site information, with a groundwater concentration reduction of 50 percent, meeting the MCL for TCE at the WMB and beyond would be expected in approximately 33.5 years (by 2031), less than 25 years from the completion of this Revised EE/CA Report.

For the complete analysis and supporting documentation please refer to Attachment J - Fate and Transport Evaluation of Degradation Time for TCE to meet MCLs at WMB for the Garland Road Landfill Site, dated December 12, 2005 revised December 22, 2005. The fate and transport analysis will be updated upon receipt of the additional groundwater investigation data proposed as part of each alternative. Thereafter the fate and transport analysis will be updated annually.

The objective of the ozone sparging operation is to achieve a 50 percent reduction in the mean average groundwater concentration of TCE at existing monitoring wells, based on the 2002 data (monitoring wells D-2 at 170 µg/L, D-3 at 120 µg/L, and S-4 at 190 µg/L). This reduction will accelerate the ongoing natural attenuation processes. Based on the 2002 data, the average TCE concentration for the wells identified was 160 µg/L. Therefore, a 50 percent reduction would equate to an average concentration of approximately 80 µg/L. When the average concentration in monitoring wells D-2, D-3, and S-4 reduces to 80 µg/L for two consecutive monitoring events, the groundwater treatment objective will have been met. This will ensure that MCLs will be met beyond the WMB within a reasonable timeframe (supporting document of Appendix J). The effectiveness of this treatment would be evaluated by groundwater sampling (see Figure 5.5). Quarterly groundwater sampling for VOCs at monitoring wells just outside the WMB will also be performed for 2 years following termination of the groundwater ozone treatment system.

A field pilot test is proposed for the south end of the Site in order to confirm delivery of ozone to the impacted media as well as provide data to allow for optimization of well spacing. The pilot study would be used to refine the details of the ozone sparging system for remedial design. Based on the results of the pilot test, GM would evaluate whether the groundwater objective (i.e., 50 percent reduction of the mean average concentration of the 2002 data) is achievable within 2 years using the ozone sparging methods proposed. GM would present the results of the pilot study and the evaluation to U.S. EPA. If the desired 50 percent reduction could not be achieved within the agreed reasonable timeframe, GM would propose a contingency plan. To determine whether the treatment is effective there should be a significant reduction in VOC concentrations measurable in downgradient monitoring wells within 6 months. If the treatment is not

effective, GM would evaluate potential modifications to the ozone treatment system and/or other potential treatment technologies and their cost and present the evaluation to U.S. EPA to determine whether additional treatment activities were warranted based on costs and benefits.

The ozone sparging pilot study will continue for one month within the waste management area to define the operating parameters. The system will be operated to have ozone consumed by organics in the groundwater and will be monitored and adjusted accordingly. The system will be monitored to identify any problems including fracturing of the aquifer material or failure of the bentonite seal. In addition, vegetation will be monitored for affects of ozone. Should ozone enter the vadose zone it is expected that it would migrate passively through an impermeable cover designed to vent normal landfill gas. The following outlines the operating parameters that will be collected to optimize operation of the ozone system:

Operating Parameter Testing

Data will be collected during the first 8 hours of operation to determine appropriate operating levels for the remainder of study and evaluate the radius of influence of the sparging wells. During this period, the pressure will be increased between the minimum bubble-entry pressure [expected to be 13 pounds per square inch (psi)] and a maximum of 30 psi, in a stepwise fashion in increments of 5 psi every hour. The test will be stopped if a sudden increase in flow is noted. Parameters to be evaluated during this time period include:

- air and ozone flow rates (continuous recording);
- sparge pressures (increased hourly by 5 psi);
- groundwater elevation (every 15 minutes at existing monitoring wells, and possibly continuous recording at selected monitoring wells);
- presence of bubbles (visual inspection every 15 minutes at the existing monitoring wells; and
- headspace oxygen and headspace ozone by Drager™ tube (hourly at wells where bubbles are observed).

Aquifer Response Testing

Data will be collected on a weekly basis during the one month of pilot study operation to further evaluate the radius of influence of each of the sparging wells. Parameters to be evaluated during this time period include:

- groundwater elevation (at the existing monitoring wells);
- presence of bubbles (at the existing monitoring wells); and
- headspace oxygen and headspace ozone by Drager™ tube (at wells where bubbles are observed).

Groundwater Monitoring

Conditions after 1 month of pilot study operation of ozone sparging wells will be documented. This will consist of measuring static water levels and collecting groundwater samples for VOC, oxidizable inorganic (iron and manganese), and dissolved oxygen analyses at the existing monitoring wells. All samples (with appropriate duplicates, trip blanks, and other QA/QC samples) will be analyzed by an off-Site laboratory. At the conclusion of the pilot study, the information will be analyzed and the full scale implementation will be initiated. Careful consideration will be given to the location of the equipment since the Site is prone to flooding.

Each ozone sparging well will be constructed of 2-inch diameter Schedule 40 Chlorinated Polyvinyl Chloride (CPVC) riser pipe with a 2-foot long 10-slot screen. Figure 5.14 presents a typical injection/well sparge point detail. The annular space from bottom to top will be filled with a sand pack (consisting of uniform silica sand), a bentonite seal, and cement-bentonite grout. A flush-mounted protective casing will be installed at the surface, set in concrete sloped to allow drainage away from the well. A fine bubble diffuser 1.5 feet in length and 1.5 inches in diameter, consisting of microporous aluminum oxide, will be attached to 3/4-inch Teflon tubing rated for 100 psi and placed at the bottom of the well. The fine bubble diffuser is used because of its superior ability to create small (1 micrometer) bubbles, which are ideal for treating groundwater. The diffuser will be sealed with tubing leading down the well from the ozone generator. This will prevent the entire well from filing up with ozone. Final details regarding the diffuser will be provided as part of the final design for the system. The tubing will be mounted to an air-tight sealing well cap and will extend along the ground surface to the treatment trailer. A flow meter and valve will be installed in the tubing within the treatment trailer for controlling and monitoring flow to each ozone sparging well.

Figure 5.13 presents the typical layout of the ozone sparging process schematic. The Ozonology model M-1362 or approved alternate will be used to generate and inject ozone. The M-1362 has five outlets. Samples will be collected from the five areas presented on Figure 5.10. The three areas with the highest TCE results will each have a sparge point installed. The ozone sparging wells will be installed at the bottom of the overburden aquifer in an effort to maximize the radius of influence. The radius of influence is dependent on the thickness of the water table but varies from approximately 7 to 28 feet at the minimum bubble-entry pressure of approximately 13 psi, based on bubble movement at a 45-degree angle from each ozone sparging well. All ozone sparging wells will be set at the top of the bedrock.

An additional investigation as proposed in Alternative 2, including the installation of up to 8 new monitoring wells, would be completed with this Alternative. Table 5.2 provides a summary of the groundwater monitoring activities proposed for the Site. Figure 5.5 presents the locations of existing monitoring wells and proposed additional monitoring wells, piezometers, and boreholes. The monitoring program includes quarterly sampling of VOCs during ozone treatment until the mean average TCE concentration in monitoring wells D-2, D-3, and S-4 (160 µg/L based on 2002 data), is reduced by 50 percent, or to 80 µg/L.

Upon termination of the treatment system, quarterly VOC monitoring of wells just outside the WMB will be conducted for 2 years, after which the long term groundwater monitoring program will begin. The purpose of this quarterly sampling of select wells just outside the WMB will be to evaluate the potential for a rebound in VOC concentrations after attaining the performance criteria. The landfill cap will significantly reduce infiltration and potential leaching from remaining waste materials, but the amount of water entering the landfill through this pathway is a small proportion in comparison to that from normal groundwater flow. Hence the impact of continued leaching that could result in a rebound in VOC concentrations after treatment is expected to be minimal. The significance of any rebound measured during this 2-year period will be assessed upon the completion of this monitoring.

The long-term groundwater program includes annual sampling. Monitoring wells will be removed from the program and abandoned following four consecutive events reporting all parameters below MCLs. The purpose of the monitoring program is to ensure that the conditions at the Site are stable and contaminant concentrations are decreasing. This long-term monitoring program can be modified in response to actual conditions.

Under Alternative 4, institutional controls would be necessary to limit inappropriate Site use (no camping/campfires), to maintain the integrity of the landfill cap, ensure that the public is notified of restrictions on groundwater usage, and monitor the effectiveness of the response action alternative.

#### 5.2.4.1 EFFECTIVENESS

Alternative 4 would be effective for preventing direct contact with contaminated soil and with waste in the landfill and for reducing infiltration of precipitation, thereby minimizing leaching of contaminants from the unsaturated zone to groundwater. The cap and ACM riverbank stabilization would reduce the mobility of contaminants present in waste, soil, and groundwater, and the ACM riverbank stabilization measures would protect the riverbank from collapse, which would eventually result in a release of landfill waste. The ozone sparging treatment would reduce the toxicity and volume of contaminants. The short-term effectiveness of the alternative would be good because the cap, ACM riverbank stabilization measures, and ozone sparging can be installed quickly and are effective immediately. The long-term effectiveness of the alternative would be good because engineering controls would be supported by institutional controls and because a contingency would be in place for groundwater extraction and treatment if ozone sparging alone is demonstrated to be ineffective.

#### 5.2.4.2 IMPLEMENTABILITY

Alternative 4 would comply with state and federal ARARs for capping and containment actions. The alternative would be fairly easy to implement technically because it would employ proven technologies for which services and materials would be readily available. Administratively, this alternative would require acceptance from the state and community with regard to remediating and stabilizing the Stillwater Riverbank. In addition, access and deed restrictions would be required to limit access to the landfill cap as well as possible future land uses and development.

#### 5.2.4.3 COST

The cost estimate for Alternative 4 is presented in Table 5.5. The cost estimate includes capital (direct and indirect) and PRSC costs. The costs for Alternative 4 are significantly less than Alternative 3 and similar to those for Alternative 2 with the exception of the costs associated with ozone sparging and cap construction. The major capital costs for

Alternative 4 would be for the construction of the impermeable cap, ACM riverbank stabilization, and ozone sparging. The major O&M costs would be for labor, electricity, and groundwater monitoring associated with ozone sparging equipment. The groundwater monitoring would be required for more than 30 years.

## 6.0 COMPARATIVE EVALUATION OF RESPONSE ACTION ALTERNATIVES

In this section, the response action alternatives presented in Section 5.0 are compared based on the three evaluation criteria of effectiveness, implementability, and cost. This comparison is followed by a discussion of the response action schedule.

### 6.1 EFFECTIVENESS

The effectiveness of the response action alternatives developed for the Site is evaluated based on their overall protection of human health and the environment; compliance with ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; and short-term effectiveness. The ability of the alternatives to meet these criteria is compared below.

#### 6.1.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Alternative 1, "no action," would not provide overall protection of human health and the environment under current or future land-use scenarios because the risks posed by direct contact with the contaminants at the Site would remain. TCE concentrations at the Site also currently exceed MCLs, however, the groundwater at the Site is not used for potable drinking water or other purposes. Future groundwater use is expected to be consistent with current groundwater use. Residents in the area utilize City water. In addition, off-Site migration of groundwater contamination, exposed waste, and riverbank erosion would not be addressed.

Under Alternatives 2 through 4, the landfill would be capped. These alternatives would therefore offer similar degrees of protection of human health and the environment from direct contact with the landfill's contents. Each of these Alternatives protect human health and the environment by isolating the waste, thus preventing any future direct contact. All of the capping alternatives will result in a removal of existing habitat within the cap footprint, including mature trees, however this should be minimal as the more ecologically valuable trees are located in the riparian zone along the riverbank. Furthermore, improved stormwater management for each of the capping alternatives would result in decreased sediment loading to the Stillwater River during precipitation and snowmelt runoff.

To ensure waste on the eastern margin of the landfill (i.e., the margin adjacent to the Stillwater River) does not erode into the river in the future, engineered controls are included in Alternatives 2 through 4. These erosion controls include ACM riverbank stabilization in select areas for Alternatives 2 and 4 and sheet piling for Alternative 3. During riverbank stabilization, all existing habitat and the existing aesthetic characteristics of the riverbank would be destroyed during sheet pile wall construction; therefore, habitat restoration to reduce these effects is also a necessary component of Alternative 3. The ACM riverbank stabilization would involve much less destruction of habitat and aesthetic appearance, and a portion of that loss would be short term as the articulated blocks allow vegetation other than substantive trees to grow through the engineered voids. In addition, the ACM approach would only be installed in select areas, which show signs of erosion or bank instability, thus preserving a portion of the riparian zone in those areas where no controls are needed.

Alternatives 2 to 4 address current groundwater contamination and its continued off-Site migration in the future. While all of the caps are roughly equivalent, the Alternative 2 cap would allow marginally less infiltration of precipitation, theoretically allowing less leaching of contaminants from remaining waste. However, any measurable, observable difference resulting from less infiltration under Alternative 2 is anticipated to be inconsequential due to the small volumetric differences between the alternative caps and the prior removal of drummed waste and associated contaminated soil. Furthermore, Alternative 2 does not include leachate/groundwater treatment, which could enhance the existing natural attenuation of current groundwater contamination. A leachate collection and treatment system is included in Alternative 3 and ozone sparging is included in Alternative 4 to reduce concentrations within the WMB and allow groundwater outside the WMB to naturally attenuate to levels less than the MCLs within a reasonable period of time. Thus groundwater contamination outside the WMB may remain for a longer period of time under Alternative 2.

Alternatives 2 through 4 all include the same institutional controls necessary to protect human health at the Site during future land use as well as the environment under current and future land-use conditions. These controls will ensure that contact with the waste materials and contaminated groundwater will not occur into the future.

### 6.1.2 COMPLIANCE WITH ARARs

The potential chemical-specific ARARs for the Site are MCLs for groundwater outside the WMB and U.S. EPA Region 9 residential direct contact criteria for soils. Alternative 1 does not meet any chemical-specific ARARs. Alternatives 2 through 4 do

meet chemical-specific ARARs, although Alternative 2 would meet this ARAR after a longer time frame than under Alternatives 3 or 4.

The potential action-specific ARARs for the Site are Executive Order 12372 [40 Code of Federal Regulations (CFR) 29], the Occupational Safety and Health Act (OSHA), RCRA Subtitle D landfill closure regulations, Ohio landfill permitting requirements (Ohio Administrative Code [OAC] 3734), Ohio regulations governing fugitive dust and particulate emissions (OAC 3745-17), and 57), CAA regulations related to grading and excavation activities and operation of an air stripper (OAC 3745-17, 21, 23, and 25), and the CWA regulations applicable to discharge of treated water to the Stillwater River (OAC 3745-1, *Ohio Revised Code* [ORC] 6111, and 40 CFR 122.44). All remediation work for Alternatives 1 through 4 can be performed in accordance with these regulations.

Other potential action-specific ARARs include the Ohio groundwater monitoring requirements (OAC 3745- 27, 54, and 81) and Ohio landfill closure requirements (OAC 3745-27, 54, 55. Alternatives 2, 3, and 4 all include a monitoring program that will be in consistent with the Ohio groundwater monitoring requirements. Alternative 2 does not provide contaminated groundwater containment or treatment and therefore does not meet the Ohio landfill closure requirements where as Alternatives 3 and 4 provide contaminated groundwater containment and treatment in accordance with the Ohio landfill closure requirements.

Prevention of riverbank erosion, preservation of the environment, and maintenance of the appearance of the Stillwater River are considered to be of equal concern. Alternatives 2 through 4 meet these concerns by preventing riverbank erosion, stabilizing the riverbank, and restoring the natural appearance of the riverbank as well as some habitat for wildlife. Alternative 1 would not contain contaminated groundwater or prevent erosion, but it would preserve the existing habitat and appearance of the Stillwater Riverbank at the Site.

The potential location-specific ARARs for the Site are the Wild and Scenic Rivers Act (40 CFR 6.302, 16 USC 1271, and OAC 1517.15), the Endangered Species Act (50 CFR 402), the List of Endangered Species (OAC 1501:31-23), the Fish and Wildlife Coordination Act (16 USC 661), the Landfill Siting Criteria, Executive Orders 11988 and 11990 (40 CFR 6, Subpart A), MCD requirements, and U.S. Army Corps of Engineers requirements. It is expected that all work can be performed in accordance with MCD requirements for obtaining fill from within the regulated area. It is also expected that all work can be performed in accordance with U.S. Army Corps of Engineers requirements for construction along waterways. The impact of Executive Orders 11988 and 11990 must be considered for all the alternatives except Alternative 1, but it is expected that

appropriate grading to account for flooding would satisfy these orders' requirements. Alternatives 2 through 4 would satisfy the Wild and Scenic Rivers Act, the Endangered Species Act, and the Fish and Wildlife Coordination Act because they would stabilize the riverbank, prevent riverbank erosion, and restore the riverbank's habitat and appearance. Alternative 1 would have no impact on the habitat. Alternatives 2 and 4 would have minor impact on the habitat, with most of the impact having a short term duration until vegetation re-establishes within the ACM. Alternative 3 would destroy all of the existing habitat along the riverbank because extensive clearing and grading would be required to construct a stable working platform for the large vibratory installation equipment for the sheet pile wall. However, the area between the river and the steel sheet pile would be backfilled with clean soil and planted with native trees and shrubs that would restore a portion of the natural appearance of the riverbank and provide some habitat for wildlife.

### 6.1.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

Long-term effectiveness and permanence refer to the extent to which the alternatives would reduce the magnitude of residual risk at a site and the adequacy and reliability of the controls that would ensure operation of the alternatives.

Alternative 1 would not provide long-term effectiveness or permanence at the Site. Under Alternative 1, potential health risks would still exist, groundwater contamination exceeding MCLs would continue to migrate from the landfill, and erosion along the riverbank would continue.

Alternatives 2 through 4 would be equally effective with respect to the caps installed and riverbank stabilization. All of the cap designs are essentially equivalent in long-term effectiveness and permanence in that they will prevent direct contact with the waste, significantly reduce infiltration through the cap and, with periodic maintenance, will maintain effectiveness over time. The bank stabilization measures should similarly achieve long term effectiveness with periodic maintenance.

Alternatives 1 and 2 have no active groundwater treatment, but rely on natural attenuation to reduce off-Site migration of contaminants exceeding MCLs. Once achieved, this natural reduction would be permanent, although the period of time necessary to achieve the reduction will be longer than for Alternatives 3 or 4.

For Alternatives 3 and 4, leachate extraction wells, air stripping and ozone sparging are all reliable, proven technologies that provide permanent protection with regular

inspections and maintenance. However, the leachate/groundwater extraction and treatment in Alternative 3 is more passive and long term than the in-situ ozone treatment in Alternative 3, and since the Site is prone to extensive flooding, additional maintenance is expected for Alternative 3 versus Alternative 4 where the groundwater treatment objectives are expected to be met within 2 years. The effectiveness of the ozone sparging technology is dependant on the ability to target the areas where the highest levels of VOCs are present that may migrate off-Site to the south. Ozone sparging is a source treatment technology whereas the leachate extraction wells and air stripping is a groundwater treatment technology. Success of the ozone sparging will eliminate the source in the area that was treated, whereas the leachate/groundwater extraction treatment does not address the source which could result in a long-term treatment system. Although Alternatives 2 and 4 differ from Alternative 3 with respect to leachate/groundwater treatment, they would have the same long-term effectiveness because if the desired results are not achieved within the reasonable timeframe for Alternatives 2 and 4, GM would propose a contingency plan. GM would evaluate potential modifications to this treatment system and/or research other potential treatment technologies and their cost and present the evaluation to U.S. EPA to determine whether additional treatment activities were warranted based on costs and benefits.

### 6.1.4 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT

Alternatives 1 and 2 would not reduce the toxicity, mobility, or volume of contaminants through treatment because no treatment is included.

Alternative 4 would provide better reduction of the toxicity, mobility, and volume of contaminated groundwater through treatment than Alternative 3. Ozone sparging proposed in Alternative 4 is a source treatment technology that destroys the source whereas the leachate/groundwater extraction treatment technology proposed in Alternative 3 does not treat the source but only the leachate/groundwater. Both treatments are irreversible, breaking down the products into non-harmful constituents (carbon dioxide and water). Treating the source as opposed to the leachate/groundwater will decrease the amount of residuals after treatment and will reduce the overall treatment timeframe. Alternative 4 is expected to be completed within 2 years reducing the inherent hazards on-Site in a shorter time frame compared to Alternative 3, which is expected to operate for more than 30 years.

### 6.1.5 SHORT-TERM EFFECTIVENESS

All the alternatives except Alternative 1 would pose some degree of short-term risk during their implementation. The significance of the risk would depend on the nature and duration of response action. In addition, under Alternatives 2 through 4, there would be increased traffic in the community and some destruction of Stillwater River habitat as well.

The short-term risks associated with Alternatives 2 through 4 would be similar with respect to construction of the landfill cap, although there may be somewhat more habitat destruction along the riparian zone in Alternative 2 where the side slope of the cap terminates. The riverbank stabilization in Alternative 3, involving construction of the sheet pile wall, would be more extensive, involve more risk to worker safety during installation, involve greater potential of riverbank/landfill failure into the river following vegetation removal and prior to sheet pile completion, and more short term habitat destruction than the riverbank stabilization using ACM in Alternatives 2 and 4. Most of the short-term risk to worker health associated with the components of Alternatives 2 through 4 would result from waste consolidation and fugitive dust emissions during construction activities. There might also be some risks to the environment associated with potential discharges of Site soils and waste to the Stillwater River during bank stabilization and grading activities along the riverbank. Engineering practices such as dust suppression techniques and use of silt fencing would be fairly effective in minimizing short-term impacts during construction activities. Alternatives 3 and 4 include leachate/groundwater collection and/or treatment, whereas Alternatives 1 and 2 do not have leachate/groundwater treatment. Thus, the groundwater component of Alternatives 3 and 4 would be more intrusive and labor-intensive and would require more support equipment and on-Site activities.

Alternative 1 and 2 are estimated to achieve MCLs at the WMB and beyond in approximately 37.5 years (from 1997) based on the calculations for monitored natural attenuation presented in Section 5.2.4, since neither alternative includes groundwater/leachate treatment. With ozone treatment of the source in Alternative 4, the expectation is to achieve MCLs at the WMB and beyond in approximately 33.5 years (from 1997) as detailed in Section 5.2.4. It is estimated that leachate/groundwater extraction treatment in Alternative 3 will be somewhere between 33.5 and 37.5 years to achieve MCLs at the WMB and beyond, since leachate/groundwater extraction treatment is not a source treatment but does treat leachate/groundwater.

## 6.2 IMPLEMENTABILITY

Technical implementability refers to the extent to which a technology has been developed, its ease of construction, the frequency or complexity of its O&M, and the ability to monitor its effectiveness. Administrative implementability refers to the need to coordinate activities (including the issuance of permits) with agencies or offices. The technical and administrative implementability of the four response action alternatives developed for the Garland Road Landfill Site is compared below.

### 6.2.1 TECHNICAL IMPLEMENTABILITY

Alternative 1 would require no technical implementation and would therefore be the easiest alternative to implement. Alternatives 2 through 4 all include proven technologies that have been used at numerous sites. Alternatives 2 through 4 all include a cap and riverbank stabilization. The caps in Alternatives 2 through 4 are roughly similar to implement, although the transition at the edge of the cap for the Alternative 2 cap could be somewhat challenging due to the blending of a thick cap into existing grades. The sheet pile wall in Alternative 3 would be the most difficult and labor intensive riverbank stabilization component to implement. Implementing the work without slope failure or accidental discharge to of soil into the Stillwater River may be difficult.

The ability to technically implement Alternative 4 is easier than Alternative 3 with respect to leachate/groundwater collection and/or treatment. Since the Site is within the floodplain of the Stillwater River, which inundates the Site on average once every 2 years, the potential for flooding of the systems required for leachate/groundwater extraction and treatment system proposed in Alternative 3 is greater than the ozone sparging system proposed in Alternative 4 because of the length of treatment (2 years for ozone treatment and 30 plus years for leachate/groundwater extraction and treatment). The leachate extraction system and air stripper would also require regular long-term inspection and maintenance. Iron fouling of the air stripper is a common technical challenge in treating anoxic landfill leachate and groundwater. The ozone sparging system included in Alternative 4 would require regular inspection and maintenance, but for a much shorter time period and with few anticipated complications. The effectiveness of the ozone sparging is related to the ability to adequately disperse the ozone into the effected areas of the aquifer. Therefore, a pre-design assessment of groundwater conditions will be implemented. Alternatives 1 and 2 do not provide for groundwater treatment.

The ability to monitor the effectiveness of the leachate containment system in Alternative 3 would be limited to a degree by the presence of the Stillwater River immediately downgradient of the Site. Because monitoring wells could not be installed immediately downgradient of the sheet pile wall, the effectiveness of the containment system would be indirectly evaluated by monitoring the water levels in the extraction wells to ensure that they are lower than the level of the Stillwater River. The effectiveness of leachate treatment would be evaluated by sampling air stripper influent and effluent. The effectiveness of the ozone sparging would be evaluated by the collection of samples from the monitoring wells installed downgradient of the ozone treatment. The effectiveness of the cap and of riverbank stabilization would be evaluated by direct observation during inspections. Groundwater monitoring would be critical for evaluating the effectiveness of groundwater remediation south of the landfill. Under Alternative 3, groundwater monitoring would be used to verify the groundwater extraction system's capture zones and to evaluate the changes in VOC concentrations over time. Under Alternative 4 groundwater monitoring would be used to evaluate the effectiveness of ozone sparging and to determine whether it is necessary to initiate contingent groundwater extraction.

### 6.2.2 ADMINISTRATIVE IMPLEMENTABILITY

Alternative 1 would be relatively easy to implement administratively because no active work is required. Alternatives 2 through 4 include riverbank stabilization components, and although no permits are required it would be necessary to coordinate activities along the riverbank with state agencies such as OEPA, ODNR, MCD, as well as with the U.S. Army Corps of Engineers. The sheet pile wall in Alternative 3 would provide the most administrative challenges because it would be removing both floodway and floodplain storage from the watershed. Alternatives 2 through 4 include the same institutional controls (access and deed restrictions); thus, they would have the same administrative implementability in that regard. Alternatives 2 through 4 also include additional investigation, which includes construction of monitoring wells within the neighbor's farmland. The neighbor must be notified of the locations of the monitoring wells within his field to ensure their safety.

## 6.3 COST

The present-worth costs for the alternatives, from highest to lowest, are as follows: (1) Alternative 3 at **$16,453,691**; (2) Alternative 2 at **$6,506,965**; (3) Alternative 4 at **$5,578,621**

## 6.4 RESPONSE ACTION SCHEDULE

Response action schedules for Alternatives 2 through 4 are presented on Figures 6.1 through 6.3, respectively. These timeframes are estimated and will vary depending on the Site owner and the regulatory environment. The schedules were developed with a milestone date for approval of this Revised EE/CA Report and selection of the Site remedy as the start date. A start date of January 1, 2007, has been arbitrarily selected. This start date is tentative and will be revised at a later time because the length of time required for U.S. EPA and OEPA review of the Revised EE/CA Report and for community comment on the report is unknown. In addition, the schedules will be revised once a start date is finalized to allow for work stoppages during spring flooding and to minimize flood damage to uncompleted works.

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# FIGURES

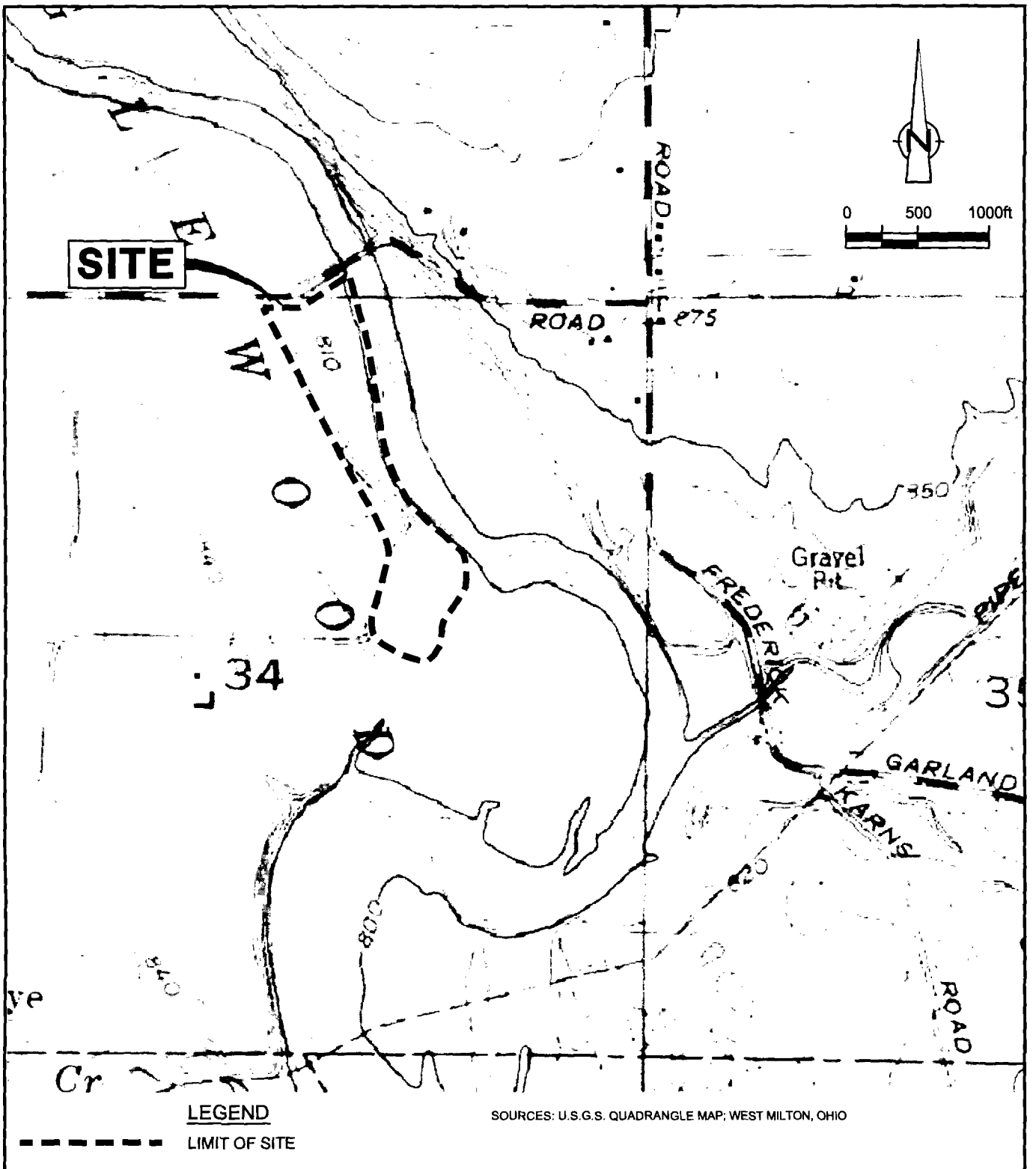



figure 2.1

SITE LOCATION
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

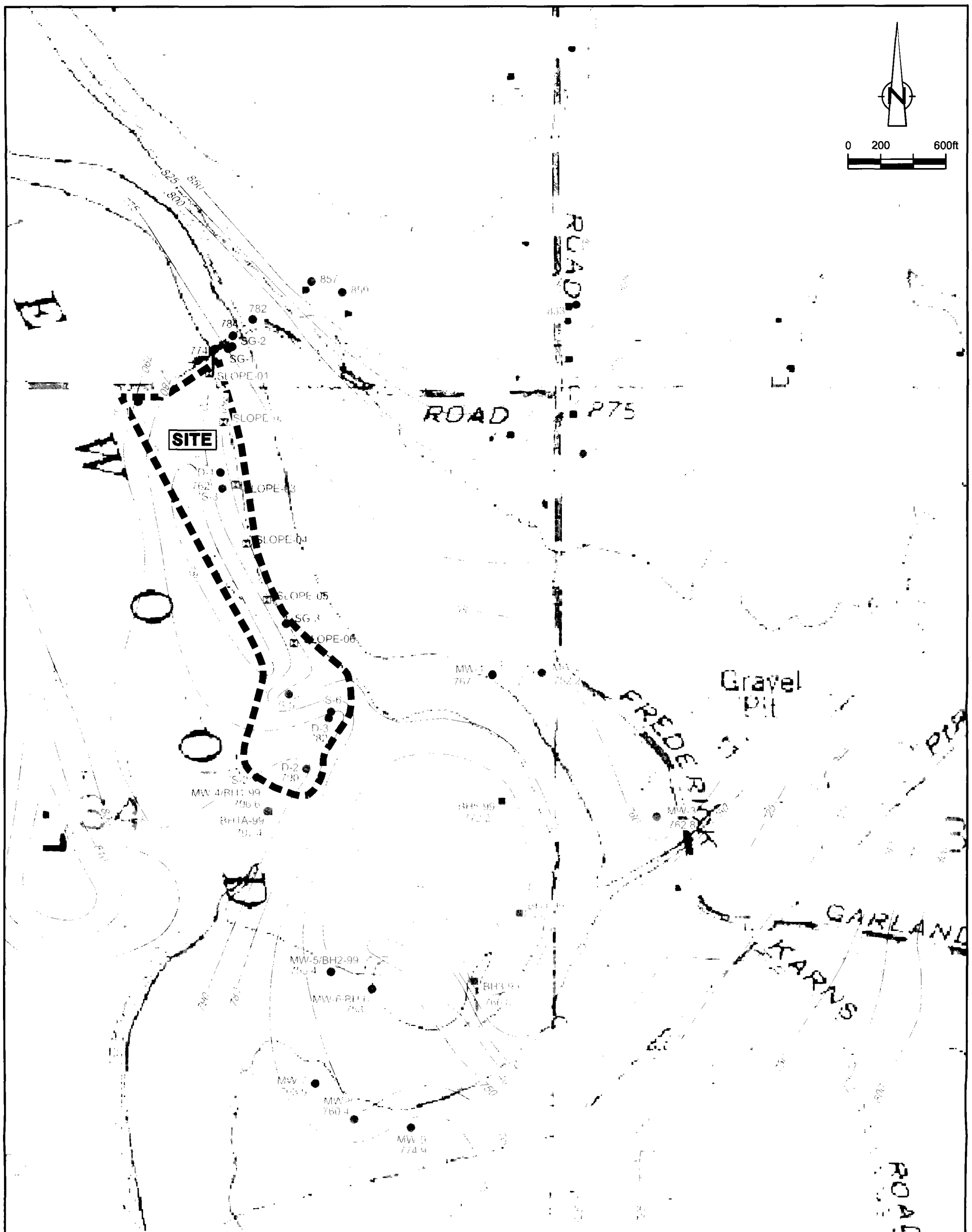
07043-90(014)GN-WA008 MAY 31/2006

figure 2.2

SITE PLAN
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

SOURCE: HENDERSON AERIAL SURVEY, 2006.

07043-90(014)GN-WA009 JUN 23/2006




## LEGEND

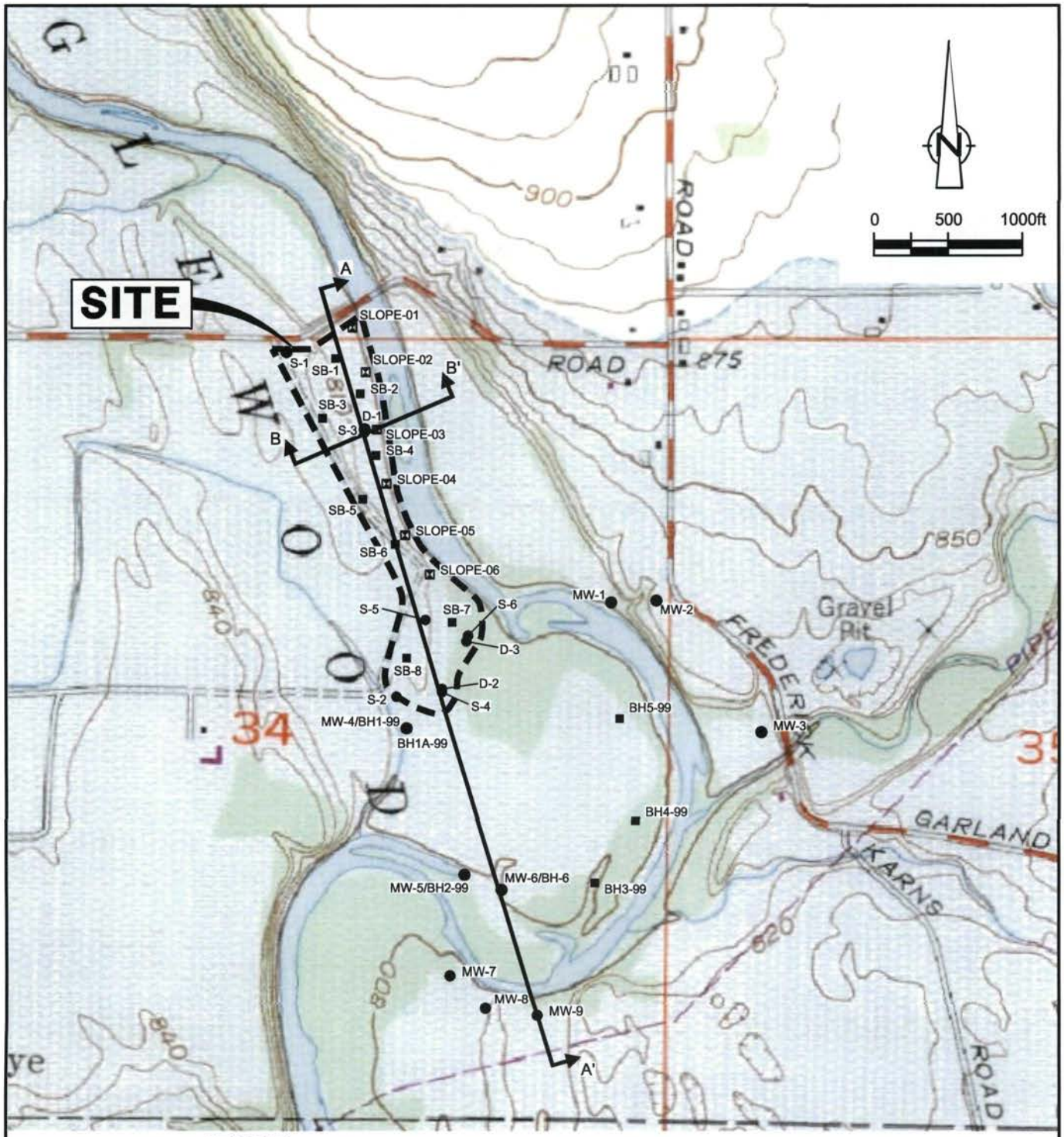
- LIMIT OF SITE
- TOP OF BEDROCK ELEVATION (FT. AMSL)
- TOP OF BEDROCK ELEVATION
- MONITORING WELL LOCATION
- APPROXIMATE LOCATION OF SLOPE STABILITY BORING
- STAFF GAUGE LOCATION
- SOIL BORING LOCATION

SOURCES:
U.S.G.S. QUADRANGLE MAP; WEST MILTON, OHIO WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000 AND JUNE 2001 NOVA CONSULTING INC.
BEDROCK CONTOURS FROM ODNR, 1994; MAP BG-B5H3.

figure 2.3

MONITORING WELL, STAFF GAUGE, AND SOIL BORING LOCATIONS
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA010 JUN 23/2006




LEGEND

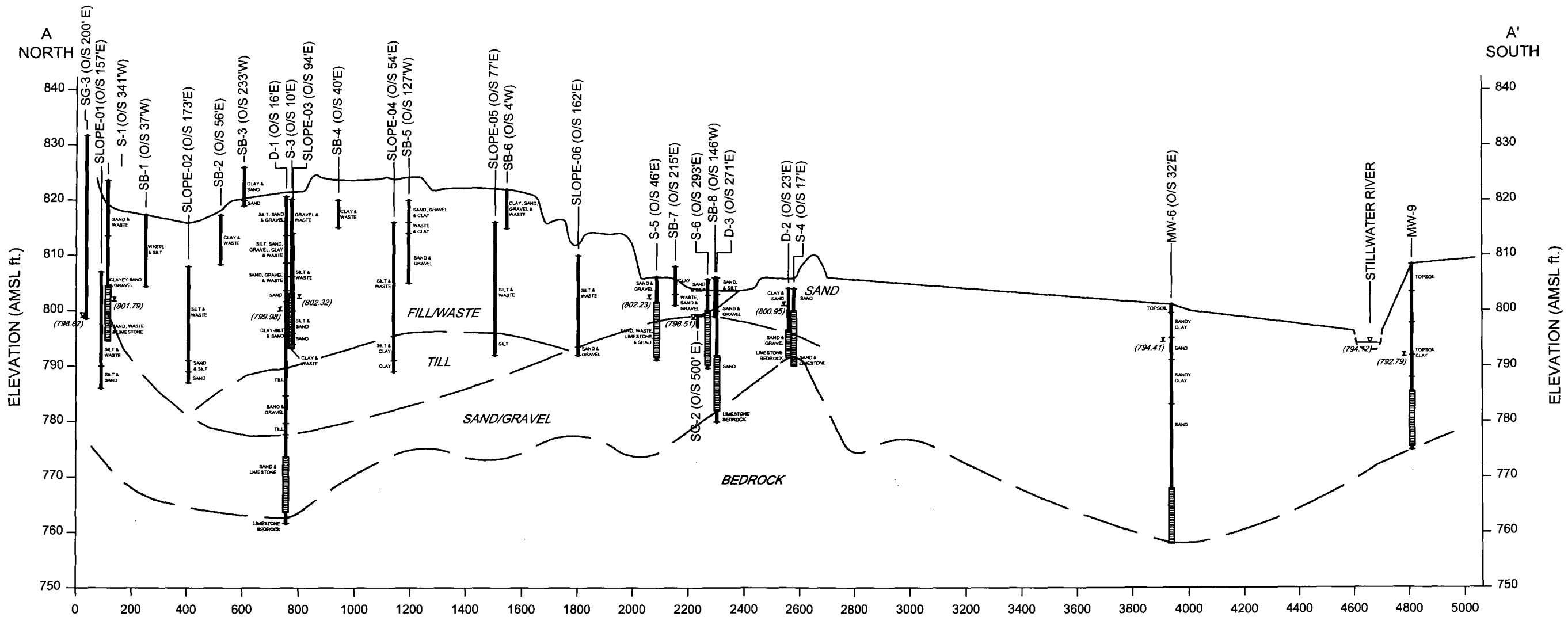
| | |
|---|---|
| — — — — | LIMIT OF SITE |
| ■ BH4-99 | BOREHOLE LOCATION |
| ■ SB-2 | SOIL BORING LOCATION |
| ● MW-9 | MONITORING WELL LOCATION |
| ⊞ SLOPE-02 | APPROXIMATE LOCATION OF SLOPE STABILITY BORING |
| A | CROSS-SECTION LOCATION |

SOURCES: U.S.G.S. QUADRANGLE MAP;
WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000
AND JUNE 2001
NOVA CONSULTING INC.

figure 2.4

CROSS-SECTION LOCATIONS
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA011 JUN 23/2006




SCALE: VERT: 1"=20'
HORZ. 1"=400'

## LEGEND

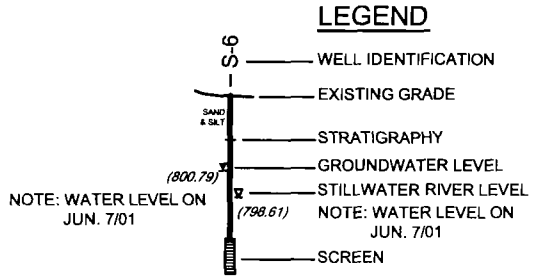
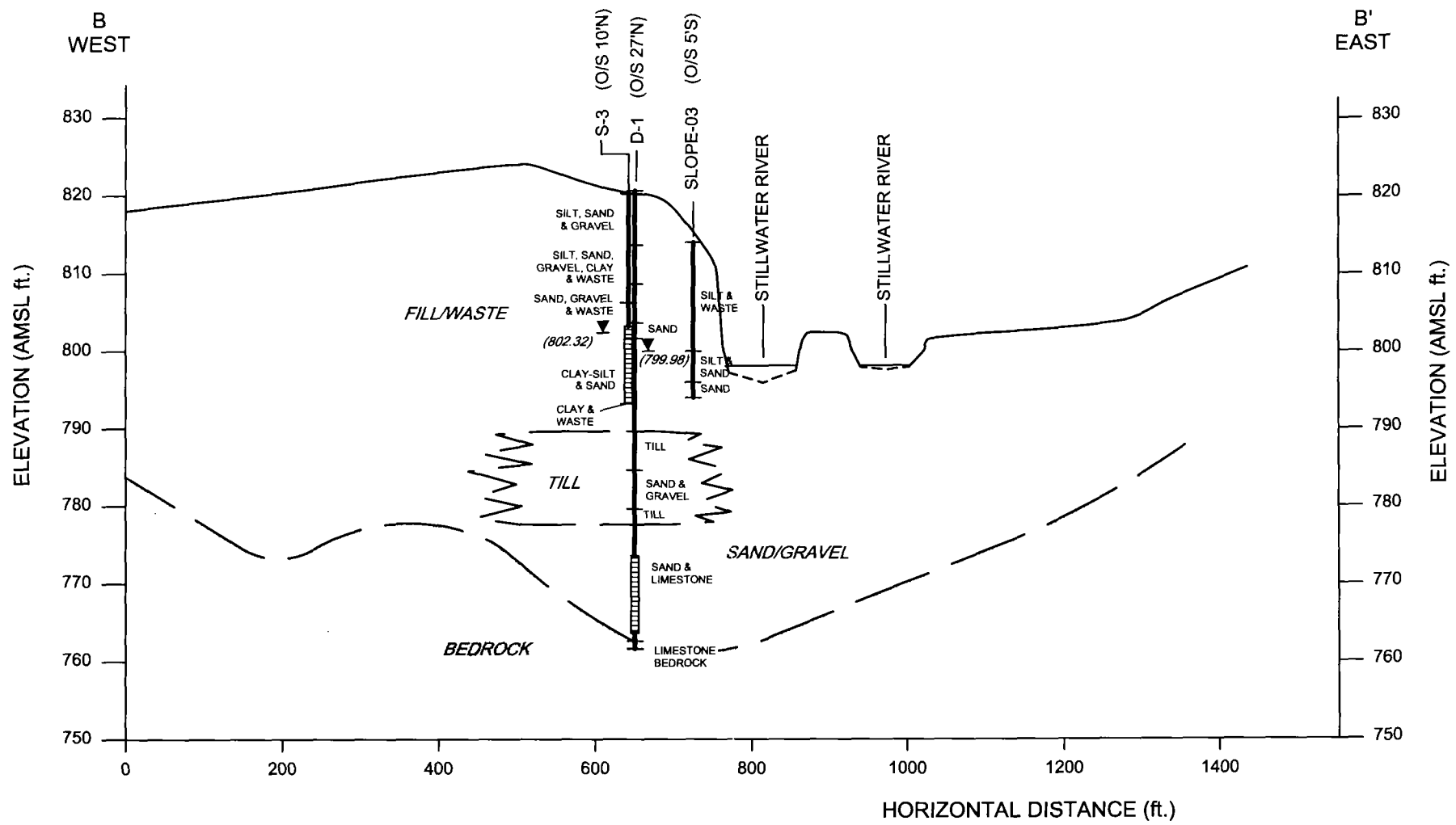


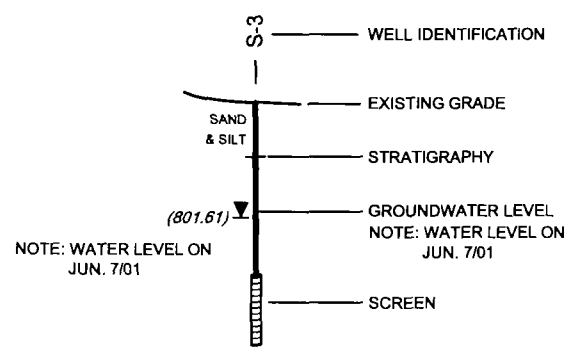

figure 2.5

CROSS-SECTION A-A'
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA012 MAY 31/2006




## LEGEND




NOTE: U.S.G.S. QUADRANGLE MAP CONTOURS USED BEYOND SITE BOUNDARY FOR ADDITIONAL INFORMATION

figure 2.6

CROSS-SECTION B-B'
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA013 JUN 05/2006

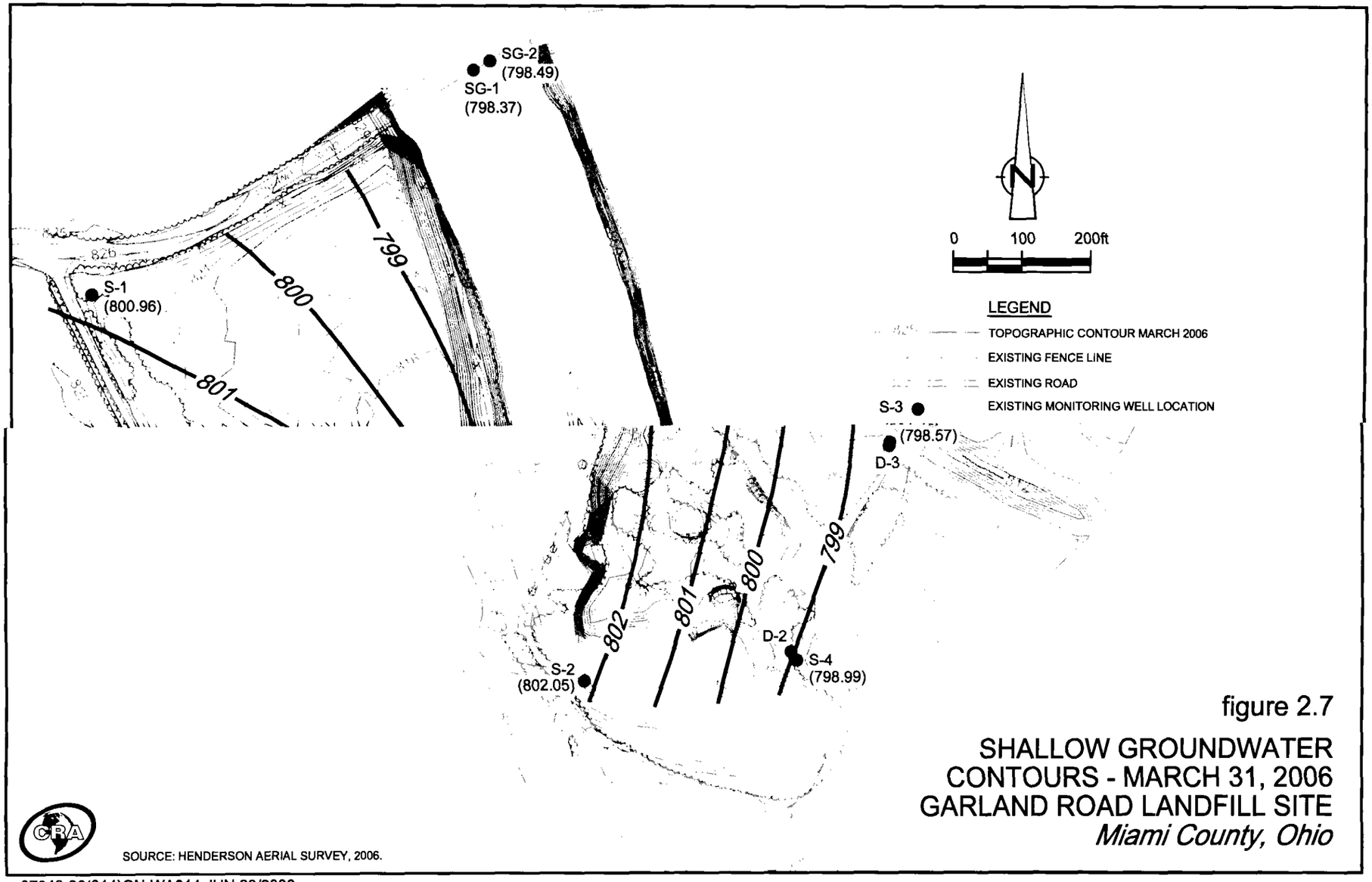



figure 2.7

SHALLOW GROUNDWATER CONTOURS - MARCH 31, 2006
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

SOURCE: HENDERSON AERIAL SURVEY, 2006.

07043-90(014)GN-WA014 JUN 23/2006

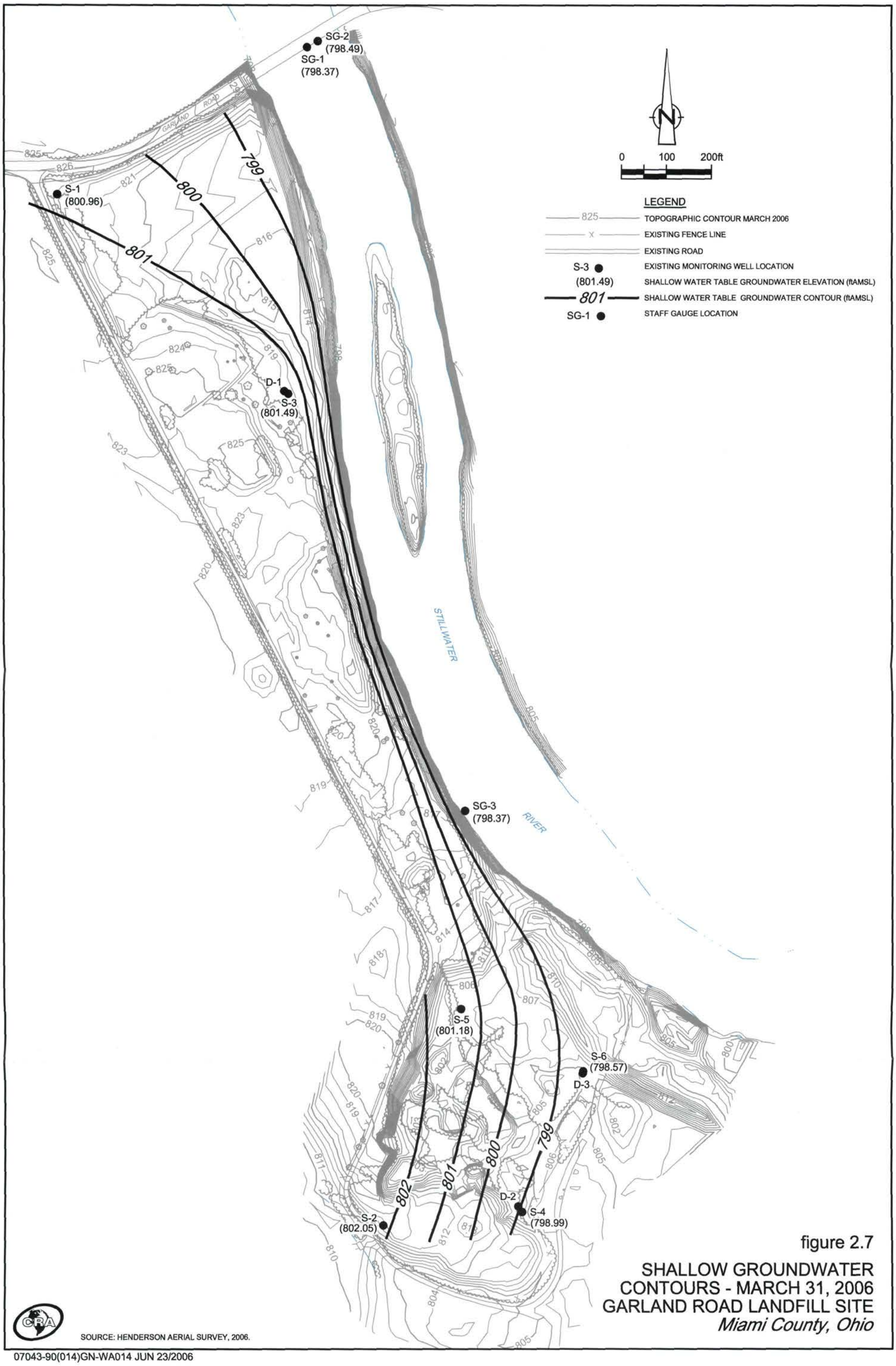



figure 2.7

SHALLOW GROUNDWATER CONTOURS - MARCH 31, 2006
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

SOURCE: HENDERSON AERIAL SURVEY, 2006.

07043-90(014)GN-WA014 JUN 23/2006

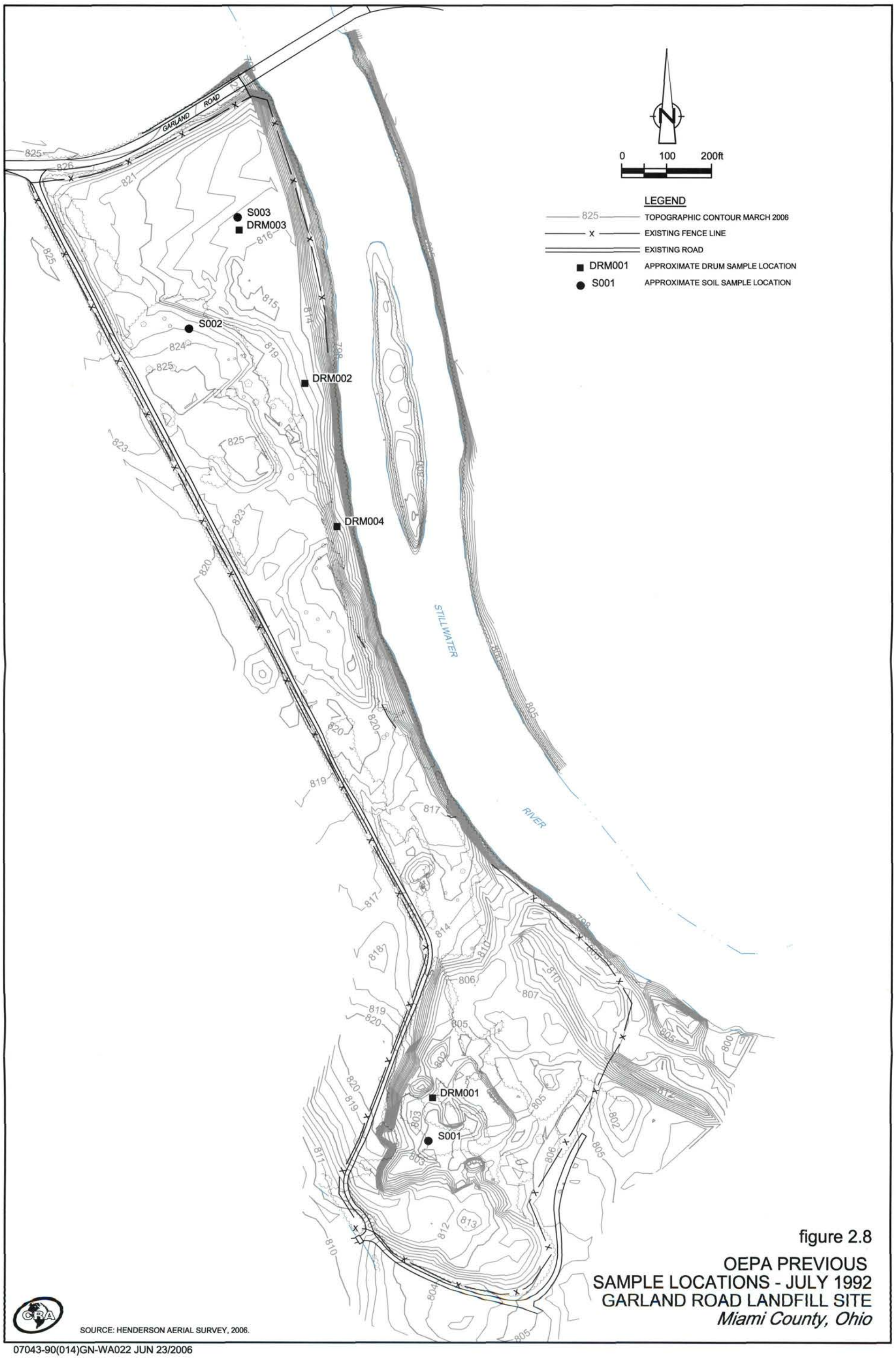



figure 2.8

OEPA PREVIOUS
SAMPLE LOCATIONS - JULY 1992
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

SOURCE: HENDERSON AERIAL SURVEY, 2006.

07043-90(014)GN-WA022 JUN 23/2006

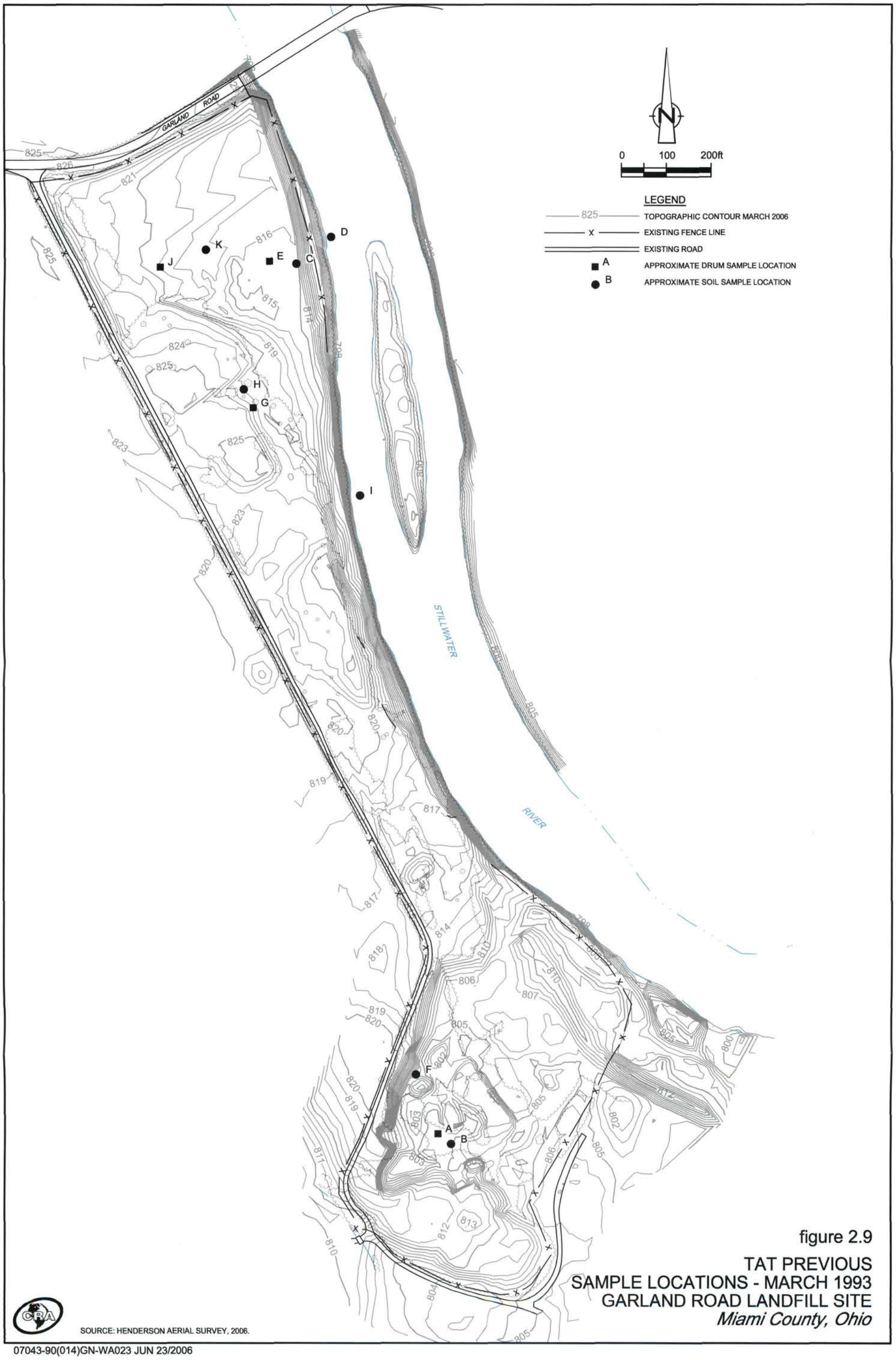



figure 2.9

TAT PREVIOUS
SAMPLE LOCATIONS - MARCH 1993
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

SOURCE: HENDERSON AERIAL SURVEY, 2006.

07043-90(014)GN-WA023 JUN 23/2006

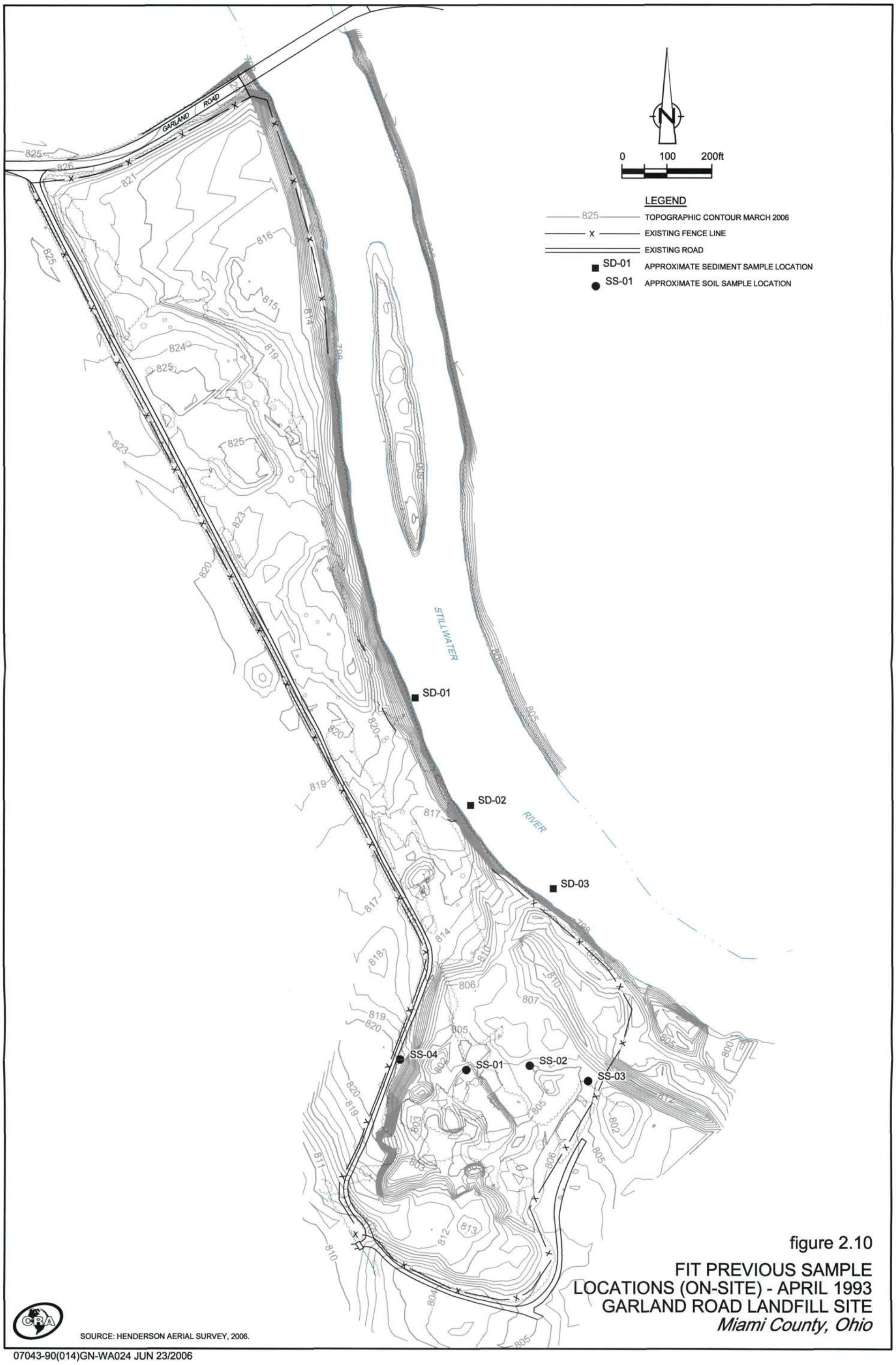
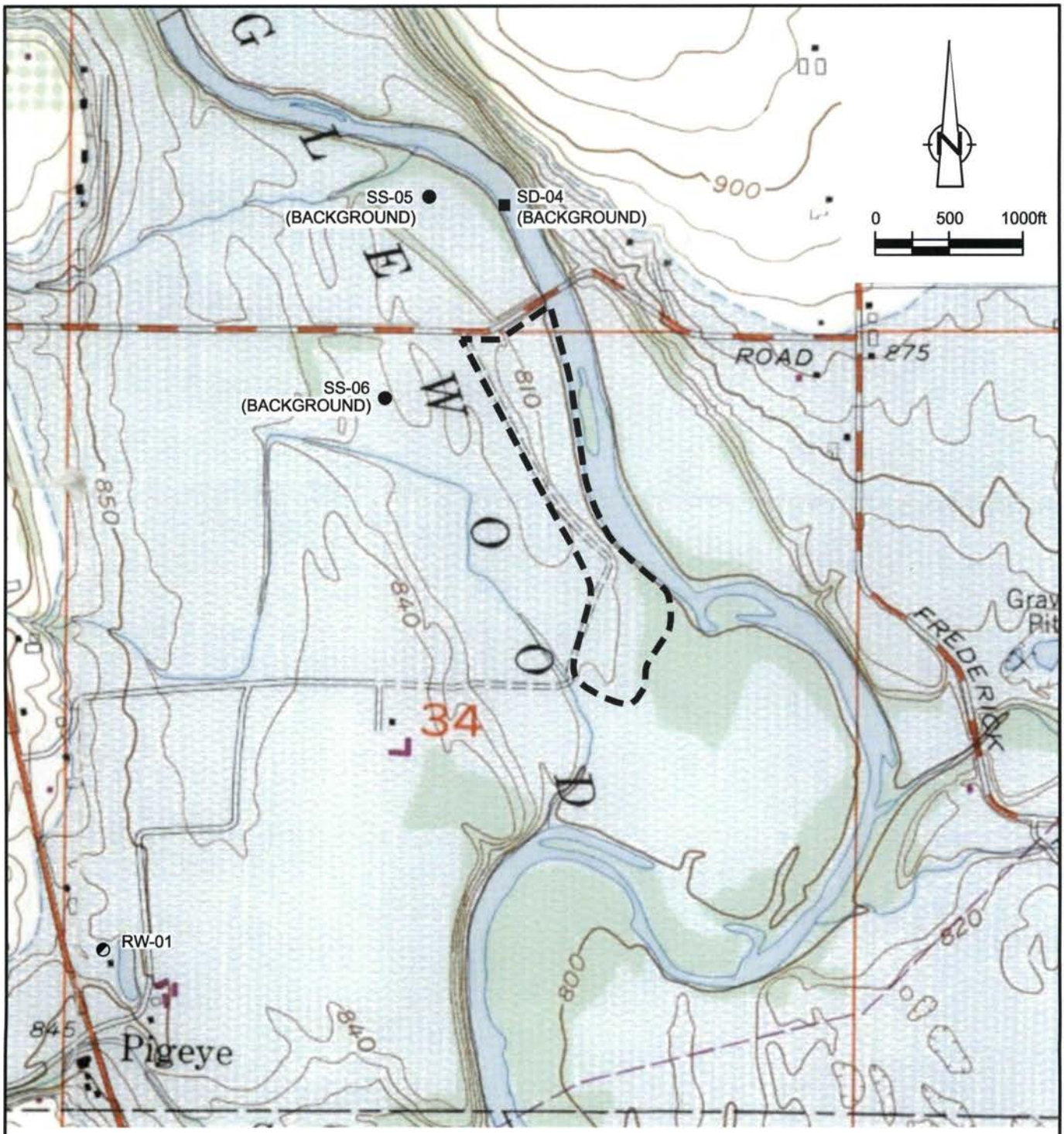



figure 2.10

FIT PREVIOUS SAMPLE LOCATIONS (ON-SITE) - APRIL 1993
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

SOURCE: HENDERSON AERIAL SURVEY, 2006.

07043-90(014)GN-WA024 JUN 23/2006




LEGEND

SOURCE: U.S.G.S. QUADRANGLE MAP; WEST MILTON, OHIO

- LIMIT OF SITE
- SD-01 APPROXIMATE SEDIMENT SAMPLE LOCATION
- SS-01 APPROXIMATE SOIL SAMPLE LOCATION
- RW-01 APPROXIMATE RESIDENTIAL WELL SAMPLE LOCATION

figure 2.11

FIT PREVIOUS SAMPLE LOCATIONS (OFF-SITE) - APRIL 1993
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA025 JUN 05/2006

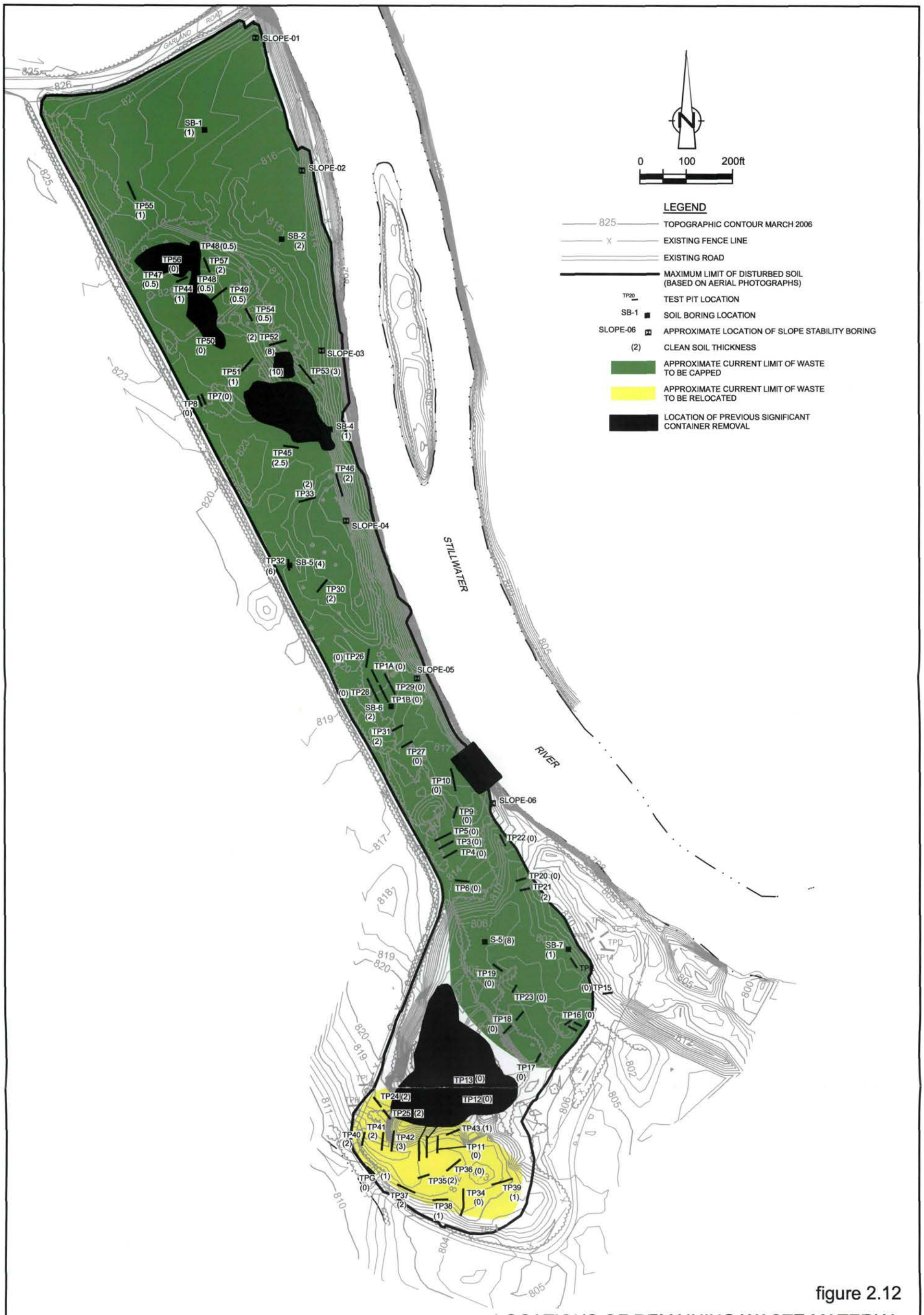



figure 2.12

LOCATIONS OF REMAINING WASTE MATERIAL
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

SOURCE: HENDERSON AERIAL SURVEY, 2006.

07043-90(014)GN-WA001 JUN 23/2006

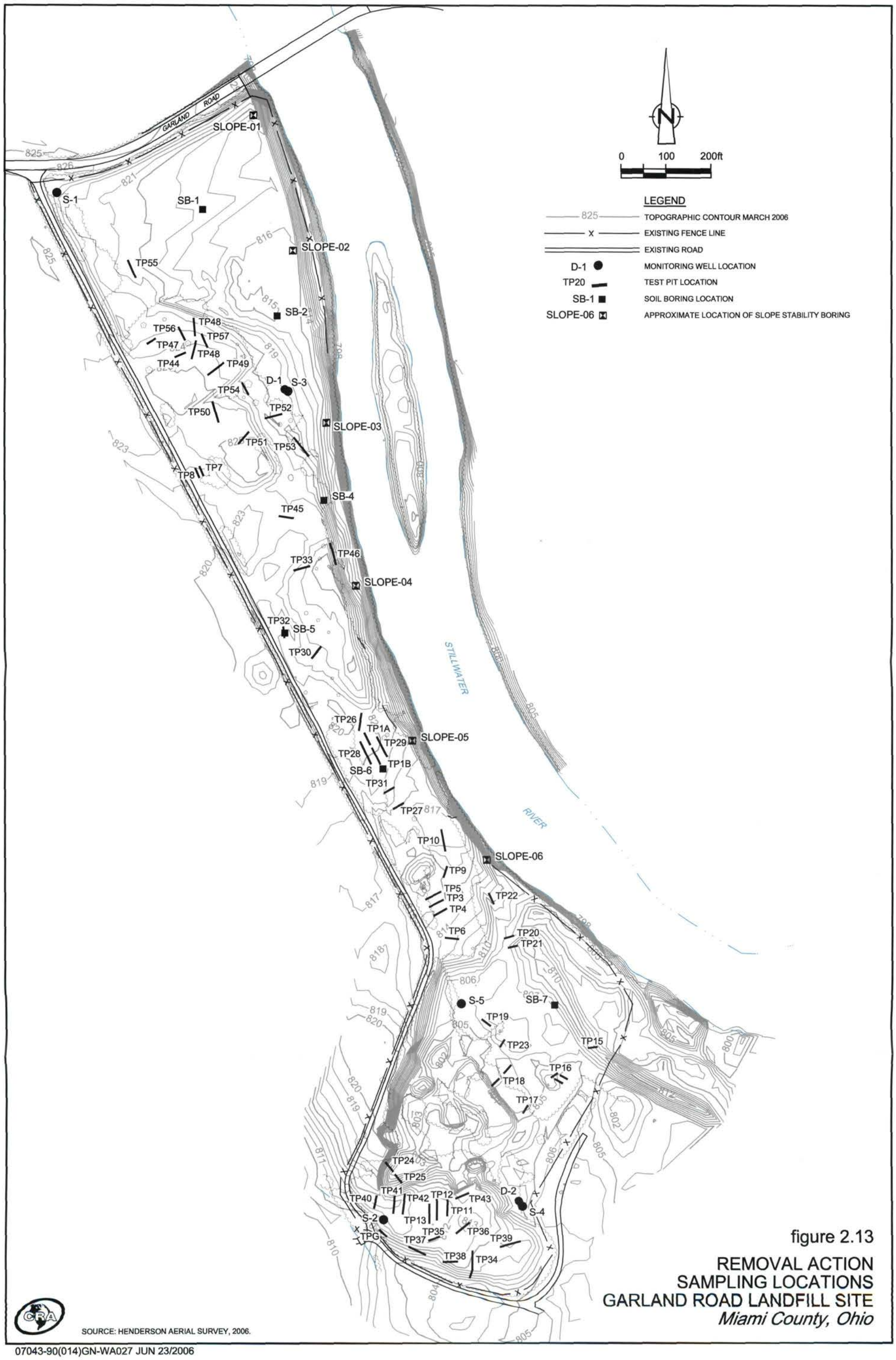



figure 2.13

REMOVAL ACTION
SAMPLING LOCATIONS
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

SOURCE: HENDERSON AERIAL SURVEY, 2006.

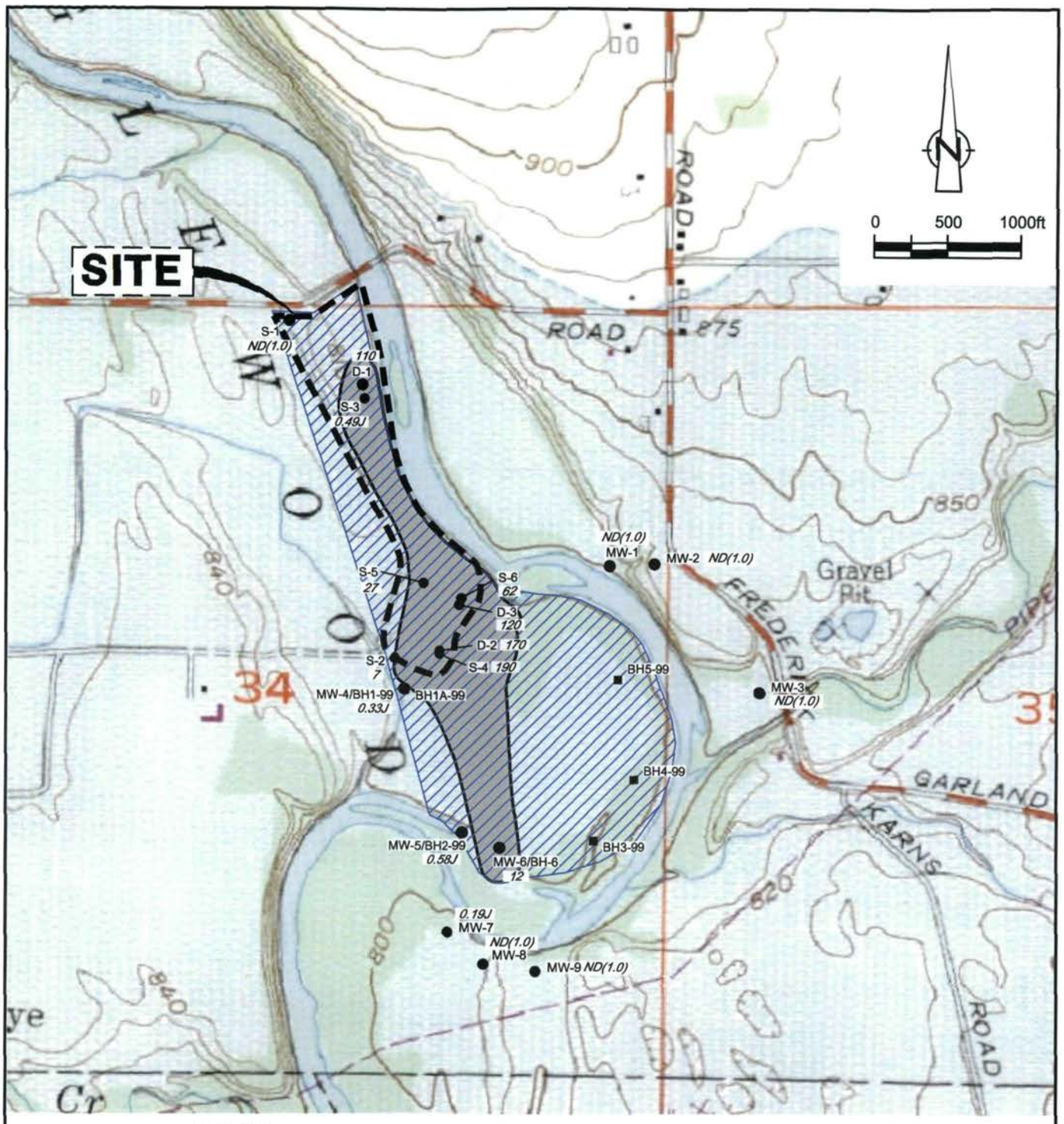
07043-90(014)GN-WA027 JUN 23/2006

SOURCE: HENDERSON AERIAL SURVEY, 2006.

figure 2.14

EE/CA SAMPLING LOCATIONS
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA026 JUN 23/2006




LEGEND

- LIMIT OF SITE
- BH4-99 BOREHOLE LOCATION
- MW-9 MONITORING WELL LOCATION
- J ESTIMATED
- APPROXIMATE EXTENT OF TRICHLOROETHENE ABOVE MCL
- PROPOSED LIMITS OF INSTITUTIONAL CONTROLS

SOURCES: U.S.G.S. QUADRANGLE MAP; WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000 AND JUNE 2001
NOVA CONSULTING INC.

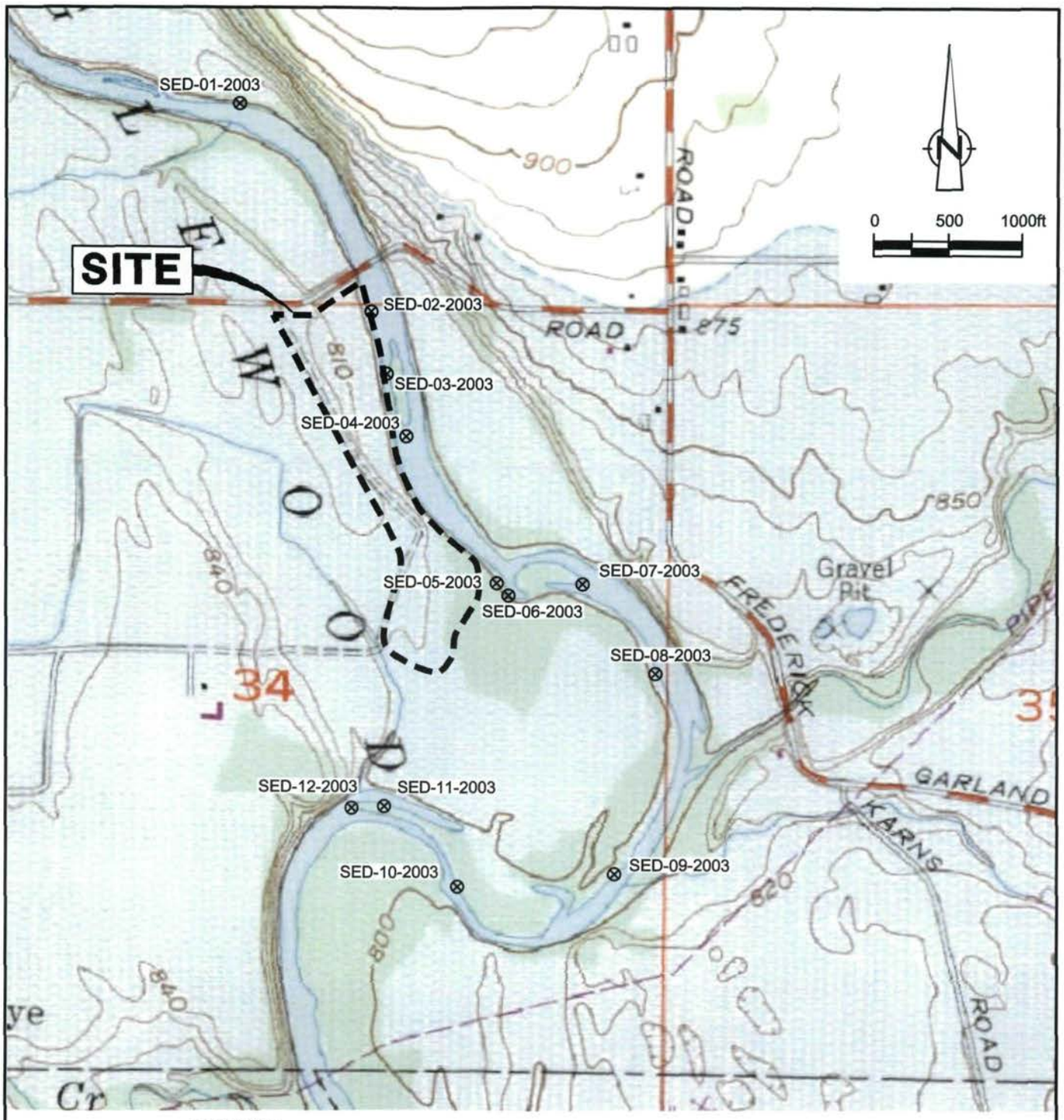
figure 2.15

PROPOSED LIMITS OF INSTITUTIONAL CONTROLS
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

NOTES

1) ALL UNITS IN µg/L
2) MCL = 5 µg/L
3) JUNE 2002 DATA

07043-90(014)GN-WA038 JUN 23/2006




LEGEND

SOURCE: U.S.G.S. QUADRANGLE MAP; WEST MILTON, OHIO

- - - - - LIMIT OF SITE

⊗ SED-02-2003 APPROXIMATE SEDIMENT SAMPLE LOCATION

figure 2.16

2003 SEDIMENT SAMPLE LOCATIONS
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA037 JUN 23/2006

figure 5.1

ALTERNATIVE 2: EXTENT OF CAP AND RIVERBANK STABILIZATION GARLAND ROAD LANDFILL SITE

*Miami County, Ohio*

SOURCE: HENDERSON AERIAL SURVEY, 2006.

07043-90(014)GN-WA031 JUN 23/2006

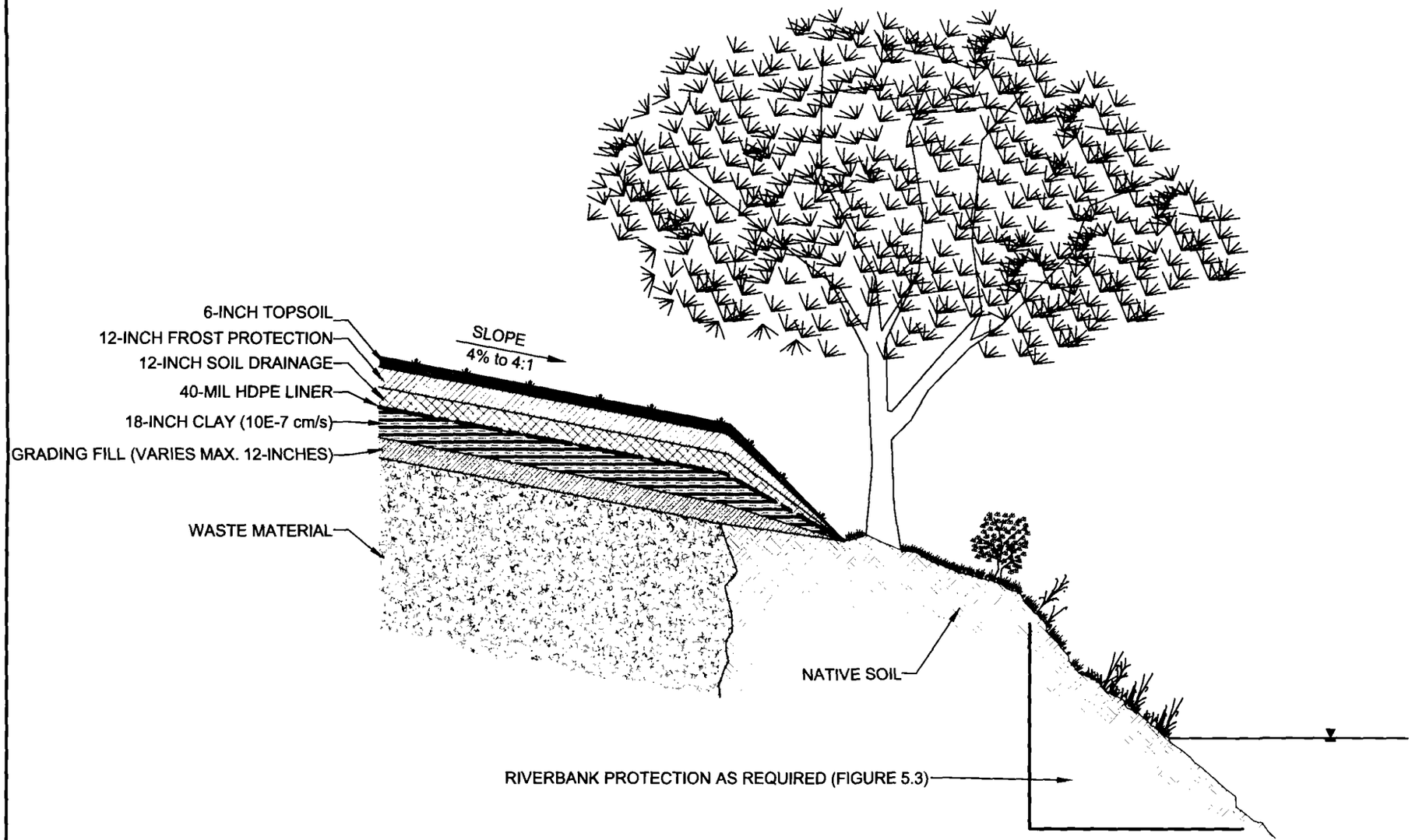


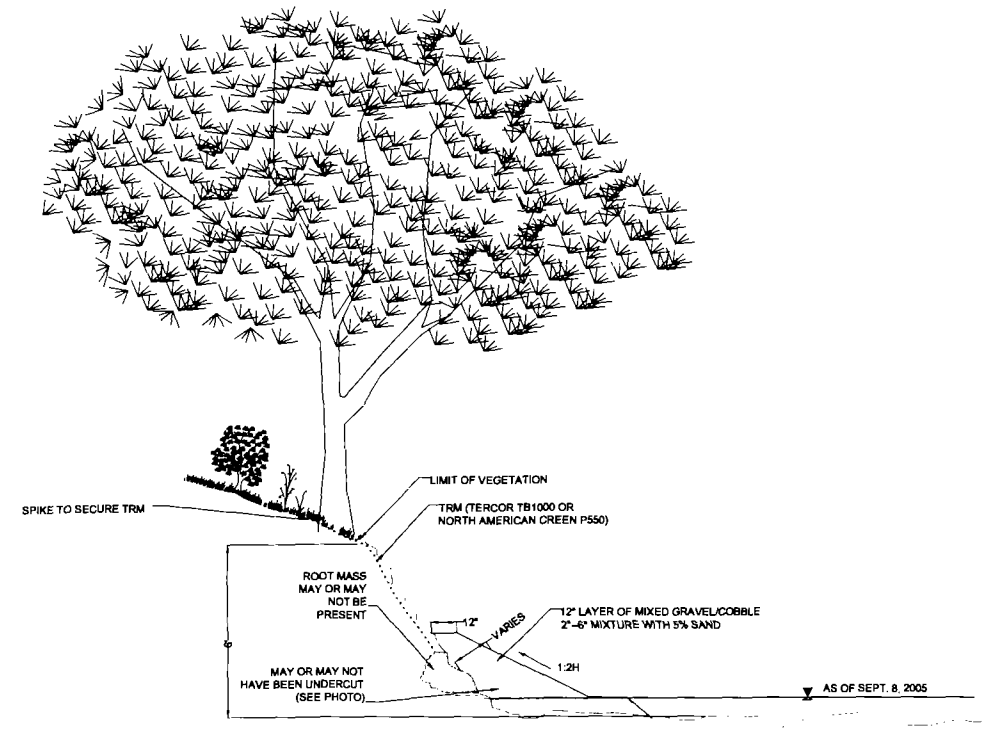

figure 5.2

TYPICAL SECTION ALTERNATIVE 2
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

NOTE:
NOT TO SCALE

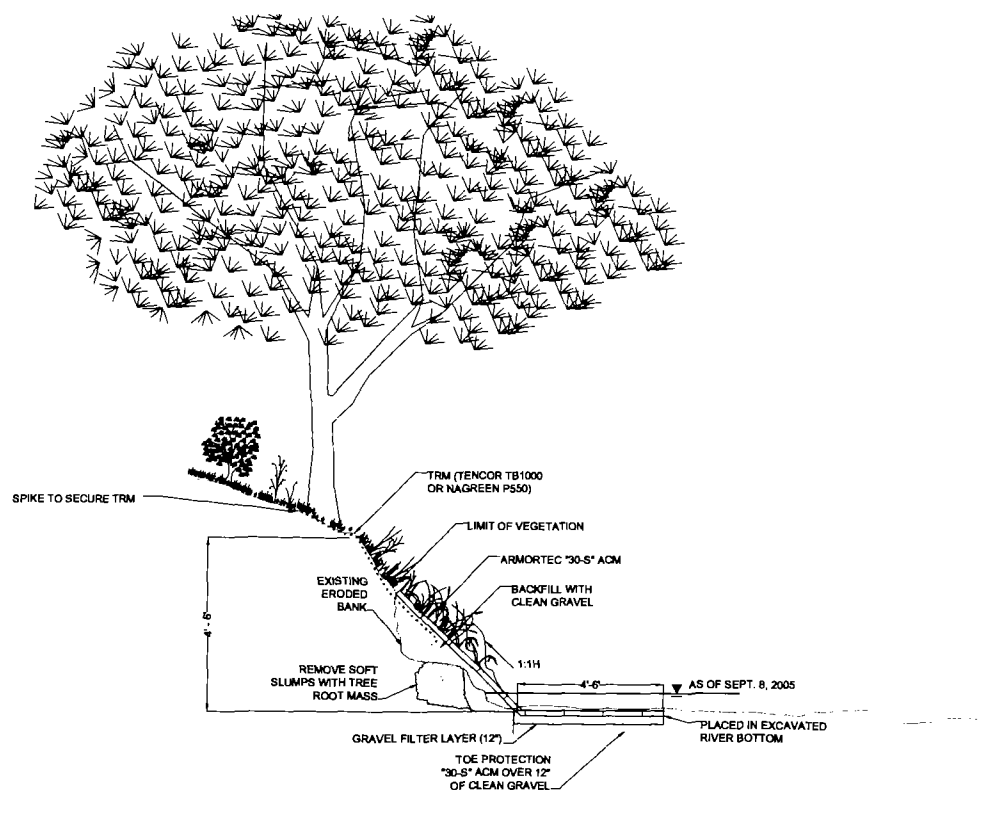
07043-90(014)GN-WA040 JUN 23/2006

DO
NOTHING



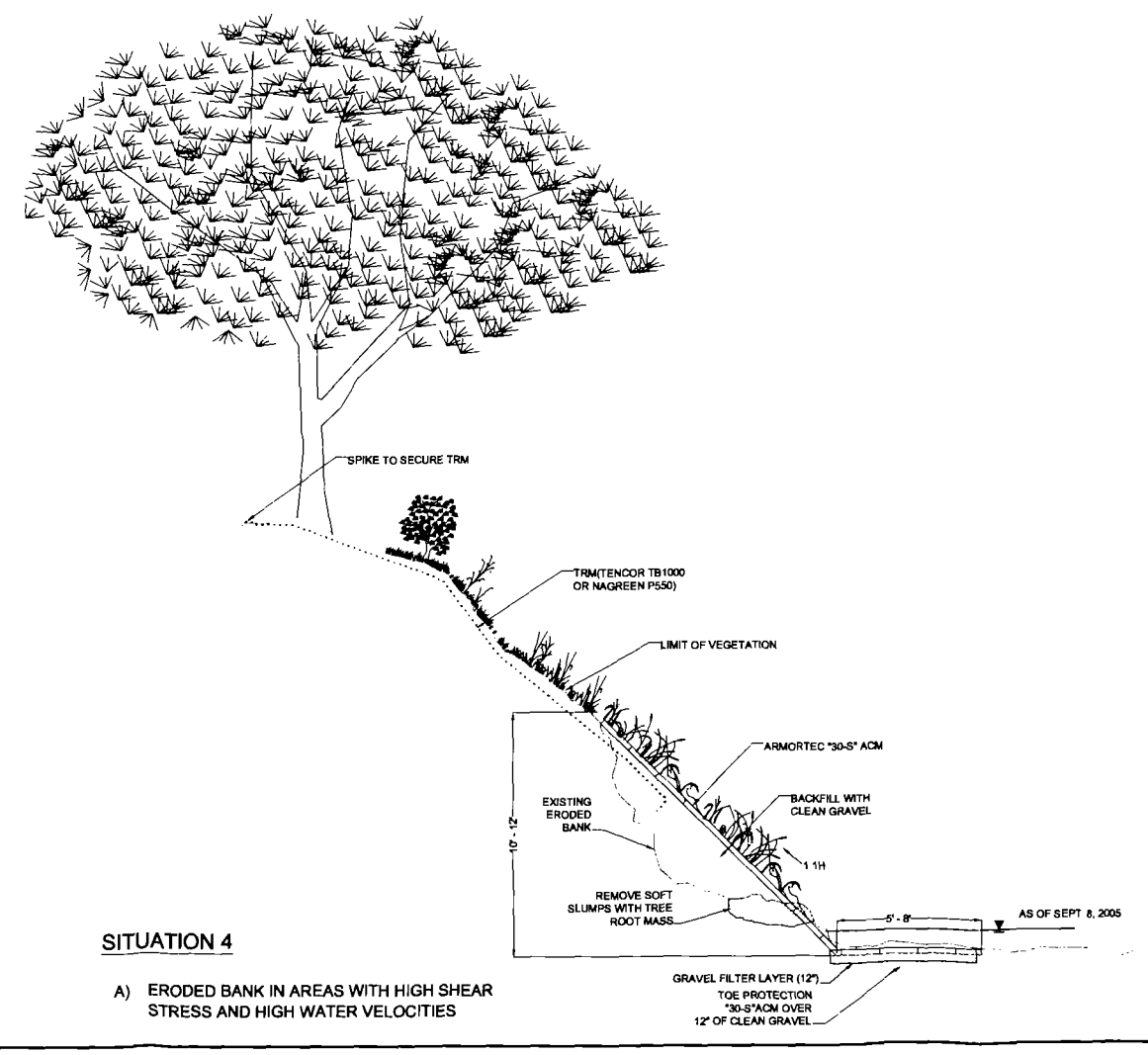

## SITUATION 1

A) SHORELINE WITH "NO" TO "LOW" EROSION POTENTIAL
B) SLOPE OF SHORELINE IS 1V : 1 ½H OR 1V : 2H




## SITUATION 2

A) SHORELINE WITH "LOW" EROSION POTENTIAL
B) CUT OR OVERSTEEP BANK




## SITUATION 3

A) ERODED BANK WITH STABLE VEGETATION,AREAS WITH MILD SHEAR STRESS AND MODERATE WATER VELOCITIES

## SITUATION 4

A) ERODED BANK IN AREAS WITH HIGH SHEAR STRESS AND HIGH WATER VELOCITIES

| Nº | Revision | Date | Initial |
|---|---|---|---|
| | | | |

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

| Status | Date | Initial |
|---|---|---|
| | | |

GARLAND ROAD LANDFILL SITE

MIAMI COUNTY, OHIO

DETAILS FOR PROPOSED STABILIZED RIVERBANK SITUATION

CONESTOGA-ROVERS & ASSOCIATES

Source References.

| Project Manager | Reviewed By | Date | |
|---|---|---|---|
| MRT | JEP | JUNE 2006 | |
| Scale: | Project Nº: 07043-90 | Report Nº: 014 | Drawing Nº 5.3 |

07043-90(014)GN-WA028 JUN 23/2006

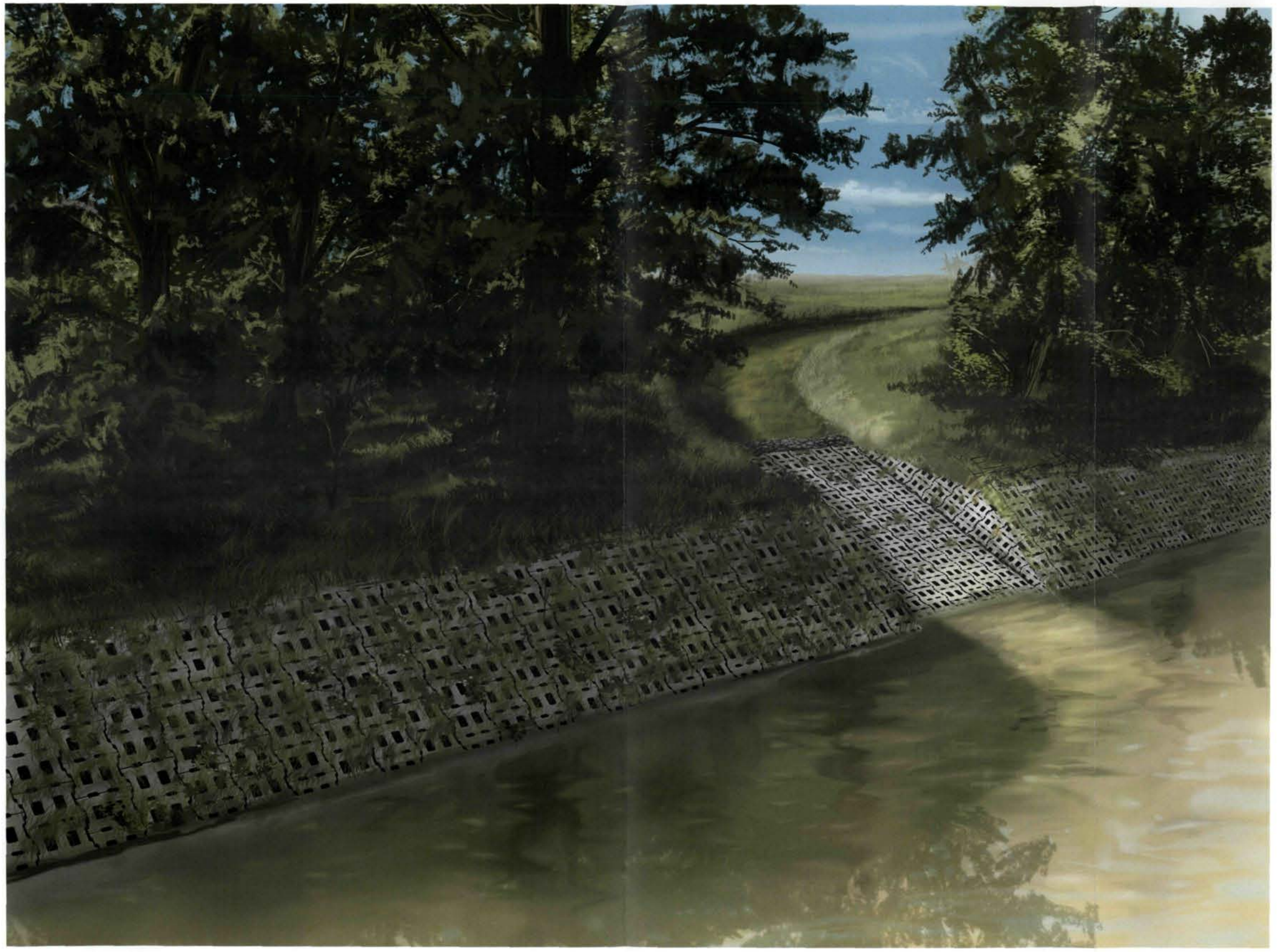
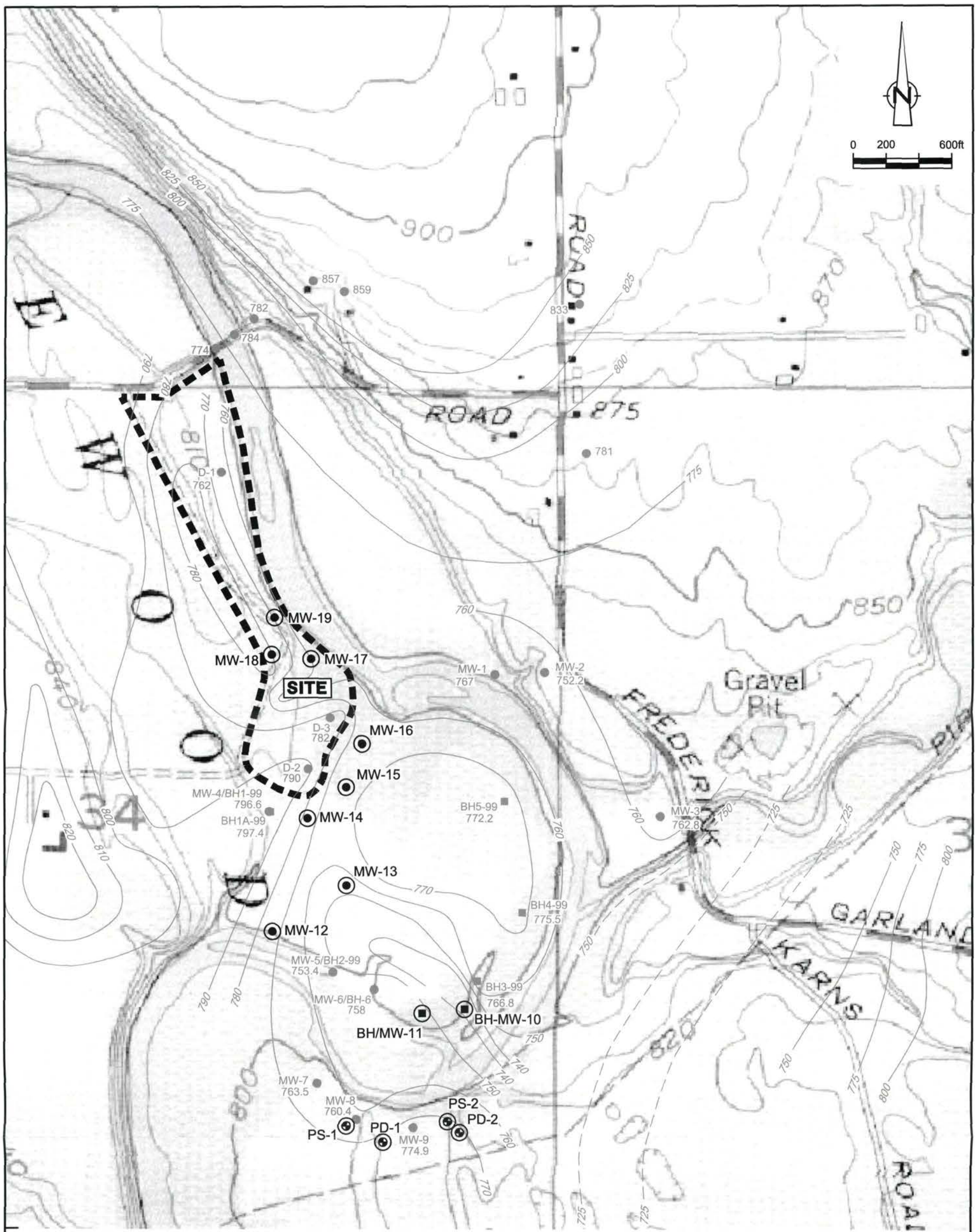


figure 5.4

CONCEPTUAL RIVERBANK STABILIZATION
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA044 JUN 21/2006




LEGEND

| | |
|---|---|
| ▬ ▬ ▬ ▬ | LIMIT OF SITE |
| 800 | TOP OF BEDROCK ELEVATION (FT. AMSL) |
| ● 905 | TOP OF BEDROCK ELEVATION |
| ● MW-9 | MONITORING WELL LOCATION |
| ◉ BH-11 | PROPOSED BOREHOLE/WELL |
| ⊕ PS-1 | PROPOSED WATER TABLE PIEZOMETER |
| ⊕ PD-1 | PROPOSED DEEP OVERBURDEN PIEZOMETER |
| ◉ MW-12 | PROPOSED MONITORING WELL |

figure 5.5

PROPOSED GROUNDWATER MONITORING PROGRAM WELL LOCATIONS
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

SOURCES:
U.S.G.S. QUADRANGLE MAP; WEST MILTON, OHIO WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000 AND JUNE 2001 NOVA CONSULTING INC.
BEDROCK CONTOURS FROM ODNR, 1994; MAP BG-B5H3.

07043-90(014)GN-WA034 JUN 23/2006

figure 5.6

ALTERNATIVE 3: EXTENT OF CAP, LEACHATE EXTRACTION AND TREATMENT SYSTEM, AND SHEET PILE WALL
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

SOURCE: HENDERSON AERIAL SURVEY, 2006.

07043-90(014)GN-WA033 JUN 23/2006

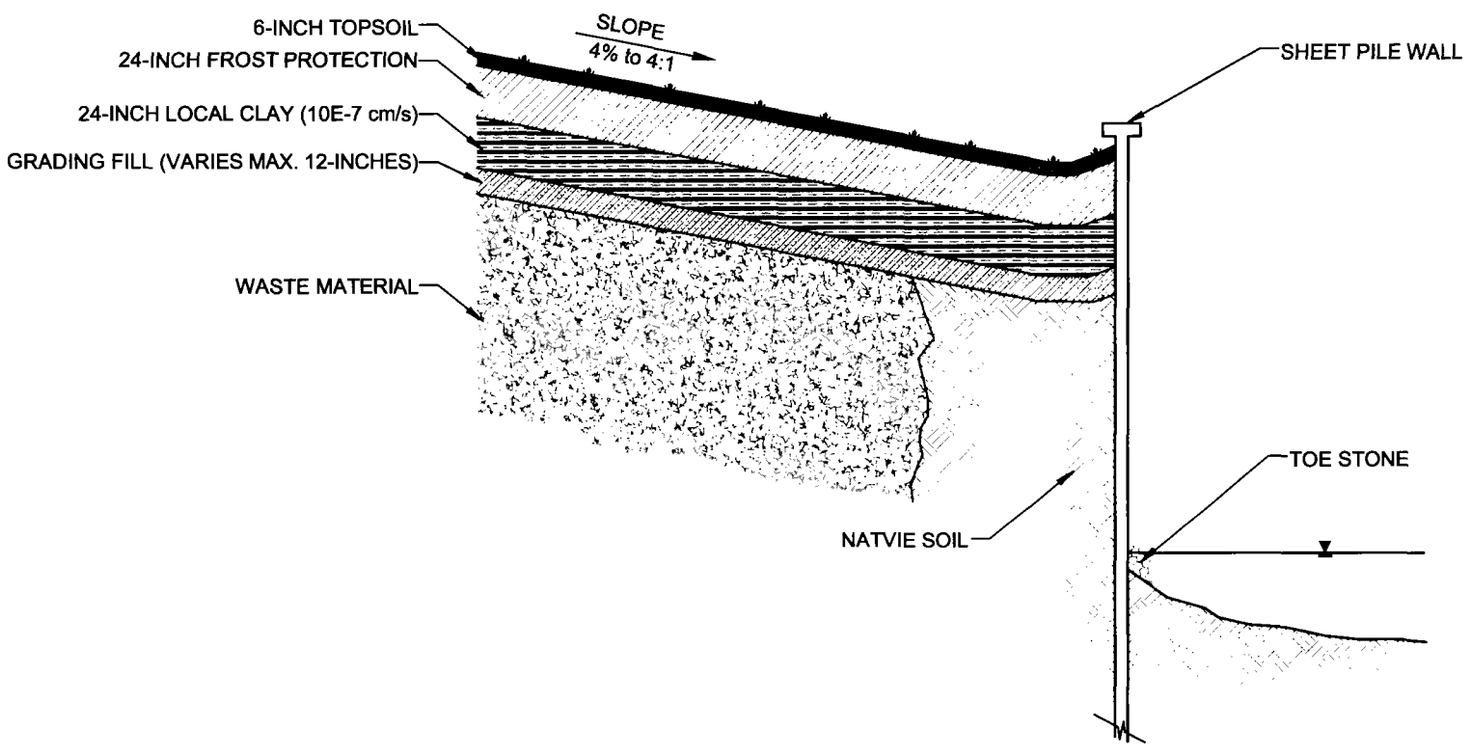
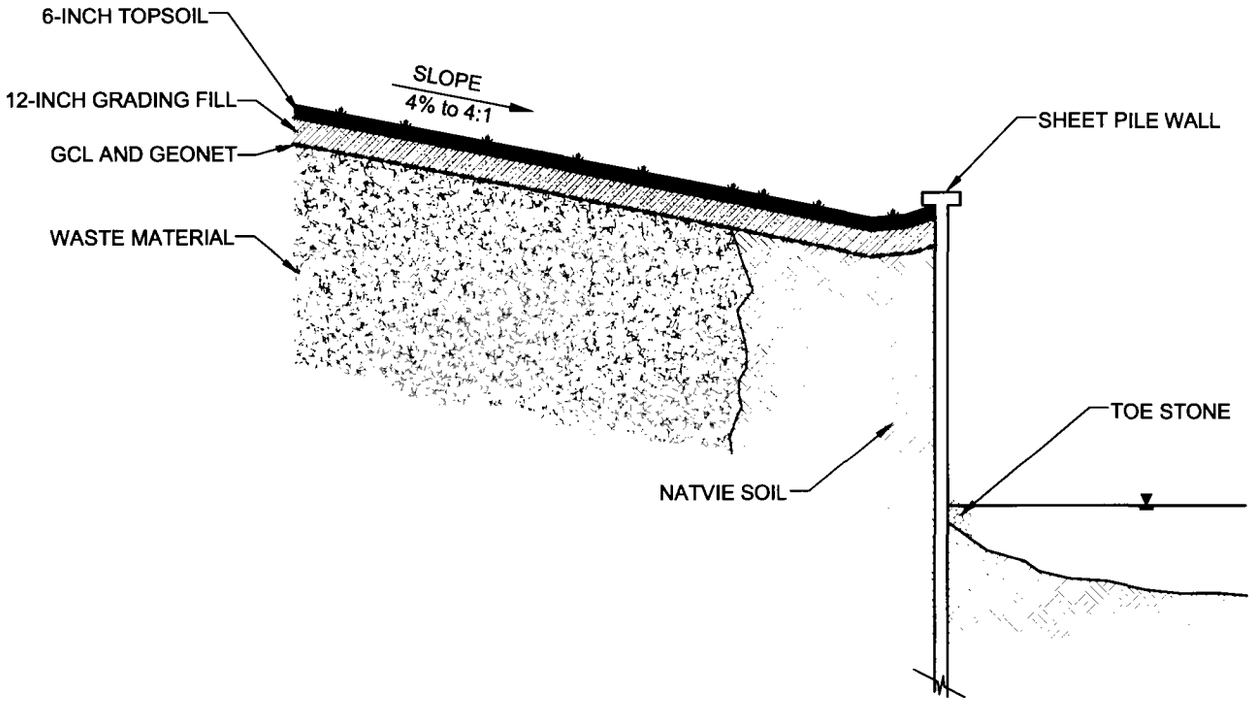



figure 5.7

TYPICAL SECTION ALTERNATIVE 3 (2-FOOT CLAY)
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

NOTE:
NOT TO SCALE

07043-90(014)GN-WA041 JUN 23/2006




NOTE:
NOT TO SCALE

figure 5.8

TYPICAL SECTION ALTERNATIVE 3 (GCL)
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA042 JUN 23/2006

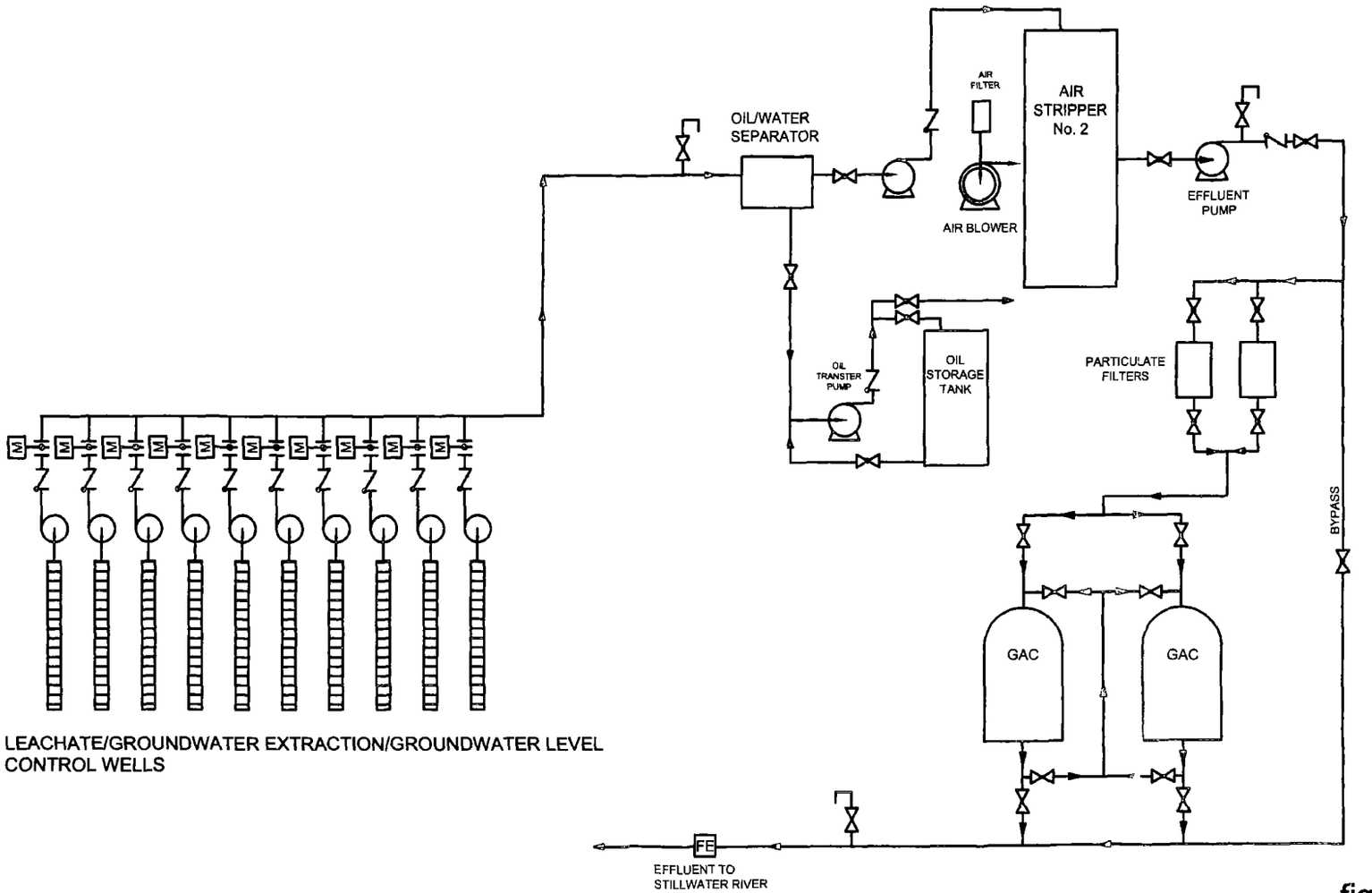



figure 5.9

ALTERNATIVE 3: LEACHATE AND GROUNDWATER TREATMENT SYSTEM SCHEMATIC
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

SOURCE: TETRATECH FIGURE 5-5, TDD No.:S05-0012-032

07043-90(014)GN-WA036 JUN 23/2006

figure 5.10

ALTERNATIVE 4: EXTENT OF CAP, OZONE SPARGING, AND RIVERBANK STABILIZATION
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA032 JUN 26/2006

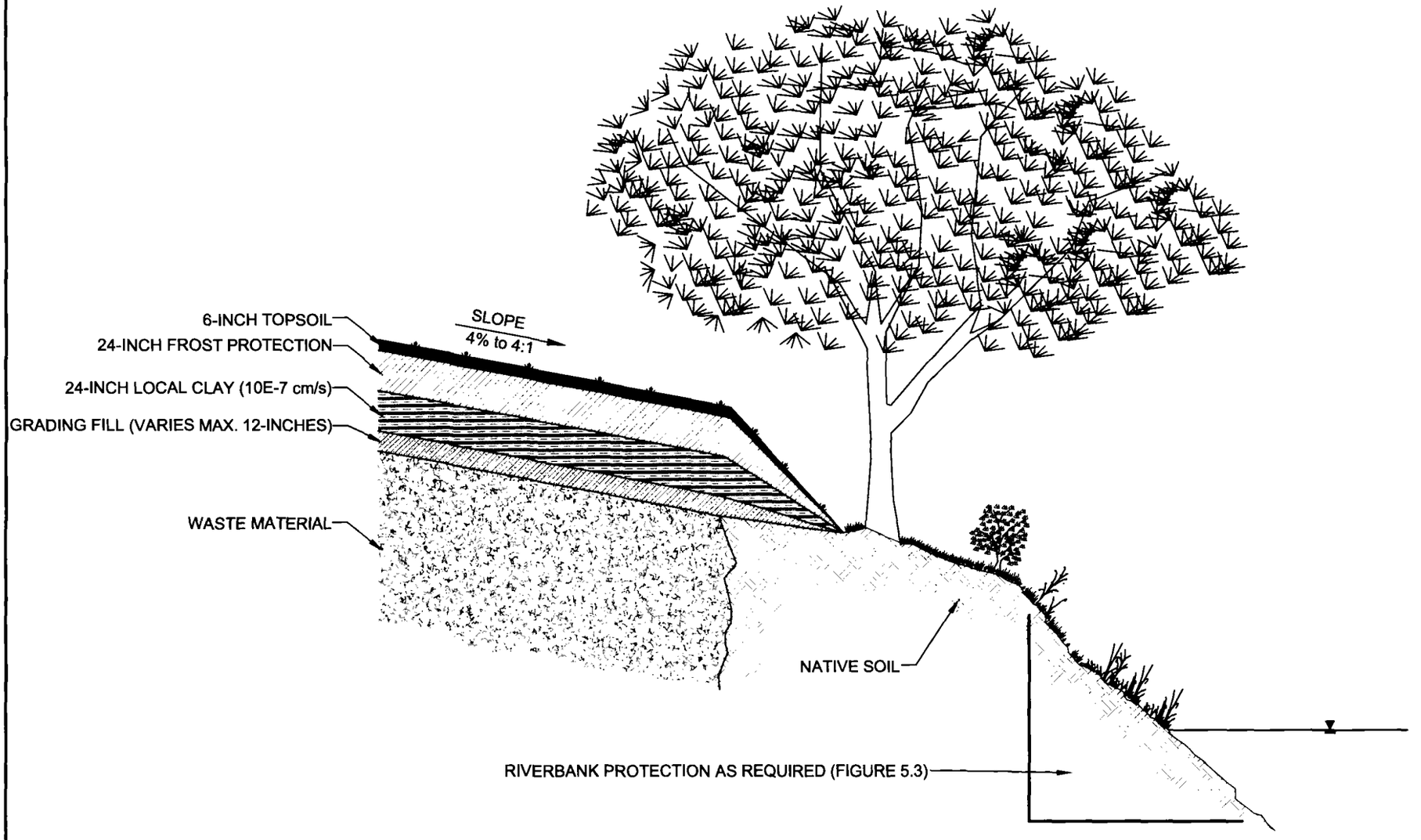



figure 5.11

TYPICAL SECTION ALTERNATIVE 4 (2-FOOT CLAY)
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

NOTE:
NOT TO SCALE

07043-90(014)GN-WA039 JUN 23/2006

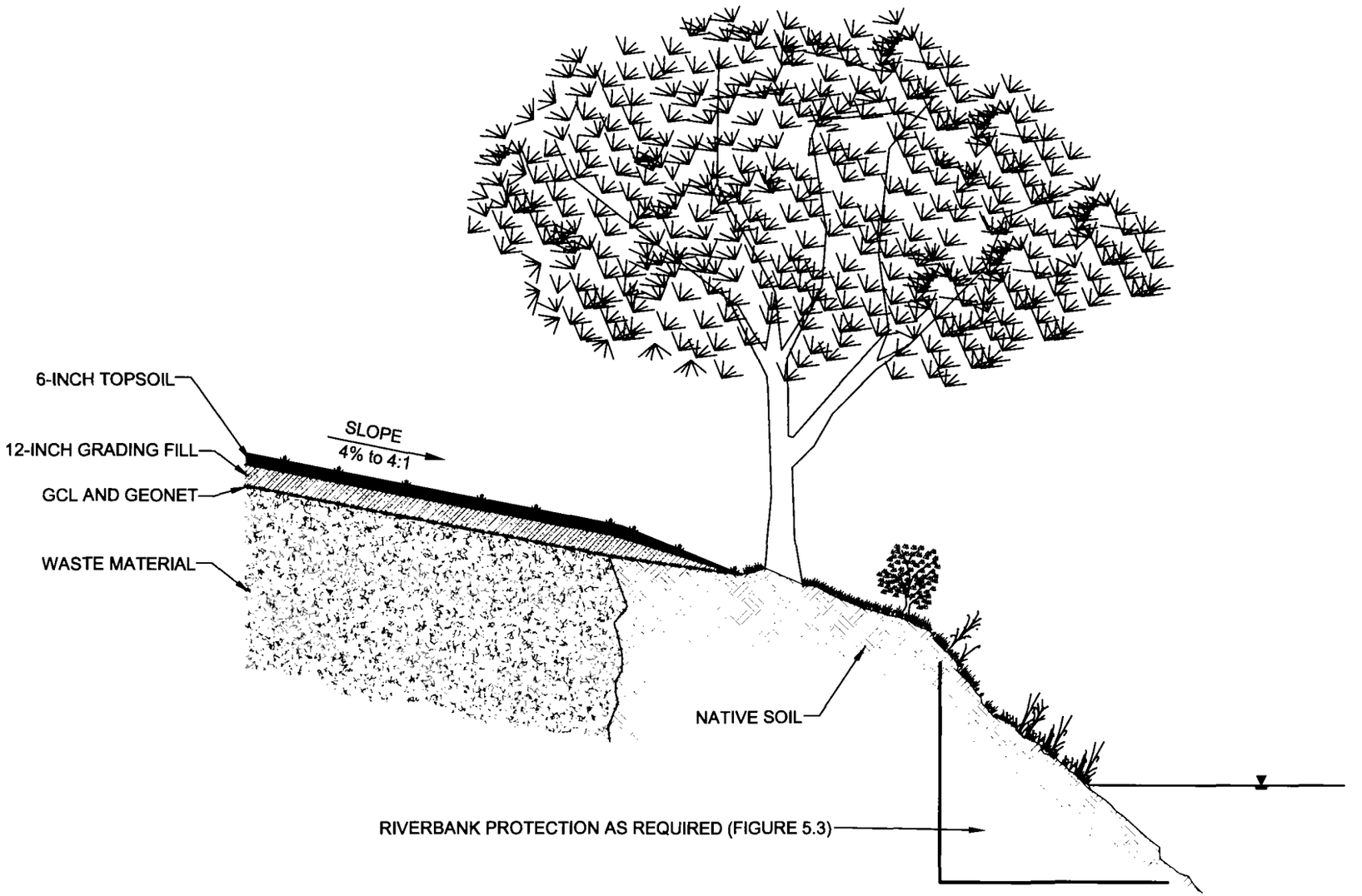



figure 5.12

TYPICAL SECTION ALTERNATIVE 4 (GCL)
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

NOTE:
NOT TO SCALE

07043-90(014)GN-WA043 JUN 23/2006

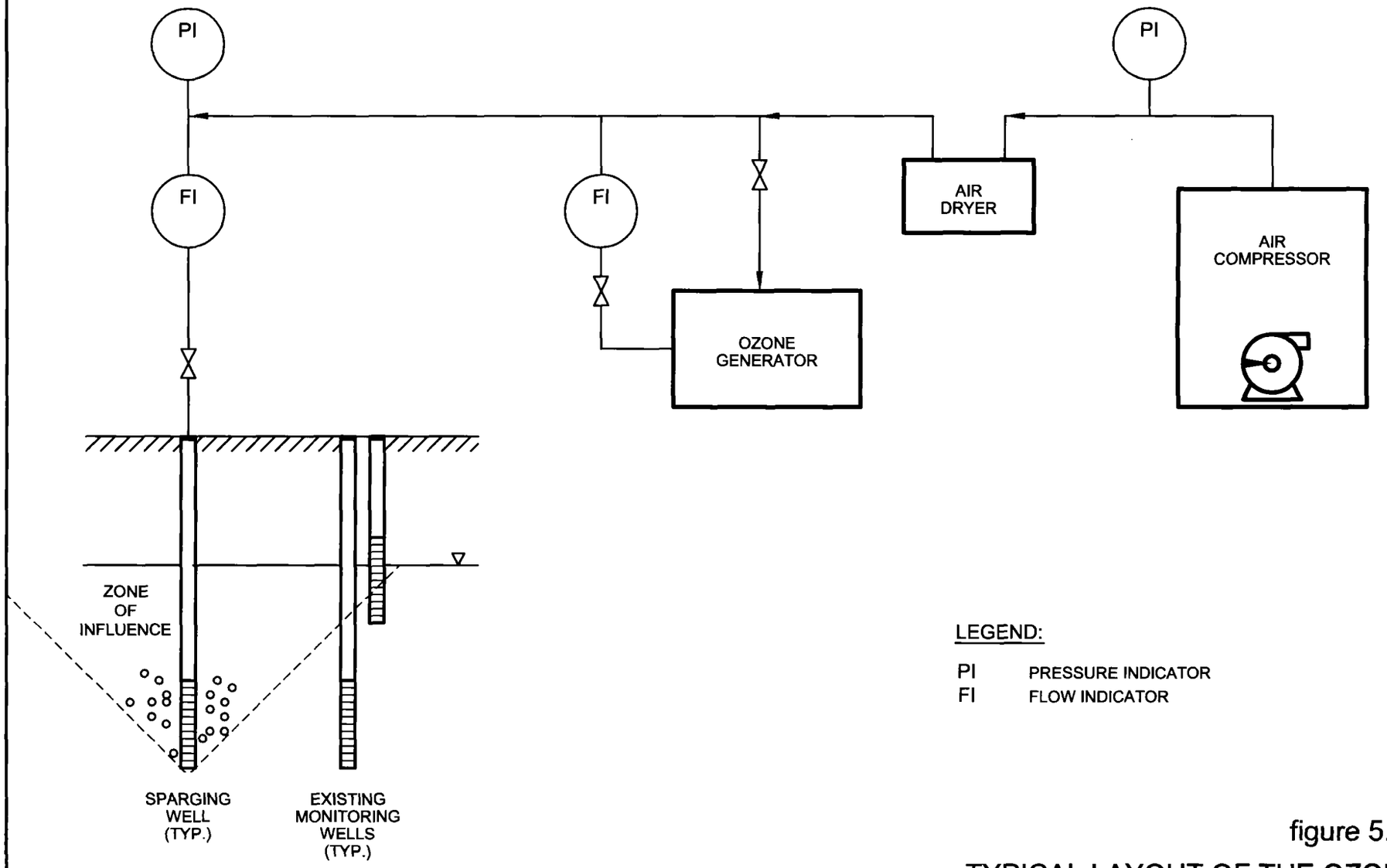



figure 5.13

TYPICAL LAYOUT OF THE OZONE SPARGING PROCESS SCHEMATIC
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA029 JUN 23/2006

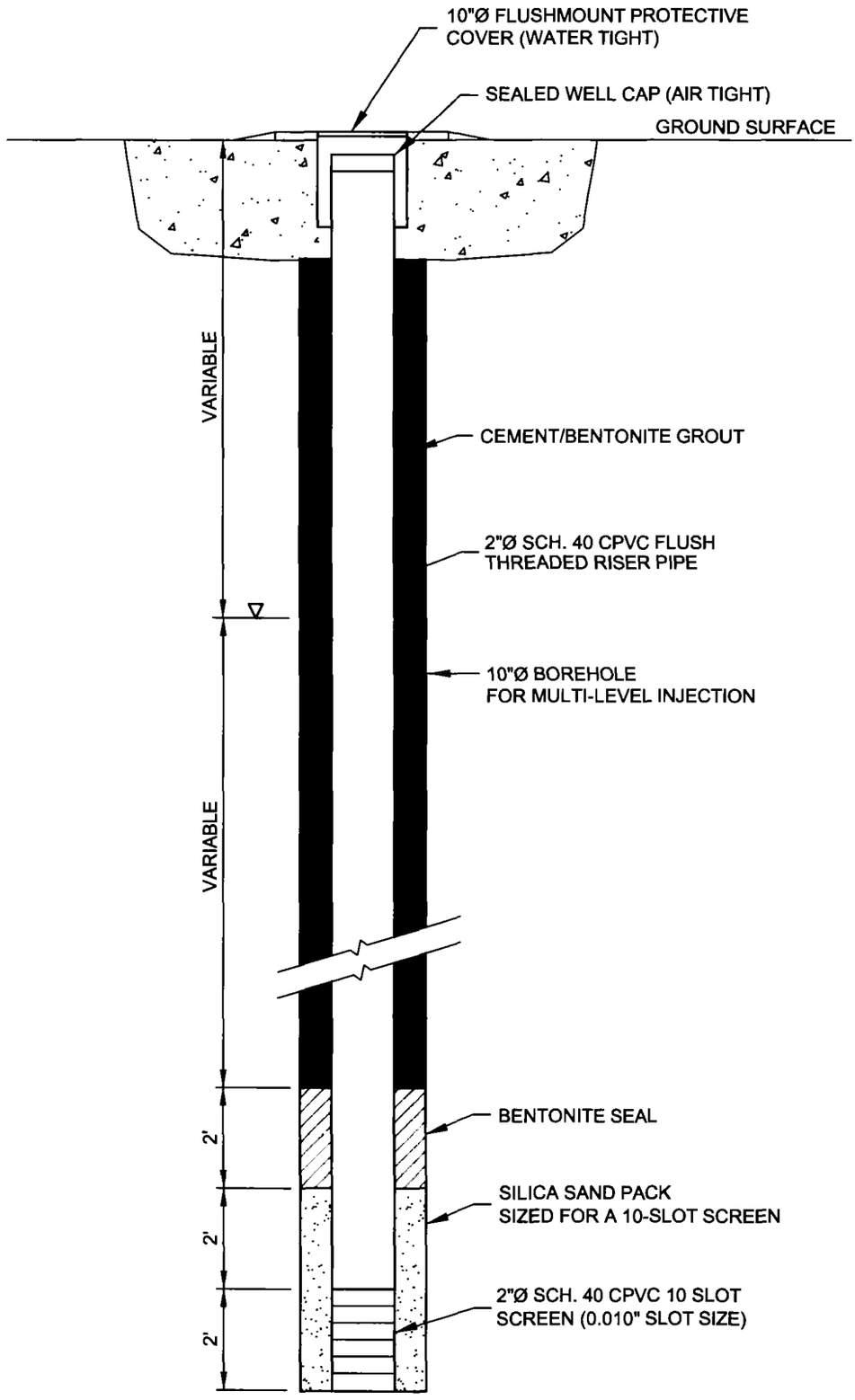
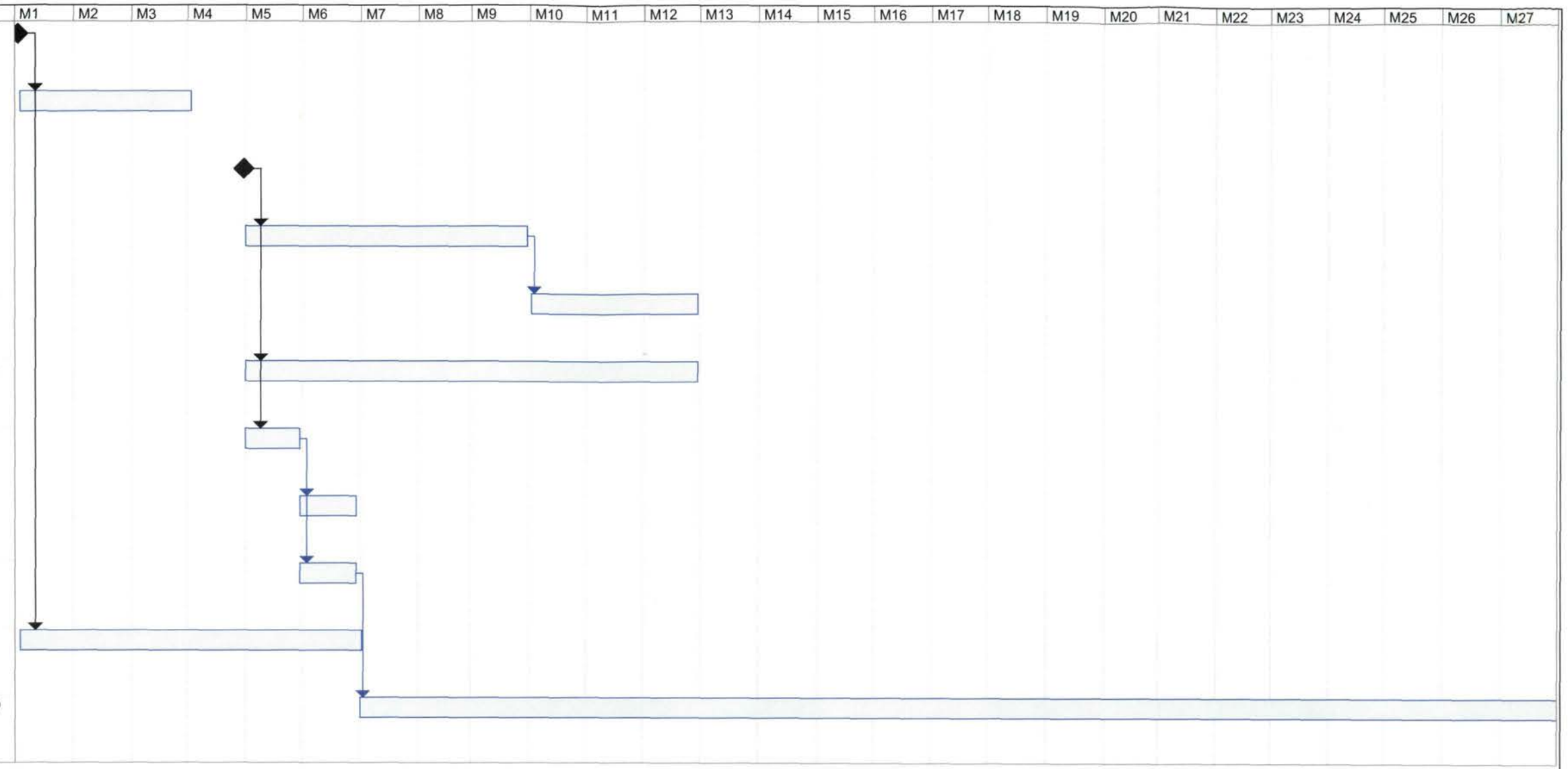



figure 5.14

TYPICAL INJECTION WELL/SPARGE POINT DETAIL
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA030 JUN 26/2006

| ID | Task Name |
|---|---|
| 1 | U.S. EPA Remedy Selection |
| 2 | Design of Selected Remedy |
| 3 | U.S. EPA Approval of Design |
| 4 | Consolidation of Waste Material (3 months for permit, 1 month for waste consolidation) |
| 5 | Ohio Solid Waste Cap Installation |
| 6 | Riverbank Stabilization (6 months for permit, 2 months for construction) |
| 7 | Soil Boring Installation |
| 8 | Piezometer Installation |
| 9 | Monitoring Well Installation |
| 10 | Implementation of Institutional Controls |
| 11 | Groundwater Monitoring (Quarterly for 2 years) |



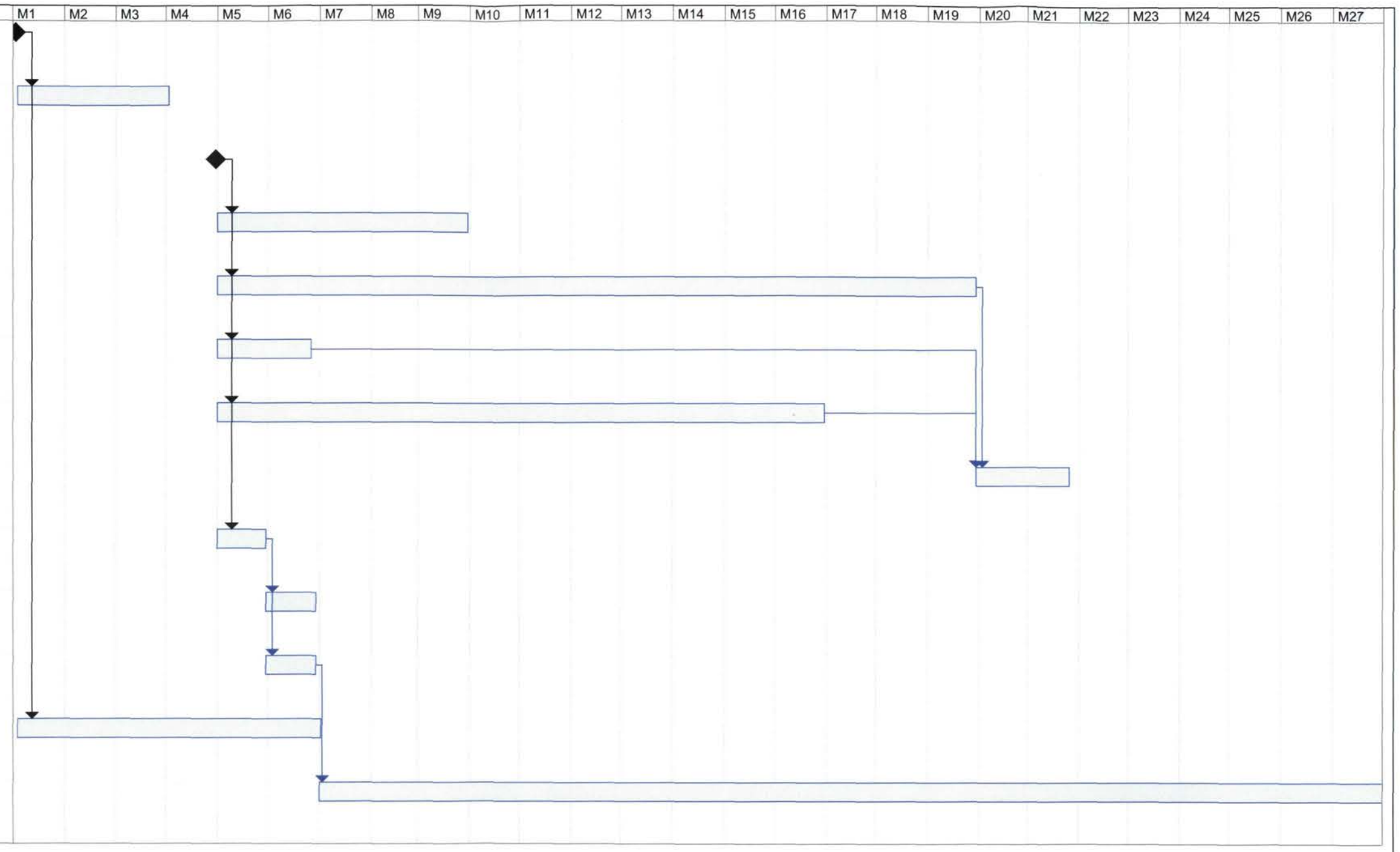

Task Milestone

Notes:
1) Task schedules will shift with actual milestones.
2) Construction may be adjusted to ensure work conducted during appropriate season (i.e. no winter construction).



FIGURE 6.1 SCHEDULE FOR ALTERNATIVE 2
GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

| ID | Task Name |
|---|---|
| 1 | U.S. EPA Remedy Selection |
| 2 | Design of Selected Remedy |
| 3 | U.S. EPA Approval of Design |
| 4 | Consolidation of Waste Material (3 months for permit, 1 month for waste consolidation) |
| 5 | Sheetpile Installation Along East Side and South End (9 months for permit, 6 months for construction) |
| 6 | Leachate Extraction System Installation |
| 7 | Leachate Groundwater Treatment Facility (6 months for permit, 6 months for construction) |
| 8 | Impermeable Cap Installation |
| 9 | Soil Boring Installation |
| 10 | Piezometer Installation |
| 11 | Monitoring Well Installation |
| 12 | Implementation of Institutional Controls |
| 13 | Groundwater Monitoring (Quarterly for 2 Years) |



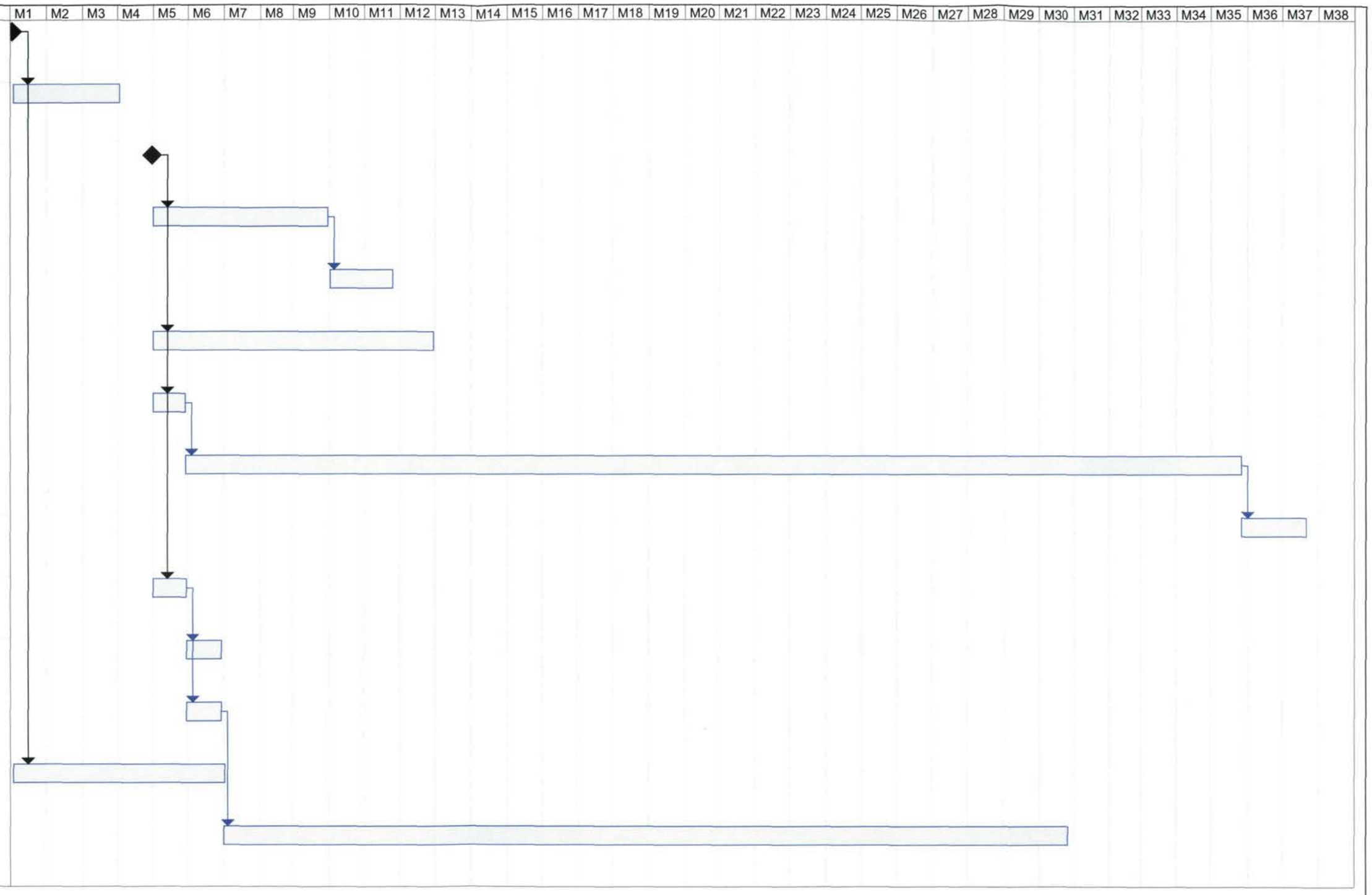

Task Milestone

Notes:
1) Task schedules will shift with actual milestones.
2) Construction may be adjusted to ensure work conducted during appropriate season (i.e. no winter construction).



FIGURE 6.2 SCHEDULE FOR ALTERNATIVE 3
GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

| ID | Task Name |
|---|---|
| 1 | U.S. EPA Remedy Selection |
| 2 | Design of Selected Remedy |
| 3 | U.S. EPA Approval of Design |
| 4 | Consolidation of Waste Material (3 months for permit, 1 month for waste consolidation) |
| 5 | Impermeable Cap Installation (North End of Site) |
| 6 | Riverbank Stabilization (6 months for permit, 2 months for construction) |
| 7 | Pilot Study for Ozone Sparging Treatment |
| 8 | Full Scale Ozone Sparging |
| 9 | Impermeable Cap Installation (South End of Site) |
| 10 | Soil Boring Installation |
| 11 | Piezometer Installation |
| 12 | Monitoring Well Installation |
| 13 | Implementation of Institutional Controls |
| 14 | Groundwater Monitoring (Quarterly for 2 Years) |




Task Milestone

Notes:
1) Task schedules will shift with actual milestones.
2) Construction may be adjusted to ensure work conducted during appropriate season (i.e. no winter construction).



FIGURE 6.3 SCHEDULE FOR ALTERNATIVE 4
GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

# TABLES

TABLE 2.1

MONITORING WELL COMPLETION DETAILS AND
GROUNDWATER ELEVATIONS
GARLAND ROAD LANDFILL
MIAMI COUNTY, OHIO

| *Monitoring Well / Staff Gage* | *Ground Surface Elevation (ft amsl)* | *1995 Top of Casing Elevation (ft amsl)* | *Mar-06 [2] Top of Casing Elevation (ft amsl)* | *Top of Screen Elevation (ft amsl)* | *Bottom of Screen Elevation (ft amsl)* | *Groundwater Elevation (ft amsl)* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *23-Aug-95* | *28-Aug-95* | *4-Aug-96* | *29-Sep-97* | *1-Sep-99* | *22-Aug-00* |
| S-1 | 823.55 | 827.72 | 826.92 | 19.00 | 29.00 | 801.60 | 800.79 | 800.34 | 799.02 | 798.72 | 799.21 |
| S-2 | 812.63 | 815.7 | 815.36 | 5.00 | 15.00 | 802.94 | 802.32 | 801.21 | 800.07 | Dry | 800.31 |
| S-3 | 820.19 | 822.68 | 821.80 | 17.00 | 27.00 | 802.58 | 801.61 | 801.32 | 799.93 | 798.63 | 800.12 |
| S-4 | 804.05 | 807.76 | 807.20 | 4.00 | 14.00 | 800.82 | 800.02 | 799.18 | 797.36 | 797.01 | 797.88 |
| S-5 | 806.13 | 810.02 | 809.22 | 4.50 | 14.50 | 802.48 | 801.95 | 801.29 | 799.19 | 798.56 | 799.65 |
| S-6 | 805.66 | 808.54 | 807.98 | 5.50 | 15.50 | - | - | 798.98 | 797.52 | 797.25 | 797.89 |
| D-1 | 820.64 | 823.27 | 822.73 | 47.00 | 57.00 | 799.32 | 798.78 | 798.73 | 798.08 | 797.87 | 798.20 |
| D-2 | 804.07 | 807.02 | 806.52 | 7.50 | 12.50 | 800.95 | 800.18 | 799.27 | 798.40 | 796.96 | 797.91 |
| D-3 | 805.97 | 808.53 | 807.98 | 14.00 | 24.00 | - | - | 799.01 | 797.50 | 797.27 | 797.88 |
| MW-1 | 803.54 | 805.48 | | 24.80 | 34.80 | - | - | - | - | [1] | 789.53 |
| MW-2 | 832.23 | 834.69 | | 69.50 | 79.50 | - | - | - | - | [1] | 798.18 |
| MW-3 | 807.75 | 809.99 | | 34.50 | 44.50 | - | - | - | - | [1] | 799.51 |
| MW-4 | 804.07 | 806.79 | | 2.50 | 7.50 | - | - | - | - | [1] | 799.21 |
| MW-5 | 802.35 | 803.80 | | 38.50 | 48.50 | - | - | - | - | [1] | 794.47 |
| MW-6 | 801.46 | 804.01 | | 33.50 | 43.50 | - | - | - | - | [1] | [1] |
| MW-7 | 819.48 | 822.51 | | 25.00 | 35.00 | - | - | - | - | [1] | [1] |
| MW-8 | 812.41 | 814.63 | | 41.50 | 51.50 | - | - | - | - | [1] | [1] |
| MW-9 | 808.41 | 810.77 | | 23.00 | 33.00 | - | - | - | - | [1] | [1] |
| SG-1 | -- | -- | 806.57 [3] | -- | -- | - | - | - | - | 793.41 | 792.90 |
| SG-2 | -- | -- | 833.32 [3] | -- | -- | - | - | - | - | 797.86 | 797.32 |
| SG-3 | -- | -- | 801.12 [3] | -- | -- | - | - | - | - | 798.02 | 797.34 |

Notes:

(1) Well constructed after this date.
(2) Water levels before 2006 calculated from the 1995 surveyed top of casing, for water levels collected in 2006, the March 2006 survey is used.
(3) Staff gauges installed in March 2006:
SG-1 is located on the bridge abutment;
SG-2 is located 22 guard rail posts from east concrete abutment on the south side of bridge; and
SG-3 is a stake in the water south of the island.

TABLE 2.1

MONITORING WELL COMPLETION DETAILS AND
GROUNDWATER ELEVATIONS
GARLAND ROAD LANDFILL
MIAMI COUNTY, OHIO

| *Monitoring Well / Staff Gage* | *Ground Surface Elevation (ft amsl)* | *1995 Top of Casing Elevation (ft amsl)* | *Mar-06 (2) Top of Casing Elevation (ft amsl)* | *Top of Screen Elevation (ft amsl)* | *Bottom of Screen Elevation (ft amsl)* | *Groundwater Elevation (ft amsl)* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *7-Jun-01* | *17-Jun-02* | *13-Mar-06* | *14-Mar-06* | *15-Mar-06* | *16-Mar-06* |
| S-1 | 823.55 | 827.72 | 826.92 | 19.00 | 29.00 | 801.75 | 802.52 | 804.47 | 805.03 | 804.70 | 804.31 |
| S-2 | 812.63 | 815.7 | 815.36 | 5.00 | 15.00 | 802.58 | 802.73 | 802.57 | 802.94 | 803.19 | 803.29 |
| S-3 | 820.19 | 822.68 | 821.80 | 17.00 | 27.00 | 802.44 | 802.90 | 804.38 | 804.84 | 804.35 | 804.12 |
| S-4 | 804.05 | 807.76 | 807.20 | 4.00 | 14.00 | 800.49 | 800.50 | 799.80 | 800.66 | 801.01 | 801.07 |
| S-5 | 806.13 | 810.02 | 809.22 | 4.50 | 14.50 | 802.20 | 802.52 | 802.09 | 802.69 | 802.44 | 802.24 |
| S-6 | 805.66 | 808.54 | 807.98 | 5.50 | 15.50 | 800.17 | 800.15 | 802.62 | 801.98 | 801.35 | 801.08 |
| D-1 | 820.64 | 823.27 | 822.73 | 47.00 | 57.00 | 799.76 | 799.70 | 806.42 | 804.40 | 802.58 | 801.73 |
| D-2 | 804.07 | 807.02 | 806.52 | 7.50 | 12.50 | 800.61 | 800.62 | 800.01 | 800.82 | 801.16 | 801.22 |
| D-3 | 805.97 | 808.53 | 807.98 | 14.00 | 24.00 | 800.16 | 800.13 | 802.68 | 802.01 | 801.36 | 801.04 |
| MW-1 | 803.54 | 805.48 | | 24.80 | 34.80 | 798.56 | 798.97 | - | - | - | - |
| MW-2 | 832.23 | 834.69 | | 69.50 | 79.50 | 799.59 | 799.43 | - | - | - | - |
| MW-3 | 807.75 | 809.99 | | 34.50 | 44.50 | 800.55 | 800.24 | - | - | - | - |
| MW-4 | 804.07 | 806.79 | | 2.50 | 7.50 | 800.66 | 800.46 | - | - | - | - |
| MW-5 | 802.35 | 803.80 | | 38.50 | 48.50 | 794.64 | 791.95 | - | - | - | - |
| MW-6 | 801.46 | 804.01 | | 33.50 | 43.50 | 794.41 | 791.21 | - | - | - | - |
| MW-7 | 819.48 | 822.51 | | 25.00 | 35.00 | 796.12 | 794.61 | - | - | - | - |
| MW-8 | 812.41 | 814.63 | | 41.50 | 51.50 | 793.07 | 785.81 | - | - | - | - |
| MW-9 | 808.41 | 810.77 | | 23.00 | 33.00 | 792.79 | 784.37 | - | - | - | - |
| SG-1 | -- | -- | 806.57 (3) | -- | -- | 798.82 | - | - | - | - | - |
| SG-2 | -- | -- | 833.32 (3) | -- | -- | 798.51 | - | - | - | - | - |
| SG-3 | -- | -- | 801.12 (3) | -- | -- | 794.12 | - | - | - | - | - |

Notes:

(1) Well constructed after this date.
(2) Water levels before 2006 calculated from the 1995 surveyed top of casing, for water levels collected in 2006, the March 2006 survey is used.
(3) Staff gauges installed in March 2006:
SG-1 is located on the bridge abutment;
SG-2 is located 22 guard rail posts from east concrete abutment on the south side of bridge; and
SG-3 is a stake in the water south of the island.

TABLE 2.1

MONITORING WELL COMPLETION DETAILS AND
GROUNDWATER ELEVATIONS
GARLAND ROAD LANDFILL
MIAMI COUNTY, OHIO

| *Monitoring Well / Staff Gage* | *Ground Surface Elevation (ft amsl)* | *1995 Top of Casing Elevation (ft amsl)* | *Mar-06* [2] *Top of Casing Elevation (ft amsl)* | | *Top of Screen Elevation (ft amsl)* | *Bottom of Screen Elevation (ft amsl)* | *31-Mar-06* |
|---|---|---|---|---|---|---|---|
| S-1 | 823.55 | 827.72 | 826.92 | | 19.00 | 29.00 | 800.96 |
| S-2 | 812.63 | 815.7 | 815.36 | | 5.00 | 15.00 | 802.05 |
| S-3 | 820.19 | 822.68 | 821.80 | | 17.00 | 27.00 | 801.49 |
| S-4 | 804.05 | 807.76 | 807.20 | | 4.00 | 14.00 | 798.99 |
| S-5 | 806.13 | 810.02 | 809.22 | | 4.50 | 14.50 | 801.18 |
| S-6 | 805.66 | 808.54 | 807.98 | | 5.50 | 15.50 | 798.57 |
| D-1 | 820.64 | 823.27 | 822.73 | | 47.00 | 57.00 | 798.95 |
| D-2 | 804.07 | 807.02 | 806.52 | | 7.50 | 12.50 | 799.24 |
| D-3 | 805.97 | 808.53 | 807.98 | | 14.00 | 24.00 | 798.57 |
| MW-1 | 803.54 | 805.48 | | | 24.80 | 34.80 | - |
| MW-2 | 832.23 | 834.69 | | | 69.50 | 79.50 | - |
| MW-3 | 807.75 | 809.99 | | | 34.50 | 44.50 | - |
| MW-4 | 804.07 | 806.79 | | | 2.50 | 7.50 | - |
| MW-5 | 802.35 | 803.80 | | | 38.50 | 48.50 | - |
| MW-6 | 801.46 | 804.01 | | | 33.50 | 43.50 | - |
| MW-7 | 819.48 | 822.51 | | | 25.00 | 35.00 | - |
| MW-8 | 812.41 | 814.63 | | | 41.50 | 51.50 | - |
| MW-9 | 808.41 | 810.77 | | | 23.00 | 33.00 | - |
| SG-1 | -- | -- | 806.57 | [3] | -- | -- | 798.37 |
| SG-2 | -- | -- | 833.32 | [3] | -- | -- | 798.49 |
| SG-3 | -- | -- | 801.12 | [3] | -- | -- | 798.37 |

Notes:

(1) Well constructed after this date.
(2) Water levels before 2006 calculated from the 1995 surveyed top of casing, for water levels collected in 2006, the March 2006 survey is used.
(3) Staff gauges installed in March 2006:
SG-1 is located on the bridge abutment;
SG-2 is located 22 guard rail posts from east concrete abutment on the south side of bridge; and
SG-3 is a stake in the water south of the island.

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| **Surface Water Protection** | | | |
| ORC 3767.13 B, C:<br>Prohibition of Nuisances.<br>Prohibits noxious exhalations or smells and the obstruction of waterways. | **Applicable**<br>Action-specific | Appropriate measures would be taken to minimize odors during excavation and to minimize obstruction of the Stillwater River. | 40 CFR 141.3 |
| ORC 3767.14:<br>Prohibition of Nuisances.<br>Prohibits throwing refuse, oil, or filth into lakes, streams, or drains. | **Applicable**<br>Action-specific | Appropriate measures would be taken to minimize disposal of any materials or items in the Stillwater River. | 40 CFR 141.3 |
| ORC 1517.15 B:<br>River Classifications.<br>Defines Scenic River areas. | **Applicable**<br>Location-specific | The Stillwater River is a State Scenic River, so actions taken in the landfill area must be protective of this status. | 40 CFR 6.302(e)<br>16 USC 1271 through 1274 |
| OAC 3745-1-03:<br>Analytical Methods.<br>Establishes analytical sample collection procedures and sampling methods for surface water discharges. | **Applicable**<br>Action-specific | This regulation would be applicable if surface water samples are collected as part of the response action. | 40 CFR 136 |
| OAC 3745-1-04 A through F:<br>Criteria Applicable to All Waters.<br>Specifies water quality standards for on-site surface water bodies and for point source discharges to adjacent water bodies. | **Applicable**<br>Action-specific | These regulations would be applicable if treated groundwater is discharged to the Stillwater River. | 40 CFR 131 |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-1-05 B through F:<br>Antidegradation Policy for Surface Water.<br>Prohibits lowering of water quality as a result of new point source discharges to surface water bodies. This regulation is used to set standards when existing water quality is better than the surface use for which it is designated. | **Applicable**<br>Action-specific | This regulation would be applicable if treated groundwater is discharged to the Stillwater River. | 40 CFR 131.12 |
| OAC 3745-1-06:<br>Mixing Zones for Surface Water.<br>Provides standards for establishing mixing zones as a result of new point source discharges to surface water bodies. | **Applicable**<br>Action-specific | This regulation would be applicable if treated groundwater is discharged to the Stillwater River. | 40 CFR 131.13 |
| OAC 3745-1-07:<br>Water Quality Criteria and Statewide Use Designations.<br>Provides water quality criteria for point source discharges to surface water bodies. | **Applicable**<br>Chemical-specific | This regulation would be applicable if treated groundwater is discharged to the Stillwater River. | 40 CFR 131.10 |
| OAC 3745-1-21:<br>Water Use Designation for Great Miami River.<br>Establishes water use designations for stream segments within the Great Miami River basin. | **Applicable**<br>Location-specific | The Stillwater River discharges to the Great Miami River. This regulation would be applicable if the Stillwater River is affected by site conditions or if the remedy includes direct discharge to the Stillwater River. | OAC 3745-1-05<br>OAC 3745-01-07 |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| ORC 6111.04, A:<br>Prohibits pollution of waters of the state. | **Applicable**<br>Action-specific | Treated leachate and groundwater discharged to the Stillwater River must meet water quality criteria. | Clean Water Act<br>40 CFR 122.44<br>40 CFR 125<br>40 CFR 264.94<br>33 USC 125 through 1376 |
| ORC 6111.07 A, C:<br>Water Pollution Control Requirements - Duty to Comply.<br>Prohibits failure to comply with requirements of ORC 6111.01 through 6111.08 or any rule, permit, or order issued under those sections. | **Applicable**<br>Action-specific | The requirements of this rule would be reviewed during response action design and implementation to ensure compliance. | 40 CFR 122.44 |
| **Groundwater Protection** | | | |
| OAC 3745-9-04:<br>Location Siting of New Groundwater Wells.<br>Mandates that groundwater wells must be located so as to prevent contaminants from entering the wells and to be accessible for cleaning and maintenance. | **Applicable**<br>Action-specific | This regulation is applicable to locating groundwater wells for the response action. | |
| OAC 3745-9-05:<br>Construction of New Groundwater Wells.<br>Specifies the minimum construction requirements for new groundwater wells. | **Applicable**<br>Action-specific | This regulation is applicable to constructing groundwater wells for the response action. | |
| OAC 3745-9-06:<br>Requirements for New Groundwater Wells.<br>Establishes specific requirements for well casings. | **Applicable**<br>Action-specific | This regulation is applicable to constructing groundwater wells for the response action. | |

TABLE 3.1

SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
GARLAND ROAD LANDFILL

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-9-07:<br>Surface Design of New Groundwater Wells.<br>Establishes specific surface design requirements. | **Applicable**<br>Action-specific | This regulation is applicable to constructing groundwater wells for the response action. | |
| OAC 3745-9-08:<br>Start Up and Operation of Groundwater Wells.<br>Requires disinfection of new wells and use of potable water for pumps. | **Applicable**<br>Action-specific | This regulation is applicable to constructing groundwater wells for the response action. | |
| OAC 3745-9-09:<br>Maintenance and Modification of Groundwater Wells.<br>Establishes specific maintenance and modification requirements for casings, pumps, and wells. | **Applicable**<br>Action-specific | This regulation is applicable to constructing groundwater wells for the response action. | |
| OAC: 3745-9-10, A, B, C:<br>Abandonment of Test Holes and Groundwater Wells.<br>Requires that following completion of use, wells and test holes be completely filled with grout or similar material or be maintained in compliance with all regulations. | **Applicable**<br>Action-specific | Monitoring wells, soil borings, and other intrusions into the subsurface would be properly abandoned. | OAC 3745-65-91 |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-27-10 B, C, D:<br>Sanitary Landfill Groundwater Monitoring.<br>Requires that a groundwater monitoring program be established for all sanitary landfill facilities. The monitoring well system must consist of enough wells located both upgradient (background) and downgradient and samples must meet the minimum requirements specified in this rule. Sampling and analysis procedures must comply with this rule. | **Relevant and Appropriate**<br>Action-specific | This regulation pertains to any new solid waste facility and any expansions of the existing solid waste landfills on site. The regulation may pertain to existing areas of contamination that are capped in place under the solid waste rules. This regulation may also apply to the capping alternatives. | |
| OAC 3745-81-11:<br>Maximum Contaminant Levels and Best Available Technologies for Inorganic Chemicals.<br>Presents MCLs for inorganics in drinking water. | **Relevant and appropriate**<br>Chemical-specific | These requirements may be used to establish completion of the response action. | 40 CFR 141; 40 CFR 143<br>OAC 3745-81-02(B) (primary drinking water standards)<br>Safe Drinking Water Act (42 USC 300G: PL 93-523) |
| OAC 3745-81-12 A, B, C:<br>Maximum Contaminant Levels and Best Available Technologies for Organic Chemicals.<br>Presents MCLs for organics in drinking water. | **Relevant and appropriate**<br>Chemical-specific | These requirements may be used to establish completion of the response action.<br><br>Off-Site groundwater currently exceeds MCLs. | 40 CFR 141; 40 CFR 143<br>OAC 3745-81-02(B) (primary drinking water standards)<br>Safe Drinking Water Act (42 USC 300G: PL 93-523) |
| OAC 3701-28-10 D:<br>Location, Operation, and Maintenance of Private Water Systems.<br>Requires that a private water system not be located within a 100-year flood plain unless the requirements of OAC 3701-28-21 are met. | **Relevant and appropriate**<br>Action- and location-specific | This requirement could impact future development of the site area. | 40 CFR 141.5 |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-54-90 through 99:<br>Groundwater Protection.<br>Establishes applicability guidelines, required programs, standards, hazardous constituents, concentration limits, compliance standards, and monitoring requirements for groundwater. | **Applicable**<br>Chemical-specific | Groundwater monitoring would be required at the site. Influent and effluent monitoring would be performed for ex situ groundwater treatment systems. Groundwater monitoring may not be possible for an in situ groundwater treatment system because of the proximity of the Stillwater River downgradient of the site. | 40 CFR 90 through 94 |
| OAC 3745-81-23 A, K:<br>Inorganic Contaminant Monitoring Requirements.<br>Presents monitoring requirements for inorganic contaminants. | **Relevant and appropriate**<br>Chemical-specific | The requirements of this rule were considered in the design of the groundwater monitoring plan. | 40 CFR 141 |
| OAC 3745-81-24 A, E:<br>Organic Contaminant Monitoring Requirements.<br>Presents monitoring requirements for organic contaminants. | **Relevant and appropriate**<br>Chemical-specific | The requirements of this rule were considered in the design of the groundwater monitoring plan. | 40 CFR 141 |
| OAC 3745-81-27 A through E:<br>Analytical Techniques.<br>Presents general analytical techniques related to MCLs. | **Relevant and appropriate** | The requirements of this rule were considered in the design of the groundwater monitoring plan. | 40 CFR 141 |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| **Air Quality Protection** | | | |
| ORC 3704.05 A through I:<br>Prohibits Violation of Air Pollution Control Rules.<br>Prohibits emission of an air contaminant in violation of ORC 3704 or any rule, permit, order, or variance issued pursuant to that section of the ORC. | **Applicable**<br>Action-specific | All air emissions generated during excavation of soils and air stripper operation would be evaluated in light of this and other applicable or relevant and appropriate requirements. | Clean Air Act<br>42 USC 7616 (Sulfur Dioxide Provisions)<br>OAC 3745-18-02<br>OAC 3745-18-04<br>OAC 3745-18-05 |
| OAC 3745-15-06 A1, A2:<br>Malfunction and Maintenance of Air Pollution Control Equipment.<br>Requires schedules for maintenance and specifies when a pollution source must be shut down during maintenance. | **Applicable**<br>Action-specific | The requirements of this rule would be considered during design and operation of the air stripper. | OAC 3745-15-04 |
| OAC 3745-15-07 A:<br>Air Pollution Nuisances Prohibited.<br>Prohibits emissions into the air from any source of smoke, odor, or combinations of these that endanger the health, safety, or welfare of the public or that cause personal injury or property damage. | **Applicable**<br>Action-specific | This regulation requires that measures be taken to control emissions during excavation and air stripper operation. | 40 CFR 52, Subpart KK<br>OAC 3767-13<br>OAC 3767-02 |
| OAC 3745-17-02, A-D:<br>Particulate Ambient Air Quality Standards.<br>Establishes specific standards for total suspended particulates. | **Applicable**<br>Chemical-specific | This regulation would be considered during response action design and implementation to ensure compliance during excavation, cap or cover construction, and air stripper operation. | 40 CFR 52, Subpart KK |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-17-05:<br>Particulate Non-Degradation Policy.<br>Prohibits degradation of air quality in any area where air quality is better than required by OAC 3745-17-02. | **Applicable**<br>Chemical-specific | This regulation would be considered during response action design and implementation to ensure compliance during construction activities. | 40 CFR 52, Subpart KK |
| OAC 3745-17-07 A through D:<br>Visible Particulate Emission Control.<br>Specifies the allowable opacity for particulate emissions and provides exceptions for uncombined water, startup and shutdown of fuel-burning equipment, and malfunctions. | **Applicable**<br>Chemical-specific | This regulation would be considered during response action design and implementation to ensure compliance during grading and excavation. | 40 CFR 52, Subpart KK |
| OAC 3745-17-08 A1, A2, B, D:<br>Emission Restrictions for Fugitive Dust.<br>Requires that all emissions of fugitive dust be controlled. | **Applicable**<br>Action-specific | This regulation would be considered during response action design and implementation to ensure compliance during grading and excavation. | 40 CFR 52, Subpart KK |
| OAC 3745-19-03 A, B, C, D:<br>Open Burning Standards in Restricted Areas.<br>Prohibits open burning without prior authorization from OEPA. | **Applicable**<br>Location-specific | This regulation would be considered during response action design and implementation to ensure compliance. | 40 CFR 240.207-3<br>40 CFR 256.50<br>40 CFR 257.3 through 7<br>40 CFR 260.10 |
| OAC 3745-21-02 A, B:<br>Ambient Air Quality Standards and Guidelines.<br>Establishes specific air quality standards for carbon monoxide, ozone, and nonmethane hydrocarbons. | **Applicable**<br>Chemical-specific | The requirements of this rule would be considered during response action design and implementation to ensure compliance. | 40 CFR 50.8<br>40 CFR 50.9<br>42 USC 7401 through 7642 |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-21-03 B, C:<br>Methods of Ambient Air Quality Measurement.<br>Specifies measurement methods to determine ambient air quality with respect to carbon monoxide, ozone, and non-methane hydrocarbons. | **Relevant and appropriate**<br>Action-specific | The requirements of this rule would be relevant and appropriate f air monitoring for the referenced compounds is deemed appropriate. | 40 CFR 50 |
| OAC 3745-21-07 A, B, G, I, J:<br>Organic Materials Emission Control: Stationary Sources.<br>Requires control of emissions of organic materials from stationary sources and requires use of best available technology. | **Applicable**<br>Action- and chemical-specific | The requirements of this rule would be considered during response action design and implementation to ensure compliance. | 40 CFR 60<br>40 CFR 61 |
| OAC 3745-21-08, A through E:<br>Carbon Monoxide Emission Control: Stationary Sources.<br>Requires that emissions from any stationary source of carbon monoxide be minimized by the use of best available control technologies and operating practices in accordance with the best current technology. | **Applicable**<br>Action- and chemical-specific | The requirements of this rule would be considered during response action design and implementation to ensure compliance. | 40 CFR 60 |
| OAC 3745-21-09:<br>VOC Emissions Control from Stationary Sources.<br>Establishes limitations for emissions of volatile organic compounds from stationary sources. | **Applicable**<br>Action- and chemical-specific | This regulation would be applicable if ex-site groundwater treatment is conducted as part of the response action. | 40 CFR 60 |
| OAC 3745-23-01:<br>Nitrogen Dioxide Ambient Air Quality Standards.<br>Establishes a maximum ambient air quality standard for nitrogen dioxide. | **Applicable**<br>Action- and chemical-specific | The requirements of this rule will be considered during response action design and implementation to ensure compliance. | 40 CFR 60 |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-23-02 A, B:<br>Measurement Methods for Nitrogen Dioxide.<br>Specifies methods of measurement for nitrogen dioxide to determine ambient air quality. | **Relevant and appropriate**<br>Action-specific | The requirements of this rule would be relevant and appropriate if air monitoring for nitrogen dioxide is deemed appropriate. | 40 CFR 50.11 |
| OAC 3745-23-01, 02, 06:<br>Nitrogen Dioxide Non-degradation Policy.<br>Prohibits significant and avoidable deterioration of air quality by the release of nitrogen dioxide emissions. | **Applicable**<br>Action- and chemical-specific | The requirements of this rule will be considered during response action design and implementation to ensure compliance. | 40 CFR 50.11 |
| OAC 3745-23-06:<br>Nitrogen Oxides Emission Controls: Stationary Source.<br>Requires that emission from all stationary sources of nitrogen oxides be minimized by the use of the latest available control techniques and operating practices in accordance with the best current technology and establishes limits for nitrogen oxide emissions from combustion. | **Applicable**<br>Action-specific | The requirements of this rule will be considered during response action design and implementation to ensure compliance. | 40 CFR 50.11 |
| OAC 3745-25-03:<br>Emission Control Action Programs.<br>Requires preparation for air pollution alerts, warnings, and emergencies. | **Applicable**<br>Action-specific | This regulation would be applicable if groundwater treatment is conducted as part of the response action. | |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| **Solid Waste** | | | |
| OAC 3745-27-08 C through H:<br>Construction Specifications for Sanitary Landfills.<br>Specifies minimum requirements for the soil and clay layers, granular drainage layer, geosynthetics, leachate management system, gas monitoring system, and so on; establishes construction requirements for facilities to be located in unfavorable areas. | **Relevant and Appropriate**<br>Action-specific | This regulation pertains to any new solid waste disposal facility created on site and any expansions to the existing solid waste landfill. Portions of this regulation also pertain to areas of contamination that are capped under the solid waste rules. This regulation may serve as siting criteria. | OAC 3745-27-07<br>OAC 3745-27-11<br>OAC 3745-27-19<br>OAC 3745-27-20 |
| OAC 3745-27-11:<br>Final Closure of a Sanitary Landfill Facility.<br>Establishes criteria for closing a sanitary landfill. | **Relevant and Appropriate**<br>Action-specific | Landfill cap design, construction, and operation must comply with these standards. Compliance with RCRA Subtitle D would be required for cap construction. | 40 CFR 265.310 |
| OAC 3745-27-12 A, B, D, E, M, N:<br>Explosive Gas Monitoring for a Sanitary Landfill Facility.<br>Establishes when an explosive gas monitoring plan is required; specifies the minimum information required in such a plan, including detailed engineering plans, specifications, information on gas generation potential, sampling and monitoring procedures, and so on; mandates a repair schedule for an explosive gas monitoring system; applies only to landfills that have received putrescible solid wastes. | **Relevant and Appropriate**<br>Action- and location-specific | This regulation pertains to any site that has had or will have putrescible solid wastes placed on site and has a residence or any other occupied structure located within 1,000 feet of the emplaced solid waste. This regulation may apply to capping alternatives. | OAC 3745-27-09 |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-27-12 I, J:<br>Explosive Gas Monitoring for a Sanitary Landfill Facility.<br>Identifies parameters and schedules for explosive gas monitoring. | **Relevant and Appropriate**<br>Action- and chemical-specific | This regulation pertains to any disposal site where explosive gas generation and migration may be a threat. This regulation may apply to the capping alternatives. | OAC 3745-27-09 |
| OAC 3745-27-13 C:<br>Disturbances Where Hazardous or Solid Waste Facilities Were Operated.<br>Institutes planning requirements for any earth-moving activity where a hazardous waste facility or solid waste facility was operated and allows for imposition of special terms by the OEPA Director to protect the public and the environment. | **Relevant and appropriate**<br>Action- and location-specific | The substantive requirements of this regulation would be met during the response action design process. | 40 CFR 264.111 |
| OAC 3745-27-14 A:<br>Post-Closure Care of Sanitary Landfill Facilities.<br>Specifies the required post-closure care for solid waste facilities, including continuing operation of leachate and surface water management systems, maintenance of the cap system, and groundwater monitoring. | **Relevant and Appropriate**<br>Action-specific | The substantive requirements pertain to any newly created solid waste landfills on site, any expansions of the existing solid waste landfill on site, and any existing areas of contamination that are capped under the solid waste rules. This regulation may apply to the capping alternatives. | OAC 3745-27-10<br>OAC 3745-27-11 |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-27-19 D(2):<br>Construction Compliance for a Sanitary Landfill Facility.<br>Requires an owner or operator to implement measures of the OAC regulations if testing indicates that a component or portion of a landfill has not been constructed in accordance with those rules. | **Relevant and Appropriate**<br>Action-specific | This regulation pertains to any new solid waste disposal facilities to be created on site and any existing landfill that would be expanded during remediation. This regulation also pertains to construction of final cover systems and may apply to the capping alternatives. | OAC 3745-27-09(F)<br>OAC 3745-27-11<br>OAC 3745-37 |
| OAC 3745-27-19 H:<br>Sanitary Landfill Operations Final Cover.<br>Includes requirements for the final cover system for areas at final elevations. | **Relevant and Appropriate**<br>Action-specific | This regulation pertains to any new solid waste disposal facilities to be created on site and any existing landfill that would be expanded during remediation. Portions of this regulation also may pertain to existing areas of contamination that would be capped in place under the solid waste rules. This regulation may apply to the capping alternatives. | 40 CFR 264.310 |
| OAC 3745-27-19 J:<br>Sanitary Landfill Operations Surface Water Management.<br>Specifies that surface water must be diverted from areas where solid waste is being or has been deposited; requires runon and runoff to be controlled to minimize infiltration through the cover materials and to minimize erosion of the cover system. | **Relevant and Appropriate**<br>Action-specific | This regulation pertains to any new solid waste disposal facilities to be created on site and any existing landfill that would be expanded during remediation. Portions of this regulation also may pertain to existing areas of contamination that would be capped in place under the solid waste rules. This regulation may apply to the capping alternatives. | |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-17-19 K:<br>Sanitary Landfill Operations Leachate Management.<br>Requires repair of leachate outbreaks; collection and treatment of leachate on the surface of a landfill; and actions to minimize, control, or eliminate conditions causing leachate outbreaks. | **Relevant and Appropriate**<br>Action-specific | This regulation pertains to any new solid waste disposal facilities to be created on site and any existing landfill that would be expanded during remediation. Portions of this regulation also may pertain to existing areas of contamination that would be capped in place under the solid waste rules. This regulation may apply to the capping alternatives. | 40 CFR 264.304 |
| **Hazardous Waste** | | | |
| ORC 3734.02 (G):<br>Exemptions to Solid & Hazardous Waste T/S/D Requirements.<br>Provides authority and conditions by which the OEPA Director may exempt any person from permitting or other requirements governing generation, storage, treatment, transport, or disposal of solid or hazardous waste. | **Relevant and Appropriate**<br>Action-specific | If appropriate, applicable exemptions would be requested from the OEPA Director. | 42 USC 6925 |
| ORC 3734.02 (H):<br>"Digging" Where Hazardous or Solid Waste Facility Was Located.<br>Prohibits filling, grading, excavation, building, drilling, or mining on land where a hazardous waste or solid waste facility was operated without prior authorization from the OEPA Director. | **Relevant and appropriate**<br>Action-specific | The requirements of this rule would be met during the removal action design process. | 40 CFR 264, Subpart G<br>OAC 3745-27-13 |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| ORC 3734.04.1:<br>Explosive Gas Monitoring Plan for Sanitary Landfill.<br>Establishes conditions under which explosive gases must be monitored. | **Applicable** | Gas monitoring may be required at the site. | ORC 3734.05 |
| OAC 3745-52-11 A, D:<br>Evaluation of Wastes.<br>Requires that any person generating a waste determine whether that waste is a hazardous waste through listing or by characteristic. | **Applicable**<br>Chemical-specific | All wastes generated would be properly characterized. | 40 CFR 262.11 |
| OAC 3745-52-20:<br>Hazardous Waste Manifest - General Requirements.<br>Requires a generator that transports or offers for transport hazardous waste for off-site treatment, storage, or disposal to prepare a uniform hazardous waste manifest. | **Applicable**<br>Action-specific | This regulation would be applicable only if characterization reveals that hazardous waste is present. All wastes transported off site would be properly manifested. | 40 CFR 262.20 |
| OAC 3745-52-30, 31, 32, 33:<br>Hazardous Waste Packaging, Labeling, Marking, and Placarding.<br>Requires a generator to package hazardous waste in accordance with DOT regulations for transport off site. | **Applicable**<br>Action-specific | This regulation would be considered during response action design and implementation to ensure compliance. | 40 CFR 262.30 through 33<br>49 CFR 172, 173, 178, and 179<br>DOT HM 181 |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-52-34:<br>Accumulation Time of Hazardous Waste.<br>Identifies maximum time periods that a generator may accumulate a hazardous waste without being considered an operator of a storage facility; establishes standards for management of hazardous wastes by generators. | **Applicable**<br>Action-specific | This regulation would be considered during response action design and implementation to ensure compliance. | 40 CFR 262.34 |
| OAC 3745-54-13 A:<br>General Analysis of Hazardous Waste.<br>Requires that prior to any treatment, storage, or disposal of hazardous wastes, a representative sample of the waste be chemically and physically analyzed. | **Applicable**<br>Chemical-specific | This regulation would be considered during response action design and implementation to ensure compliance. | 40 CFR 264.13 |
| OAC 3745-270-0, C, E:<br>Hazardous Wastes Restricted from Land Disposal Exceptions.<br>Lists types of restricted wastes that may be land-disposed; lists types of hazardous wastes that are not subject to land disposal restrictions. | **Relevant and Appropriate**<br>Action-specific | All excavated wastes would be properly characterized, and restricted wastes will not be land-disposed until they are appropriately treated. | 40 CFR 268, Subpart C |
| OAC 3745-270-09 B, C:<br>Special Rules Regarding Waste that Exhibits a Characteristic.<br>Prohibits land disposal of characteristic waste unless the waste complies with applicable treatment standards. If the waste is listed and exhibits a characteristic, the treatment standard for the listed waste will be applied in lieu of the standard for the characteristic waste. | **Applicable**<br>Action-specific | Wastes would be evaluated to identify any potential characteristic wastes. Any excavated material determined to be listed a waste would be treated in accordance with applicable treatment standards. | 40 CFR 268<br>OAC 3745-51-30 through 3745-51-35 (listed wastes)<br>OAC 3745-57-12 (prohibition of disposal of ignitable or reactive wastes without treatment)<br>OAC 3745-57-13 (prohibition of disposal of incompatible wastes in same cell of landfill) |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-270-30 A, B, C:<br>Waste Specific Prohibitions.<br>Prohibits spent solvent wastes or contaminated soil and debris resulting from a response action under CERCLA or RCRA from being land-disposed unless the generator meets treatment standards (OAC 3745-270-40 through 3745-270-44) or has been granted an extension or exemption. | **Applicable**<br>Action-specific | Excavated materials would be evaluated in light of these requirements. | 40 CFR 268<br>OAC 3745-51-30 through 3745-51-35 |
| OAC 3745-279-50(f):<br>Prohibitions on Storage of Restricted Wastes.<br>Prohibits land disposal of soils containing polychlorinated biphenyl concentrations greater than 50 parts per million in RCRA Subtitle C landfill facilities. | **Applicable**<br>Action- and chemical-specific | This regulation would be applicable if remedial activities involve unearthing, treating, and re-disposing of hazardous waste. | 40 CFR 268<br>40 CFR 761.65 |
| OAC 3745-59-270 A, B, C:<br>Applicability of Treatment Standards.<br>Prohibits land disposal of restricted waste unless the waste is tested and the concentration of any hazardous constituent does not exceed the applicable concentration(s). A waste treated using a technology specified in OAC 3745-270-42 or its equivalent may be land-disposed. | **Applicable**<br>Action-specific | Restricted wastes would not be land-disposed until applicable standards are met. | 42 USC 6901 et seq.<br>40 CFR 265, Subparts P and Q<br>40 CFR 268<br>OAC 3745-59-43 |
| OAC 3745-270-42 A, C, D:<br>Treatment Standards Expressed as Specified Technologies.<br>Establishes treatment standards for liquid hazardous waste containing polychlorinated biphenyls, nonliquid hazardous waste containing HOCs, and lab packs. | **Applicable**<br>Action-specific | Nonliquid hazardous wastes containing HOCs would not be land-disposed until applicable standards are met. | 40 CFR 268.42<br>OAC 3745-59-42(A)(2) (specific standards for HOCs)<br>OAC 3745-59-32 |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| OAC 3745-270-44 A, C:<br>Treatment Standards Expressed as Waste Concentrations.<br>States that if a treatment standard is expressed as a concentration and a waste cannot be treated to achieve the specified level or the treatment technology is not appropriate for the waste, the facility may petition the U.S. Environmental Protection Agency Administrator for a variance. | **Applicable**<br>Action-specific | Excavated soils with hazardous constituent concentrations exceeding the permitted concentrations for land disposal would not be land-disposed until applicable standards are met. | 40 CFR 268.43 |
| OAC 3745-270-50 A, B, C, D, E:<br>Prohibition on Storage of Restricted Waste.<br>Prohibits on-site storage of hazardous wastes restricted from land disposal beyond a timeframe stated in the rule. | **Applicable**<br>Action-specific | On-site storage of excavated soils is not anticipated. This rule would be considered during response action design and implementation to ensure compliance. | 40 CFR 268.50<br>OAC 3745-59-35 |
| ORC 6101:<br>Conservancy Districts.<br>Establishes the authority of conservancy districts to manage projects with environmental impacts | **Applicable**<br>Location-specific | Cap or cover material from within the flood retention basin would be used in accordance with the guidelines of the Miami Conservancy District. | |

TABLE 3.1

SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
GARLAND ROAD LANDFILL

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| **Soil Remediation Goals** | | | |
| U.S. Environmental Protection Agency Region 9 Generic Residential Preliminary Remediation Goals | **Relevant but not appropriate**<br>Chemical-specific | This requirement establishes direct contact criteria for soil in Region 9 and is generally accepted in other regions. Contaminant concentrations in site soils currently exceed these criteria. Because of the site's location in a flood plain, future residential development of the site is unlikely, and it is not zoned for residential development. | |
| **Non-Media-Specific or Non-Environmental Regulations** | | | |
| Occupational Safety and Health Administration Standards 29 CFR 1910<br>1910.1000, Subpart Z, Toxic and Hazardous Substances<br>1910.1025, Lead<br>1910.1028, Benzene<br>1910.1101, Asbestos<br>1910.1018, Inorganic arsenic | **Applicable** | All emissions generated during remedial activities would be monitored to ensure compliance. | |
| Occupational Safety and Health Administration Standards, 29 CFR 1910.95, Subpart G, Noise. Establishes the permissible occupational exposure level for noise at 90 decibels for an 8-hour day; establishes 115 decibels as a 15-minute per day short-term exposure level. | **Applicable**<br>Action-specific | Appropriate measures would be taken to comply with the permissible exposure level and short-term exposure level during excavation and other activities. | OAC 3745-27-52 |

TABLE 3.1

SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
GARLAND ROAD LANDFILL

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| Executive Order 12372: Specifies that state and local coordination and review are required for U.S. Environmental Protection Agency (federal)-assisted projects. | **Relevant and appropriate** | State and local entities would be consulted as the response action progresses. | |
| ORC 1518.02: Endangered Plant Species. Prohibits removal or destruction of endangered plant species (with some private property exceptions); applies to remediation sites where chemicals may harm endangered species; clearly establishes that receptor plant species must be considered in risk assessments. | **Appropriate** Location-specific | No endangered plant species are present at this site. | 40 CFR 302(h)<br>16 USC 1531 |
| OAC 1501:31-23- 01 A, B: List of Endangered Animal Species. Lists Ohio animal species considered to be endangered. | **Relevant and appropriate** Location-specific | ODNR has been contacted to obtain information about endangered species in the site area. There is a need to determine whether any endangered species listed on the ODNR web site are found near the site. Endangered animal species may be present. | 40 CFR 302(h)<br>50 CFR 402<br>16 USC 1531 |
| 16 USC 661, et. seq.: Fish and Wildlife Coordination Act. Requires actions to protect fish or wildlife from diversion, channeling, or other activities that modify a stream or river so as to affect the fish or wildlife. | **Relevant and appropriate** Location-specific | These provisions may be relevant and appropriate if groundwater is discharged to a surface water body during the response action. | 33 CFR 320 through 330 |
| 42 USC 9601, et seq.: CERCLA/SARA. Includes applicable, relevant, and appropriate requirements under Section 121 of SARA. | **Applicable** | This requirement applies to both removal and remedial actions. | 40 CFR 300.68 (NCP)<br>40 CFR 300.415 (NCP) |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

| *Citation and Requirements* | *Applicability* | *Application to Alternatives* | *Cross-Reference* |
|---|---|---|---|
| 29 CFR 1910: Occupational Safety and Health Administration Standards. | **Relevant and appropriate** | All operation and maintenance would be performed in accordance with Occupational Safety and Health Administration standards. | |
| 40 CFR 257: RCRA Subtitle D.<br>Sets standards for land disposal facilities for nonhazardous waste. | **Relevant and Appropriate** | These regulations apply to capping. | |
| 40 CFR 260 through 267: RCRA Subtitle C.<br>Regulates generation, transport, storage, treatment, and disposal of hazardous wastes generated in the course of a remedial action; regulates design, construction, monitoring, operation, and closure of hazardous waste facilities. | **Relevant and Appropriate** | These regulations apply to capping. | |
| 50 CFR 402: Endangered Species Act.<br>Requires that the U.S. Fish and Wildlife Service be consulted if endangered species or critical habitat will be affected. | **Relevant and appropriate** | ODNR has been contacted to obtain information about endangered species in the site area. There is a need to determine whether any endangered species listed on the ODNR web site are found near the site. | 16 USC 1531<br>50 CFR 200 |
| Executive Orders 11988 and 11990.<br>State that activities that may adversely affect flood plains or wetlands should be avoided. | **Relevant and appropriate** | Site remediation activities would be conducted so as to minimize damage to the flood plain. | 40 CFR 6<br>40 CFR 264.18 |
| U.S. Army Corps of Engineers authority. | **Relevant and appropriate** | Work along the riverbank must comply with U.S. Army Corps of Engineers requirements. | |

**TABLE 3.1**

**SUMMARY OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
**GARLAND ROAD LANDFILL**

Notes:

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CFR = *Code of Federal Regulations*
DOT = U.S. Department of Transportation
HOC = Halogenated organic compound
MCL = Maximum contaminant level
NCP = National Oil and Hazardous Substances Pollution Contingency Plan
OAC = *Ohio Administrative Code*
ODNR = Ohio Department of Natural Resources
OEPA = Ohio Environmental Protection Agency
ORC = *Ohio Revised Code*
PL = Public Law
RCRA = Resource Conservation and Recovery Act
SARA = Superfund Amendments and Reauthorization Act of 1986
USC = *U.S. Code*

**TABLE 5.1**

**SUMMARY OF RESPONSE ACTIONS ALTERNATIVES**
**GARLAND ROAD LANDFILL**

| *Alternative* | *Current Ohio Solid Waste Cap* | *GCL Cap/Clay ($10^{-7}$ cm/s) Cap* | *Leachate/Groundwater Extraction and/or Treatment* | *Riverbank Stabilization* | *Institutional Controls* |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | X | | | X | X |
| 3 | | X | X | X | X |
| 4 | | X | X | X | X |

**TABLE 5.2**

**PROPOSED GROUNDWATER MONITORING PROGRAM**
**GARLAND ROAD LANDFILL SITE, MIAMI COUNTY, OHIO**

| | *Initial Groundwater Monitoring (2 years)* [2] [3] | | *Long-Term Groundwater Monitoring* [3] | |
|---|---|---|---|---|
| *Location* | *Parameters* [1] | *Frequency* | *Parameters* | *Frequency* |
| *On-Site Wells* | | | | |
| **Existing** | | | | |
| S-1 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| S-2 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| S-3 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| S-4 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| S-5 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| S-6 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| D-1 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| D-2 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| D-3 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| **Proposed** | | | | |
| MW-17 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-18 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-19 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| *Off-Site Wells* | | | | |
| **Existing** | | | | |
| MW-1 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-2 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-3 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-4 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-5 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-6 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-7 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-8 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-9 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| **Proposed** | | | | |
| MW-10 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-11 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-12 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-13 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-14 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-15 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| MW-16 | VOCs, static water levels, attenuation parameters [4] | quarterly | VOCs, static water levels | annually |
| *Staff Gauges* | | | | |
| **Existing** | | | | |
| SG-1 (bridge abutment) | static water levels | quarterly | static water levels | annually |
| SG-2 (on guardrail of bridge) | static water levels | quarterly | static water levels | annually |
| SG-3 (approximately 600 ft south of island) | static water levels | quarterly | static water levels | annually |

TABLE 5.2

PROPOSED GROUNDWATER MONITORING PROGRAM
GARLAND ROAD LANDFILL SITE, MIAMI COUNTY, OHIO

| | *Initial Groundwater Monitoring (2 years)* [(2)(3)] | | *Long-Term Groundwater Monitoring* [(3)] | |
|---|---|---|---|---|
| *Location* | *Parameters* [(1)] | *Frequency* | *Parameters* | *Frequency* |
| *Piezometers* | | | | |
| **Proposed** | | | | |
| PS-1 | static water levels | quarterly | static water levels | annually |
| PS-2 | static water levels | quarterly | static water levels | annually |
| PD-1 | static water levels | quarterly | static water levels | annually |
| PD-2 | static water levels | quarterly | static water levels | annually |

Notes:

(1) Additional ozone indication parameters will be included in the parameter list for Alternative 4 to optimize operations of the system.

(2) Groundwater monitoring in Alternative 4 during ozone treatment will stop once the average TCE concentration in monitoring wells D-2, D-3, and S-4 (160 µg/L based on 2002 data), is reduced by 50% or 80 µg/L, after which the long-term groundwater monitoring program will begin.

(3) Wells or parameters will be removed from the monitoring program following four consecutive results below the MCLs

(4) Attenuation parameters include alkalinity, chloride, Iron (II) ($Fe^{+2}$), methane, nitrate, oxidation-reduction potential, oxygen, pH, sulfate ($SO_4^{-2}$), temperature, and total organic carbon

TABLE 5.3

ALTERNATIVE 2: COST ESTIMATE
SOURCE CONTAINMENT WITH CURRENT OHIO SOLID WASTE CAP, RIVER BANK STABILIZATION, GROUNDWATER MONITORING, AND INSTITUTIONAL CONTROLS
GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

| *Item* | *Quantity* | *Unit* | *Unit Price* | | *Cost* |
|---|---|---|---|---|---|
| *Capital Costs* | | | | | |
| 1. Institutional Controls | | | | | |
| a. Deed Restrictions | - - | lump sum | - - | $ | 100,000 |
| **Subtotal - Deed Restrictions** | | | | **$** | **100,000** |
| 2. Fence Removal | | | | | |
| a. Removal of Existing Security Fence | - - | lump sum | - - | $ | 25,000 |
| **Subtotal - Removal of Existing Security Fence** | | | | **$** | **25,000** |
| 3. Groundwater Investigation/Monitoring | | | | | |
| a. Groundwater Investigation | | | | | |
| - Discrete Interval Sampling | 7 | each | $6,000 | $ | 42,000 |
| - Monitoring Well Installations | 7 | each | $2,500 | $ | 17,500 |
| - Piezometer Installations | 4 | each | $1,500 | $ | 6,000 |
| b. Interim Groundwater Monitoring Program (first 2 year: | 8 | events | $25,000 | $ | 200,000 |
| **Subtotal - Groundwater Investigation/Monitoring** | | | | **$** | **265,500** |
| 4. Bank Stabilization | | | | | |
| a. Engineering Costs: | | | | | |
| - detailed design | - - | lump sum | - - | $ | 75,000 |
| - stream gaging | - - | lump sum | - - | $ | 12,000 |
| - project management | 4 | month | $2,500 | $ | 10,000 |
| - construction oversight | 4 | month | $15,000 | $ | 60,000 |
| b. Site Preparation: | | | | | |
| - general requirements | - - | lump sum | - - | $ | 50,000 |
| - construction facilities | - - | lump sum | - - | $ | 40,000 |
| - construct access road | 1,500 | l. foot | $60 | $ | 90,000 |
| - remove trees and brush | - - | lump sum | - - | $ | 20,000 |
| c. Bank Stabilization and Materials: | | | | | |
| - grade slopes, backfill with gravel | 3,200 | cu.yd. | $38 | $ | 120,000 |
| - armortec block, purchase and install | 11,500 | sq.ft. | $10 | $ | 115,000 |
| - TRM install and purchase | 1,600 | sq.yd. | $10 | $ | 16,000 |
| - purchase and install gravel slope protection | 2,400 | cu.yd. | $30 | $ | 72,000 |
| - silt fence | 3,000 | l. foot | $3 | $ | 7,500 |
| - temporary river diversion and silt curtains | - - | lump sum | - - | $ | 15,000 |
| - erosion control geotextile | 3,600 | sq. yd. | $10 | $ | 36,000 |
| **Subtotal - Bank Stabilization** | | | | **$** | **738,500** |

TABLE 5.3

ALTERNATIVE 2: COST ESTIMATE
SOURCE CONTAINMENT WITH CURRENT OHIO SOLID WASTE CAP, RIVER BANK STABILIZATION, GROUNDWATER MONITORING, AND INSTITUTIONAL CONTROLS
GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

| *Item* | *Quantity* | *Unit* | *Unit Price* | | *Cost* |
|---|---|---|---|---|---|
| 5. Current Ohio Solid Waste Cap | | | | | |
| a. Engineering Costs: | | | | | |
| - detailed design | - - | lump sum | - - | $ | 100,000 |
| - project management | - - | lump sum | - - | $ | 30,000 |
| - construction oversight | - - | lump sum | - - | $ | 150,000 |
| b. Site Preparation: | | | | | |
| - general requirements | - - | lump sum | - - | $ | 400,000 |
| - construction facilities | - - | lump sum | - - | $ | 200,000 |
| - clearing/grubbing | 18 | acre | $7,000 | $ | 126,000 |
| - monitoring well extension | 30 | v. foot | $100 | $ | 3,000 |
| - surveying 6 monitoring wells | - - | lump sum | - - | $ | 2,500 |
| c. Cap Construction and Materials: | | | | | |
| - erosion control blanket for swale | - - | lump sum | - - | $ | 50,000 |
| - relocate waste from south end | 20,000 | cu. yd. | $10 | $ | 200,000 |
| - silt fence | 3,500 | l. foot | $4 | $ | 14,000 |
| - grading | 19 | acre | $7,000 | $ | 133,000 |
| - grading soil below cap 12-inches | 30,000 | cu. yd. | $8 | $ | 240,000 |
| - local clay 18-inches | 45,000 | cu. yd. | $15 | $ | 675,000 |
| - 40-mil HDPE flexible membrane liner | 90,000 | sq. yd. | $13 | $ | 1,125,000 |
| - soil drainage layer 12-inches | 30,000 | cu. yd. | $10 | $ | 300,000 |
| - cap protection vegetative layer 12-inches | 30,000 | cu. yd. | $8 | $ | 240,000 |
| - topsoil - 6-inches | 14,000 | sq. yd. | $10 | $ | 140,000 |
| - prairie grass seed | 19 | acre | $3,000 | $ | 57,000 |
| **Subtotal - Current Ohio Solid Waste Cap** | | | | **$** | **4,185,500** |
| TOTAL CAPITAL COSTS | | | | **$** | **5,314,500** |
| | | | CONTINGENCY (10%) | **$** | **531,450** |
| | | | GRAND TOTAL CAPITAL COSTS | **$** | **5,845,950** |

TABLE 5.3

ALTERNATIVE 2: COST ESTIMATE
SOURCE CONTAINMENT WITH CURRENT OHIO SOLID WASTE CAP, RIVER BANK STABILIZATION, GROUNDWATER MONITORING, AND INSTITUTIONAL CONTROLS
GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

| *Item* | *Quantity* | *Unit* | *Unit Price* | *Cost* |
|---|---|---|---|---|
| ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS | | | | |
| 1. Institutional Controls | | | | |
| a. Deed Restrictions | - - | lump sum | - - | $ - |
| **Subtotal - Deed Restrictions** | | | | $ - |
| 2. Fence Removal | | | | |
| a. Fence Removal | - - | lump sum | - - | $ - |
| **Subtotal - Fence Removal** | | | | $ - |
| 3. Groundwater Monitoring/Reporting | | | | |
| a. Groundwater Monitoring | 1 | per year | $25,000 | $ 25,000 |
| **Subtotal - Groundwater Investigation/Monitoring** | | | | **$ 25,000** |
| 4. Bank Stabilization | | | | |
| a. Site Inspection | 1 | per year | $5,000 | $ 5,000 |
| **Subtotal - Bank Stabilization** | | | | **$ 5,000** |
| 5. Current Ohio Solid Waste Cap | | | | |
| a. Site Inspection | 1 | per year | $1,000 | $ 1,000 |
| b. Cap Maintenance and Repair | 1 | per year | $10,000 | $ 10,000 |
| c. Regrading/Reseeding | 1 | per year | $2,000 | $ 2,000 |
| **Subtotal - Soil Cover and Vegetative Cap with Trees** | | | | **$ 13,000** |
| TOTAL ANNUAL O&M COSTS | | | | **$ 43,000** |
| **PRESENT WORTH OF O&M (5 percent over 30 years)** | | | | **$ 661,015** |
| | PRESENT WORTH TOTAL REMEDY COST | | | **$ 6,506,965** |

**TABLE 5.4**

**ALTERNATIVE 3: COST ESTIMATE**
**SOURCE CONTAINMENT WITH IMPERMEABLE CAP, SHEET PILING ALONG EAST SIDE AND SOUTH END OF THE SITE, LEACHATE EXTRACTION AND TREATMENT, GROUNDWATER MONITORING, INSTITUTIONAL CONTROLS**
**GARLAND ROAD LANDFILL SITE**
**MIAMI COUNTY, OHIO**

| *Item* | *Quantity* | *Unit* | *Unit Price* | *Cost* |
|---|---|---|---|---|
| ***Capital Costs*** | | | | |
| 1. Institutional Controls | | | | |
| a. Deed Restrictions | - - | lump sum | - - | $ 100,000 |
| **Subtotal - Deed Restrictions** | | | | **$ 100,000** |
| 2. Fence Removal | | | | |
| a. Removal of Existing Security Fence | - - | lump sum | - - | $ 25,000 |
| **Subtotal - Removal of Existing Security Fence** | | | | **$ 25,000** |
| 3. Groundwater Investigation/Monitoring | | | | |
| a. Groundwater Investigation | | | | |
| - Discrete Interval Sampling | 7 | each | $6,000 | $ 42,000 |
| - Monitoring Well Installations | 7 | each | $2,500 | $ 17,500 |
| - Piezometer Installations | 4 | each | $1,500 | $ 6,000 |
| b. Interim Groundwater Monitoring Program (first 2 years) | 8 | events | $25,000 | $ 200,000 |
| **Subtotal - Groundwater Investigation/Monitoring** | | | | **$ 265,500** |
| 4. Bank Stabilization | | | | |
| a. Engineering Costs: | | | | |
| - detailed design | - - | lump sum | - - | $ 200,000 |
| - stream gaging | - - | lump sum | - - | $ 12,000 |
| - project management | - - | lump sum | - - | $ 100,000 |
| - construction oversight | - - | lump sum | - - | $ 100,000 |
| b. Site Preparation: | | | | |
| - general requirements | - - | lump sum | - - | $ 50,000 |
| - construction facilities | - - | lump sum | - - | $ 40,000 |
| - construct access road | 1,500 | l. foot | $60 | $ 90,000 |
| - remove trees and brush | - - | lump sum | - - | $ 20,000 |
| c. - sheet piling along east and south side of site (45 by 3,000 ft) | 139,500 | sq.ft. | $28 | $ 3,925,212 |
| - toe stone | - - | lump sum | - - | $ 20,000 |
| **Subtotal - Bank Stabilization** | | | | **$ 4,537,212** |

TABLE 5.4

ALTERNATIVE 3: COST ESTIMATE
SOURCE CONTAINMENT WITH IMPERMEABLE CAP, SHEET PILING ALONG EAST SIDE AND SOUTH END OF THE SITE, LEACHATE EXTRACTION AND TREATMENT, GROUNDWATER MONITORING, INSTITUTIONAL CONTROLS
GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

| *Item* | *Quantity* | *Unit* | *Unit Price* | *Cost* | GCL |
|---|---|---|---|---|---|
| 5. Clay Cap with Frost Protection | | | | | |
| a. Engineering Costs: | | | | | |
| - detailed design | - - | lump sum | - - | $ 75,000 | $ 75,000 |
| - project management | - - | lump sum | - - | $ 15,000 | $ 15,000 |
| - construction oversight | - - | lump sum | - - | $ 80,000 | $ 80,000 |
| b. Site Preparation: | | | | | |
| - general requirements | - - | lump sum | - - | $ 400,000 | $ 400,000 |
| - construction facilities | - - | lump sum | - - | $ 200,000 | $ 200,000 |
| - clearing/grubbing | 18 | acre | $7,000 | $ 126,000 | $ 126,000 |
| - monitoring well extension | 30 | v. foot | $100 | $ 3,000 | $ 3,000 |
| - surveying 6 monitoring wells | - - | lump sum | - - | $ 2,500 | $ 2,500 |
| c. Cap Construction and Materials: | | | | | |
| - erosion control blanket for swale | - - | lump sum | - - | $ 50,000 | $ 50,000 |
| - relocate waste from south end | 20,000 | cu. yd. | $10 | $ 200,000 | $ 200,000 |
| - silt fence | 3,500 | l. foot | $4 | $ 14,000 | $ 14,000 |
| - grading | 19 | acre | $7,000 | $ 133,000 | $ 133,000 |
| - grading soil below cap 12-inches | 30,000 | cu. yd. | $8 | $ 240,000 | $ 240,000 |
| - local clay 24-inches | 60,000 | cu. yd. | $8 | $ 480,000 | $ - |
| - GCL | 90,000 | sq. yd. | $7.20 | | $ 648,000 |
| - Geonet drainage layer | 85,000 | sq. yd. | $8.10 | | $ 688,500 |
| - frost protection 24-inches | 60,000 | cu. yd. | $8 | $ 480,000 | |
| - grading soil on top cap 12-inches | 30,000 | cu. yd. | $8 | | $ 240,000 |
| - topsoil - 6-inches | 14,000 | sq. yd. | $10 | $ 140,000 | $ 140,000 |
| - prairie grass seed | 19 | acre | $3,000 | $ 57,000 | $ 57,000 |
| **Subtotal - Clay Cap with Frost Protection** | | | | **$ 2,695,500** | **$ 3,312,000** |
| 6. Groundwater Extraction Wells | | | | | |
| - drilling of 3 6-inch borings, 50 feet deep | 10 | each | $1,500 | $ 15,000 | |
| - extraction wells, 6-inch, S.S., screens and casings 50 ft. | 10 | each | $9,500 | $ 95,000 | |
| - extraction well manholes with covers | 10 | each | $1,700 | $ 17,000 | |
| - extraction pumps, 4-inch 40-gpm, 5-hp | 10 | each | $4,800 | $ 48,000 | |
| - electricity service for each well | 10 | each | $7,900 | $ 79,000 | |
| - level control systems | 10 | each | $2,250 | $ 22,500 | |
| - well discharge pipe, 2-inch | 300 | l. foot | $28 | $ 8,400 | |
| - force main, 4-inch-diameter | 1,000 | l. foot | $51 | $ 51,000 | |
| **Subtotal - Groundwater Extraction Wells** | | | | **$ 335,900** | |

TABLE 5.4

ALTERNATIVE 3: COST ESTIMATE
SOURCE CONTAINMENT WITH IMPERMEABLE CAP, SHEET PILING ALONG EAST SIDE AND SOUTH END OF THE SITE, LEACHATE EXTRACTION AND TREATMENT, GROUNDWATER MONITORING, INSTITUTIONAL CONTROLS
GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

| *Item* | *Quantity* | *Unit* | *Unit Price* | | *Cost* |
|---|---|---|---|---|---|
| 7. Leachate and Groundwater Treatment Facility | | | | | |
| a. Engineering Costs: | | | | | |
| - detailed design | - - | lump sum | - - | $ | 120,000 |
| - project management | - - | lump sum | - - | $ | 50,000 |
| - construction oversight | - - | lump sum | - - | $ | 60,000 |
| b. Facility Requirements: | | | | | |
| - process building | 2,000 | sq.ft. | $42 | $ | 84,000 |
| - building sump pump | 1 | each | $3,400 | $ | 3,400 |
| - 300-gpm oil-water separators | 2 | each | $5,600 | $ | 11,200 |
| - oil storage tank, 3,000 gallon | 1 | each | $4,000 | $ | 4,000 |
| - 20-gpm oil transfer pump with controls | 2 | each | $62,000 | $ | 124,000 |
| - oil transfer piping, valves, and controls | - - | lump sum | - - | $ | 9,000 |
| - gas heater | 2 | each | $11,000 | $ | 22,000 |
| - electricity service and electrical work | - - | lump sum | - - | $ | 68,000 |
| c. Air Stripper Materials: | | | | | |
| - 300-gpm air stripper pumps with controls | 2 | each | $10,000 | $ | 20,000 |
| - low profile, 300-gmp air strippers with blowers and control | 2 | each | $135,000 | $ | 270,000 |
| - air stripper piping and valves | - - | lump sum | - - | $ | 22,500 |
| d. GAC Materials: | | | | | |
| - 300-gpm GAC pump with controls | 2 | each | $10,000 | $ | 20,000 |
| - GAC piping and valves | - - | lump sum | - - | $ | 45,000 |
| - 300-gpm dual particulate filters | 2 | each | $17,000 | $ | 34,000 |
| - GAC dual beds, 300-gpm, 20,000 lb per bed | 2 | each | $146,000 | $ | 292,000 |
| e. Treatment Effluent Storage and Sampling Materials | | | | | |
| - LPG storage tanks, 2,000-gallon | 2 | each | $11,000 | $ | 22,000 |
| - LPG piping and valves | - - | lump sum | - - | $ | 3,000 |
| - effluent sampler with piping, controls | - - | lump sum | - - | $ | 8,000 |
| - effluent piping, 10-inch HDPE | 500 | l. foot | $85 | $ | 42,500 |
| **Subtotal - Leachate and Groundwater Treatment Facility** | | | | **$** | **1,334,600** |
| **TOTAL CAPITAL COSTS** | | | | **$** | **9,293,712** |
| | | | **CONTINGENCY (10%)** | **$** | **929,371** |
| | | | **GRAND TOTAL CAPITAL COSTS** | **$** | **10,223,083** |

TABLE 5.4

ALTERNATIVE 3: COST ESTIMATE
SOURCE CONTAINMENT WITH IMPERMEABLE CAP, SHEET PILING ALONG EAST SIDE AND SOUTH END OF THE SITE, LEACHATE EXTRACTION AND TREATMENT, GROUNDWATER MONITORING, INSTITUTIONAL CONTROLS
GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

| *Item* | *Quantity* | *Unit* | *Unit Price* | *Cost* |
|---|---|---|---|---|
| ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS | | | | |
| 1. Institutional Controls | | | | |
| a. Deed Restrictions | - - | lump sum | - - | $ - |
| **Subtotal - Deed Restrictions** | | | | $ - |
| 2. Fence Removal | | | | |
| a. Fence Removal | - - | lump sum | - - | $ - |
| **Subtotal - Fence Removal** | | | | $ - |
| 3. Groundwater Monitoring/Reporting | | | | |
| a. Groundwater Monitoring | 1 | per year | $25,000 | $ 25,000 |
| **Subtotal - Groundwater Investigation/Monitoring** | | | | **$ 25,000** |
| 4. Bank Stabilization | | | | |
| a. Site Inspection | 1 | per year | $5,000 | $ 5,000 |
| **Subtotal - Bank Stabilization** | | | | **$ 5,000** |
| 5. Clay Cap with Frost Protection | | | | |
| a. Site Inspection | 1 | per year | $1,000 | $ 1,000 |
| b. Cap Maintenance and Repair | 1 | per year | $6,000 | $ 6,000 |
| c. Regrading/Reseeding | 1 | per year | $2,000 | $ 2,000 |
| **Subtotal - Clay Cap with Frost Protection** | | | | **$ 9,000** |
| 6. Groundwater Extraction Wells | | | | |
| a. Groundwater Extraction Wells | - - | lump sum | - - | $ 10,000 |
| **Subtotal - Groundwater Extraction Wells** | | | | **$ 10,000** |
| 7. Leachate and Groundwater Treatment Facility | | | | |
| - maintenance and operation, part-time | 12 | month | $4,000 | $ 48,000 |
| - particulate filter cartridge (32 cartridge, once per month) | 384 | each | $115 | $ 44,160 |
| - maintenance of GAC (two replacements per year) | 160,000 | lb | $0.85 | $ 136,000 |
| - air filters for air stripper blowers | - - | lump sum | - - | $ 450 |
| - oil disposal | 9,000 | gal | $7 | $ 61,200 |
| - LPG for 1 year | 1 | year | $17,000 | $ 17,000 |
| - electricity | 450,000 | Kwh | $0.11 | $ 49,500 |
| **Subtotal - Leachate and Groundwater Treatment Facility** | | | | $ 356,310 |
| TOTAL ANNUAL O&M COSTS | | | | **$ 405,310** |
| PRESENT WORTH OF O&M (5 percent over 30 years) | | | | **$ 6,230,608** |
| | | | PRESENT WORTH TOTAL REMEDY COST | **$ 16,453,691** |

TABLE 5.5

ALTERNATIVE 4: COST ESTIMATE
SOURCE CONTAINMENT WITH IMPERMEABLE CAP, RIVER BANK STABILIZATION, SOURCE AREA GROUNDWATER TREATMENT, GROUNDWATER MONITORING, INSTITUTIONAL CONTROLS
GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

| *Item* | *Quantity* | *Unit* | *Unit Price* | | *Cost* |
|---|---|---|---|---|---|
| *Capital Costs* | | | | | |
| 1. Institutional Controls | | | | | |
| a. Deed Restrictions | - - | lump sum | - - | $ | 100,000 |
| **Subtotal - Deed Restrictions** | | | | **$** | **100,000** |
| 2. Fence Removal | | | | | |
| a. Removal of Existing Security Fence | - - | lump sum | - - | $ | 25,000 |
| **Subtotal - Removal of Existing Security Fence** | | | | **$** | **25,000** |
| 3. Groundwater Investigation/Monitoring | | | | | |
| a. Groundwater Investigation | | | | | |
| Discrete Interval Sampling | 7 | each | $6,000 | $ | 42,000 |
| Monitoring Well Installations | 7 | each | $2,500 | $ | 17,500 |
| Piezometer Installations | 4 | each | $1,500 | $ | 6,000 |
| b. Interim Groundwater Monitoring Program (first 2 years) | 8 | events | $25,000 | $ | 200,000 |
| **Subtotal - Groundwater Investigation/Monitoring** | | | | **$** | **265,500** |
| 4. Bank Stabilization | | | | | |
| a. Engineering Costs: | | | | | |
| - detailed design | - - | lump sum | - - | $ | 75,000 |
| - stream gaging | - - | lump sum | - - | $ | 12,000 |
| - project management | 4 | month | $2,500 | $ | 10,000 |
| - construction oversight | 4 | month | $15,000 | $ | 60,000 |
| b. Site Preparation: | | | | | |
| - general requirements | - - | lump sum | - - | $ | 50,000 |
| - construction facilities | - - | lump sum | - - | $ | 40,000 |
| - construct access road | 1,500 | l. foot | $60 | $ | 90,000 |
| - remove trees and brush | - - | lump sum | - - | $ | 20,000 |
| c. Bank Stabilization and Materials: | | | | | |
| - grade slopes, backfill with gravel | 3,200 | cu.yd. | $38 | $ | 120,000 |
| - armortec block, purchase and install | 11,500 | sq.ft. | $10 | $ | 115,000 |
| - TRM install and purchase | 1,600 | sq.yd. | $10 | $ | 16,000 |
| - purchase and install gravel slope protection | 2,400 | cu.yd. | $30 | $ | 72,000 |
| - silt fence | 3,000 | l. foot | $2.50 | $ | 7,500 |
| - temporary river diversion and silt curtains | - - | lump sum | - - | $ | 15,000 |
| - erosion control geotextile | 3,600 | sq. yd. | $10 | $ | 36,000 |
| **Subtotal - Bank Stabilization** | | | | **$** | **738,500** |

TABLE 5.5

ALTERNATIVE 4: COST ESTIMATE
SOURCE CONTAINMENT WITH IMPERMEABLE CAP, RIVER BANK STABILIZATION, SOURCE AREA GROUNDWATER TREATMENT, GROUNDWATER MONITORING, INSTITUTIONAL CONTROLS
GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

| *Item* | *Quantity* | *Unit* | *Unit Price* | *Cost* | | |
|---|---|---|---|---|---|---|
| 5. Clay Cap with Frost Protection | | | | | | GCL |
| a. Engineering Costs: | | | | | | |
| - detailed design | - - | lump sum | - - | $ 75,000 | $ | 75,000 |
| - project management | - - | lump sum | - - | $ 15,000 | $ | 15,000 |
| - construction oversight | - - | lump sum | - - | $ 80,000 | $ | 80,000 |
| b. Site Preparation: | | | | | | |
| - general requirements | - - | lump sum | - - | $ 400,000 | $ | 400,000 |
| - construction facilities | - - | lump sum | - - | $ 200,000 | $ | 200,000 |
| - clearing/grubbing | 18 | acre | $7,000 | $ 126,000 | $ | 126,000 |
| - monitoring well extension | 30 | v. foot | $100 | $ 3,000 | $ | 3,000 |
| - surveying 6 monitoring wells | - - | lump sum | - - | $ 2,500 | $ | 2,500 |
| c. Cap Construction and Materials: | | | | | | |
| - erosion control blanket for swale | - - | lump sum | - - | $ 50,000 | $ | 50,000 |
| - relocate waste from south end | 20,000 | cu. yd. | $10 | $ 200,000 | $ | 200,000 |
| - silt fence | 3,500 | l. foot | $4 | $ 14,000 | $ | 14,000 |
| - grading | 19 | acre | $7,000 | $ 133,000 | $ | 133,000 |
| - grading soil below cap 12-inches | 30,000 | cu. yd. | $8 | $ 240,000 | $ | 240,000 |
| - local clay 24-inches | 60,000 | cu. yd. | $8 | $ 480,000 | $ | - |
| - GCL | 90,000 | sq. yd. | $7.20 | | $ | 648,000 |
| - Geonet drainage layer | 85,000 | sq. yd. | $8.10 | | $ | 688,500 |
| - frost protection 24-inches | 60,000 | cu. yd. | $8 | $ 480,000 | | |
| grading soil on top cap 12-inches | 30,000 | cu. yd. | $8 | | $ | 240,000 |
| - topsoil - 6-inches | 14,000 | sq. yd. | $10 | $ 140,000 | $ | 140,000 |
| - prairie grass seed | 19 | acre | $3,000 | $ 57,000 | $ | 57,000 |
| **Subtotal - Clay Cap with Frost Protection** | | | | **$ 2,695,500** | **$** | **3,312,000** |
| 6. Ozone Sparging | | | | | | |
| a. pilot test | | | | | | |
| - run power to Site | - - | lump sum | - - | $ 50,000 | | |
| - install sparge points | 15 | each | $1,500 | $ 22,500 | | |
| - install ozone system | - - | lump sum | - - | $ 50,000 | | |
| - operate system | 3 | month | $10,000 | $ 30,000 | | |
| - electricity | 3 | month | $350 | $ 1,050 | | |
| - pilot test monitoring/reporting | - - | lump sum | - - | $ 50,000 | | |
| b. 2-years of ozone sparging | | | | | | |
| - install sparge points | 100 | each | $1,500 | $ 150,000 | | |
| - operate system | 24 | month | $10,000 | $ 240,000 | | |
| - electricity | 24 | month | $350 | $ 8,400 | | |
| - monitoring/reporting | - - | lump sum | - - | $ 100,000 | | |
| **Subtotal - Ozone Sparging** | | | | **$ 701,950** | | |
| **TOTAL CAPITAL COSTS** | | | | **$ 4,526,450** | | |
| | | | **CONTINGENCY (10%)** | **$ 452,645** | | |
| | | | **GRAND TOTAL CAPITAL COSTS** | **$ 4,979,095** | | |

TABLE 5.5

ALTERNATIVE 4: COST ESTIMATE
SOURCE CONTAINMENT WITH IMPERMEABLE CAP, RIVER BANK STABILIZATION, SOURCE AREA GROUNDWATER TREATMENT, GROUNDWATER MONITORING, INSTITUTIONAL CONTROLS
GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

| *Item* | *Quantity* | *Unit* | *Unit Price* | *Cost* |
|---|---|---|---|---|
| ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS | | | | |
| 1. Institutional Controls | | | | |
| a. Deed Restrictions | - - | lump sum | - - | $ - |
| **Subtotal - Deed Restrictions** | | | | $ - |
| 2. Fence Removal | | | | |
| a. Fence Removal | - - | lump sum | - - | $ - |
| **Subtotal - Fence Removal** | | | | $ - |
| 3. Groundwater Monitoring/Reporting | | | | |
| a. Groundwater Monitoring | 1 | per year | $25,000 | $ 25,000 |
| **Subtotal - Groundwater Investigation/Monitoring** | | | | **$ 25,000** |
| 4. Bank Stabilization | | | | |
| a. Site Inspection | 1 | per year | $5,000 | $ 5,000 |
| **Subtotal - Bank Stabilization** | | | | **$ 5,000** |
| 5. Clay Cap with Frost Protection | | | | |
| a. Site Inspection | 1 | per year | $1,000 | $ 1,000 |
| b. Cap Maintenance and Repair | 1 | per year | $6,000 | $ 6,000 |
| c. Regrading/Reseeding | 1 | per year | $2,000 | $ 2,000 |
| **Subtotal - Clay Cap with Frost Protection** | | | | **$ 9,000** |
| 6. Ozone Sparging | | | | |
| a. Ozone Sparging | - - | lump sum | - - | $ - |
| **Subtotal - Ozone Sparging** | | | | $ - |
| TOTAL ANNUAL O&M COSTS | | | | **$ 39,000** |
| **PRESENT WORTH OF O&M (5 percent over 30 years)** | | | | **$ 599,526** |
| | | | **PRESENT WORTH TOTAL REMEDY COST** | **$ 5,578,621** |

A

# APPENDIX A

## STRATIGRAPHIC AND COMPLETION DETAILS FOR MONITORING WELLS, BORING LOGS, AND TEST PITS

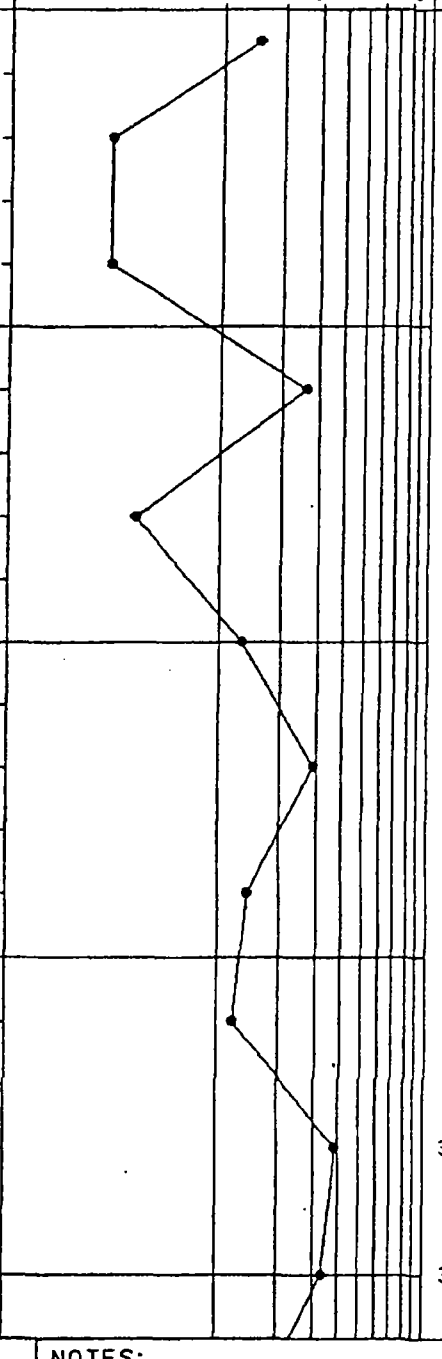
- Shallow Monitoring Wells (S-1 to S-6)
- Deep Monitoring Wells (D-1 to D-3)
- Monitoring Wells (MW-1 to MW-9)
- Soil Borings (SB-1 to SB-8)
- Slope Stability Borings (Slope-01 to Slope-06)
- Private Well Logs
- Test Pit Logs

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. S-1

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | N VALUE |
|---|---|---|---|---|---|---|---|
| | | Brown Silty SAND<br>Soil Sample Collected | SS | 2 | 3.2 | | 15 |
| | | Brown Gravelly Silty SAND<br>w/rock fragments | SS | 5 | 3.4 | | 3 |
| | | Drilled through metal | SS | 0 | 4-5 | | 3 |
| 5 | | 0-3" Brown Clayey SAND, moist<br>3-7" WASTE | SS | 7 | 4 | -5 | 28 |
| | | | SS | 0 | BG | | 4 |
| 10 | | WASTE w/dry Sand | SS | 3 | 3-8 | -10 | 13 |
| | | Tan Clayey SAND, firm, moist | SS | 18 | BG | | 29 |
| | | 0-15" Tan Clayey SAND, w/waste<br>15-16.5" Tan Sandy GRAVEL | SS | 16.5 | 3.8 | | 14 |
| 15 | | Tan Silty Fine SAND to Gray<br>Clayey SAND, firm, moist | SS | 18 | 4.2 | -15 | 12 |
| | | 0-1" GRAVEL<br>1-6" Tan-grn firm Clayey SAND<br>6-9" Dry Gravelly SAND | SS | 9 | 4 | | 38 |
| 20 | | Tan-grn Clayey SAND, moist | SS | 18 | 3 | -20 | 33 |

STANDARD PENETRATION TEST DATA (blows/ft)




DATE STARTED: 6-28-95
DATE FINISHED: 6-28-95
DRILLING METHOD: 4-1/4" ID Hollow Stem Auger
GEOLOGIST: E. Council
DRILLER: D. Roelker
WATER LEVEL: --

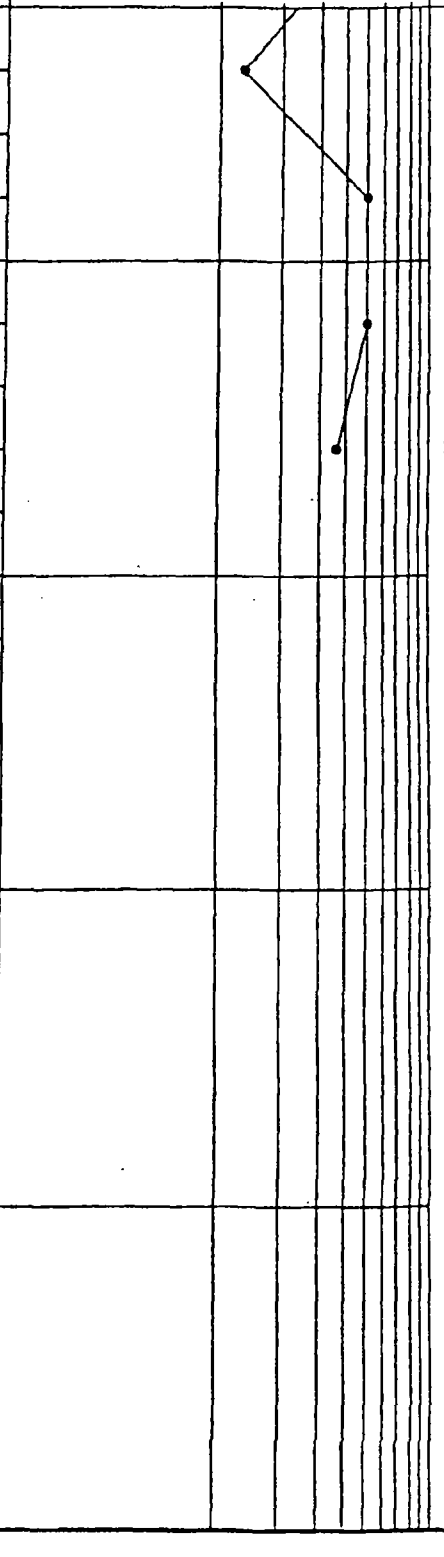
NOTES:
BG = Background
PID background is 2.8 ppm.

RUST Environment & Infrastructure

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

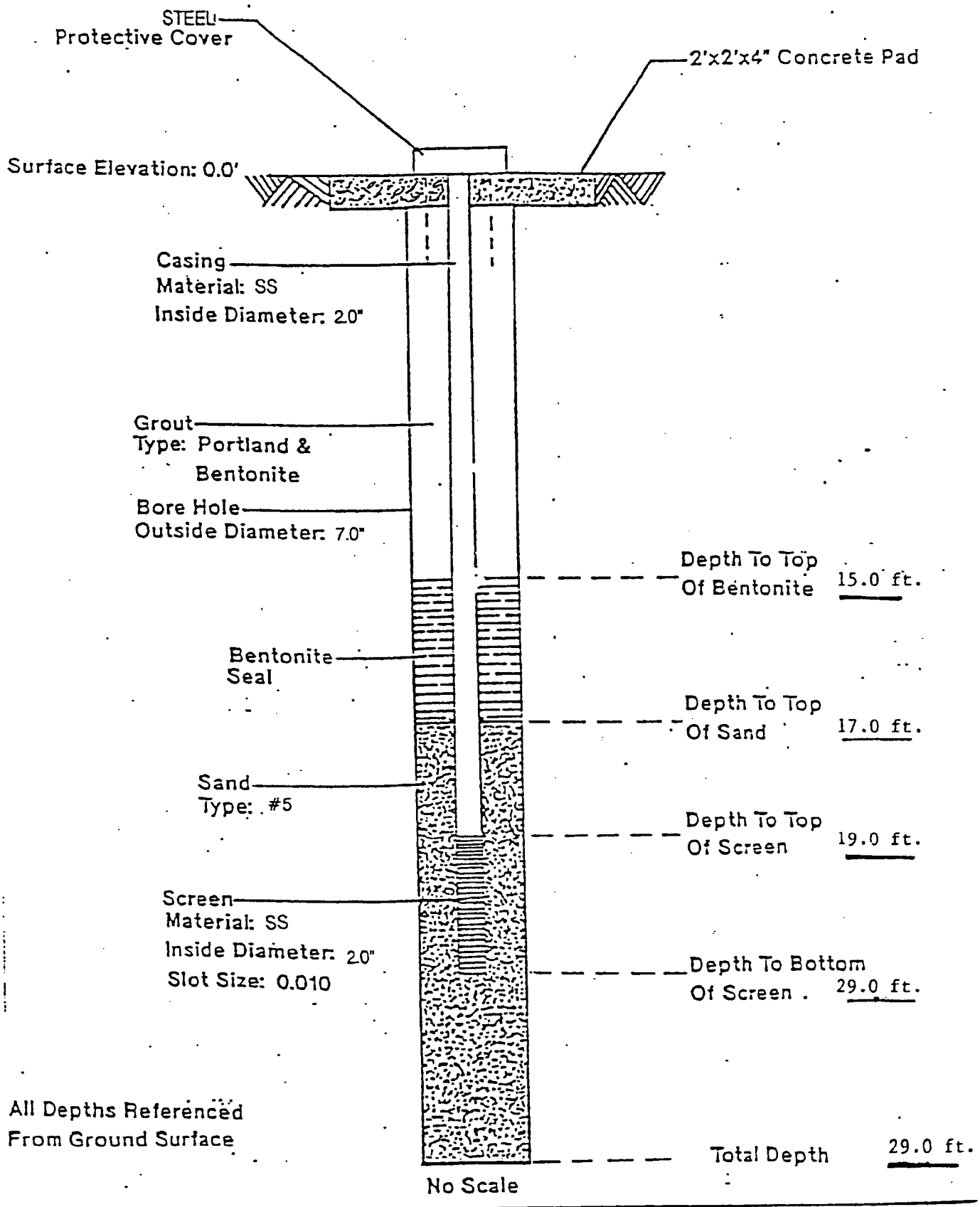
# LOG OF BORING NO. S-1

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | STANDARD PENETRATION TEST DATA (blows/ft) | N VALUE |
|---|---|---|---|---|---|---|---|---|
| | | 0-5.5" Gray Silty CLAY, moist<br>5.5-11.5" dry Tan Clayey SAND | SS | 11.5 | 4.2 | | | 13 |
| | | Red-Tan SAND to GRAVEL w/minor Waste.<br>Soil Sample Collected | SS | 5 | 10 | | | 50 |
| 25 | | GRAVEL, wet | SS | 5 | BG | -25 | | 50 |
| | | 0-2" WASTE<br>2-4" Tan Silty SAND<br>4-7" Lt Gray LIMESTONE<br>7-17" Red Gravelly SAND wet | SS | 17 | 5 | | | 38 |
| | | Boring terminated at 29.0 ft. | | | | | | |
| 30 | | | | | | -30 | | |
| 35 | | | | | | -35 | | |
| 40 | | | | | | -40 | | |




RUST Environment & Infrastructure

CONSTRUCTION LOG OF WELL NO. S-1




Garland Road Landfill Monitoring Wells - SI

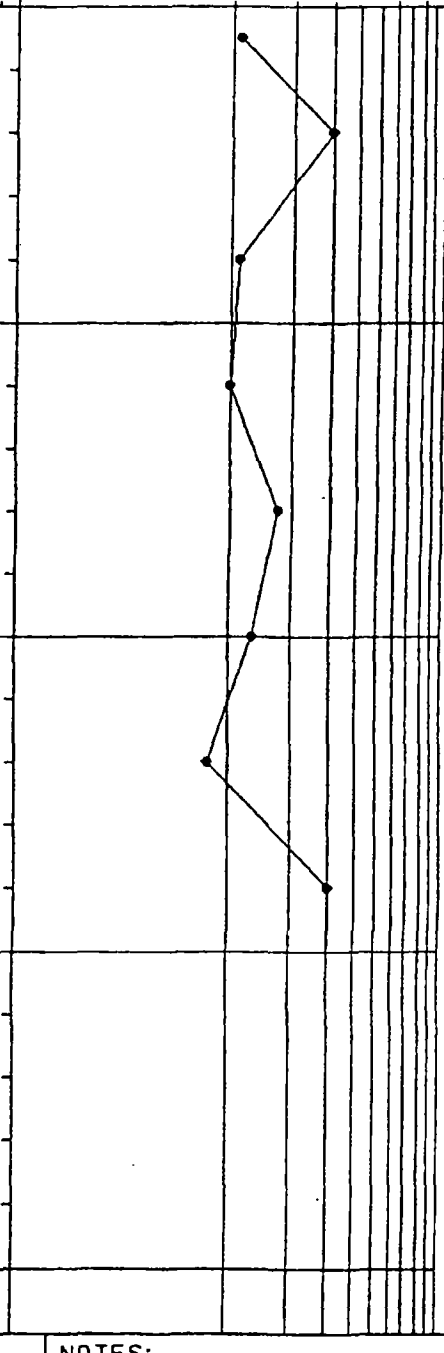
RUST ENVIRONMENT & INFRASTRUCTURE

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. S-2

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | N VALUE |
|---|---|---|---|---|---|---|---|
| | | Drk Brown Gravelly SAND<br>Soil Sample Collected | SS | 4 | 2 | | 11 |
| | | Waste w/minor tan Clayey GRAVEL | SS | 5 | 1.5 | | 30 |
| | | Brown Silty Gravelly CLAY w/minor Waste | SS | 4 | 1.8 | | 11 |
| 5 | | Silty CLAY with Gravel | SS | 1 | 4-5 | -5 | 10 |
| | | 0-2" Drk Brn Silty CLAY<br>2-4" Grn WASTE<br>4-10"Lt Gray-Brn Silty SAND and Gravel, Dry | SS | 10 | 2-5 | | 17 |
| 10 | | Lt Gray-Brn Silty SAND w/ Gravel<br>Soil Sample Collected | SS | 12 | BG | -10 | 13 |
| | | Same w/ more Clay | SS | 8.5 | 1-2 | | 8 |
| | | 0-5" Tan Med Gravelly SAND, wet<br>5-10" Tan SAND | SS | 10 | BG | | 30 |
| 15 | | Boring terminated at 15.0 ft. | | | | -15 | |
| 20 | | | | | | -20 | |

STANDARD PENETRATION TEST DATA (blows/ft)

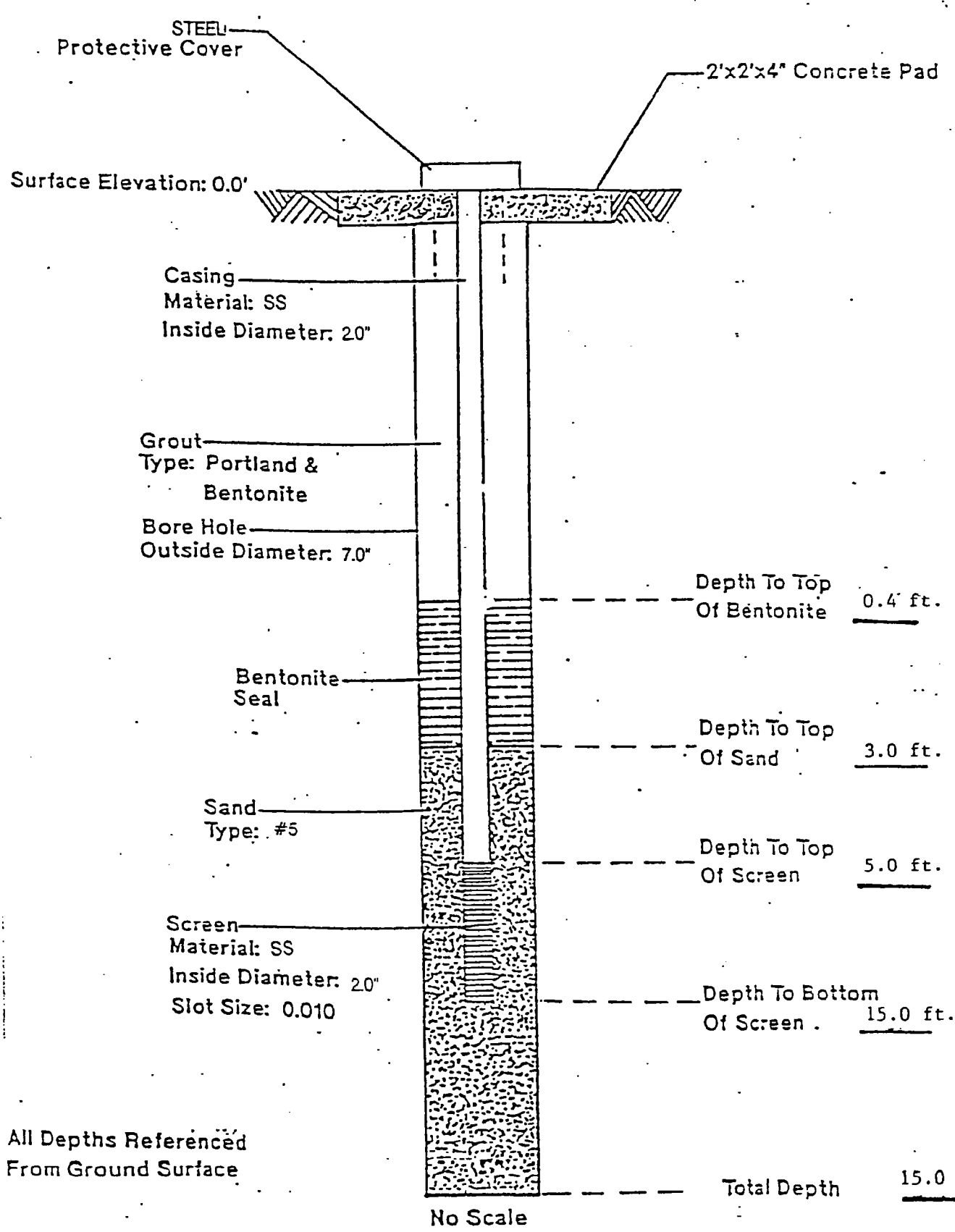



DATE STARTED: 6-22-95
DATE FINISHED: 6-22-95
DRILLING METHOD: 4-1/4" ID Hollow Stem Auger
GEOLOGIST: E. Council
DRILLER: D. Roelker
WATER LEVEL: --

NOTES:
BG = Background
PID background is < 1.0 ppm.

RUST Environment & Infrastructure

CONSTRUCTION LOG OF WELL NO. S-2




Garland Road Landfill Monitoring Wells - SI

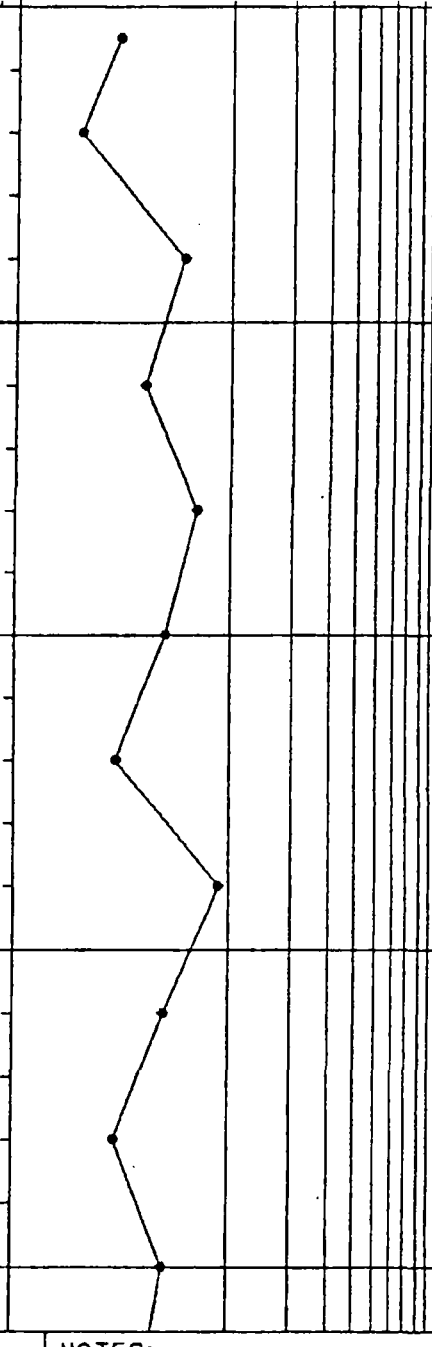
RUST ENVIRONMENT & INFRASTRUCTURE

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. S-3

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | N VALUE |
|---|---|---|---|---|---|---|---|
| | | Brown Sandy GRAVEL, Dry Soil Sample Collected | SS | 4 | BG | | 3 |
| | | Same w/minor Clay | SS | 9 | 1-2 | | 2 |
| | | Brn-Red Sandy GRAVEL, dry | SS | 5 | 2 | | 8 |
| 5 | | | | | | -5 | |
| | | Same | SS | 3 | BG | | 4 |
| | | Lt Gray Sandy GRAVEL | SS | 2 | BG | | 7 |
| 10 | | Same w/minor Waste Slightly moist | SS | 5.5 | 4 | -10 | 5 |
| | | Same w/water in seams | SS | 3 | 9 | | 3 |
| | | Drk Brn CLAY, firm & moist | SS | 3 | 2.8 | | 9 |
| 15 | | | | | | -15 | |
| | | Same w/more Sand firm & moist | SS | 13 | 2 | | 5 |
| | | Gray-grn Silty CLAY, firm w/minor mottling, moist | SS | 11 | 3.2 | | 3 |
| 20 | | Same w/minor Waste Soil Sample Collected | SS | 21 | BG | -20 | 5 |

STANDARD PENETRATION TEST DATA (blows/ft)




DATE STARTED: 6-26-95
DATE FINISHED: 6-26-95
DRILLING METHOD: 4-1/4" ID Hollow Stem Auger
GEOLOGIST: E. Council
DRILLER: D. Roelker
WATER LEVEL: --

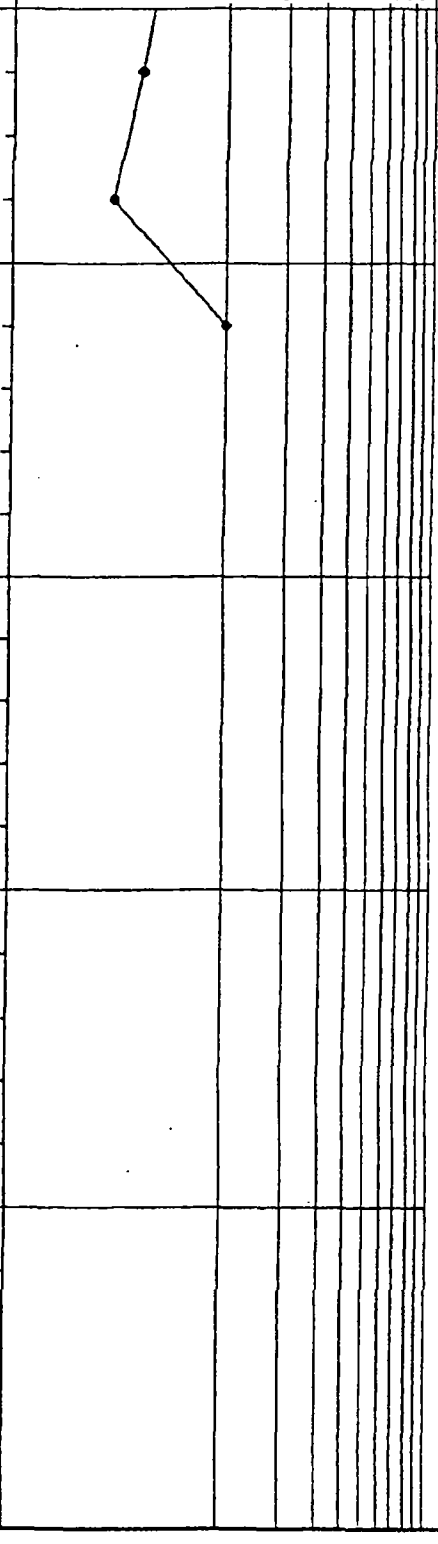
NOTES:
BG = Background
PID background is < 10 ppm.

RUST Environment & Infrastructure

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

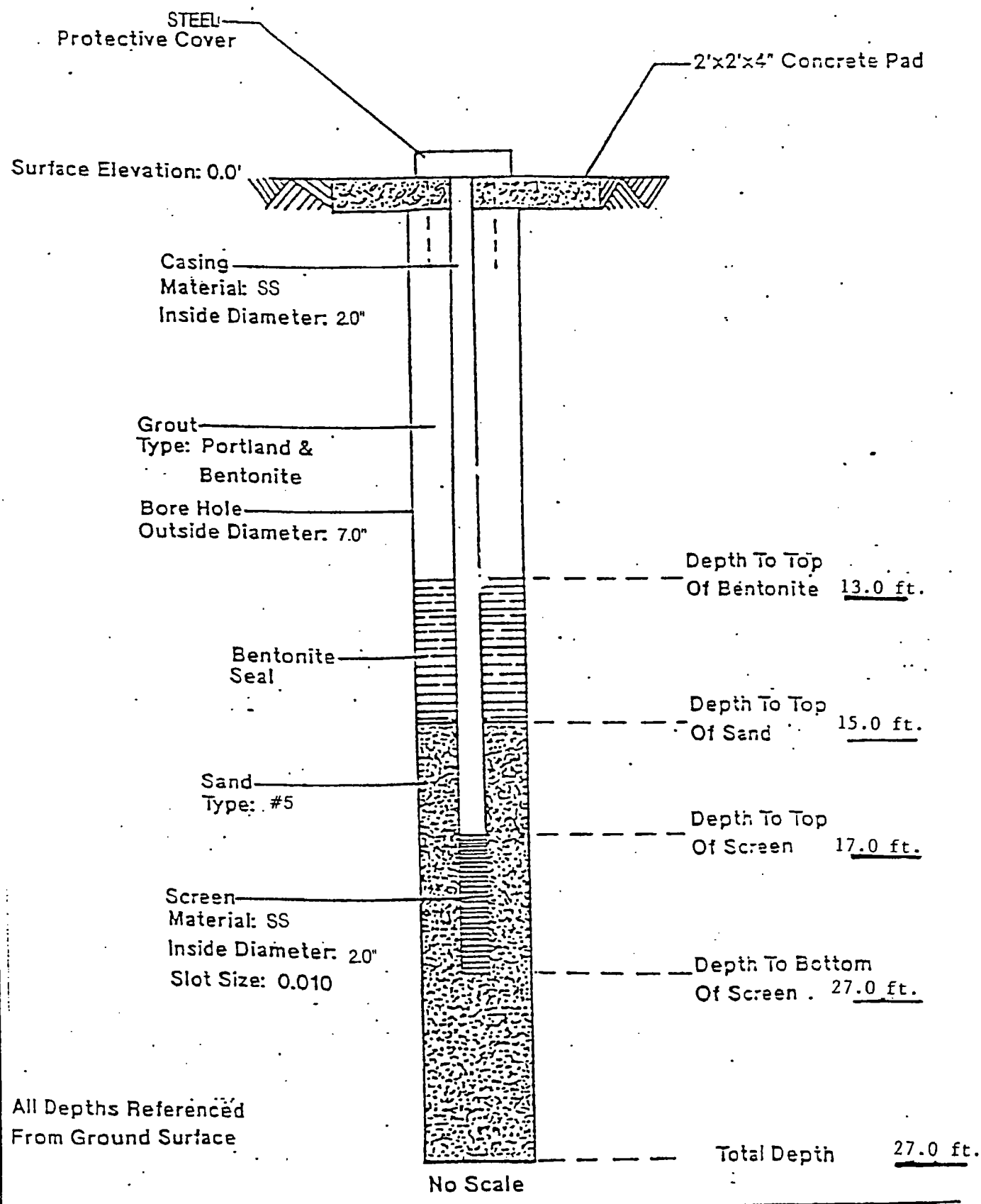
# LOG OF BORING NO. S-3

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | STANDARD PENETRATION TEST DATA (blows/ft) | N VALUE |
|---|---|---|---|---|---|---|---|---|
| | | 0-6" Gray Silty CLAY, wet<br>6-10" Tan fine SAND, wet<br>10-16 Tan Sandy CLAY, wet | SS | 8 | 3.2 | | | 4 |
| | | 0-2" Drk Gray-Grn Silty CLAY<br>2-6" Drk Grn Sandy CLAY w/Waste | SS | 16 | 3.2 | | | 3 |
| 25 | | 6-11" Yellow Gry Clayey GRAVEL firm, wet | SS | 11 | 2.8 | -25 | | 10 |
| | | Boring terminated at 27.0 ft. | | | | | | |
| 30 | | | | | | -30 | | |
| 35 | | | | | | -35 | | |
| 40 | | | | | | -40 | | |




RUST Environment & Infrastructure

CONSTRUCTION LOG OF WELL NO. S-3




Garland Road Landfill Monitoring Wells - SI

RUST ENVIRONMENT & INFRASTRUCTURE

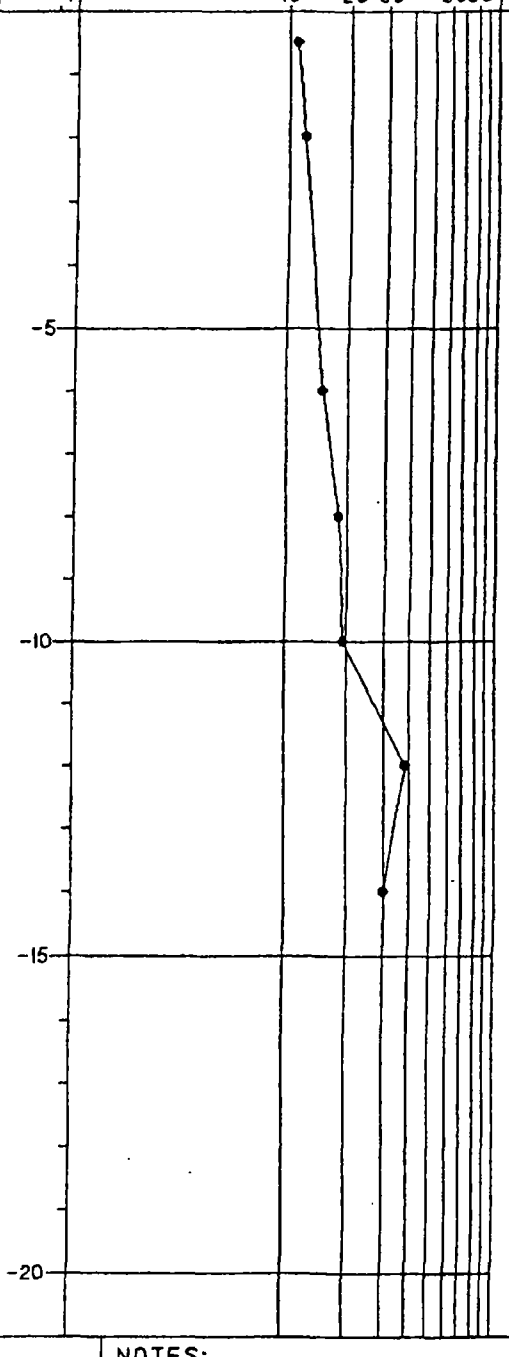
Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. S-4

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | N VALUE |
|---|---|---|---|---|---|---|
| | | Brown silty SAND<br>Soil Sample Collected | SS | 4 | 1 | 11 |
| | | 0-6" Brn Silty SAND w/minor Gravel & Clay<br>6-16" Lt Tan-Brn Gravelly SAND, dry | SS | 16 | 1 | 12 |
| | | 0-7" Brn SAND w/minor Gravel & Clay, moist<br>7-8" Red-Tan SAND w/minor Clay<br>possible perched water | SS | 8 | | |
| 5 | | 0-6.5" Brn Clayey SAND, dry<br>6.5-13" Gry Sandy GRAVEL, moist<br>Soil Sample Collected | SS | 13 | 10 | 15 |
| | | 0-12" Sandy GRAVEL, dry<br>12-16" SAND | SS | 16 | BG | 18 |
| 10 | | 0-2" Drk Brn Silty CLAY w/Sand friable, wet<br>2-14" Tan Sandy GRAVEL w/minor Silt & Clay, weak, wet | SS | 14 | BG | 19 |
| | | 0-6" Tan-Red Gravelly SAND, wet<br>6-9" more Gravel<br>9-17" Gray LIMESTONE, wet | SS | 17 | BG | 38 |
| | | 0-2" Red-Tan SAND w/minor Silt<br>2-12" Sandy GRAVEL | SS | 12 | BG | 30 |
| 15 | | Boring terminated at 14.0 ft. | | | | |
| 20 | | | | | | |

ELEV. (MSL) (ft.)

STANDARD PENETRATION TEST DATA (blows/ft)

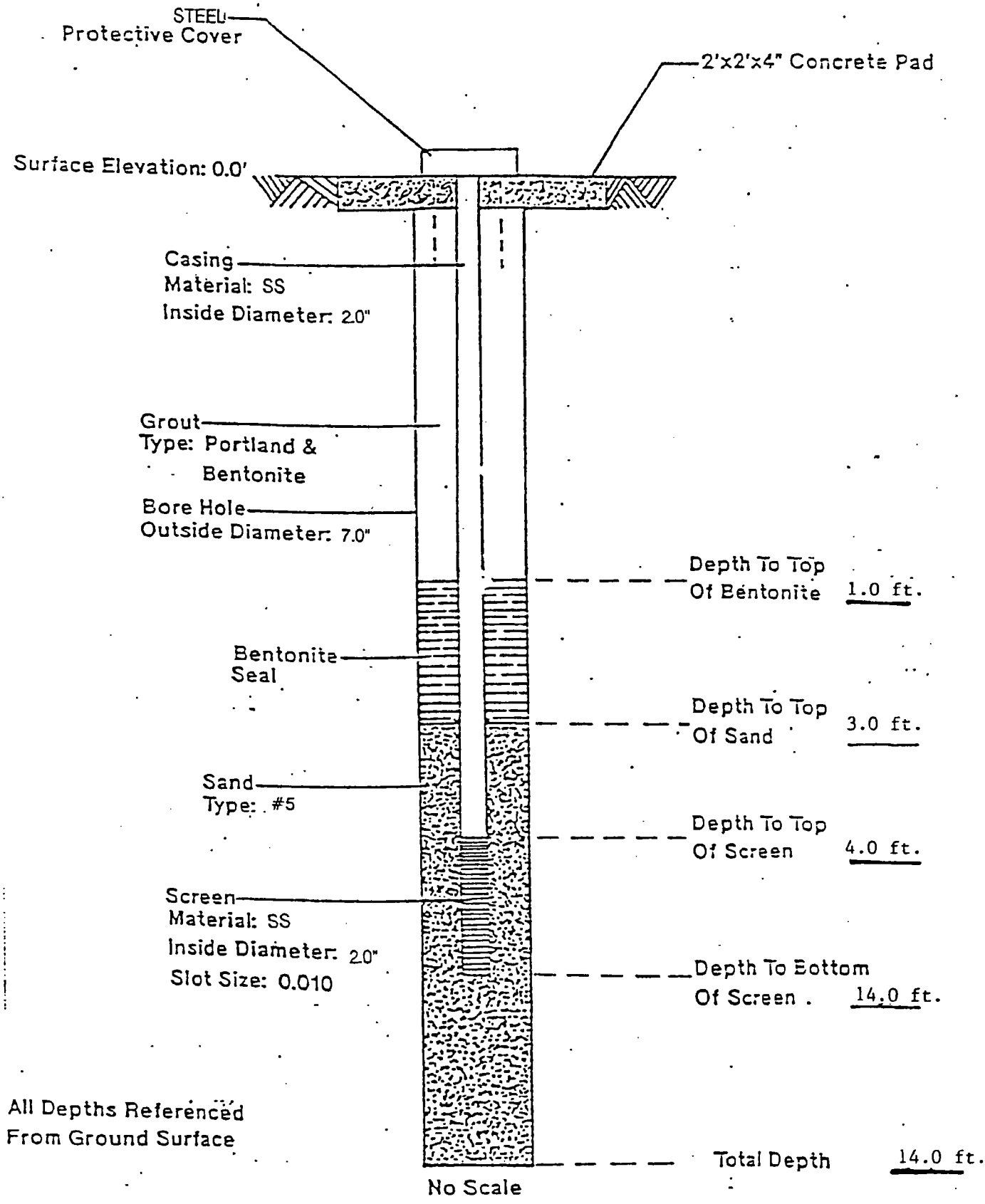



| | |
|---|---|
| DATE STARTED: 6-22-95 | DATE FINISHED: 6-23-95 |
| DRILLING METHOD: 4-1/4" ID Hollow Stem Auger | |
| GEOLOGIST: E. Council | DRILLER: D. Roelker |
| WATER LEVEL: -- | |

NOTES:
BG = Background
PID background is < 10 ppm.

RUST Environment & Infrastructure

CONSTRUCTION LOG OF WELL NO. S-4




Garland Road Landfill Monitoring Wells - SI

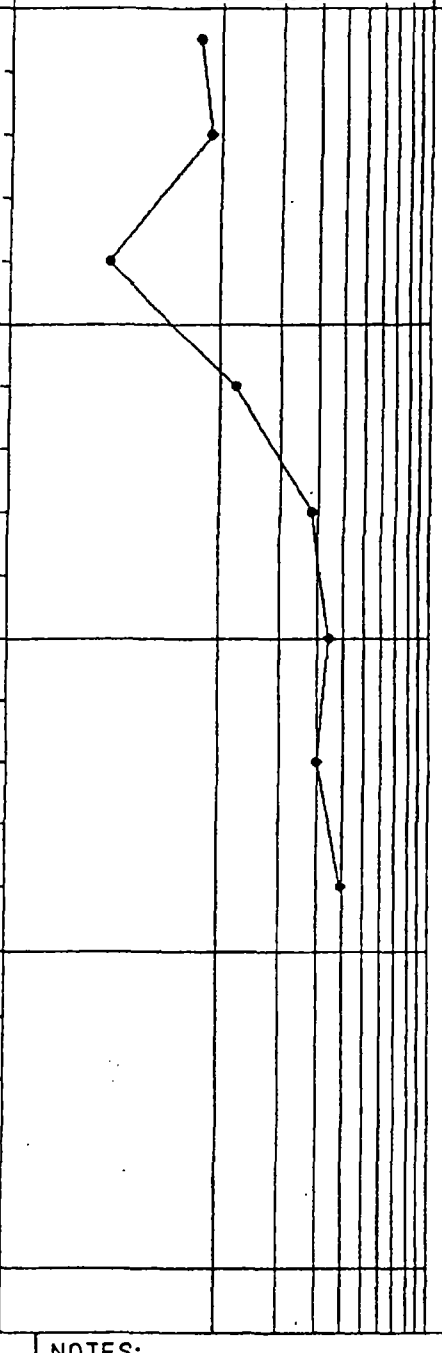
RUST ENVIRONMENT & INFRASTRUCTURE

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. S-5

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | N VALUE |
|---|---|---|---|---|---|---|---|
| | | Tan SAND, GRAVEL, natural organic material<br>Soil Sample Collected | SS | 3 | 9 | | 8 |
| | | Same | SS | 1 | 1 | | 9 |
| | | Tan Sandy GRAVEL, Dry<br>Soil Sample Collected | SS | 7 | 3 | | 3 |
| 5 | | Same, wet | SS | 1 | BG | -5 | 12 |
| | | Tan to Gray Gravelly SAND<br>minor amount of waste, wet | SS | 15 | 1 | | 28 |
| 10 | | 0-2" Tan Silty SAND, weak<br>2-5" WASTE<br>5-13" Lt. Gray LIMESTONE | SS | 13 | BG | -10 | 34 |
| | | 0-4" Tan Sandy GRAVEL, waste<br>4-14" Gray LIMESTONE<br>14-16" Red-Brn Med-Course SAND<br>16-16.5 ROCK/GRAVEL | SS | 16.5 | BG | | 30 |
| | | 0-9" Gray LIMESTONE and SHALE w/ Brown Sandy CLAY<br>9-14.5 Waste | SS | 14.5 | BG | | 39 |
| 15 | | Boring terminated at 15.0 ft. | | | | -15 | |
| 20 | | | | | | -20 | |

STANDARD PENETRATION TEST DATA (blows/ft)

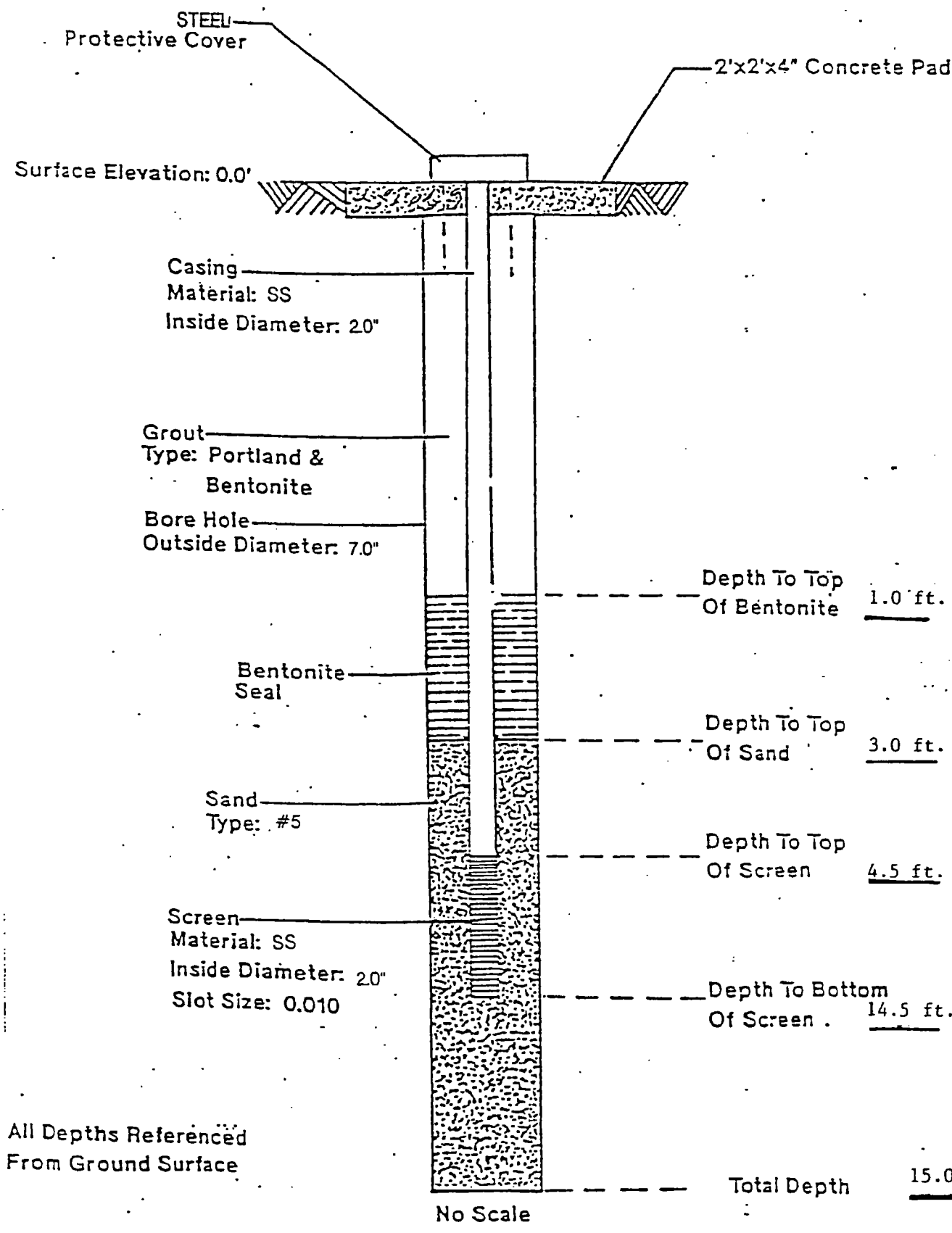



| | |
|---|---|
| DATE STARTED: 6-23-95 | DATE FINISHED: 6-23-95 |
| DRILLING METHOD: 4-1/4" ID Hollow Stem Auger | |
| GEOLOGIST: E. Council | DRILLER: D. Roelker |
| WATER LEVEL: -- | |

NOTES:
BG = Background
PID background is < 1.0 ppm.

RUST Environment & Infrastructure

CONSTRUCTION LOG OF WELL NO. S-5




Garland Road Landfill Monitoring Wells - SI

RUST ENVIRONMENT & INFRASTRUCTURE

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME: GARLAND ROAD
PROJECT NUMBER: 7043
CLIENT:
LOCATION: MIAMI COUNTY, OHIO

DRILLING CONTRACTOR: BORT-LONGYEAR
DRILLER: SEAN
SURFACE ELEVATION:
WEATHER (A.M.):
(P.M.):

HOLE DESIGNATION: S-6
DATE STARTED: ~~7-24-96~~ 7-23-96
DATE COMPLETED: 7-24-96
DRILLING METHOD: HSA
CRA SUPERVISOR: M. KLEIMAN

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS) | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS 6" | 6" | 6" | 6" | SAMPLE INTERVAL | PID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.5 | TOPSOIL, brown, moist - fairly moist | 1 | SS | 2 | 3 | 4 | 4 | 0/2.0 | Ø | | |
| 0.5 | | 2.8 | ML/SM - SANDY SILT, some clay, fairly firm, | | | R= | 18" | N= | 7 | | | | |
| | | | brown, dark brown, fairly moist | 2 | SS | 23 | 24 | 20 | 52 | 2.0/4.0 | Ø | | |
| 2.8 | | | SM/SP/GP - SAND AND GRAVEL, trace clay, trace | | | R= | 12" | N= | 44 | | | | |
| | | | silt, gravel up to 1", fairly loose to fairly firm, | 3 | SS | 39 | 54 | 30 | 60 | 4.0/6.0 | Ø | | |
| | | | brown, brown-gray, fairly moist to fairly dry | | | R= | 8" | N= | 84 | | | | |
| | 4.0 | | little silt, little clay, sand is fine to coarse | 4 | SS | 33 | 42 | 54 | 63 | 6.0/8.0 | Ø | | |
| | | | grained, ~~very~~ moist | | | R= | 24" | N= | 96 | | | | |
| | 5.8 | | very moist | 5 | SS | 22 | 13 | 22 | 24 | 8.0/10.0 | Ø | | |
| | 6.5 | | gravel up to 1 1/2", wet | | | R= | 20" | N= | 35 | | | | |
| | 8.0 | | loose, brown | 6 | SS | 14 | 18 | 39 | 44 | 10.0/12.0 | 0-1.5 | | |
| | 10.0 | | spoon wet, slight diesel odor | | | R= | 24" | N= | 57 | | | | |
| | | | | 7 | SS | 55 | 26 | 27 | 23 | 12.0/14.0 | Ø | | |
| | | | BOTTOM OF BOREHOLE AT 16.0' BGS | | | R= | 22" | N= | 53 | | | | |
| | | | WELL SET AT 15.5' BGS → | 8 | SS | 10/11 | - AUGER TO | 16.0 | - | 14.0/14.5 | Ø | | |
| | | | SEE WELL INSTRUMENTATION LOG FOR DETAILS | | | R= | 6" | N= | / | | | | |

NOTES AND COMMENTS:

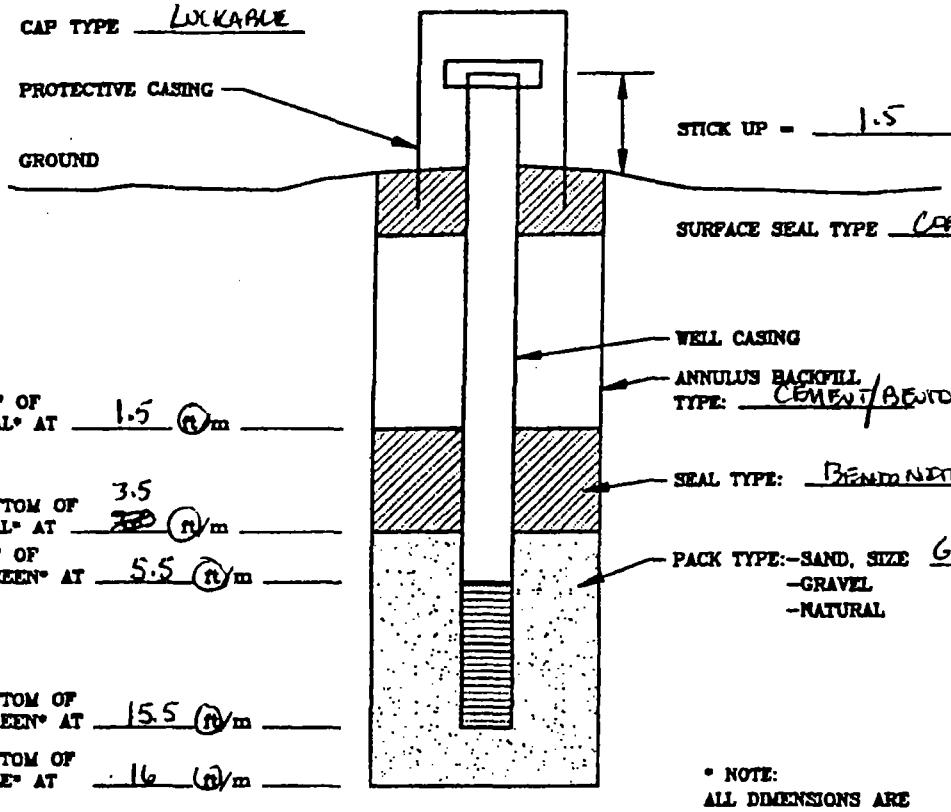
CRA FORM SP-17

# OVERBURDEN INSTRUMENTATION LOG

PROJECT NAME: GARLAND ROAD
PROJECT NUMBER: 7043
CLIENT:
LOCATION: MIAMI COUNTY OHIO

HOLE DESIGNATION: S-6
DATE COMPLETED: 7-24-96
DRILLING METHOD: HSA
CRA SUPERVISOR: M. KLEEMAN

CAP TYPE: LOCKABLE




STICK UP = 1.5 (ft)/m

SURFACE SEAL TYPE: CONCRETE

ANNULUS BACKFILL TYPE: CEMENT/BENTONITE GROUT

TOP OF SEAL* AT 1.5 (ft)/m

BOTTOM OF SEAL* AT 3.5 (ft)/m

TOP OF SCREEN* AT 5.5 (ft)/m

BOTTOM OF SCREEN* AT 15.5 (ft)/m

BOTTOM OF HOLE* AT 16 (ft)/m

* NOTE:
ALL DIMENSIONS ARE BELOW GROUND SURFACE (BGS)

SCREEN TYPE: ☑ continuous slot ☐ perforated ☐ louvre ☐ other:

SCREEN MATERIAL: ☑ stainless steel ☐ plastic ☐ other:

SCREEN LENGTH: 10 (ft)/m SCREEN DIAMETER: 2 (in)/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: SS WELL CASING DIAMETER: 2 (in)/cm

HOLE DIAMETER: 8"

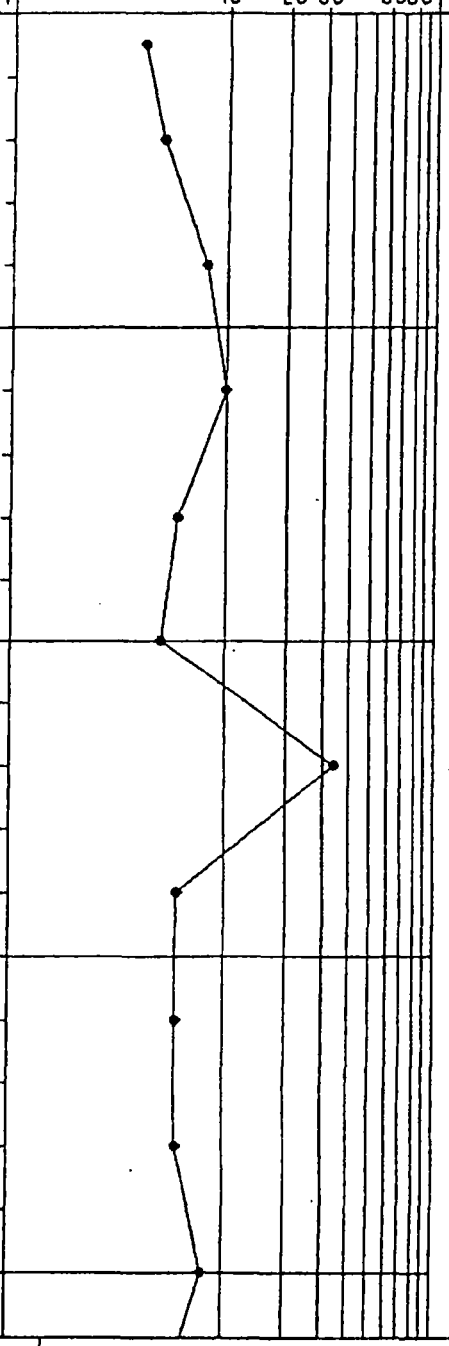
DEVELOPMENT: METHOD: DURATION:

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. D-1

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | N VALUE |
|---|---|---|---|---|---|---|---|
| | | Brown SILT, SAND, GRAVEL damp | SS | 0.5 | BG | | 4 |
| | | Same | SS | 13 | BG | | 5 |
| | | Same | SS | 9 | BG | | 8 |
| 5 | | | | | | -5 | |
| | | Same | SS | 12 | BG | | 10 |
| | | Same w/Clayey Waste | SS | 7 | BG | | 6 |
| 10 | | | SS | 6 | BG | -10 | 5 |
| | | Brn SAND, GRAVEL, WASTE damp | SS | 4 | BG | | 34 |
| | | Same | SS | 9 | BG | | 6 |
| 15 | | | | | | -15 | |
| | | Same | SS | 8 | BG | | 6 |
| | | Brn SAND to Fine GRAVEL | SS | 1 | BG | | 6 |
| | | Drk Brn CLAY w/Sand, Gravel & Waste, damp | SS | 9 | BG | | 8 |
| 20 | | | | | | -20 | |

STANDARD PENETRATION TEST DATA (blows/ft)




DATE STARTED: 6-29-95
DATE FINISHED: 7-03-95
DRILLING METHOD: 4-1/4" ID Hollow Stem Auger
GEOLOGIST: K. Heaton
DRILLER: J. Murphy
WATER LEVEL: --

NOTES:
BG = Background
PID background is < 10 ppm.

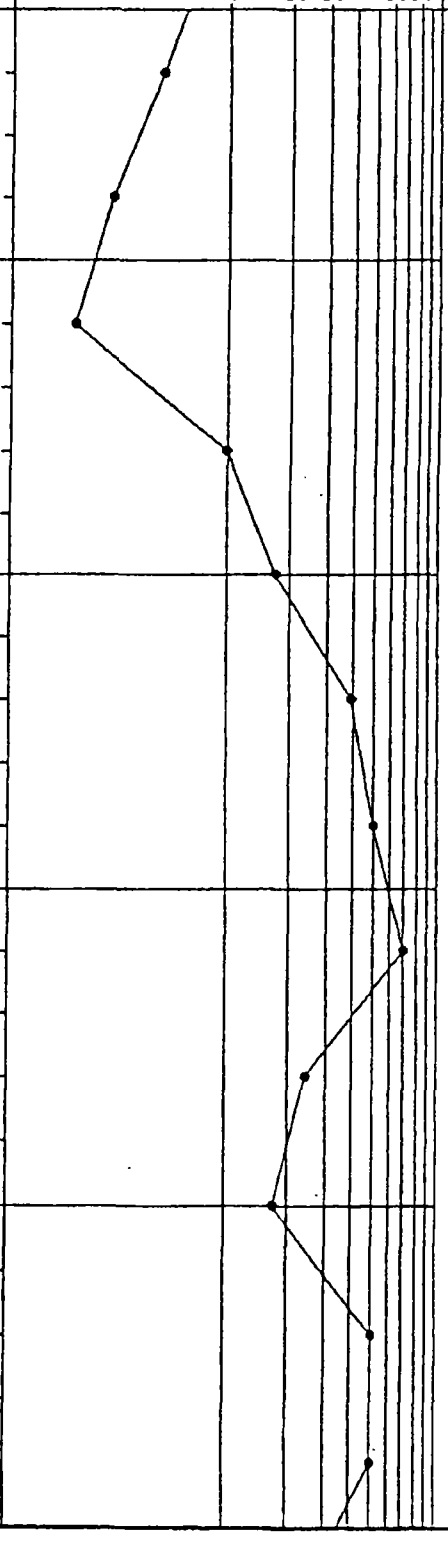
RUST Environment & Infrastructure

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. D-1

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | N VALUE |
|---|---|---|---|---|---|---|---|
| | | Drk Gry Silty CLAY, moist | SS | 24 | BG | | 5 |
| | | Same, wet | SS | 1 | BG | | 3 |
| 25 | | | | | | -25 | |
| | | Gry-Tan Clayey SILT w/minor Sand, wet | SS | 10 | BG | | 2 |
| | | Same w/Gravel | SS | 4 | BG | | 10 |
| | | Brn Silty SAND w/Clay & Gravel, wet | SS | 11 | BG | | 17 |
| 30 | | | | | | -30 | |
| | | Gry-Brn SILTY & CLAY TILL | SS | 12 | BG | | 39 |
| | | | SS | 0 | BG | | 50 |
| 35 | | | | | | -35 | |
| | | Gry-Brn SILT & CLAY w/minor Gravel | SS | 12 | BG | | 70 |
| | | Silty Gravelly SAND, wet | SS | 14 | BG | | 24 |
| 40 | | Tan GRAVEL w/Sand, Silt, & Clay, wet | SS | 14 | BG | -40 | 17 |
| | | TILL, damp | SS | 23 | BG | | 50 |
| | | Brn Silty fine SAND w/trace Gravel, moist | SS | 11 | BG | | 50 |

STANDARD PENETRATION TEST DATA (blows/ft)

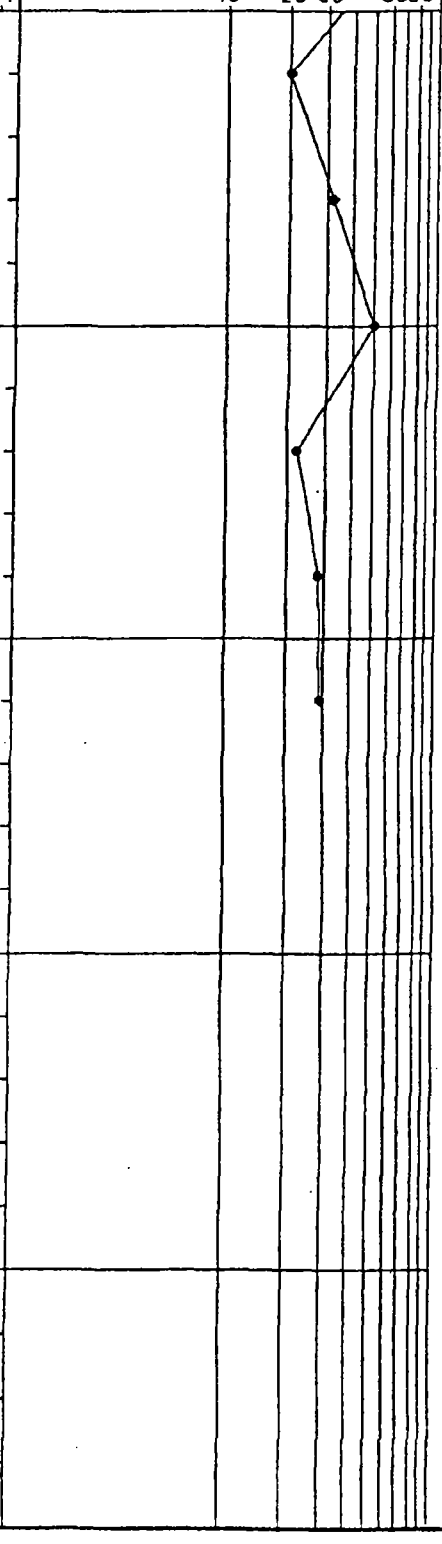



RUST Environment & Infrastructure

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

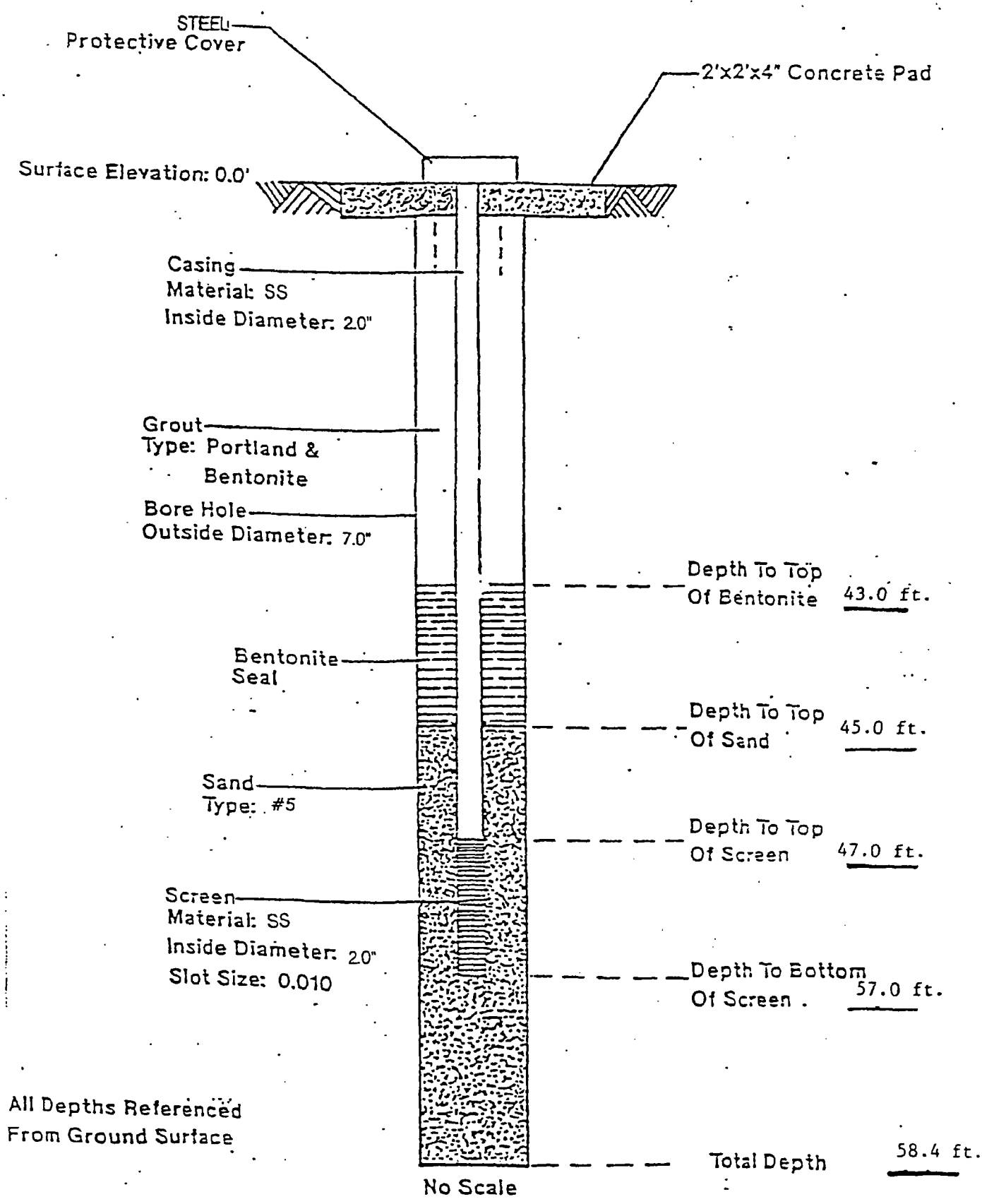
# LOG OF BORING NO. D-1

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | STANDARD PENETRATION TEST DATA (blows/ft) | N VALUE |
|---|---|---|---|---|---|---|---|---|
| | | Same with pulverized LIMESTONE, wet | SS | 24 | BG | | | 20 |
| | | Same | SS | 24 | BG | | | 32 |
| 50 | | Tan GRAVEL & coarse SAND poorly sorted | SS | 12 | BG | -50 | | 50 |
| | | Same | SS | 12 | BG | | | 22 |
| | | Silty SAND w/minor Gravel & Clay | SS | 24 | BG | | | 28 |
| 55 | | SAND & GRAVEL | SS | 12 | BG | -55 | | 29 |
| | | LIMESTONE | CORE | 22 | BG | | | |
| | | Boring terminated at 59.0 ft. | | | | | | |
| 60 | | | | | | -60 | | |
| 65 | | | | | | -65 | | |




RUST Environment & Infrastructure

CONSTRUCTION LOG OF WELL NO. D-1




Garland Road Landfill Monitoring Wells - SI

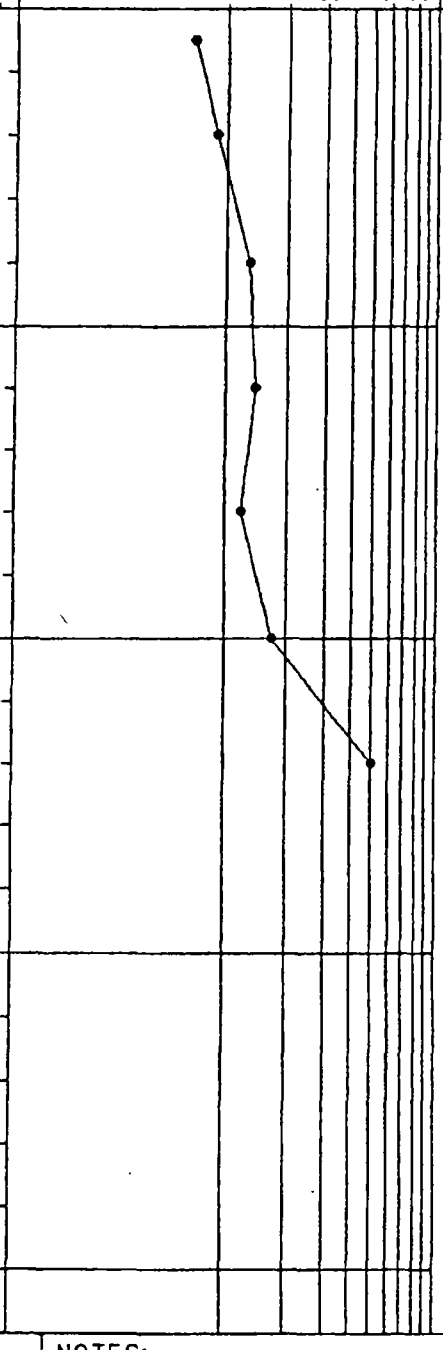
RUST ENVIRONMENT & INFRASTRUCTURE

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. D-2

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | N VALUE |
|---|---|---|---|---|---|---|---|
| | | Brown silty CLAY | SS | 1 | 10 | | 7 |
| | | Same, moist | SS | 1 | 4 | | 8 |
| | | 0-1" GRAVEL<br>1-2" Brn Silty CLAY, moist<br>2-12" Tan SAND w/minor Silt, wet to dry | SS | 12 | 2.5 | | 13 |
| 5 | | 0-3 Brn Silty CLAY, moist firm<br>3-14" Tan Coarse Gravelly SAND wet | SS | 14 | 2.5 | -5 | 14 |
| | | 0-4" Med. SAND, wet, firm<br>4-10" Tan Med. SAND w/minor Gravel, wet<br>10-16" Coarse Gravelly SAND | SS | 18 | BG | | 12 |
| 10 | | Tan coarse SAND w/Gravel | SS | 18 | BG | -10 | 17 |
| | | LIMESTONE Bedrock at 12.5 ft. | SS | 18 | BG | | 50 |
| | | Boring terminated at 12.5 ft. | | | | | |
| 15 | | | | | | -15 | |
| 20 | | | | | | -20 | |

STANDARD PENETRATION TEST DATA (blows/ft)

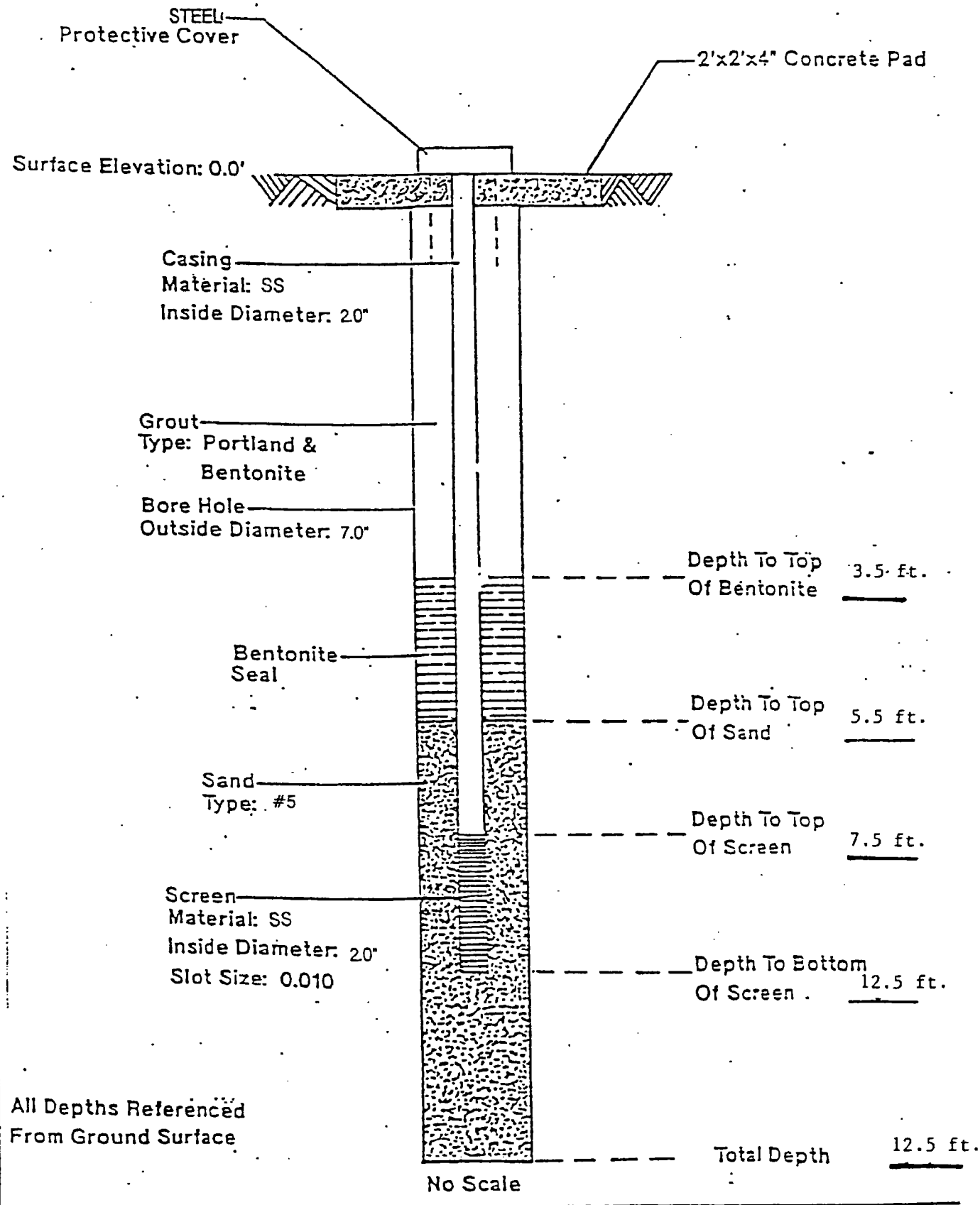



DATE STARTED: 7-03-95
DATE FINISHED: 7-05-95
DRILLING METHOD: 4-1/4" ID Hollow Stem Auger
GEOLOGIST: K. Heaton
DRILLER: J. Murphy
WATER LEVEL: --

NOTES:
BG = Background
PID background is < 10 ppm

RUST Environment & Infrastructure

CONSTRUCTION LOG OF WELL NO. D-2




Garland Road Landfill Monitoring Wells - SI

RUST ENVIRONMENT & INFRASTRUCTURE

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME: Garson Road
PROJECT NUMBER: 7043
CLIENT:
LOCATION: Miami County, Ohio

DRILLING CONTRACTOR: Boart-Longyear
DRILLER: Stan
SURFACE ELEVATION:
WEATHER (A.M.):
(P.M.):

HOLE DESIGNATION: O-3
DATE STARTED: 7.23-96
DATE COMPLETED: 7.23.96
DRILLING METHOD: HSA
CRA SUPERVISOR: M. Kleiman

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS 6" | 6" | 6" | 6" | SAMPLE INTERVAL | PID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 1.0 | Topsoil, brown, dark brown, moist | 1 | SS | 22 | 13 | 25 | 26 | 0/2.0 | Ø | X | |
| 1.0 | | 3.0 | ML/SM - Sand and Silt, trace clay, loose to | | | R= | 10" | N= | 38 | | | | |
| | | | fairly firm, sand is fine to medium grained, brown, | 2 | SS | 9 | 11 | 18 | 30 | 2.0/4.0 | Ø | | |
| | | | fairly moist | | | R= | 18" | N= | 29 | | | | |
| 3.0 | | 8.0 | GP/SP - Sand + Gravel (w/out water), trace silt, gravel up | 3 | SS | 50 | 44 | 64 | 100 | 4.0/6.0 | Ø | X | |
| | | | to 1" (limestone), brown, brown-gray, fairly dry | | | R= | 24" | N= | 108 | | | | |
| | 5.5 | | sand is fine to coarse grained, wet! | 4 | SS | 29 | 42 | 67 | 70 | 6.0/8.0 | Ø | | |
| | 6.0 | | trace - little silt and clay, loose to slightly cohesive, | | | R= | 24" | N= | 109 | | | | |
| | | | spoon wet | 5 | SS | 48 | 26 | 39 | 31 | 8.0/10.0 | Ø-2.0 | X | |
| 8.0 | | 24.0 | SP/SM - Sand (some gravel), trace clay, trace silt, loose to | | | R= | 16" | N= | 75 | | | | |
| | | | slightly cohesive, sand is fine to coarse | 6 | SS | 16 | 19 | 54 | 36 | 10.0/12.0 | 0-5.0 | X | |
| | | | grained, brown, wet | | | R= | 10" | N= | 73 | | | | |
| | 10.0 | | loose | 7 | SS | 10/6" - R=6" | - | - | - | 12.0/13.5 | Ø | | |
| | 12.0 | | trace to little silt, trace to little clay, trace | | | (Auger from 12.5' to 14.0') | | | | | | | |
| | | | to little gravel, brown and brown-gray | 8 | SS | 49 | 53 | 33 | 34 | 14.0/16.0 | Ø | | |
| | 16.0 | | trace gravel, trace silt, trace clay, loose to slightly | | | R= | 12" | N= | 86 | | | | |
| NOTES AND COMMENTS | | | cohesive | | | | | | | | | | |

CRA FORM SP-17

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME: Gannano Road
PROJECT NUMBER: 7043
CLIENT:
LOCATION:

DRILLING CONTRACTOR:
DRILLER:
SURFACE ELEVATION:
WEATHER (A.M.):
(P.M.):

HOLE DESIGNATION: O-3
DATE STARTED: 7-23-96
DATE COMPLETED: 7-23-96
DRILLING METHOD: HSA
CRA SUPERVISOR: M. Kleiman

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS) | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS 6" | 6" | 6" | 6" | SAMPLE INTERVAL | PID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~18.0~~ | 18.0 | | no gravel | 9SS | | 3 | 12 | 16 | 18 | 16.0/18.0 | Ø | | |
| | 20.0 | | fairly firm to fairly loose | | | R= | 24" | N= | 28 | | | | |
| 24.0 | | 26.0 | BEDROCK - LIMESTONE, TAN+GRAY, [redacted] | 10SS | | 9 | 10 | 11 | 15 | 18.0/20.0 | Ø | | |
| | | | | | | R= | 24" | N= | 21 | | | | |
| | | | | 11SS | | 18 | 25 | 36 | 47 | 20.0/22.0 | Ø | | |
| | | | BOTTOM OF BOREHOLE AT 26.0' BGS | | | R= | 24" | N= | 61 | | | | |
| | | | MONITORING WELL SET AT 24.0' BGS → | 12SS | | 49 | 32 | 50 | 63 | 22.0/24.0 | Ø | | |
| | | | SEE WELL INSTRUMENTATION LOG FOR | | | R= | 24" | N= | 82 | | | | |
| | | | DETAILS | 13SS | | 170 | 32 | 44 | 67 | 24.0/26.0 | Ø | | |
| | | | | | | R= | 6" | N= | 76 | | | | |

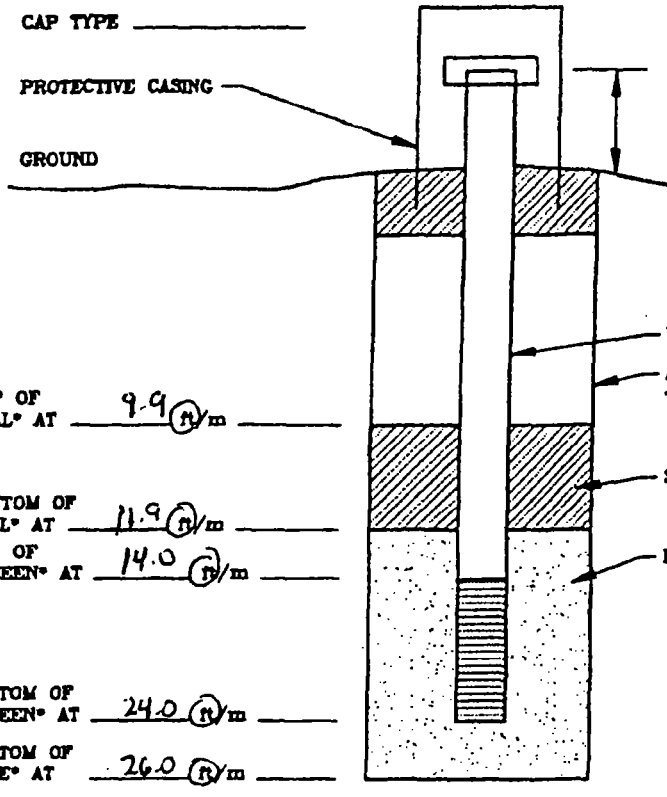
NOTES AND COMMENTS:

CRA ORM SP-17

# OVERBURDEN INSTRUMENTATION LOG

PROJECT NAME: GARLAND ROAD
PROJECT NUMBER: 7043
CLIENT:
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: D-3
DATE COMPLETED: 7-23-96
DRILLING METHOD: HSA
CRA SUPERVISOR: M. KLEIMAN




* NOTE:
ALL DIMENSIONS ARE BELOW GROUND SURFACE (BGS)

SCREEN TYPE: ☑ continuous slot ☐ perforated ☐ louvre ☐ other:

SCREEN MATERIAL: ☑ stainless steel ☐ plastic ☐ other:

SCREEN LENGTH: 10 ft/m SCREEN DIAMETER: 2 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: STAINLESS STEEL WELL CASING DIAMETER: 2 in/cm

HOLE DIAMETER: 8"

DEVELOPMENT: METHOD: DURATION:

# STRATIGRAPHIC AND INSTRUMENTATION LOG
## (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: MW1-00
DATE COMPLETED: AUGUST 16, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: C. AMEY

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | REFERENCE POINT (Top of Riser)<br>GROUND SURFACE | 805.48<br>803.54 | | | | | |
| | OL-SILTY CLAY (LOAM), vegetation, firm, low plasticity, dark brown, dry | | BENTONITE PELLETS | 1SS | X | 11 | 5.1 |
| 2.5 | | | | | | | |
| 5.0 | CL-SILTY CLAY, trace subrounded gravel, soft, medium plasticity, dark brown, moist | 798.54 | CEMENT/ BENTONITE GROUT | 2SS | X | 9 | 6.7 |
| 7.5 | | | | | | | |
| 10.0 | SW-GRAVELLY SAND (NATIVE), coarse grained sand, coarse grained and subrounded gravel, well graded, brown/gray, wet | 793.54 | 2" Ø STAINLESS STEEL PIPE | 3SS | X | 58 | 5.6 |
| 12.5 | | | | | | | |
| 15.0 | | | 8" Ø BOREHOLE | 4SS | X | 12 | 7.9 |
| 17.5 | | | | | | | |
| 20.0 | | | BENTONITE PELLETS | 5SS | X | 24 | 7.7 |
| | SC-CLAYEY SAND, soft, fine grained, low plasticity, brown/gray, wet | 782.54 | | | | | |
| 22.5 | | | | | | | |
| 25.0 | SP-SAND, fine grained, poorly graded, brown, wet | 778.54<br>777.88 | SAND PACK | 6SS | X | 10 | - |
| | SW-GRAVELLY SAND, medium to coarse grained sand, coarse grained and subrounded gravel, well graded, brown, wet | | | | | | |
| 27.5 | | | | | | | |
| 30.0 | | | WELL SCREEN | 7SS | X | 44 | - |
| 32.5 | | | | | | | |

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

# STRATIGRAPHIC AND INSTRUMENTATION LOG
# (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: MW1-00
DATE COMPLETED: AUGUST 16, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: C. AMEY

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | LIMESTONE BEDROCK, fine, weathered, cemented, blue gray | 787.04 / 766.54 | 2" Ø SPLIT SPOON | 8SS | X | >100 | - |
| 37.5 | END OF HOLE @ 37.0ft BGS | | | | | | |
| 40.0 | NOTE: 1. VAS water samples collected at 25.0, and 35.0ft BGS. | | SCREEN DETAILS: Screened Interval: 24.8 to 34.8ft BGS; Length: 10.0ft; Diameter: 2"; Slot Size: #10; Material: Stainless Steel; Sand Pack: 22.0 to 36.0ft BGS; Material: Silica Sand | | | | |
| 42.5 | | | | | | | |
| 45.0 | | | | | | | |
| 47.5 | | | | | | | |
| 50.0 | | | | | | | |
| 52.5 | | | | | | | |
| 55.0 | | | | | | | |
| 57.5 | | | | | | | |
| 60.0 | | | | | | | |
| 62.5 | | | | | | | |
| 65.0 | | | | | | | |
| 67.5 | | | | | | | |

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

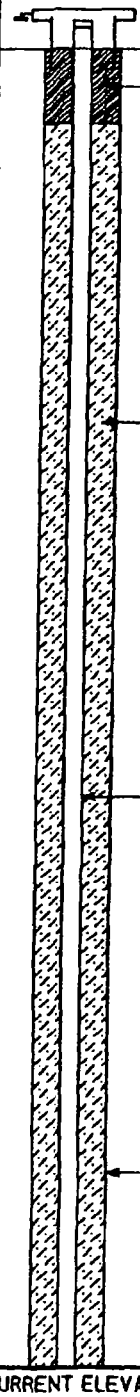
# STRATIGRAPHIC AND INSTRUMENTATION LOG
## (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: MW2-00
DATE COMPLETED: AUGUST 9, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: C. AMEY/B. WILLIAMS

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | REFERENCE POINT (Top of Riser)<br>GROUND SURFACE | 834.89<br>832.23 | | | | | |
| 2.5 | OL-SILTY CLAY, organic material (topsoil), low plasticity, dark brown with light brown streaks, moist | | BENTONITE PELLETS | 1SS | | 16 | - |
| 5.0 | CL-SANDY CLAY, soft, fine grained, low plasticity, friable, dark brown, dry<br>- very stiff | 827.23 | | 2SS | | 90 | - |
| 7.5 | | | | | | | |
| 10.0 | CL-SILTY CLAY, very firm, low plasticity, gray with orange streaks, dry | 821.57 | CEMENT/ BENTONITE GROUT | 3SS | | 75 | - |
| 12.5 | | | | | | | |
| 15.0 | SC-SANDY CLAY, firm, low plasticity, brown, dry | 817.23<br>816.40 | | 4SS | | 65 | - |
| 17.5 | CL-SILTY CALY, with coarse grained, angular gravel, very stiff, low plasticity, gray, dry | | | | | | |
| 20.0 | - firm, medium plasticity | | 2" Ø STAINLESS STEEL PIPE | 5SS | | 24 | - |
| 22.5 | | | | | | | |
| 25.0 | SC-SANDY CLAY, with coarse grained, angular gravel, firm, coarse grained sand, low plasticity, dry | 808.23 | | 6SS | | 48 | - |
| 27.5 | | | | | | | |
| 30.0 | CL-SILTY CLAY, with coarse to medium grained, angular gravel, low plasticity, dark brown, dry, no odor | 802.23 | 8" Ø BOREHOLE | 7SS | | >155 | - |
| 32.5 | - limestone cobble | | | | | | |



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

# STRATIGRAPHIC AND INSTRUMENTATION LOG
## (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: MW2-00
DATE COMPLETED: AUGUST 9, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: C. AMEY/B. WILLIAMS

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | SW-SAND, with fine grained, subrounded gravel, medium to coarse grained sand, well graded, brown, wet, no odor | 797.23 / 795.90 | | 8SS | | 54 | - |
| 37.5 | SP-SAND, fine grained, poorly graded, gray, wet, no odor | | | | | | |
| 40.0 | | | CEMENT/ BENTONITE GROUT | 9SS | | 24 | - |
| 42.5 | | | | | | | |
| 45.0 | - gray/brown | 788.73 | | | | | |
| | CL-SILTY CLAY, with fine grained, subrounded gravel, very firm, medium plasticity, dark brown | 788.57 | | 10SS | | 50 | - |
| 47.5 | SW-GRAVELLY SAND, coarse grained, angular gravel, well graded, brown/gray | | 2" Ø STAINLESS STEEL PIPE | | | | |
| 50.0 | | 782.23 | | | | | |
| | SP-SAND, fine grained, poorly graded, brown/gray, wet, no odour | 781.23 | | 11SS | | 36 | - |
| 52.5 | GW-SANDY GRAVEL, coarse to medium grained sand, coarse grained, subrounded gravel, well graded, brown/gray | | | | | | |
| 55.0 | | 777.23 | | | | | |
| | SW-SAND, with fine to coarse grained, angular gravel, medium to coarse grained sand, well graded, brown/gray, wet, no odor | | 8" Ø BOREHOLE | 12SS | | 62 | - |
| 57.5 | | | | | | | |
| 60.0 | - with subrounded gravel | | | 13SS | | 58 | - |
| 62.5 | | | | | | | |
| 65.0 | | | BENTONITE PELLETS | | | | |
| | GC-CLAYEY GRAVEL, cobbles, subrounded and angular, weathered, cemented, blue/gray, wet | 768.23 | | 14SS | | 155 | - |
| 67.5 | | | SAND PACK | | | | |

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

# STRATIGRAPHIC AND INSTRUMENTATION LOG
# (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: MW2-00
DATE COMPLETED: AUGUST 9, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: C. AMEY/B. WILLIAMS

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | SW-SAND, with angular gravel, medium to coarse grained sand, well graded, brown and gray, wet, no odor | 762.23 / 761.57 / 760.90 | | 15SS | X | 60 | - |
| 72.5 | GC/CL-GRAVEL and CLAY, angular and subrounded brown, brown/gray, clay has low plasticity, firm, gray/black | | WELL SCREEN | | | | |
| 75.0 | SW-SAND, trace coarse grained, angular gravel, medium to coarse grained sand, well graded, brown/gray, wet | 757.23 | SAND PACK | 16SS | X | >145 | - |
| | GW-GRAVEL, coarse grained, angular, gray | | | | | | |
| 77.5 | | | 8 ø BOREHOLE | | | | |
| 80.0 | LIMESTONE BEDROCK | 752.23 / 752.23 | | 17SS | X | >150 | - |
| | END OF HOLE @ 80.0ft BGS | | | | | | |
| 82.5 | | | | | | | |
| 85.0 | | | | | | | |
| 87.5 | | | | | | | |
| 90.0 | | | | | | | |
| 92.5 | | | | | | | |
| 95.0 | | | | | | | |
| 97.5 | | | | | | | |
| 100.0 | | | | | | | |
| 102.5 | | | | | | | |

**SCREEN DETAILS**
Screened Interval:
69.5 to 79.5ft BGS
Length: 10.0ft
Diameter: 2"
Slot Size: ø10
Material: Stainless Steel
Sand Pack:
67.0 to 80.0ft BGS
Material: Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

# STRATIGRAPHIC AND INSTRUMENTATION LOG
## (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: MW3-00
DATE COMPLETED: AUGUST 8, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: C. AMEY/B. WILLIAMS

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | REFERENCE POINT (Top of Riser) | 809.99 | | | | | |
| | GROUND SURFACE | 807.75 | | | | | |
| | OL-SILTY CLAY (LOAM), with organic material, trace fine grained, subrounded gravel, firm, low plasticity, moist | | BENTONITE PELLETS | 1SS | | 9 | 9.1 |
| 2.5 | | | | | | | |
| | - trace fine grained sand, dark brown | | | | | | |
| 5.0 | SP-SAND, with gravel, medium grained, poorly graded, light brown | 802.75 | | 2SS | | 22 | 0.8 |
| 7.5 | | | CEMENT/ BENTONITE GROUT | | | | |
| 10.0 | - fine to medium grained, wet | | | 3SS | | 40 | 7.7 |
| | CL-SANDY CLAY, low plasticity, light brown, wet | 798.25 | | | | | |
| 12.5 | | | | | | | |
| 15.0 | SW-SAND, with coarse gravel and cobbles, medium grained, well graded, light brown/gray, wet | 792.75 | 2" ø STAINLESS STEEL PIPE | 4SS | | 75 | 1.8 |
| 17.5 | | | | | | | |
| 20.0 | SP-SAND, fine grained, poorly graded | 787.75 | | | | | |
| | SW-SAND, medium grained, well graded | 787.25 | | 5SS | | 58 | 6.8 |
| 22.5 | | | 8" ø BOREHOLE | | | | |
| 25.0 | SP-SAND, with fine grained gravel, medium grained, poorly graded, brown, wet | 782.75 / 782.09 | | 6SS | | 35 | 8.6 |
| | CL-SILTY CLAY, with coarse grained gravel and cobbles, very stiff, low plasticity, gray, dry in middle of sample | | | | | | |
| 27.5 | | | | | | | |
| 30.0 | - no odor or staining | | BENTONITE PELLETS | 7SS | | 105 | 105 |
| 32.5 | | | SAND PACK | | | | |

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

# STRATIGRAPHIC AND INSTRUMENTATION LOG
## (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: MW3-00
DATE COMPLETED: AUGUST 8, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: C. AMEY/B. WILLIAMS

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | SW-GRAVELLY SAND, medium to coarse grained, well graded, brown/gray | 771.75 | WELL SCREEN | 8SS | X | 54 | - |
| 37.5 | SP-SAND, medium grained, poorly graded, brown | 771.25 | | | | | |
| 40.0 | SW-SAND, with medium to coarse grained, subrounded gravel, medium to coarse grained sand, well graded, brown/gray | 767.75 | SAND PACK | 9SS | X | 25 | 7.3 |
| 42.5 | | | 8" ø BOREHOLE | | | | |
| 45.0 | LIMESTONE BEDROCK | 762.75 | | 10SS | X | >100 | 4.9 |
| | END OF HOLE @ 45.0ft BGS | 762.75 | | | | | |
| 47.5 | | | | | | | |
| 50.0 | | | | | | | |
| 52.5 | | | | | | | |
| 55.0 | | | | | | | |
| 57.5 | | | | | | | |
| 60.0 | | | | | | | |
| 62.5 | | | | | | | |
| 65.0 | | | | | | | |
| 67.5 | | | | | | | |

**SCREEN DETAILS**
Screened Interval:
34.5 to 44.5ft BGS
Length: 10.0ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
32.0 to 45.0ft BGS
Material: Silica Sand

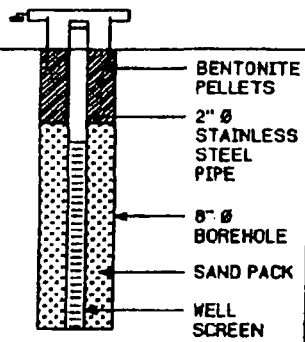
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

# STRATIGRAPHIC AND INSTRUMENTATION LOG
# (OVERBURDEN)

(WL-11)
*Page 1 of 1*

PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: MW4-00
DATE COMPLETED: AUGUST 21, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: C. AMEY

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | REFERENCE POINT (Top of Riser)<br>GROUND SURFACE | *806.79*<br>*804.07* |  | | | | |
| 2.5 | | | | | | | |
| 5.0 | | | | | | | |
| 7.5 | END OF HOLE @ 7.5ft BGS | *796.57* | **SCREEN DETAILS**<br>Screened Interval:<br>2.5 to 7.5ft BGS<br>Length: 5.0ft<br>Diameter: 2"<br>Slot Size: #10<br>Material: Stainless Steel<br>Sand Pack:<br>2.0 to 7.5ft BGS<br>Material: Silica Sand | | | | |
| 10.0 | | | | | | | |
| 12.5 | | | | | | | |
| 15.0 | | | | | | | |
| 17.5 | | | | | | | |
| 20.0 | | | | | | | |
| 22.5 | | | | | | | |
| 25.0 | | | | | | | |
| 27.5 | | | | | | | |
| 30.0 | | | | | | | |
| 32.5 | | | | | | | |

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

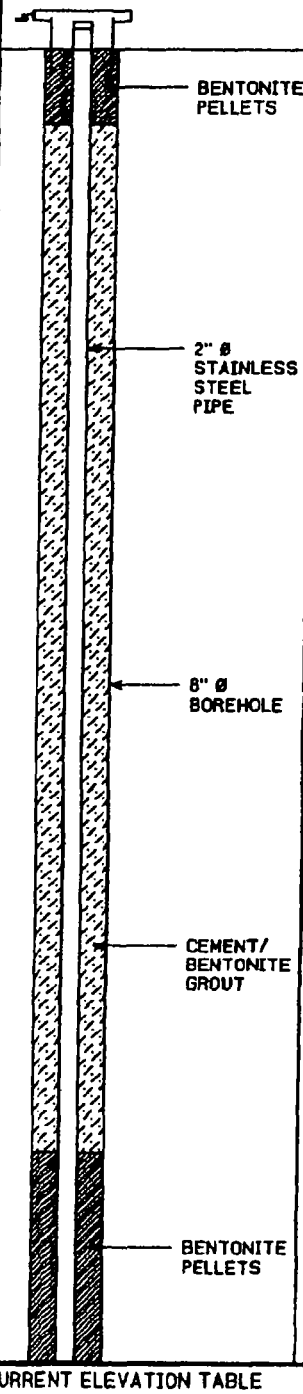
# STRATIGRAPHIC AND INSTRUMENTATION LOG
## (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-80
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: MW5-00
DATE COMPLETED: AUGUST 21, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: C. AMEY

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | REFERENCE POINT (Top of Riser)<br>GROUND SURFACE | *803.80*<br>*802.35* | | | | | |




2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
22.5
25.0
27.5
30.0
32.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

# STRATIGRAPHIC AND INSTRUMENTATION LOG
## (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: MW5-00
DATE COMPLETED: AUGUST 21, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: C. AMEY

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| 37.5 | | | 2" Ø STAINLESS STEEL PIPE | | | | |
| 40.0 | | | SAND PACK | | | | |
| 42.5 | | | | | | | |
| 45.0 | | | WELL SCREEN | | | | |
| 47.5 | | | 8" Ø BOREHOLE | | | | |
| 50.0 | END OF HOLE @ 49.0ft BGS | 753.35 | **SCREEN DETAILS**<br>Screened Interval:<br>38.5 to 48.5ft BGS<br>Length: 10.0ft<br>Diameter: 2"<br>Slot Size: #10<br>Material: Stainless Steel<br>Sand Pack:<br>35.5 to 49.0ft BGS<br>Material: Silica Sand | | | | |
| 52.5 | | | | | | | |
| 55.0 | | | | | | | |
| 57.5 | | | | | | | |
| 60.0 | | | | | | | |
| 62.5 | | | | | | | |
| 65.0 | | | | | | | |
| 67.5 | | | | | | | |

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

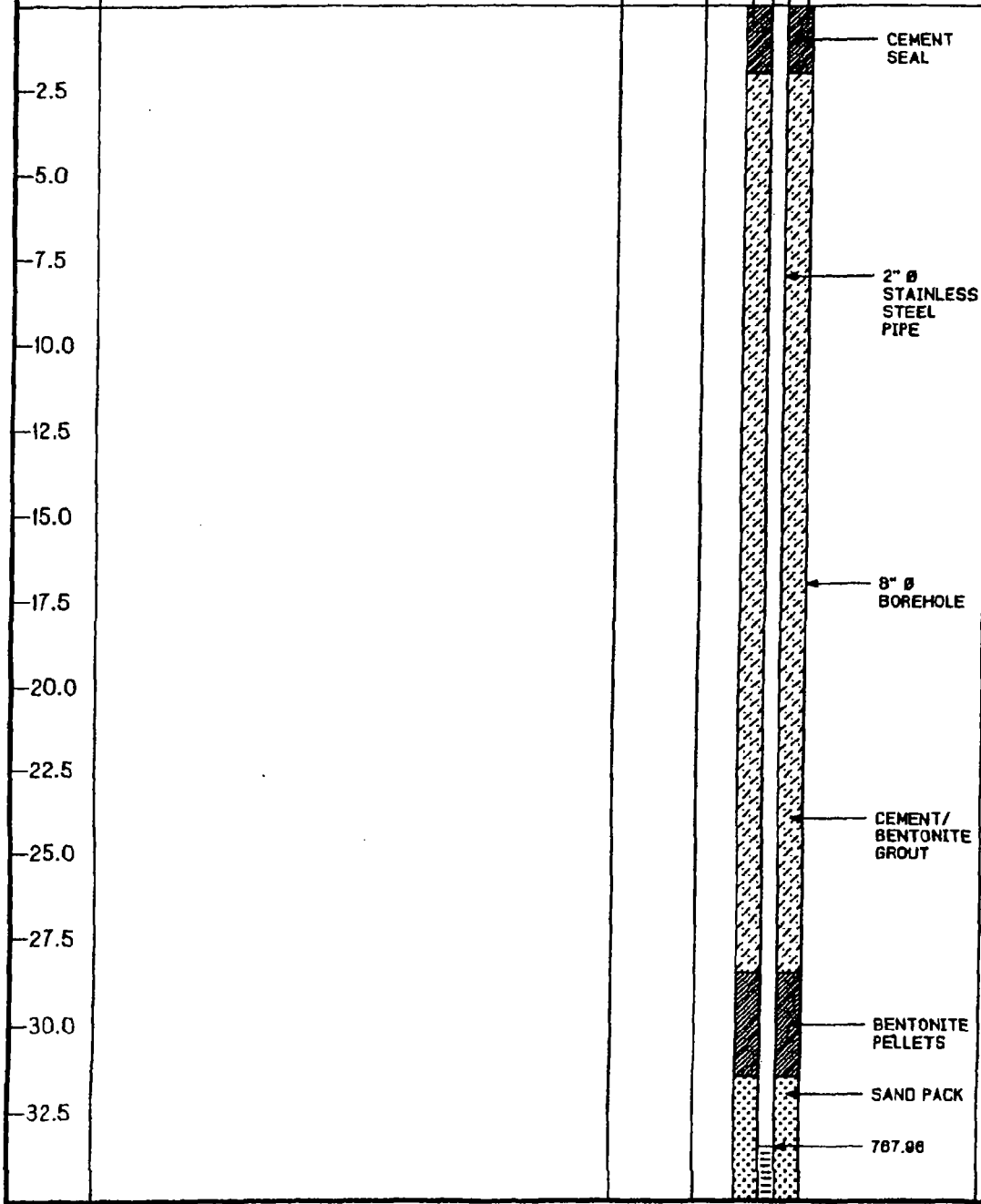
# STRATIGRAPHIC AND INSTRUMENTATION LOG
# (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: MW6-01
DATE COMPLETED: MAY 29, 2001
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: C. AMEY

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | REFERENCE POINT (Top of Riser)<br>GROUND SURFACE | *804.01*<br>*801.46* | | | | | |




NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

# STRATIGRAPHIC AND INSTRUMENTATION LOG
## (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: MW6-01
DATE COMPLETED: MAY 29, 2001
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: C. AMEY

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| 37.5 | | | 2" Ø STAINLESS STEEL PIPE; SAND PACK | | | | |
| 40.0 | | | WELL SCREEN | | | | |
| 42.5 | | | 8" Ø BOREHOLE; 757.96 | | | | |
| 45.0 | END OF HOLE @ 44.0ft BGS | 757.46 | **SCREEN DETAILS**<br>Screened Interval:<br>767.96 to 757.96ft. AMSL<br>Length: 10.0ft<br>Diameter: 2"<br>Slot Size: #10<br>Material: Stainless Steel<br>Sand Pack:<br>31.5 to 44.0ft BGS<br>Material: Silica Sand | | | | |
| 47.5 | | | | | | | |
| 50.0 | | | | | | | |
| 52.5 | | | | | | | |
| 55.0 | | | | | | | |
| 57.5 | | | | | | | |
| 60.0 | | | | | | | |
| 62.5 | | | | | | | |
| 65.0 | | | | | | | |
| 67.5 | | | | | | | |

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

# STRATIGRAPHIC AND INSTRUMENTATION LOG
## (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: BH7-01/MW7-01
DATE COMPLETED: JUNE 05, 2001
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. MOFFATT/N. ZIEGLER

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | REFERENCE POINT (Top of Riser)<br>GROUND SURFACE | 822.51<br>819.48 | | | | | |
| 2.5 | OL-TOPSOIL, with sand, with silt, with clay, trace fine to coarse gravel, cobbles, fine to medium grained sand, low plasticity, dark brown, dry | | CEMENT SEAL | 1SS | | 5 | 10.9 |
| 5.0 | CL-CLAY, with sand, with gravel, fine grained, low plasticity, dark brown, dry | 814.48 | 2" Ø STAINLESS STEEL PIPE | 2SS | | 4 | 19.5 |
| 7.5 | | | | | | | |
| 10.0 | - decreasing sand and gravel, high plasticity | | 8" Ø BOREHOLE | 3SS | | 3 | 5.7 |
| 12.5 | | | | | | | |
| 15.0 | SP/GP-SAND and GRAVEL, trace cobbles, fine to medium grained, fine to coarse gravel, gray, dry | 804.48 | CEMENT/ BENTONITE GROUT | 4SS | | 8 | 5.1 |
| 17.5 | | | | | | | |
| 20.0 | GP-GRAVEL, trace fine to medium grained sand, coarse grained gravel, brown-gray, wet | 799.48 | BENTONITE PELLETS | 5SS | | 9 | 3.8 |
| 22.5 | | | | | | | |
| 25.0 | SP/GP-SAND and GRAVEL, fine to medium grained sand, fine to coarse grained gravel, brown-gray, wet | 794.48 | 794.48 | 6SS | | 15 | 0.1 |
| 27.5 | | | SAND PACK | | | | |
| 30.0 | SP-SAND, trace fine to coarse grained gravel, trace cobbles, fine to medium grained, brown-gray, wet | 789.48 | WELL SCREEN | 7SS | | 23 | 4.1 |
| 32.5 | | | 784.48 | | | | |

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

# STRATIGRAPHIC AND INSTRUMENTATION LOG
## (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: BH7-01/MW7-01
DATE COMPLETED: JUNE 05, 2001
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. MOFFATT/N. ZIEGLER

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | | 784.48 | | | | | |
| | CL-CLAY (TILL), and silt, trace fine sand, trace fine gravel, trace cobbles, gray, dry | | SAND PACK | 8SS | X | 21 | 5.3 |
| 37.5 | | | | | | | |
| 40.0 | | | | 9SS | X | 30 | 6.2 |
| 42.5 | | | | | | | |
| 45.0 | | | CEMENT/ BENTONITE GROUT | 10SS | X | 24 | 9.3 |
| 47.5 | | | | | | | |
| 50.0 | | | | 11SS | X | 27 | 2.1 |
| 52.5 | | | | | | | |
| 55.0 | | | 8" Ø BOREHOLE | 12SS | X | >100 | 5.5 |
| | ~ bedrock (limestone) | 783.48 | | | | | |
| | END OF HOLE @ 56.0ft BGS | | | | | | |
| 57.5 | | | | | | | |
| 60.0 | | | | | | | |
| 62.5 | | | | | | | |
| 65.0 | | | | | | | |
| 67.5 | | | | | | | |

**SCREEN DETAILS**
Screened Interval:
784.48 to 784.48ft. AMSL
Length: 10.0ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
23.0 to 36.0ft BGS
Material: Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

# STRATIGRAPHIC AND INSTRUMENTATION LOG
## (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: BH8-01/MW8-01
DATE COMPLETED: JUNE 04, 2001
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. MOFFATT/N. ZIEGLER

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | REFERENCE POINT (Top of Riser)<br>GROUND SURFACE | 814.83<br>812.41 | | | | | |
| | OL-TOPSOIL, silty clay, with organics, low plasticity, dark brown, dry | | CEMENT SEAL | 1SS | X | 24 | 1.7 |
| 2.5 | | | | | | | |
| 5.0 | OL-SILT, with gravel, low plasticity, medium to light brown, moist | 807.41 | | 2SS | X | 48 | 0.8 |
| 7.5 | | | | | | | |
| 10.0 | | | 2" Ø STAINLESS STEEL PIPE | | | | |
| | SP-SAND, with gravel, medium grained, medium brown, dry to moist | 801.41 | | 3SS | X | 58 | 1.7 |
| 12.5 | | | | | | | |
| 15.0 | | | | 4SS | X | 63 | 5.7 |
| 17.5 | | | | | | | |
| 20.0 | SW-SAND, with gravel, medium to light brown, wet<br>- cobble, weathered, gray | 792.41 | 8" Ø BOREHOLE | 5SS | X | 53 | 3.8 |
| 22.5 | | | | | | | |
| 25.0 | SP-SAND, with gravel, medium grained, poorly graded, medium brown, wet<br>- cobbles, weathered, gray | 787.41 | | 6SS | X | 22 | 6.9 |
| 27.5 | | | CEMENT/ BENTONITE GROUT | | | | |
| 30.0 | SP-SAND, some gravel, medium grained, poorly graded, wet<br>- cobbles, gray, wet | 782.41 | | 7SS | X | 40 | 2.9 |
| 32.5 | | | | | | | |

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: BH8-01/MW8-01
DATE COMPLETED: JUNE 04, 2001
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. MOFFATT/N. ZIEGLER

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | | 777.41 | | | | | |
| | SW-SAND, with gravel, well graded, brown/gray, wet | | 2" Ø STAINLESS STEEL PIPE | 8SS | | 43 | 9.6 |
| 37.5 | - cobbles, weathered, gray, wet | | | | | | |
| | | | 8" Ø BOREHOLE | | | | |
| 40.0 | - medium to coarse grained | | | | | | |
| | - cobbles, fractured | | 770.91 | 9SS | | 68 | 7.5 |
| 42.5 | | | | | | | |
| | | | WELL SCREEN | | | | |
| 45.0 | | | | 10SS | | 60 | 6.7 |
| 47.5 | | | SAND PACK | | | | |
| 50.0 | - limestone, and sands (upheaval), weathered/fractured, white and gray | | | 11SS | | 72 | 8.9 |
| | | | 760.91 | | | | |
| 52.5 | - bedrock, limestone, weathered, gray | 759.91 | | 12SS | | 110 | 5.7 |
| | - refusal | | | | | | |
| | END OF HOLE @ 52.5ft BGS | | | | | | |
| 55.0 | | | | | | | |
| 57.5 | | | | | | | |
| 60.0 | | | | | | | |
| 62.5 | | | | | | | |
| 65.0 | | | | | | | |
| 67.5 | | | | | | | |

**SCREEN DETAILS**
Screened Interval:
770.91 to 760.91ft. AMSL
Length: 10.0ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
35.0 to 52.5ft BGS
Material: Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

# STRATIGRAPHIC AND INSTRUMENTATION LOG
## (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: BH9-01/MW9-01
DATE COMPLETED: JUNE 30, 2001
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. MOFFATT/N. ZIEGLER

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | REFERENCE POINT (Top of Riser) | 810.77 | | | | | |
| | GROUND SURFACE | 808.41 | | | | | |
| | OL-TOPSOIL, wirh gravels, light brown clay, low plasticity, dark brown earthan, dry | | CEMENT SEAL | 1SS | | 22 | 0 |
| 2.5 | | | | | | | |
| 5.0 | OL-SILTY CLAY, with gravel, medium plasticity, gray/brown, moist | 803.41 | CEMENT/ BENTONITE GROUT | 2SS | | 26 | 0 |
| 7.5 | | | | | | | |
| 10.0 | CL-SANDY CLAY, with gravels, low to medium plasticity, dark gray, moist to wet | 797.74 | 8" Ø BOREHOLE | 3SS | | 19 | 0 |
| 12.5 | | | | | | | |
| 15.0 | | 791.91 | BENTONITE PELLETS | 4SS | | 9 | 0 |
| 17.5 | SC-CLAYEY SAND, with gravels, fine to medium grained, low plasticity, dark gray, wet | | 2" Ø STAINLESS STEEL PIPE | | | | |
| 20.0 | GP-GRAVELLY SAND, coarse grained, brown/gray, wet | 787.91 | | 5SS | | 38 | 0 |
| 22.5 | | | 784.41 | | | | |
| 25.0 | - with cobbles | | WELL SCREEN | 6SS | | 57 | 0 |
| 27.5 | | | | | | | |
| 30.0 | SW-SAND, with gravel, with cobbles, medium to coarse grained, gray/brown, wet | 778.41 | SAND PACK | 7SS | | 65 | 2 |
| 32.5 | | | 775.41 | | | | |
| | - refusal on bedrock, limestone, gray | 774.91 | | | | | |
| | END OF HOLE @ 33.5ft BGS | | | | | | |

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

# STRATIGRAPHIC AND INSTRUMENTATION LOG
# (OVERBURDEN)



PROJECT NAME: GARLAND ROAD LANDFILL SITE
PROJECT NUMBER: 7043-90
CLIENT: *de maximis, inc.*
LOCATION: MIAMI COUNTY, OHIO

HOLE DESIGNATION: BH9-01/MW9-01
DATE COMPLETED: JUNE 30, 2001
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. MOFFATT/N. ZIEGLER

| DEPTH ft. BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft. AMSL | MONITOR INSTALLATION | SAMPLE NUMBER | SAMPLE STATE | SAMPLE 'N' VALUE | SAMPLE PID (ppm) |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 37.5 | | | SCREEN DETAILS<br>Screened interval:<br>785.41 to 775.41ft. AMSL<br>Length: 10.01ft<br>Diameter: 2"<br>Slot Size: #10<br>Material: Stainless Steel<br>Sand Pack:<br>17.0 to 33.51ft BGS<br>Material: Silica Sand | | | | |
| 40.0 | | | | | | | |
| 42.5 | | | | | | | |
| 45.0 | | | | | | | |
| 47.5 | | | | | | | |
| 50.0 | | | | | | | |
| 52.5 | | | | | | | |
| 55.0 | | | | | | | |
| 57.5 | | | | | | | |
| 60.0 | | | | | | | |
| 62.5 | | | | | | | |
| 65.0 | | | | | | | |
| 67.5 | | | | | | | |

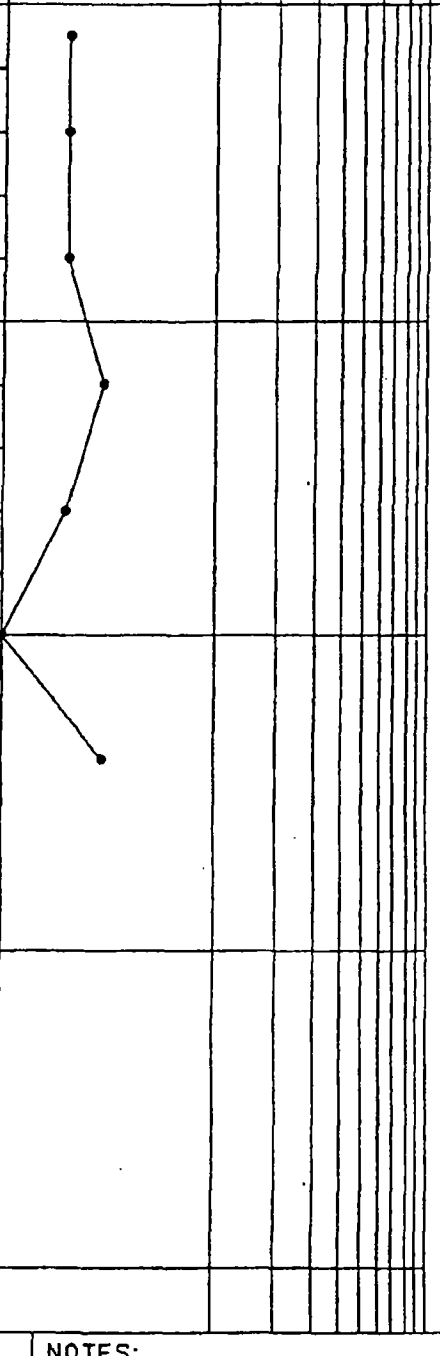
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. SB-1

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | N VALUE |
|---|---|---|---|---|---|---|---|
| | | Brown Plant debris, WASTE, SILT, damp Soil Sample Collected | SS | | BG | | 2 |
| | | Same | SS | 4.8 | BG | | 2 |
| | | Same | SS | 7.2 | BG | | 2 |
| 5 | | Same | SS | 7.2 | BG | -5 | 3 |
| | | Same | SS | 10.8 | BG | | 2 |
| 10 | | Same | SS | 4.8 | BG | -10 | 1 |
| | | 0-6" WASTE 6-18" Gray SILT, wet, firm Soil Sample Collected | SS | 18 | BG | | 3 |
| | | Boring terminated at 13.0 ft. | | | | | |
| 15 | | | | | | -15 | |
| 20 | | | | | | -20 | |

STANDARD PENETRATION TEST DATA (blows/ft)




DATE STARTED: 7-26-95
DATE FINISHED: 7-26-95
DRILLING METHOD: 4-1/4" ID Hollow Stem Auger
GEOLOGIST: K. Heaton
DRILLER: J. Murphy
WATER LEVEL: --

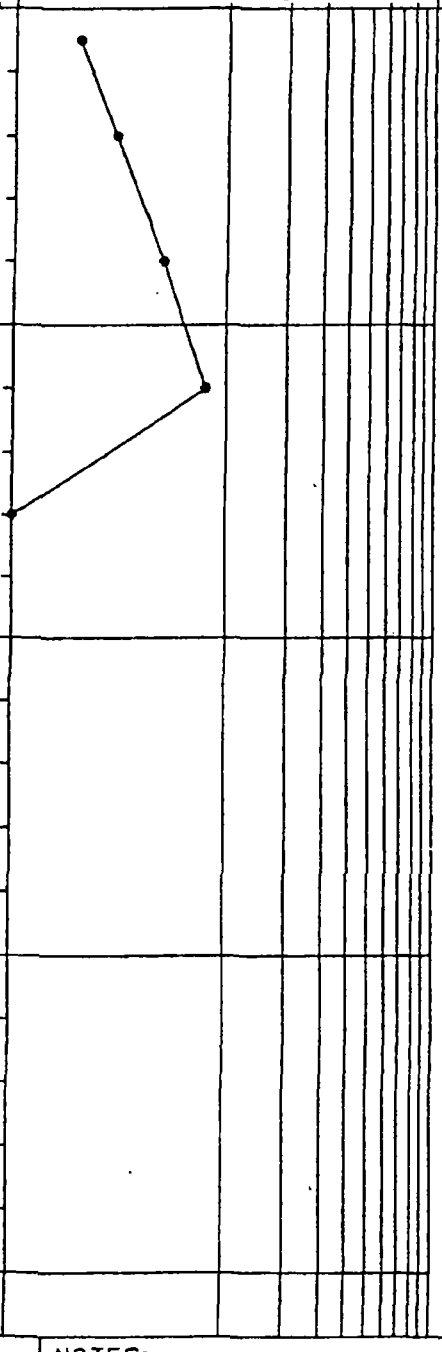
NOTES:
BG = Background
PID background is 0.8 ppm.

RUST Environment & Infrastructure

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. SB-2

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | STANDARD PENETRATION TEST DATA (blows/ft) | N VALUE |
|---|---|---|---|---|---|---|---|---|
| | | Brown CLAY and SILT, damp, Plant Debris Soil Sample Collected | SS | 1.2 | BG | | | 2 |
| | | Same w/green crystals and rust stain, damp. | SS | 9.8 | BG | | | 3 |
| | | Brown CLAY and SILT w/Waste, damp. | SS | 7.2 | BG | | | 5 |
| 5 | | WASTE | SS | 2.4 | BG | -5 | | 8 |
| | | WASTE w/Clay Soil Sample Collected | SS | 4.8 | BG | | | 1 |
| | | Boring terminated at 9.0 ft. | | | | | | |
| 10 | | | | | | -10 | | |
| 15 | | | | | | -15 | | |
| 20 | | | | | | -20 | | |




DATE STARTED: 7-26-95
DATE FINISHED: 7-26-95
DRILLING METHOD: 4-1/4" ID Hollow Stem Auger
GEOLOGIST: K. Heaton
DRILLER: J. Murphy
WATER LEVEL: --

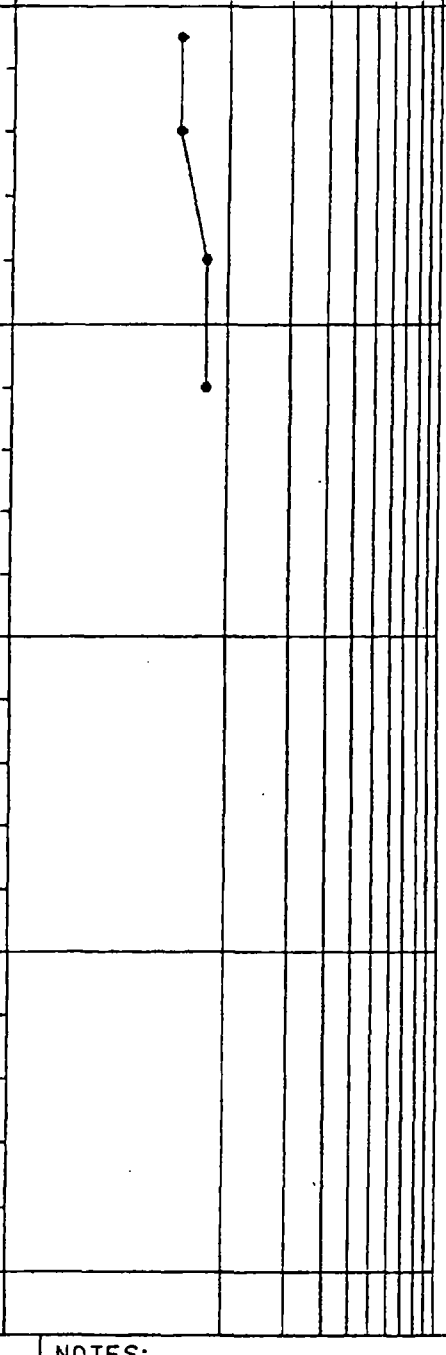
NOTES:
BG = Background
PID background is 0.9 ppm

RUST Environment & Infrastructure

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. SB-3

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | STANDARD PENETRATION TEST DATA (blows/ft) | N VALUE |
|---|---|---|---|---|---|---|---|---|
| | | Brown CLAY and SAND, moist<br>Soil Sample Collected | SS | | BG | | | 8 |
| | | Same | SS | | BG | | | 8 |
| | | Brown GRAVEL and CLAY, moist | SS | | BG | | | 8 |
| 5 | | | SS | | BG | -5 | | 8 |
| | | Tan, Silty-med. SAND, wet<br>Soil Sample Collected | | | | | | |
| | | Boring terminated at 7.0 ft. | | | | | | |
| 10 | | | | | | -10 | | |
| 15 | | | | | | -15 | | |
| 20 | | | | | | -20 | | |




DATE STARTED: 7-26-95
DATE FINISHED: 7-26-95
DRILLING METHOD: 4-1/4" ID Hollow Stem Auger
GEOLOGIST: K. Heaton
DRILLER: J. Murphy
WATER LEVEL: --

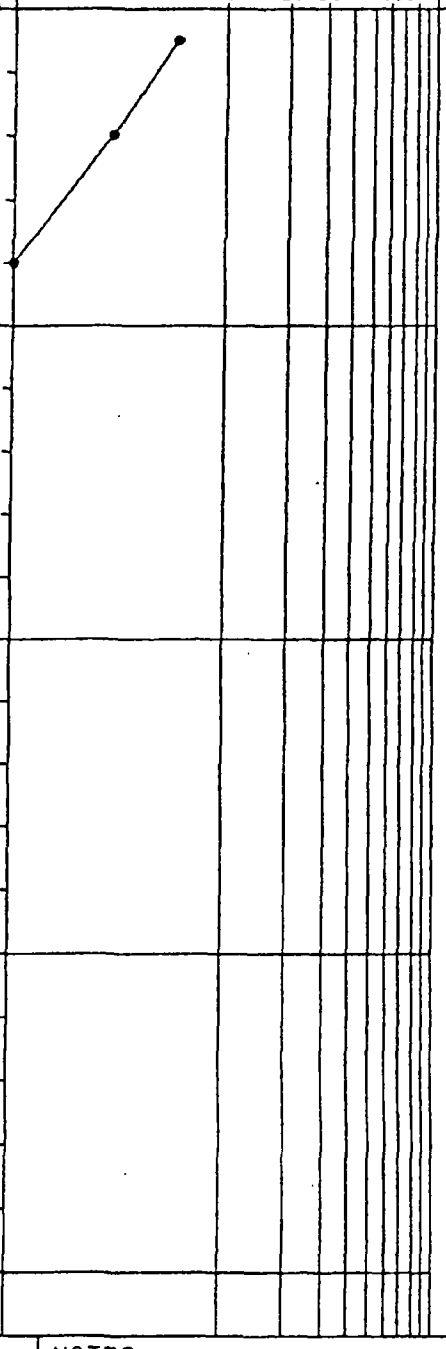
NOTES:
BG = Background
PID background is 0.8 ppm

RUST Environment & Infrastructure

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. SB-4

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | STANDARD PENETRATION TEST DATA (blows/ft) | N VALUE |
|---|---|---|---|---|---|---|---|---|
| | | Brown Silty CLAY w/Waste, Damp<br>Soil Sample Collected | SS | 12 | BG | | | 8 |
| | | Brown CLAY with Gravel. | SS | 2.4 | BG | | | 3 |
| | | Black, CLAY, WASTE, wet<br>Soil Sample Collected | SS | 7.2 | BG | | | 1 |
| 5 | | Boring terminated at 5.0 ft. | | | | -5 | | |
| 10 | | | | | | -10 | | |
| 15 | | | | | | -15 | | |
| 20 | | | | | | -20 | | |




DATE STARTED: 7-27-95
DATE FINISHED: 7-27-95
DRILLING METHOD: 4-1/4" ID Hollow Stem Auger
GEOLOGIST: K. Heaton
DRILLER: J. Murphy
WATER LEVEL: --

NOTES:
BG = Background
PID background is 0.8 ppm.

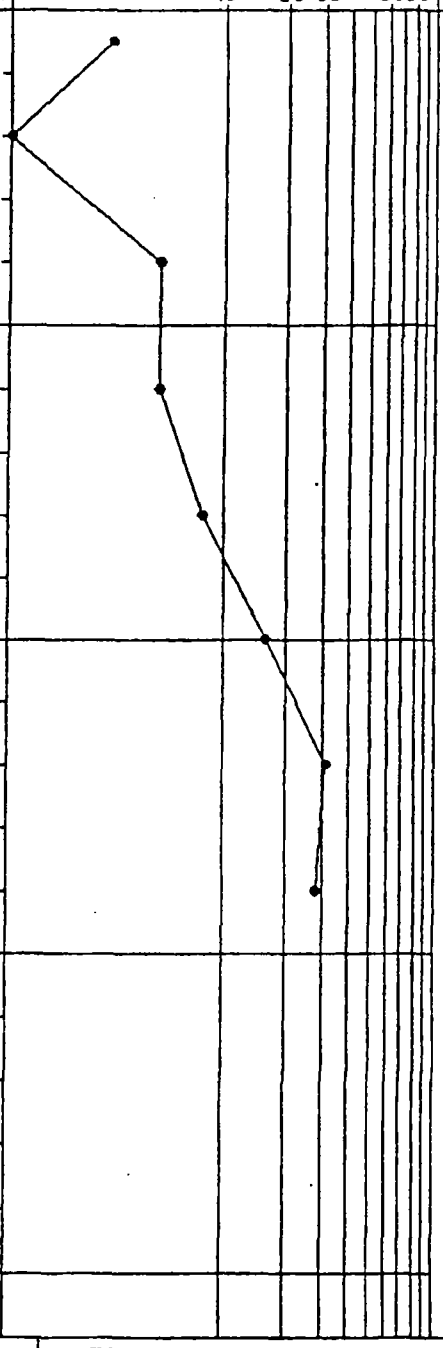
RUST Environment & Infrastructure

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. SB-5

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | N VALUE |
|---|---|---|---|---|---|---|---|
| | | Brown SAND, GRAVEL, CLAY, moist | SS | | BG | | 3 |
| | | Soil Sample Collected | SS | | BG | | 1 |
| | | Gray WASTE and CLAY, moist | SS | 8 | BG | | 5 |
| 5 | | Gray SAND and GRAVEL. Crushed Limestone, damp | SS | 12 | BG | -5 | 5 |
| | | Same | SS | 12 | BG | | 8 |
| 10 | | Same | SS | 18 | BG | -10 | 18 |
| | | Same | SS | | BG | | 31 |
| | | Coarse SAND and GRAVEL, wet Soil Sample Collected | SS | | BG | | 28 |
| 15 | | Boring terminated at 15.0 ft. | | | | -15 | |
| 20 | | | | | | -20 | |

STANDARD PENETRATION TEST DATA (blows/ft)




| | |
|---|---|
| DATE STARTED: 7-25-95 | DATE FINISHED: 7-25-95 |
| DRILLING METHOD: 4-1/4" ID Hollow Stem Auger | |
| GEOLOGIST: K. Heaton | DRILLER: J. Murphy |
| WATER LEVEL: -- | |

NOTES:
BG = Background
PID background is 0.9 ppm.

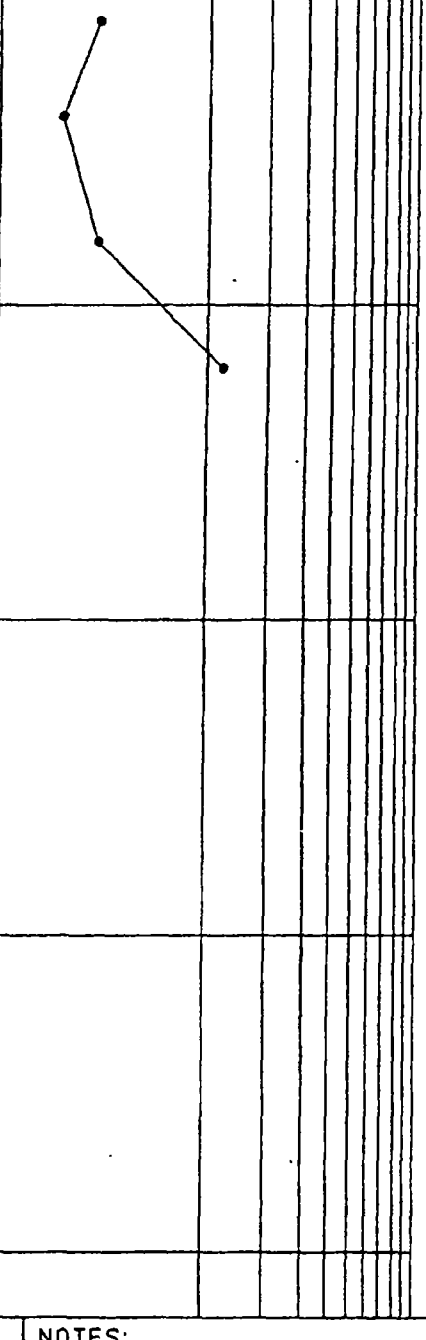
RUST Environment & Infrastructure

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. SB-6

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | N VALUE |
|---|---|---|---|---|---|---|---|
| | | Brown Silty CLAY with trace Gravel Soil Sample Collected | SS | 8 | BG | | 3 |
| | | Same, trace Waste | SS | 2.4 | BG | | 2 |
| | | SAND, SILT, and CLAY, damp | SS | 10.8 | BG | | 3 |
| 5 | | WASTE and Silty CLAY, damp Soil Sample Collected | SS | 24 | BG | -5 | 12 |
| | | Boring terminated at 7.0 ft. | | | | | |
| 10 | | | | | | -10 | |
| 15 | | | | | | -15 | |
| 20 | | | | | | -20 | |

STANDARD PENETRATION TEST DATA (blows/ft)




DATE STARTED: 7-27-95
DATE FINISHED: 7-27-95
DRILLING METHOD: 4-1/4" ID Hollow Stem Auger
GEOLOGIST: K. Heaton
DRILLER: J. Murphy
WATER LEVEL: --

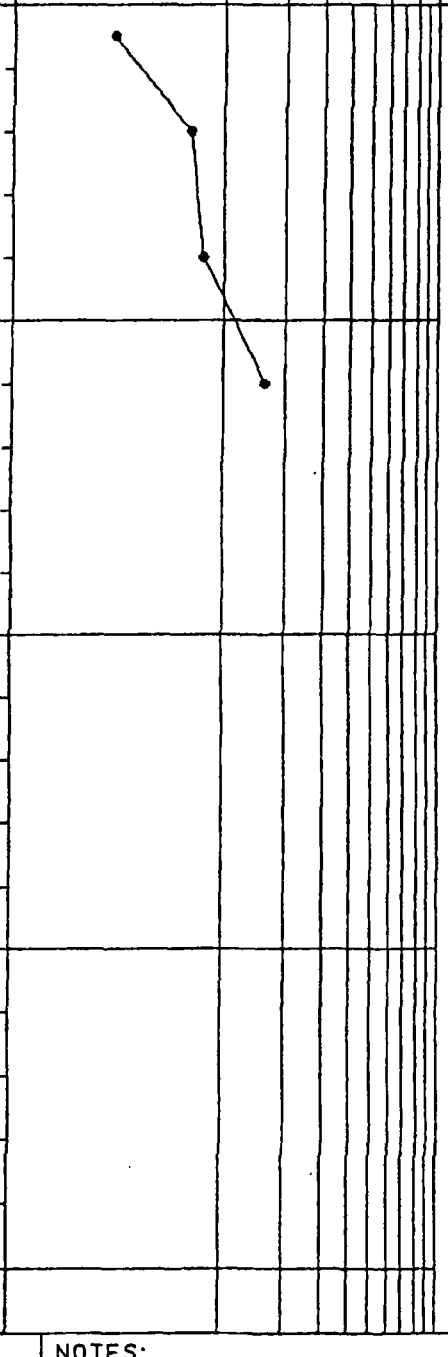
NOTES:
BG = Background
PID background is 0.8 ppm

RUST Environment & Infrastructure

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. SB-7

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | STANDARD PENETRATION TEST DATA (blows/ft) | N VALUE |
|---|---|---|---|---|---|---|---|---|
| | | Brown Silty CLAY w/Plant Debris & Gravel, damp *Soil Sample Collected* | SS | 12 | .5 | | | 3 |
| | | Same | SS | 4.8 | BG | | | 7 |
| | | Same | SS | 4.8 | BG | | | 8 |
| 5 | | Same | SS | 24 | 3 | -5 | | 16 |
| | | 0-6" WASTE<br>6-12" coarse Silty SAND & fine GRAVEL, wet<br>Soil Sample Collected | | | | | | |
| | | Boring terminated at 7.0 ft. | | | | | | |
| 10 | | | | | | -10 | | |
| 15 | | | | | | -15 | | |
| 20 | | | | | | -20 | | |




DATE STARTED: 7-27-95
DATE FINISHED: 7-27-95
DRILLING METHOD: 4-1/4" ID Hollow Stem Auger
GEOLOGIST: K. Heaton
DRILLER: J. Murphy
WATER LEVEL: --

NOTES:
BG = Background
PID background is < 0.5 ppm.

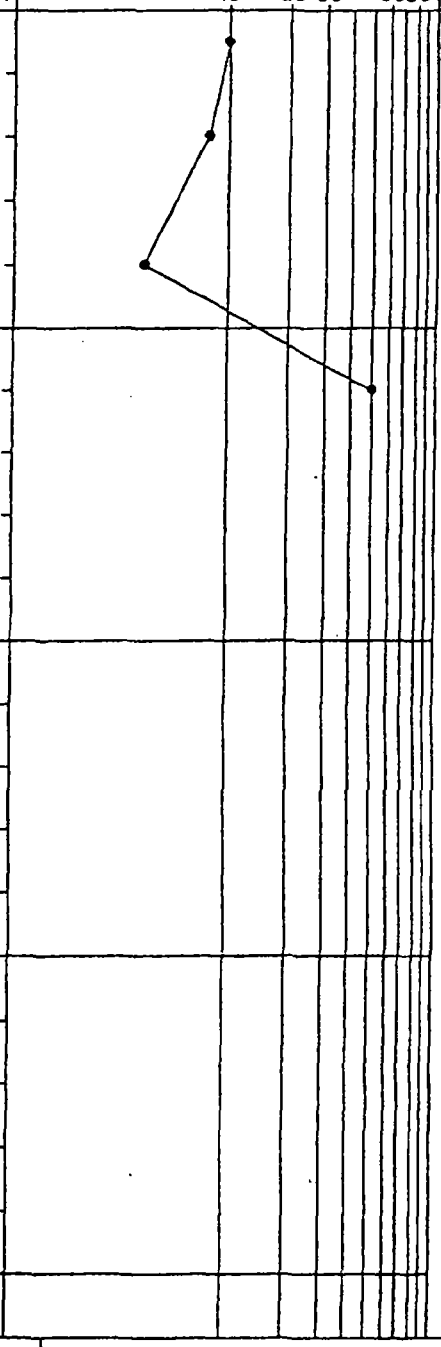
RUST Environment & Infrastructure

Client: OHM
Project: Garland Rd. Landfill
Location: West Milton, Ohio
Project No: 72791.100

# LOG OF BORING NO. SB-8

| DEPTH (feet) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE | RECOVERY (inches) | PID (ppm) | ELEV. (MSL) (ft.) | N VALUE |
|---|---|---|---|---|---|---|---|
| | | Brown SAND, GRAVEL, CLAY, (FILL), damp<br>Soil Sample Collected | SS | 12 | 1.3 | | 10 |
| | | Brown Silty SAND and GRAVEL, damp | SS | 18 | BG | | 8 |
| | | Same | SS | 3 | BG | | 4 |
| 5 | | Same, wet lower 3" of spoon<br>Soil Sample Collected | SS | 6 | BG | -5 | 50 |
| | | Boring terminated at 7.0 ft. | | | | | |
| 10 | | | | | | -10 | |
| 15 | | | | | | -15 | |
| 20 | | | | | | -20 | |

STANDARD PENETRATION TEST DATA (blows/ft)




DATE STARTED: 7-25-95
DATE FINISHED: 7-25-95
DRILLING METHOD: 4-1/4" ID Hollow Stem Auger
GEOLOGIST: K. Heaton
DRILLER: J. Murphy
WATER LEVEL: --

NOTES:
BG = Background
PID background is 0.9 ppm

RUST Environment & Infrastructure

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME: GARLAND ROAD
PROJECT NUMBER: 7043
CLIENT:
LOCATION: MIAMI COUNTY, OHIO

DRILLING CONTRACTOR: BART-LONGYEAR
DRILLER:
SURFACE ELEVATION:
WEATHER (A.M.):
(P.M.):

HOLE DESIGNATION: SLOPE-01
DATE STARTED: 7-25-96
DATE COMPLETED: 7-25-96
DRILLING METHOD: HSA
CRA SUPERVISOR: M. KLEIMAN

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS 6" | 6" | 6" | 6" | SAMPLE INTERVAL | PID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AUGER FROM 0 - 15.0' BGS | 1 | SS | 8 | 10 | 8 | 8 | 15.0/16.0 | 0-0.5 | | |
| 0 | | 17.0 | WASTE/FILL - Silt, sand, and gravel, plastic, glass, metal cans, rubber, brown, black, moist - very moist | | | N= | 2" | N= | 18 | | | | |
| | 5.0 | | clay and silt, little sand, little gravel, black, gray, brown, PID READINGS 0 - 40 ppm | 2 | SS | 13 | 15 | 5 | 5 | 17.0/19.0 | Ø | | |
| | 10.0 | | PID READINGS = 0 - 25.0 ppm | | | N= | 24" | N= | 20 | | | | |
| | 12.0 | | PID READINGS = 0 - 5.0 ppm | 3 | SS | 6 | 7 | 5 | 8 | 19.0/21.0 | Ø | | |
| | 15.0 | | silt, trace clay, trace fine grained sand, glass, dark gray, brown, moist | | | N= | 24" | N= | 15 | | | | |
| 17.0 | | 21.0 | SM/ML - SILT AND SAND (NATIVE), trace to little clay, slightly cohesive, slightly firm, fine and medium grained, gray, very moist | | | | | | | | | | |

NOTES AND COMMENTS: BOTTOM OF BOREHOLE AT 21.0' BGS. BOREHOLE BACKFILLED TO GROUND SURFACE WITH CUTTINGS UPON COMPLETION

CRA FORM SF-

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME: GARLAND ROAD
PROJECT NUMBER: 7643
CLIENT:
LOCATION: MIAMI COUNTY, OHIO

DRILLING CONTRACTOR: BOART-LONGYEAR
DRILLER: SEAN
SURFACE ELEVATION:
WEATHER (A.M.):
(P.M.):

HOLE DESIGNATION: SLOPE-02
DATE STARTED: 7-25-96
DATE COMPLETED: 7-25-96
DRILLING METHOD: HSA
CRA SUPERVISOR: M KLEEMAN

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS 6" | 6" | 6" | 6" | SAMPLE INTERVAL | PID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | - AUGER FROM 0 TO 15.0' BGS - | 1 | SS | 10 | 6 | 6 | 8 | 15.0/17.0 | 0-0.2 | | |
| 0 | | 17.0 | WASTE/FILL, silt, little clay, little sand, plastic, copper [redacted] wires, rubber, shoes, glass, black, brown, moist | | | | N = 8" | | N = 12 | | | | |
| | | | PID READINGS = 0-1.0 ppm | 2 | SS | 2 | 2 | 2 | 2 | 17.0/19.0 | Ø | | |
| | 5.0 | | plus wood, brown, gray, fairly dry to fairly moist, | | | | N = 24" | | N = 4 | | | | |
| | | | PID READINGS = 0-0.5 ppm | 3 | SS | 3 | 4 | 10 | 10 | 19.0/21.0 | Ø | | |
| | 15.0 | | gravel and silt, little clay, little sand, brown | | | | N = 10" | | N = 14 | | | | |
| | | | very moist → PID READINGS = Ø PPM | | | | | | | | | | |
| 17.0 | | 19.0 | SM/ML - SAND AND SILT, little (NATIVE) - some clay, | | | | | | | | | | |
| | | | slightly cohesive, plastic to fairly plastic, gray, | | | | | | | | | | |
| | | | green, brown, mottled, very moist - wet | | | | | | | | | | |
| 19.0 | | 21.0 | SM - SAND, some silt, trace to little clay, | | | | | | | | | | |
| | | | slightly loose to slightly cohesive (sand is fine to medium grained), brown, gray | | | | | | | | | | |
| | | | green, wet | | | | | | | | | | |

17.0 21.0

NOTES AND COMMENTS: BOTTOM OF BOREHOLE AT 21.0' BGS. BOREHOLE BACKFILLED TO GROUND SURFACE WITH CUTTINGS W/ PER COMPLETION.

CRA FORM SR...

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME: GARLAND ROAD
PROJECT NUMBER: 7043
CLIENT:
LOCATION: MIAMI COUNTY, OHIO

DRILLING CONTRACTOR: BOART-LONGYEAR
DRILLER: SEAN
SURFACE ELEVATION:
WEATHER (A.M.):
(P.M.):

HOLE DESIGNATION: SLOPE-03
DATE STARTED: 7-25-96
DATE COMPLETED: 7-25-96
DRILLING METHOD: HSA
CRA SUPERVISOR: M. KLEEMAN

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS 6" | 6" | 6" | 6" | SAMPLE INTERVAL | PID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AUGER FROM 0-14.0' BGS - SPOON BOUNCING | 1 | SS | 5 | 6 | 6 | 7 | 14.0/16.0 | | | |
| 0 | | 14.0 | WASTE/FILL - varying amounts of silt, clay and | | | r= | 10" | N= | 12 | | | | |
| | | | sand, trace gravel, rubber, glass, brown, gray, moist | 2 | SS | 8 | 7 | 6 | 8 | 16.0/18.0 | | | |
| | | | PID = 0-2.0 ppm | | | r= | 8" | N= | 13 | | | | |
| | 6.0 | | trace sand, PID readings = 0-10.0 ppm | 3 | SS | 7 | 10 | 21 | 17 | 18.0/20.0 | | | |
| | ~~10.0~~ 8.0 | | PID readings = 0-3.0 ppm, gray, black | | | r= | 1" | N= | 31 | | | | |
| | 10.0 | | + plastic, foam rubber, ~~PID~~ readings = 0-5.0 ppm | | | | | | | | | | |
| | 12.0 | | PID readings = Ø | | | | | | | | | | |
| 14.0 | | 18.0 | SM-ML, SILT + SANDY (NATIVE) some clay, slightly firm, | | | | | | | | | | |
| | | | fairly plastic, sand is fine grained green-gray, very moist to wet | | | | | | | | | | |
| | 16.0 | | increasing clay content with depth, brown, gray | | | | | | | | | | |
| | | | mottled, spoon wet | | | | | | | | | | |
| 18.0 | | 20.0 | SM - SAND, some silt, loose, brown, wet, sand | | | | | | | | | | |
| | | | is fine grained | | | | | | | | | | |

14.0-20.0

NOTES AND COMMENTS: BOTTOM OF BOREHOLE IS 20.0' BGS. BOREHOLE BACKFILLED WITH CUTTINGS TO GROUND SURFACE UPON COMPLETION

CRA

# STRATIGRAPHY LOG (OVERBURDEN)

PAGE 1 OF ___

PROJECT NAME: GARLAND ROAD
PROJECT NUMBER: 7043
CLIENT:
LOCATION: MIAMI COUNTY, OHIO

DRILLING CONTRACTOR: BOART-LONGYEAR
DRILLER: SEAN
SURFACE ELEVATION:
WEATHER (A.M.):
(P.M.):

HOLE DESIGNATION: SLOPE-04
DATE STARTED: 7-25-96
DATE COMPLETED: 7-25-96
DRILLING METHOD: HSA
CRA SUPERVISOR: M. KLEEMAN

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS 6" | 6" | 6" | 6" | SAMPLE INTERVAL | PID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | - AUGER FROM 0-5.0' BGS | 1 | SS | 10 | 5 | 10 | 10 | 5.0/7.0 | Ø | | |
| 0 | | 20.6 | FILL/WASTE, varying amounts of SILT AND CLAY, trace sand, trace gravel, rubber, wood, glass, brown, moist | | | r= | 2" | N= | 15 | | | | |
| | | | | 2 | SS | 3 | 11 | 19 | 50/0.3 | 7.5/10.8 | 0-0.5 | | |
| | 5.0 | | little sand, little gravel, foam rubber | | | r= | 2" | N= | 30 | | | | |
| | | | - AUGER FROM 7.0'-9.0' BGS (SPOON BOUNCING) - | 3 | SS | 7 | 15 | 20 | 31 | 15.0/17.0 | | | |
| | | | brown-grey | | | r= | 6" | N= | 35 | | | | |
| | | | - AUGER FROM 11.0' TO 13.0' BGS (SPOON BOUNCING) - | 4 | SS | 5 | 7 | 5 | 5 | 19.0/20.0 | | | |
| | 15.0 | | very moist | | | r= | 11" | N= | 12 | | | | |
| | | | - AUGER FROM 17.0' TO 19.0' BGS (SPOON BOUNCING) - | 5 | SS | 6 | 8 | 9 | 12 | 23.0/25.0 | | | |
| | 17.0 | | Pure GRAVEL, gray brown/gray, black | | | r= | | N= | 17 | | | | |
| 20.6 | | 25.0 | ML/CL - SILT AND CLAY (NATIVE), slightly firm, | 6 | SS | 9 | 12 | 16 | 22 | 25.0/27.0 | | | |
| | | | brown, gray-brown wet | | | r= | 22" | N= | 28 | | | | |
| | | | - ATTEMPTED SHELBY TUBE SAMPLE - 21.0-23.0' BGS (UNSUCCESSFUL) | | | | | | | | | | |
| 25.0 | | 27.0 | CL - CLAY, some silt, trace gravel, plastic to slightly firm, brown and gray, mottled, moist | | | | | | | | | | |

NOTES AND COMMENTS

BOTTOM OF BOREHOLE AT 27.0' BGS. BOREHOLE BACKFILLED WITH CUTTINGS TO (GROUND) SURFACE UPON COMPLETION.

20.6
27.0

CRA FORM SF-...

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME: GARLAND ROAD
PROJECT NUMBER: 7043-11
CLIENT:
LOCATION: MIAMI COUNTY, OHIO

DRILLING CONTRACTOR: BOART-LONGYEAR
DRILLER: SEAN
SURFACE ELEVATION:
WEATHER (A.M.):
(P.M.):

HOLE DESIGNATION: SLOPE-05
DATE STARTED: 7-24-96
DATE COMPLETED: 7-24-96
DRILLING METHOD: HSA
CRA SUPERVISOR: M. KLEIMAN

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS 6" | 6" | 6" | 6" | SAMPLE INTERVAL | PID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AUGER FROM 0-6.0' BGS (COULD NOT | 1 | SS | 5 | 10 | 10 | 7 | 6.0/8.0 | Ø | | |
| | | | SPLIT SPOON SAMPLE, SPOON BOUNCED) | | | r= | 6" | N= | 20 | | | | |
| | | | (PID READING 0-1 PPM AT CUTTINGS) | 2 | SS | 6 | 11 | 17 | 17 | 8.0/10.0 | Ø | | |
| 0 | | 19.7 | FILL/WASTE, varying amounts of silt, sand, and | | | r= | 2" | N= | 28 | | | | |
| | | | clay, trace gravel, ~~gray~~, rubber, plastic, gray, | 3 | SS | 8 | 10 | 16 | 8 | 10.0/12.0 | Ø | | |
| | | | black, brown, moist | | | r= | 1" | N= | 26 | | | | |
| | 6.0 | | plus metal, wood, rug | 4 | SS | 8 | 8 | 15 | 10 | 12.0/14.0 | Ø | | |
| | | | - AUGER FROM 16.0'-18.0' BGS (SPOON BOUNCED) | | | r= | Ø | N= | 23 | | | | |
| | 18.0 | | wet | 5 | SS | 4 | 6 | 1 | 1 | 14.0/16.0 | Ø | | |
| 19.7 | | 20.0 | ML/CL - SILT + CLAY (NATIVE), trace fine grained | | | r= | 2" | N= | 7 | | | | |
| | | | sand, firm, brown, tan, mottled, moist | 6 | SS | 3 | 4 | 8 | 15 | 18.0/20.0 | Ø | | |
| 20.0 | | 22.0 | ML - SILT, some clay, trace fine to medium grained | | | r= | 13" | N= | 12 | | | | |
| | | | sand, soft to slightly firm, gray, gray-brown, | 7 | SS | 10 | 17 | 19 | 29 | 22.0/24.0 | Ø | | |
| | | | very moist | | | r= | 20" | N= | 36 | | | | |
| 22.0 | | 24.0 | ML/SM - SILT AND SAND, little some clay, slightly | | | | | | | | | | |
| | | | firm, slightly loose to slightly cohesive, gray brown, brown | | | | | | | | | | |
| | | | wet | | | | | | | | | | |

NOTES AND COMMENTS

BOTTOM OF BOREHOLE AT 24.0' BGS. BOREHOLE BACKFILLED WITH CUTTINGS UPON COMPLETION

(SHELBY TUBE PUSHED FROM 20'-22' VERY LITTLE RECOVERY)

19.5-22.0

CRA FORM SE-

# STRATIGRAPHY LOG (OVERBURDEN)

PAGE 1 OF 1

PROJECT NAME: GARLAND ROAD
PROJECT NUMBER: 7043
CLIENT:
LOCATION: MIAMI COUNTY, OHIO

DRILLING CONTRACTOR: BEART-LONGYEAR
DRILLER: SEAN
SURFACE ELEVATION:
WEATHER (A.M.):
(P.M.):

HOLE DESIGNATION: SLOPE-06
DATE STARTED: 7-24-96
DATE COMPLETED: 7-24-96
DRILLING METHOD: HSA
CRA SUPERVISOR: M. KLEEMAN

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS) | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS 6" | 6" | 6" | 6" | SAMPLE INTERVAL | PID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | - AUGER FROM 0-2' BGS - | 1 | SS | 6 | 4 | 8 | 15 | 2.0/4.0 | Ø | | |
| 0 | | 16.5 | FILL/WASTE - silt and gravel, rubber, trace sand, | | | r= | 6" | N= | 12 | | | | |
| | | | brown, moist | 2 | SS | 5 | 9 | 12 | 8 | 4.0/6.0 | Ø | | |
| | 2.0 | | SILT and CLAY, some gravel, brick, wood, rubber, gray | | | r= | 8" | N= | 21 | | | | |
| | | | brown/moist to very moist | 3 | SS | 11 | 13 | 18 | 20 | 6.0/8.0 | Ø | | |
| | 8.0 | | SAME WITH NEWSPAPER, gray, brown | | | r= | 7" | N= | 31 | | | | |
| | 12.0 | | SAME with wood, paper, foam rubber, + plastic and very moist | 4 | SS | 17 | 20 | 25 | 33 | 8.0/10.0 | Ø | | |
| | | | - AUGER FROM 14.0' TO 16.0' BGS (SLOW BOUNCE) - | | | r= | 10" | N= | 45 | | | | |
| 16.5 | | 18.0 | GC/SP/SM, SAND AND GRAVEL, trace-little clay, | 5 | SS | 2 | 2 | 8 | 11 | 10.0/12.0 | 0-1.0 | | |
| | | | trace to little silt, sand is fine to coarse grained, | | | r= | 5" | N= | 10 | | | | |
| | | | slightly loose to slightly cohesive (crumbly) brown, gray brown, wet | 6 | SS | 25 | 8 | 10 | 6 | 12.0/14.0 | 0-1.0 | | |
| | | | | | | r= | 5" | N= | 18 | | | | |
| | | | | 7 | SS | 5 | 19 | 29 | 35 | 16.0/18.0 | Ø | | 16.5-18.0 |
| | | | | | | r= | 23" | N= | 48 | | | | |

NOTES AND COMMENTS: BOTTOM OF BOREHOLE @ 18.0' BGS → BOREHOLE BACKFILLED TO GROUND SURFACE WITH CUTTINGS UPON COMPLETION.

CRA FORM SP-

# WELL LOG AND DRILLING REPORT

ORIGINAL

95 cc

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 381171

County Miami Township Union Section of Township 21

Owner Frank Dearth Address RR Laura

Location of property South edge West Milton on East side 48

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 21

Type of screen ..... Length of screen .....

Type of pump .....

Capacity of pump .....

Depth of pump setting .....

Date of completion .....

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate ..... G.P.M. Duration of test ..... hrs.

Drawdown ..... ft. Date .....

Static level-depth to water 6 ft.

Quality (clear, cloudy, taste, odor) Bailed 6 G.P.M. at 60 ft

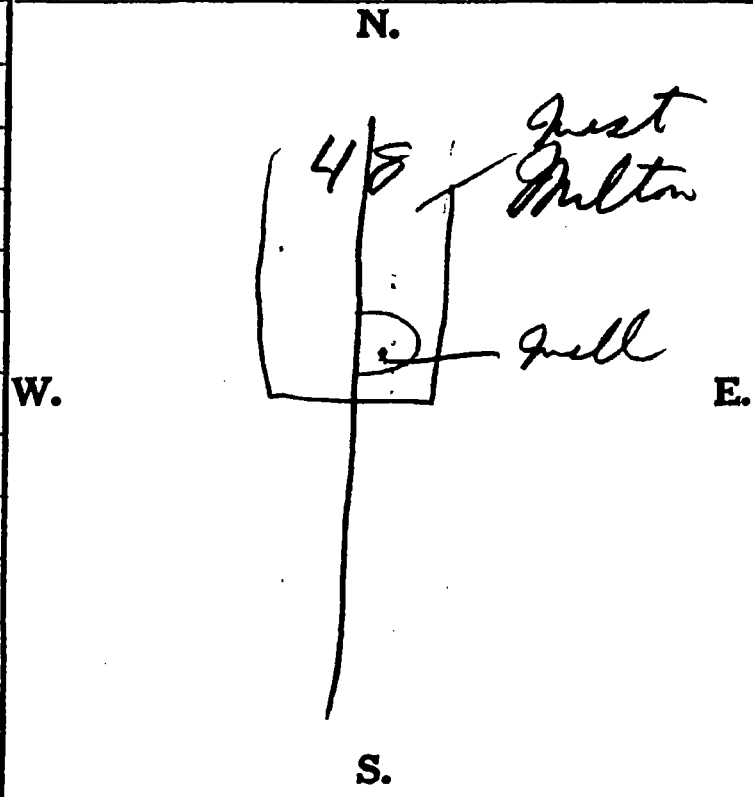
Pump installed by .....

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 4 Ft. |
| Limestone | 4 | 25 |
| Shale | 25 | 35 |
| Shale & limestone | 35 | 60 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm Don Engle Date 7-30-68

Address RR Laura Signed D. E. Engle

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

95

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

470226

County Miami Township Union Section of Township 28

Owner Keith Longenecker Address 6665 A Rt 48 West

Location of property South Edge West Milton East side 48 mile

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 12

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate G.P.M. Duration of test hrs.

Drawdown ft. Date

Static level-depth to water 14 ft.

Quality (clear, cloudy, taste, odor) Bailed approx 120 Gal. Per Hr Bt

Pump installed by

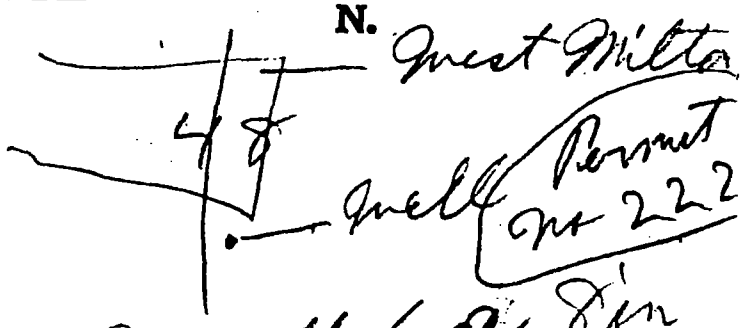
## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 3 Ft. |
| Limeston | 3 | 30 |
| shale | 30 | 150 |

RECEIVED
AUG 18 1975
HEALTH DEPARTMENT
TROY, OHIO

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




W. I drilled a 8 in hole 25 ft set 25 ft 5 5/8 Casing Cemented it in drill to 150 ft no useable amount of water Pulled Casing Back to 12 ft the only water was between 12 + 14 ft E.

S.

Drilling Firm Dan Fish

Address 112 N Main

Date 8-15-75

Signed D Fish

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

№ 276041

County Miami Township Union Section of Township 27

Owner Village of West Milton Address West Milton, Ohio

Location of property Mrs. Arnold's property

| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter ..... Length of casing 20' | Pumping Rate ..... G.P.M. Duration of test ..... hrs. |
| Type of screen ..... Length of screen ..... | Drawdown ..... ft. Date ..... |
| Type of pump ..... | Static level-depth to water 9.0 ft. |
| Capacity of pump ..... | Quality (clear, cloudy, taste, odor) ..... |
| Depth of pump setting ..... | |
| Date of completion Oct. 7, 1963 | Pump installed by ..... |

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top Soil | 0 Feet | 2 Ft. |
| Sub-Soil | 2 | 8 |
| Large Gravel | 8 | 9 |
| Sand and Gravel | 9 | 19 |
| Blue Shale Layers | 19 | 71 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

Test Hole No. 1

W. E.

S.

See reverse side for instructions

Drilling Firm Brumbaugh Enterprises Gravel and Soil Exploration

Address West Milton, Ohio

Date Log Rec'd. 3-24-64

Signed Copied by RKC - Div. of Water

418

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL
OR TYPEWRITER
DO NOT USE INK.

№ 276042

County Miami Township Union Section of Township 27

Owner Village of West Milton Address West Milton, Ohio

Location of property Mrs. Arnold Property

| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter ..... Length of casing ..... | Pumping Rate ..... G.P.M. Duration of test ..... hrs. |
| Type of screen ..... Length of screen ..... | Drawdown ..... ft. Date ..... |
| Type of pump ..... | Static level-depth to water 7.5 ft. |
| Capacity of pump ..... | Quality (clear, cloudy, taste, odor) ..... |
| Depth of pump setting ..... | |
| Date of completion Oct. 14, 1963 | Pump installed by ..... |

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top Soil | 0 Feet | 3 Ft. |
| Sand | 3 | 5 |
| Sand and Small Gradel | 5 | 21 |
| Blue Shale Layers | 21 | 51 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

Test Hole No. 2

W. E.

S.

See reverse side for instructions

Drilling Firm Baumbaugh Enterprises Gradel and Soils Exploration Date Logs Recd. 3-24-64

Address West Milton, Ohio Signed Copied by RHC - Div. of Water

418

ORIGINA

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL
OR TYPEWRITER
DO NOT USE INK.

№ 276043

County Miami Township Union Section of Township

Owner Village of West Milton Address West Milton, Ohio

Location of property Mrs. Arnold property

## CONSTRUCTION DETAILS

Casing diameter Length of casing

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion Oct. 21, 1963

## BAILING OR PUMPING TEST

Pumping Rate G.P.M. Duration of test hrs.

Drawdown ft. Date

Static level-depth to water 8.3 ft.

Quality (clear, cloudy, taste, odor)

Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top Soil | 0 Feet | 1½ Ft. |
| Sand and Small Gravel | 1½ | 7½ |
| Sand | 7½ | 9½ |
| Sand and Small Gravel | 9½ | 17½ |
| Large Gravel | 17½ | 19½ |
| Blue Shale Layers | 19½ | 21 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

Test Hole No. 3

W. E.

S.

See reverse side for instructions

Drilling Firm Brumbaugh Enterprises Gravel and Spilo Exploration Date Log Recd. 3-24-64

Address West Milton, Ohio Signed Copied by RKC Div. of Water

418

ORIGINAL

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

№ 276044

County Miami Township Union Section of Township

Owner Village of West Milton Address West Milton, Ohio

Location of property Mrs. Arnold Property

## CONSTRUCTION DETAILS

Casing diameter ..... Length of casing .....

Type of screen ..... Length of screen .....

Type of pump .....

Capacity of pump .....

Depth of pump setting .....

Date of completion October 22, 1963

## BAILING OR PUMPING TEST

Pumping Rate ..... G.P.M. Duration of test ..... hrs.

Drawdown ..... ft. Date .....

Static level-depth to water 8.0 ft.

Quality (clear, cloudy, taste, odor) .....

Pump installed by .....

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top Soil | 0 Feet | 1½ Ft. |
| Sub-Soil | 1½ | 5 |
| Blue Clay - Some Gravel | 5 | 8½ |
| Gravel and Sand | 8½ | 11 |
| Blue Clay | 11 | 14 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

Test Hole No. 4

W. E.

S.

See reverse side for instructions

Drilling Firm Brumbaugh Enterprises Gravel and Soils Exploration

Address West Milton, Ohio

Date Log Recd. 3-24-64

Signed Copied by RC - Pilot Water

418

ORIGIN

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER
*DO NOT USE INK.*

№ 276045

County Miami Township Union Section of Township

Owner Village of West Milton Address West Milton, Ohio

Location of property Mrs. Arnold Property

| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter ..... Length of casing ..... | Pumping Rate ..... G.P.M. Duration of test ..... hrs. |
| Type of screen ..... Length of screen ..... | Drawdown ..... ft. Date ..... |
| Type of pump ..... | Static level-depth to water 7.5' ft. |
| Capacity of pump ..... | Quality (clear, cloudy, taste, odor) ..... |
| Depth of pump setting ..... | |
| Date of completion October, 1963 | Pump installed by ..... |

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top Soil | 0 Feet | 1 Ft. |
| Sub-Soil | 1 | 8 |
| Sand and Gravel | 8 | 18 |
| Blue Shale | 18 | 20 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

Test Hole No. 5

W. E.

S.

See reverse side for instructions

Drilling Firm Bernbaum Enterprises Gravel and Soils Exploration Date Log Recd. 3-24-64

Address West Milton, Ohio Signed Copied by RKC fit. of Water

418

ORIGIN.

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

№ 276046

County Miami Township Union Section of Township

Owner Village of West Milton Address West Milton, Ohio

Location of property Mrs. Arnold Property

## CONSTRUCTION DETAILS

Casing diameter Length of casing

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion October, 1963

## BAILING OR PUMPING TEST

Pumping Rate G.P.M. Duration of test hrs.

Drawdown ft. Date

Static level-depth to water ft.

Quality (clear, cloudy, taste, odor)

Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top Soil | 0 Feet | 2 Ft. |
| Sand - Soil | 2 | 8 |
| Sand and Gravel | 8 | 19 |
| Blue Clay | 19 | 31 |
| Cased to Blue Clay from there on - No water | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

Test Hole No. 6

W. E.

S.

See reverse side for instructions

Drilling Firm Brumbaugh Enterprises Soil and Gravel Explorations

Address West Milton, Ohio

Date Log Read 3-24-64

Signed Signed by RKC Dist of Wtr.

418

ORIGINAL

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

№ 276047

County Miami Township Union Section of Township 27

Owner Village of West Milton Address West Milton, Ohio

Location of property M. Minker Property

| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter ..... Length of casing ..... | Pumping Rate ..... G.P.M. Duration of test ..... hrs. |
| Type of screen ..... Length of screen ..... | Drawdown ..... ft. Date ..... |
| Type of pump ..... | Static level-depth to water ..... ft. |
| Capacity of pump ..... | Quality (clear, cloudy, taste, odor) ..... |
| Depth of pump setting ..... | |
| Date of completion: October 28, 1963 | Pump installed by ..... |

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top Soil and Sub-Soil | 0 Feet | 13½ Ft. |
| Sand Some Gravel | 13½ | 19 |
| Gravel | 19 | 21' 3" |
| Blue Clay | 21' 3" | 31 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

Test Hole No. 1

across River

W. E.

S.

See reverse side for instructions

Drilling Firm Brumbaugh Enterprises Soil and Gravel Explorations Date Log Recd. 3-24-64

Address West Milton, Ohio Signed Copied by RKC - Div. of Water

1119

ORIGIN

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

№ 276048

County Miami Township Union Section of Township

Owner Village of West Milton Address West Milton, Ohio

Location of property Mr. Minkner Property

| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter ..... Length of casing ..... | Pumping Rate ..... G.P.M. Duration of test ..... hrs. |
| Type of screen ..... Length of screen ..... | Drawdown ..... ft. Date ..... |
| Type of pump ..... | Static level-depth to water ..... ft. |
| Capacity of pump ..... | Quality (clear, cloudy, taste, odor) ..... |
| Depth of pump setting ..... | |
| Date of completion October 29, 1963 | Pump installed by ..... |

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top Soil and Sub Soil | 0 Feet | 6½ Ft. |
| Sand and Gravel | 6½ | 16' 9" |
| Blue Shale - Some Hard layers | 16' 9" | 24' 9" |
| 20 ft. of casing. After cased to Clay, there was very little water. | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

Test Hole No. 8

W. E.

S.

See reverse side for instructions

Drilling Firm Brumbaugh Enterprises Soil and Gravel Explorations Date Log Recd. 3-24-64

Address West Milton, Ohio Signed Copied by RRC Pilot Water

419

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

ORIGINAL 23

518302
Permit # 78

COUNTY Miami TOWNSHIP Union SECTION OF TOWNSHIP

OWNER Russ Lukens (339-5288) ADDRESS 507 Ridge, Troy, Ohio

LOCATION OF PROPERTY 10 Acre tract on Willard Schul farm on Iddings Rd

## CONSTRUCTION DETAILS

Casing diameter 31 ft 5½" OD galv casing with packer-cemented in. Length of casing

Type of screen Length of screen

Type of pump Well ~~xx~~ is 135 ft deep, 8" hole all the way, recovery rate is

Capacity of pump ~~150 GPH.~~

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate gpm Duration of test 2x~~dka~~ days

Drawdown ft Date May 10, 1978

Static level (depth to water) 50 to water ft

Quality (clear, cloudy, taste, odor)

Pump installed by

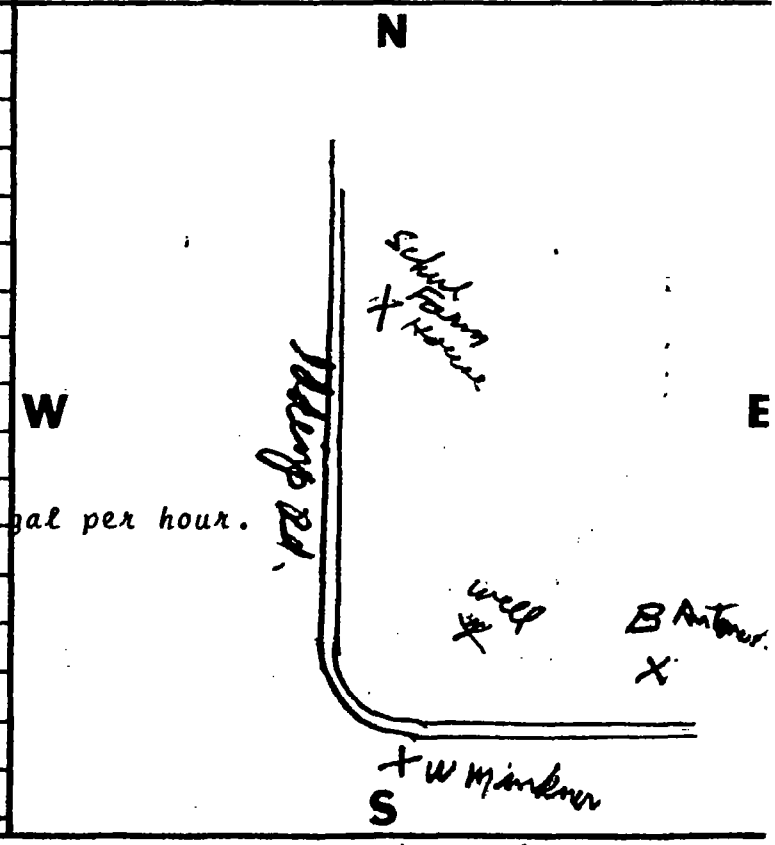
## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Dirt | 0 ft | 4 ft |
| Limestone | 4 | 42 |
| Blue clay & rock | 42 | 50 |
| Grey rock | 50 | 74 |
| Blue clay & rock | 74 | 105 |
| Hard blue shale rock | 105 | 135 |
| | | |
| Saturday May 6 9:30 AM to 3:30 PM bailed total of 900 gal. | | |
| Tuesday May 9, 9:15 AM to 4:30 PM bailed a total of 1035 Gallons. | | |
| Recovery rate is consistent at 150 gal per hour. | | |

RECEIVED
MAY 12 1978
~~HEALTH DEPARTMENT~~
TROY, OHIO

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM Lorin C. Snell
ADDRESS 9313 W. Markley Road Laura, Ohio 45337 698-4222

DATE May 10 1978
SIGNED Lorin C. Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL

23

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 257232

County Miami Township Union Section of Township 27

Owner Boyd Antonides Address RR1 W. Milton Ohio

Location of property ½ mile West of Karner Rd on Edding Rd.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 23-0

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping rate G.P.M. Duration of test hrs.

Drawdown ft. Date Aug 11 1962

Developed capacity 90 GPH

Static level—depth to water 32 ft.

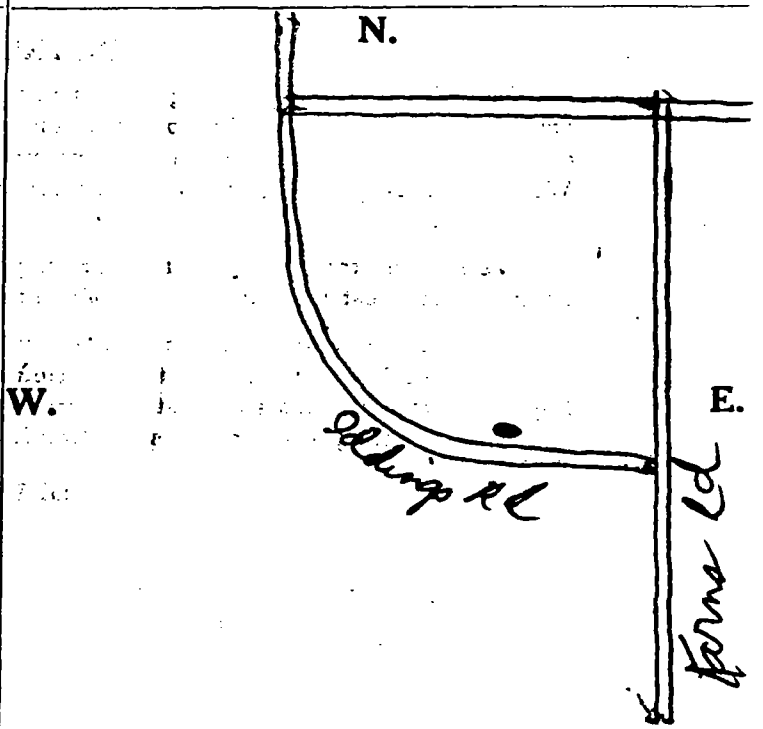
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 3 Ft. |
| Soft Limestone | 3 | 18 |
| Hard Limestone | 18 | 52 |
| Blue Rock | 52 | 65 |
| Blue clay & blue rock | 65 | 74 |
| Blue rock | 74 | 92 |
| Blue clay & Blue rock | 92 | 120 |
| Hard Blue rock | 120 | 132 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL WELL DRILLING—PUMPS Date 8-11-62

Address LAURA, O. RR. #1-MARKLEY RD.-PH. [redacted] Signed Lorin C. Snell

441

ORIGINAL

22e

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

Nº 323441

County Miami Township Union Section of Township 27

Owner Glenn Kindell Address RR2 Tipp City Ohio

Location of property 1 mile South of Garland Rd on Karna Rd

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 68 1/2

Type of screen Length of screen

Type of pump 3/4 HP Berns Jet

Capacity of pump

Depth of pump setting 54 ft

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 15 G.P.M. Duration of test hrs.

Drawdown to 55 ft. Date 5-19-66

Static level-depth to water 32 ft.

Quality (clear, cloudy, taste, odor) Sandy-but Test pumped overnight clear + OK

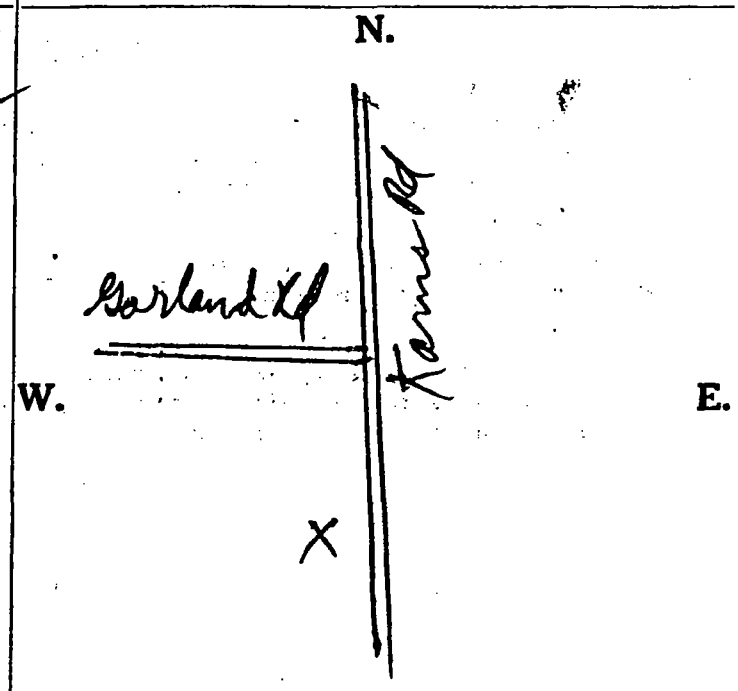
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| old well | 0 Feet | 57 Ft. |
| Sand + Gravel | 57 | 68 1/2 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL WELL DRILLING—PUMPS

Address LAURA, O. RR. #1-MARKLEY RD.-PH. LA 4227

Date 5-20-66

Signed Lorin C Snell

422

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 395294

County Miami Township Union Section of Township

Owner Joe Falb Address 5997 W. Frederick-Garland Rd., W. Milton

Location of property Same.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 25 (see below)

Type of screen 4" slotted PVC PIPE LINER Length of screen (51 ft)

Type of pump 1 H.P. UEJ Gould Sub. & Pit Adapt. Wells water tight cap.

Capacity of pump 1200 GPH at well, Excess 100 lb. pressure at tank-offset about

Depth of pump setting 570 ft. 1" PVC pipe pump set at about 44 ft. - Wire: 500 ft #8 then 125 ft #10 down to pump.

Date of completion

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 40 G.P.M. Duration of test hrs.

Drawdown to 25 ft. Date 10-16-70

Static level-depth to water 17 ft.

Quality (clear, cloudy, taste, odor) Clear-no odor, Taste OK.

Pump installed by Lorin C. Snell

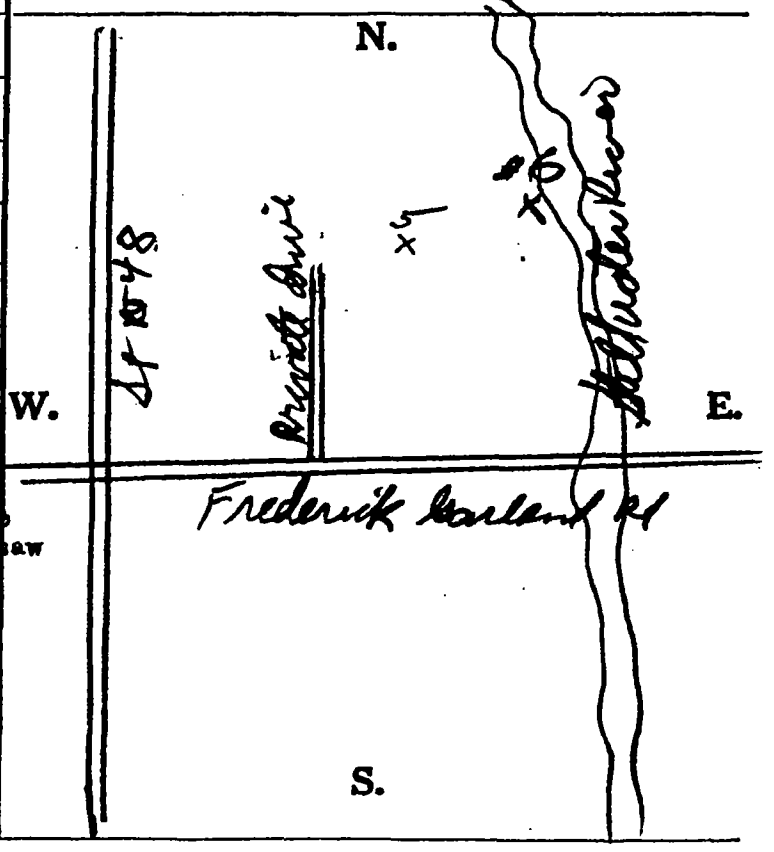
## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| WELL # 5: Dry & pulled casing dirt and hardpan | 0 Feet | 14 Ft. |
| Yellow gravelly Hardpan | 14 | 28 |
| Blue clay gravelly | 28 | 42 |
| Hard blue rock | 42 | 45 |
| WELL # 6: (at river) Dirt and clay | 0 | 18 |
| Very h ard cemented gravelly Hardpan- (muddy) | 18 | 35 |
| Very hard cemented very gravelly hardpan (not as muddy) | 35 | 45 |
| Hard Cemented gravelly Hardpan Muddy- not as gravelly | 45 | 50 |
| Hard Blue Rock | 50 | 58 |

25 ft 5 5/8 casing- perforated from 21 to 25 ft- then installed 51 ft 4" PVC plastic liner- perforated lengthwise with hand electric saw whole length.

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm LORIN C. SNELL
WELL DRILLING-PUMPS

Address LAURA, O. RR. #1-MARKLEY RD., PH.

Date

Signed

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

№ 351694

County Miami Township Union Section of Township 27

Owner Joe Falb Address 5997 W Frederick Garland Rd

Location of property West Milton Ohio

## CONSTRUCTION DETAILS

Casing diameter 8 6 ft Length of casing 5 5/8

Type of screen Length of screen

~~Type of pump~~ Sub pump coming in at 3 ft

~~Capacity of pump~~ after rain all day Saturday

Depth of pump setting Bottom 44 ft casing perforated

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 14 G.P.M. Duration of test 2 hrs.

Drawdown to 90 ft. Date 12-8-67

Static level-depth to water 23 ft.

Quality (clear, cloudy, taste, odor) OK

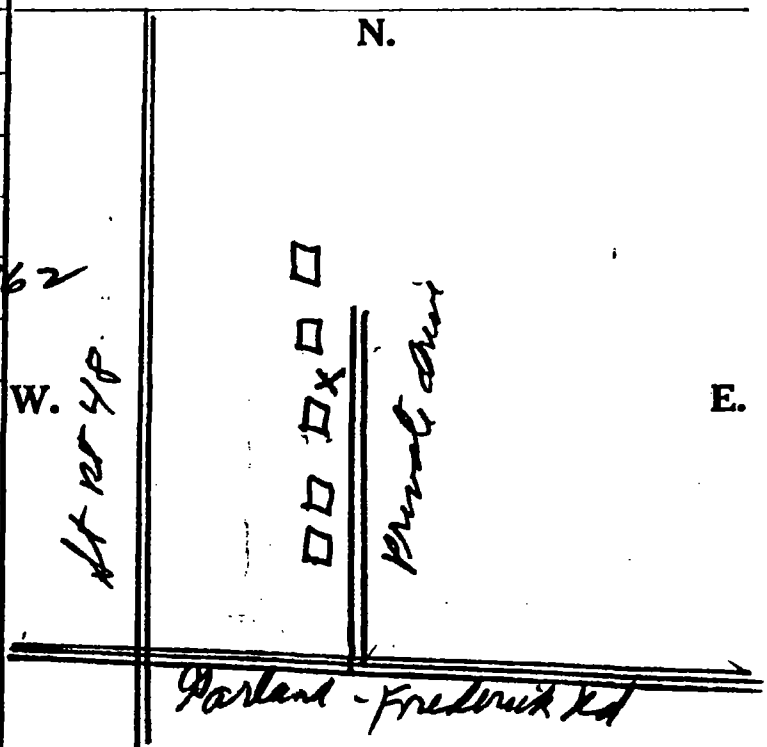
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 2 Ft. |
| Soft Limestone | 2 | 15 |
| Blue Clay + Blue Rock | 15 | 72 |
| Hard Blue Rock | 72 | 145 |
| Hard Blue Rock with caverns | 145 | 162 |
| Hard Blue Rock | 162 | 170 |
| Hard Blue Rock + Blue Clay | 170 | 180 |
| Drawdown to 110-120 ft - 8 GPM at 150 ft. | | |
| Drawdown to 90 ft at 14 GPM at 180 ft. | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL
WELL DRILLING—PUMPS

Address LAURA, O. RR. #1-MARKLEY RD.-PH.

Date

Signed

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL
30

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

Nº 351692

(3 wells)

County Miami Township Union Section of Township

Owner Joe Falb Address 5997 W Frederick Garland Rd West Milton

Location of property Same

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 31
Type of screen Length of screen
Type of pump
Capacity of pump
Depth of pump setting
Date of completion

## BAILING OR PUMPING TEST

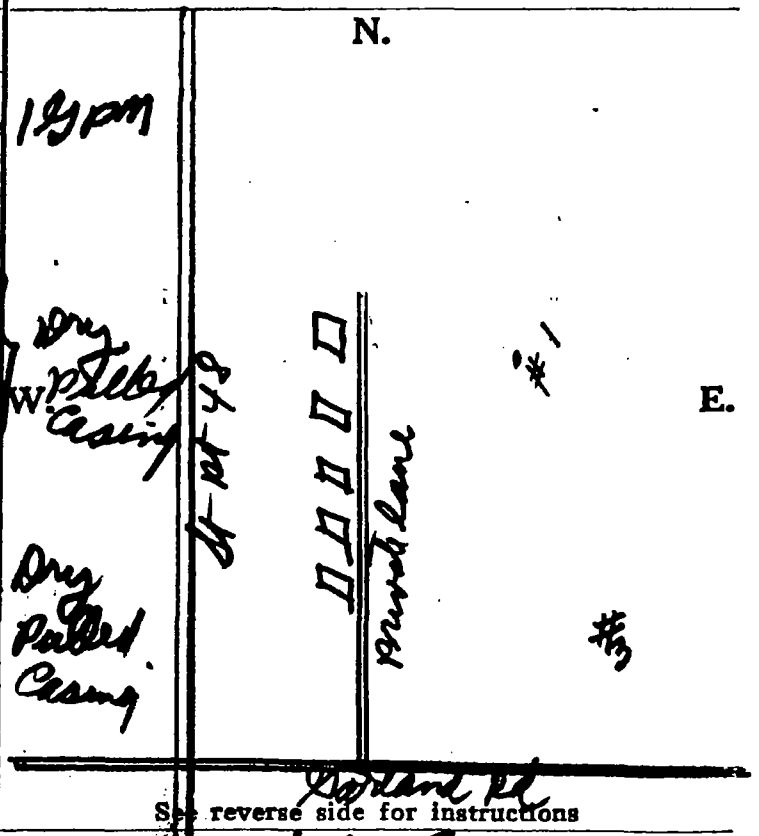
Pumping Rate G.P.M. Duration of test hrs.
Drawdown ft. Date 11-7-67
Static level-depth to water 15 5 water ft.
Quality (clear, cloudy, taste, odor) 1 gpm.
Water on Top of Blue clay.
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To | |
|---|---|---|---|
| #1 Dirt | 0 Feet | 2 Ft. | |
| Yellow gravelly clay | 2 | 30 | 1 gpm |
| Blue clay | 30 | 33 | |
| Blue Rock | 33 | 98 | |
| #2: Dirt | 0 | 2 | |
| gravelly Grey Hardpan | 2 | 32 | Dry |
| Blue clay + Rock | 32 | 37 | W Pulled Casing |
| #3: Dirt | 0 | 3 | |
| Hardpan | 3 | 17 | Dry |
| Blue clay | 17 | 21 | Pulled |
| Blue Rock | 21 | 28 | Casing |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL WELL DRILLING-PUMPS Date 11-7-67
Address LAURA, O. RR. #1-MARKLEY RD.-PH. 698-4227 Signed Lorin C Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

815 Chippewa Rd 3
Columbus O. 43215

ORIGINAL
No 351658

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

County Miami Township Union Section of Township

Owner Pat Romicker Address RR1 West Milton Ohio

Location of property 2nd property E of Stillwater River on Garland Rd

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 steel Length of casing 29 ft

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 20 G.P.M. Duration of test hrs.

Drawdown to 37 ft. Date 1-3-67

Static level-depth to water 25 ft.

Quality (clear, cloudy, taste, odor)

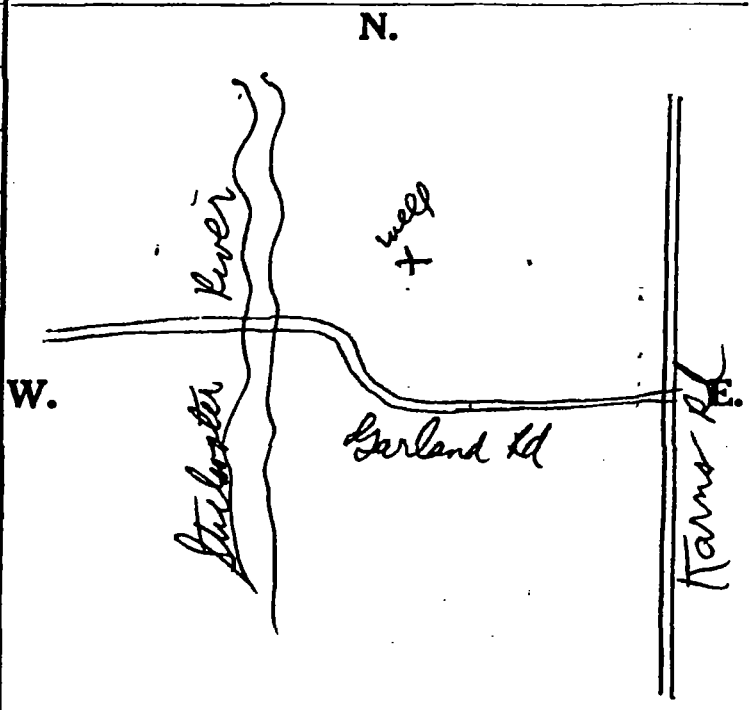
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt + Stones | 0 Feet | 11 Ft. |
| Soft Limestone | 11 | 18 |
| Blue clay | 18 | 23 |
| Limestone | 23 | 42 |
| Blue clay | 42 | 78 |
| Blue clay harder at about 70 | | |
| Blue Rock | 78 | 94 |
| First water at 42-45 ft | | |
| Casing drove to refusal - | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL WELL DRILLING-PUMPS Date 1-3-67

Address LAURA, O. RR. #1-MARKLEY RD.-PH. 698-4227 Signed Lorin C Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

11A11

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 395262

County Miami Township Union Section of Township

Owner Bob Panter Address 5235 Garland Rd

Location of property 5235 Garland Rd · West Milton Ohio

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 + shoe Length of casing 33

Type of screen Length of screen

Type of pump 3/4 Bored but not clean

Capacity of pump

Depth of pump setting 53 from not clean

Date of completion 8-1-69

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 30 G.P.M. Duration of test hrs.

Drawdown ft. Date 8-1-69

Static level-depth to water 24 ft.

Quality (clear, cloudy, taste, odor) recovery

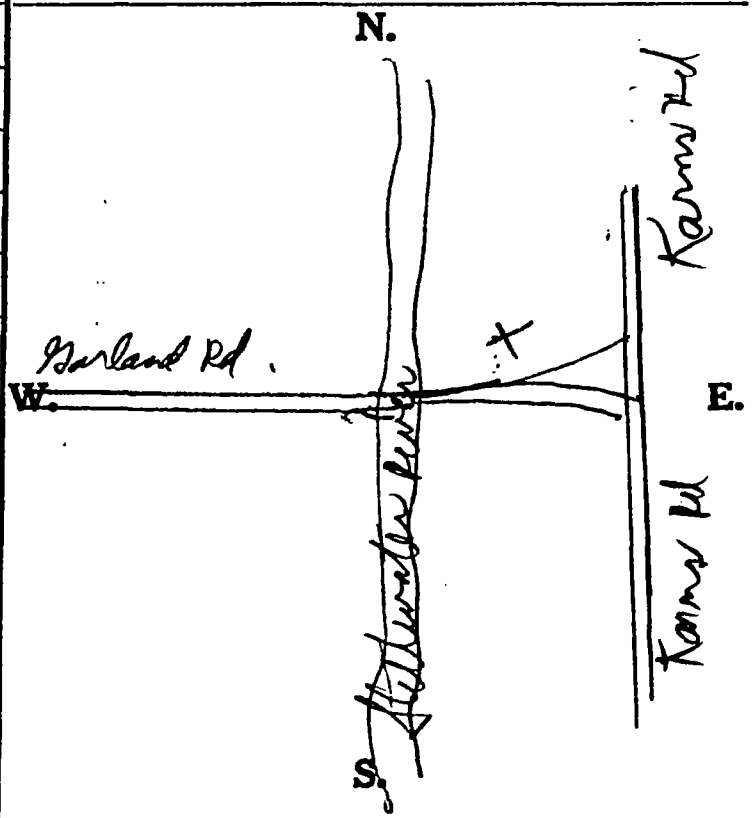
Pump installed by Lorin C. Snell

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 3 Ft. |
| Hardpan & Rocks | 3 | 21 |
| Grey Rock | 21 | 37 |
| Blue clay & Rock | 37 | 75 |
| Medium Hard Blue Rock | 75 | 84 |
| First water at 35' +- | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm LORIN C. SNELL
WELL DRILLING—PUMPS
Address LAURA, O. RR. #1-MARKLEY RD.-PH. 698-4227

Date 8-1-69

Signed Lorin C. Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

22 c

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

472083

PERMIT # 342

26

COUNTY Miami TOWNSHIP Union SECTION OF TOWNSHIP OR LOT NUMBER South-East

OWNER JACK CLARK ADDRESS 6311 KARNS Rd. WEST MILT

LOCATION OF PROPERTY 6311 KARNS Rd. WEST MILTON, OHIO

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 49'

Type of screen PVC Length of screen 160'

Type of pump 1/2 Hp Sub

Capacity of pump 600 gph

Depth of pump setting 150'

Date of completion 10-28-74

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 10 gpm Duration of test 8 hrs

Drawdown 120 ft Date 10-28-74

Static level (depth to water) 16 ft

Quality (clear, cloudy, taste, odor) Clear

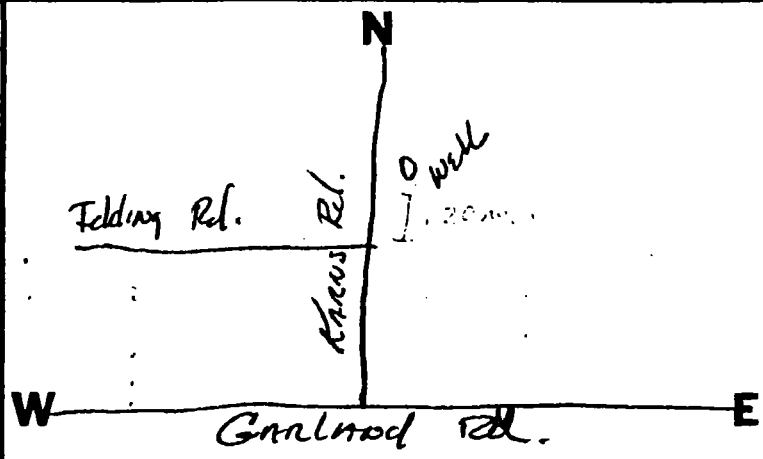
Pump installed by Ray Heckman

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 30 ft |
| Soft Limestone | 30 | 99' |
| Blue Shale | 49 | 170' |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




RECEIVED
DEC 16 1974
HEALTH DEPARTMENT
TROY, OHIO

DRILLING FIRM Heckman Well Drilling Co DATE 10-28-74

ADDRESS 920 E. Evinston Rd. Tipp City SIGNED Ray Heckman

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL 22b

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

468666

County Miami Township Union Section of Township 26

Owner Virgil Parrett Address 6333 Karns Rd, West Milton.

Location of property 6333 Karns Rd, West Milton, Ohio

## CONSTRUCTION DETAILS

Casing diameter 5½ OD & steel drive shoe Length of casing 85 ft

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 5 G.P.M. Duration of test 3 hrs.

Drawdown ft. Date Oct 11, 1974

Static level-depth to water 14 ft ft.

Quality (clear, cloudy, taste, odor) clear, drinkable

Pump installed by

## WELL LOG*

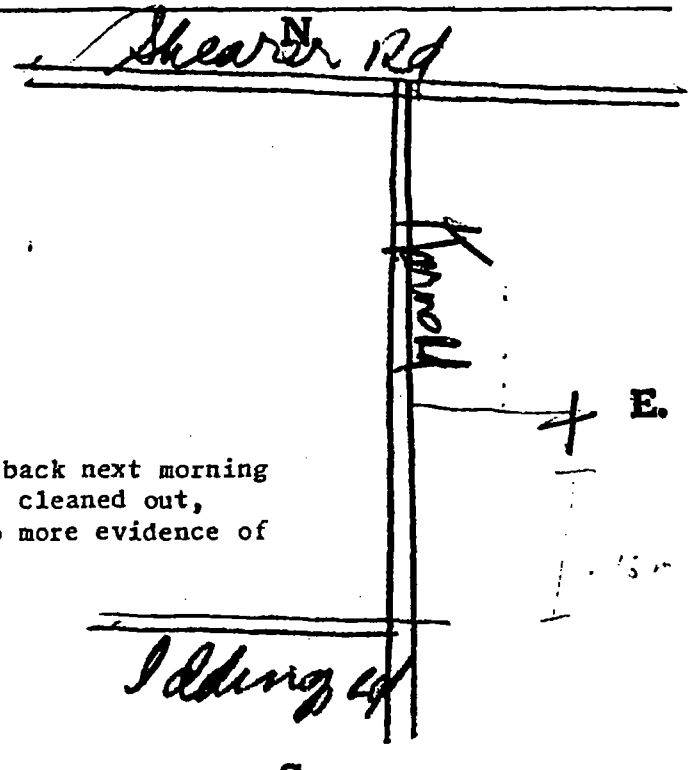
| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 3 Ft. |
| Yellow Clay | 3 | 17 |
| Dry Sandy & Gravelly Hardpan | 17 | to 58 |
| Sand, mixed with mud (won't yield water) | 58 | 75 |
| Blue Clay (dry | 75 | 82 |
| Gravelly Blue clay (water) | 82 | 92 |
| Hard blue shale rock | 92 | 94 |

Bailed for 2 hrs at a recovery rate of 3½ gpm, came back next morning bailed dry, blue clay & gravel wahsed in 1 ft deep, cleaned out, then bailed for 1 hrs at recovery rate of 5 GPM, no more evidence of wash in.

RECEIVED
OCT 15 1974
HEALTH DEPARTMENT
TROY, OHIO

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm Lorin C. Snell Well Drilling - Pumps
9313 Markley Rd
Lewis, Ohio 43337
Phone: 643-4222

Address

Date Oct 11 1974

Signed Lorin C. Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL (22b)

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

496570

COUNTY Miami TOWNSHIP Union SECTION OF TOWNSHIP OR LOT NUMBER 26

OWNER Dave Eyers ADDRESS 6333 Karns Rd - West Mil

LOCATION OF PROPERTY 6333 Karns Rd - West Milton - West on 571 - left on wheelock - Right on Shearer Rd - left on Karns Rd about 1 mi - house on left

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 25'

Type of screen None Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST (specify one by circling)

Test rate 15 gpm Duration of test 1/2 hrs

Drawdown 0 ft Date 10-25-76

Static level (depth to water) 9 ft

Quality (clear, cloudy, taste, odor) clear no odor

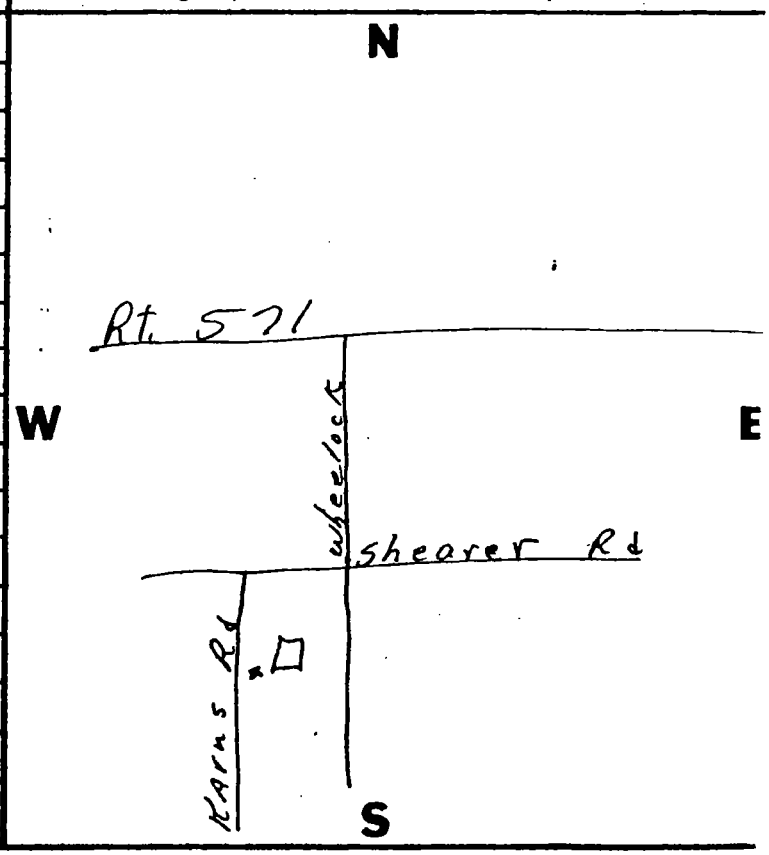
Pump installed by

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Top Soil | 0 ft | 1 ft |
| Clay (brown) | 1 | 22 |
| limestone (white) | 22 | 38 |
| gravel + WTR. | 38 | 40 |
| WTR. AT 40' | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




RECEIVED
NOV 16 1976
HEALTH DEPARTMENT
TROY, OHIO

DRILLING FIRM Gregory + Sons DATE 11-15-76

ADDRESS 8 N. Lincoln ST. Christiansburg, Ohio SIGNED Henry L Gregory

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL

22d

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1500 Dublin Road
Columbus, Ohio

No. 200609

County Miami Township Union Section of Township 26 E

Owner Raymond Roberts Address RR 1 W. Milton O

Location of property 2 Mile N of Laddings Rd on Karns Rd

## CONSTRUCTION DETAILS

Casing diameter 5 7/8 Length of casing 52 + Shoe

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping rate 27 G.P.M. Duration of test hrs.

Drawdown 3 ft. Date 9-16-57

Developed capacity 2000 GPH +

Static level—depth to water 23 ft.

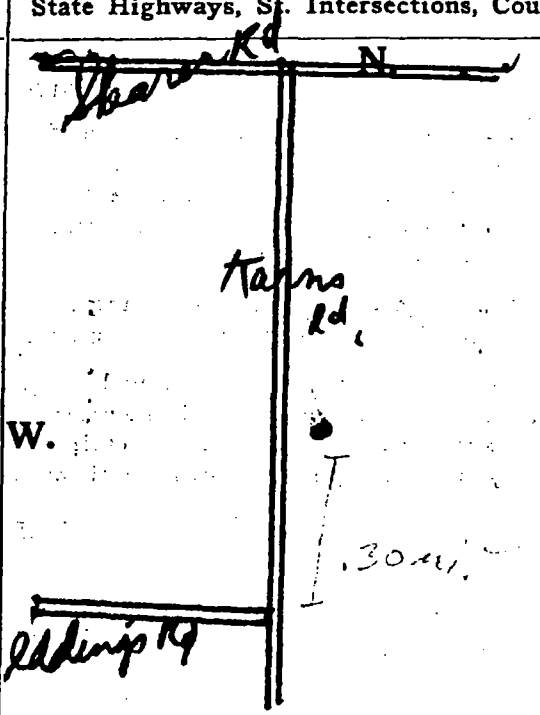
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 4 Ft. |
| Yellow clay | 4 | 20 |
| Sand & gravel | 20 | 23 |
| Gray Sandy Hardpan | 23 | 45 |
| Sandy & Gravel some clay | 45 | 50 |
| Blue Rock | 50 | 67 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




S.

See reverse side for instructions

Drilling Firm Shell

Address Laura Ohio RR 1

Date 9-16-57

Signed Lorin Shell

428

ORIGINAL

22a

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1500 Dublin Road
Columbus, Ohio

No. 200608

County Miami Township Union Section of Township 26 B

Owner Don Neargarder Address RR1 West Milton

Location of property 1 N of Iddings Rd on Karnes Rd.

## CONSTRUCTION DETAILS

Casing diameter 4 1/4 Length of casing 31-7

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping rate G.P.M. Duration of test hrs.

Drawdown ft. Date 9-7-57

Developed capacity 10 GPM.

Static level—depth to water 5 ft.

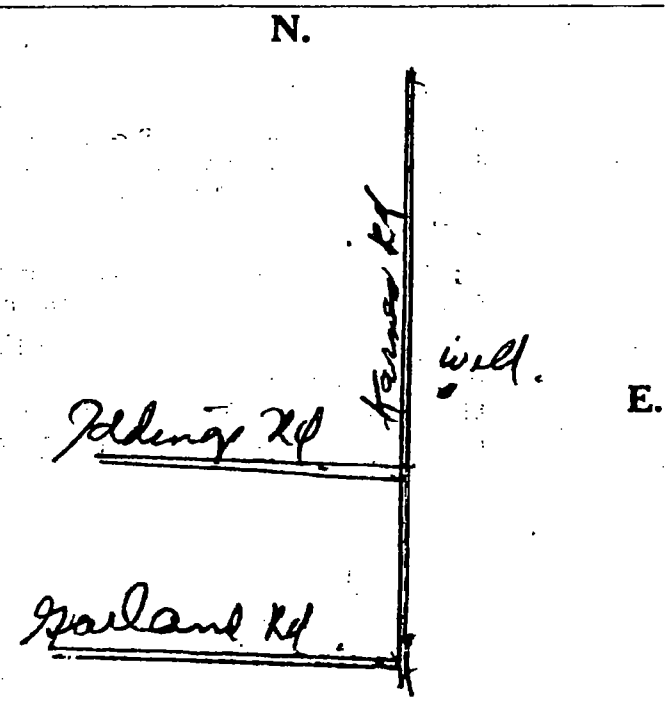
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 3 Ft. |
| Yellow Clay | 3 | 15 |
| Grey Hardpan | 3 | 30 |
| thin layer of Sand at 30 | | |
| Hit large boulder at 9 ft | | |
| This was 6" hole but due to boulders necessary to use 4 1/4 Casing | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

RECEIVED
SEP 23 1957

Drilling Firm Lorin Snell Date 9-7-57

Address Tarlton Ohio RR1 Signed Lorin C Snell

429

# WELL LOG AND DRILLING REPORT

ORIGINAL

22fc

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

№ 360420

County Miami Township ~~Monroe~~ Union Section of Township 26

Owner Howard Kauffman Address West Milton, Ohio RR #1

Location of property Corner of Iddings & Karnes Rd.

## CONSTRUCTION DETAILS

Casing diameter 6" OD Length of casing 43'-6"

Type of screen None Length of screen —

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 20 G.P.M. Duration of test hrs.

Drawdown 55 ft. Date 5/6/67

Static level-depth to water 10 ft.

Quality (clear, cloudy, taste, odor) Clear

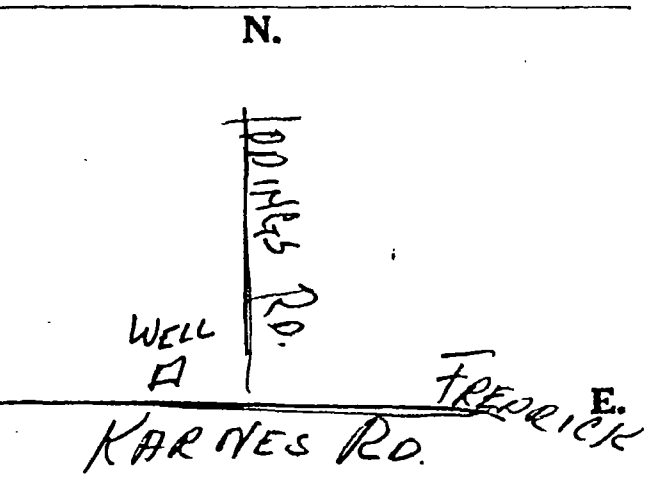
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Topsoil & Clay | 0 Feet | 18 Ft. |
| Dry Gravel | 18 | 30 |
| Sand | 30 | 32 |
| Blue Clay | 32 | 42 |
| Blue Shale | 42 | 98 |
| Brown Shale | 98 | 108 |

## SKETCH SHOWING LOCATION 911

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Heckman Well Drilling Date 5/6/67

Address 634 Evanston Rd. Zipp City, Ohio Signed George C. Thompson (Driller)

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

22fc

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

№ 360860

County Miami Township Union Section of Township 26

Owner Conrley Address RR Great Milton

Location of property on Harris Rd N of Garland 3 house

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 65

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate G.P.M. Duration of test hrs.

Drawdown ft. Date

Static level-depth to water 30 ft.

Quality (clear, cloudy, taste, odor)

Bailed 30 G.P.M.

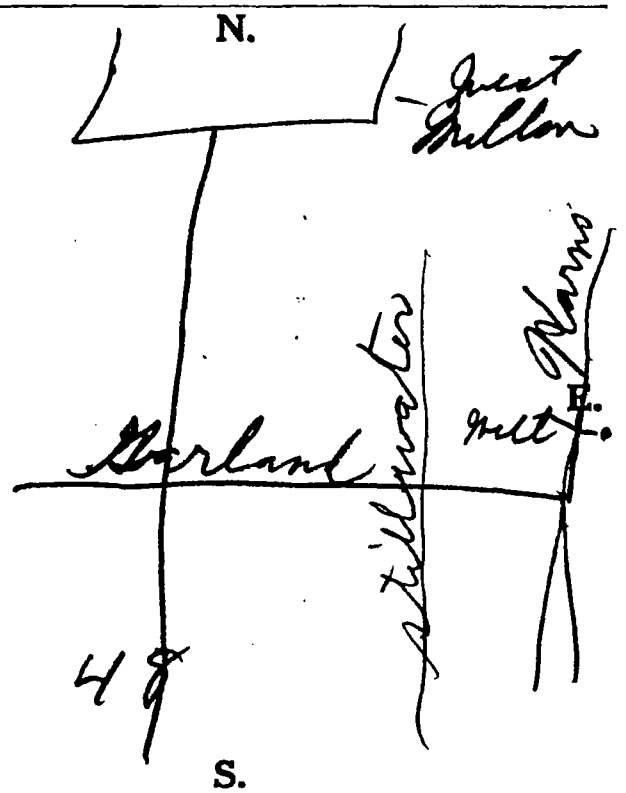
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Sandy Clay | 0 Feet | 42 Ft. |
| Shale soft | 42 | 65 |
| Hard Blue shale | 65 | 116 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Conley Bros

Address R.R. Laura

Date 7-16-67

Signed D. E. Bryle

*If additional space is needed to complete well log, use next consecutive numbered form.

U21

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

ORIGINAL

20 LC

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 268247

County Miami Township UNION Section of Township 26

Owner Ralph Mumford Address RR West Milton

Location of property on Hubbard Rd 1½ Mi S of 71

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 58

Type of screen ..... Length of screen .....

Type of pump .....

Capacity of pump .....

Depth of pump setting .....

Date of completion .....

## BAILING OR PUMPING TEST

Pumping rate ..... G.P.M. Duration of test ..... hrs.

Drawdown ..... ft. Date .....

Developed capacity Bailer aff 30 Gal in Min

Static level—depth to water 30 ft.

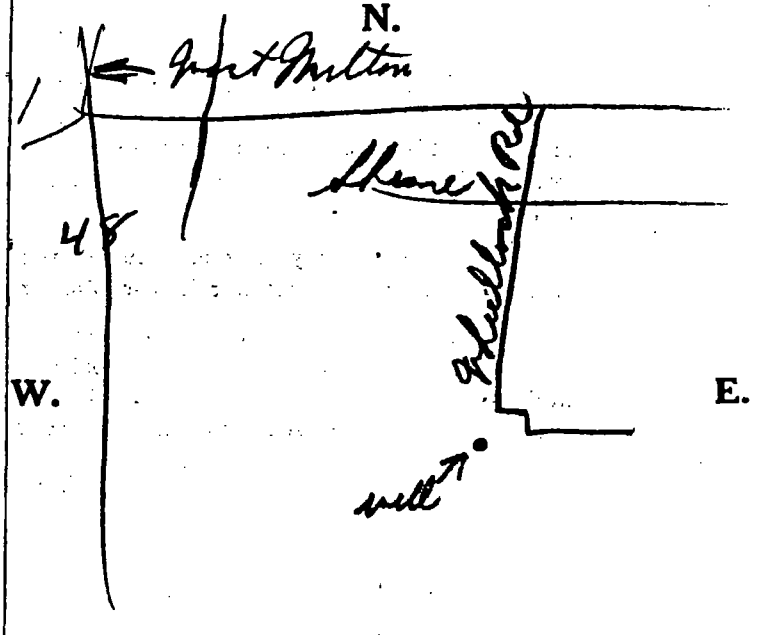
Pump installed by .....

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 50 Ft. |
| Sand & Gravel | 50 | 58 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Danny Engle Date July 5 1962

Address RR Lawrn Signed D. E. Engle

432

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 404929

County Miami Township Union Section of Township 26

Owner Mr + Mrs Hoover Address 6310 Kessler Frederick Rd

Location of property Kessler Frederick Rd West Milton, Ohio

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 33'

Type of screen None Length of screen

Type of pump Submersible

Capacity of pump

Depth of pump setting 30'

Date of completion 7/17/70

## BAILING OR PUMPING TEST (Specify one by circling)

Test Rate 10 G.P.M. Duration of test 5 hrs.

Drawdown 3 ft. Date 7/14/70

Static level-depth to water 28 ft.

Quality (clear, cloudy, taste, odor) Clear

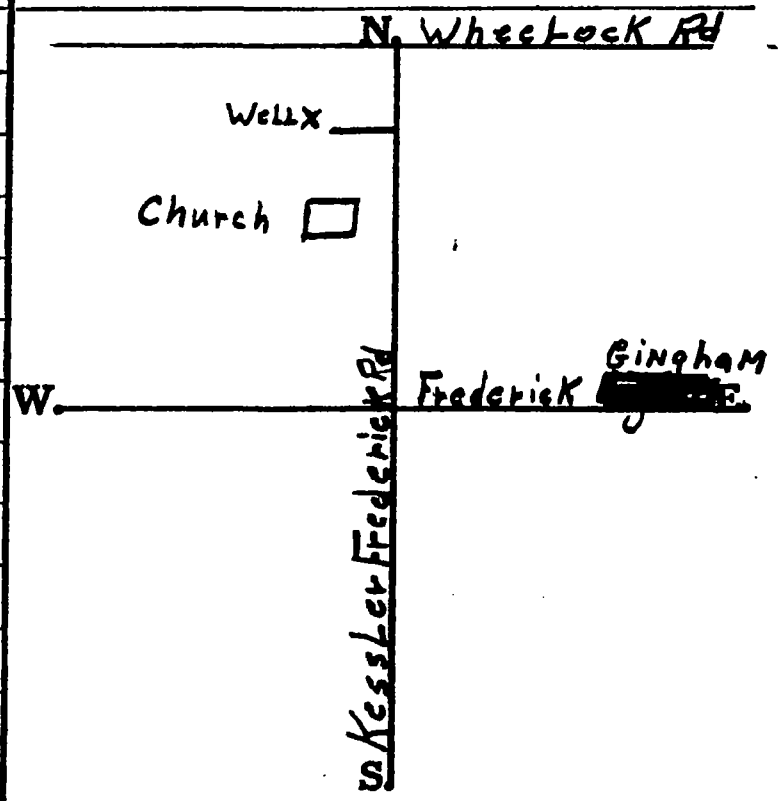
Pump installed by H.L. Stoltz + Son

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 33 Ft. |
| Boulders | 33 | 34 |
| Gravel | 34 | 37 |
| Water at 37' | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm H.L. Stoltz + Son Date 7/14/70

Address 852 Martindale Rd Signed Gene Renney

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINA

# WEL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

№ 323437

County Miami Township Union Section of Township

Owner Robt Hughes Address RR1 West Milton Ohio

Location of property 2 mile N of Neal Pearson Rd on Frederick Rd

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Shoe Length of casing 25

Type of screen Length of screen

Type of pump 1/2 HP Sta-Rite Set.

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 28 G.P.M. Duration of test hrs.

Drawdown to 13 ft. Date 3-16-66

Static level-depth to water 8 ft.

Quality (clear, cloudy, taste, odor)

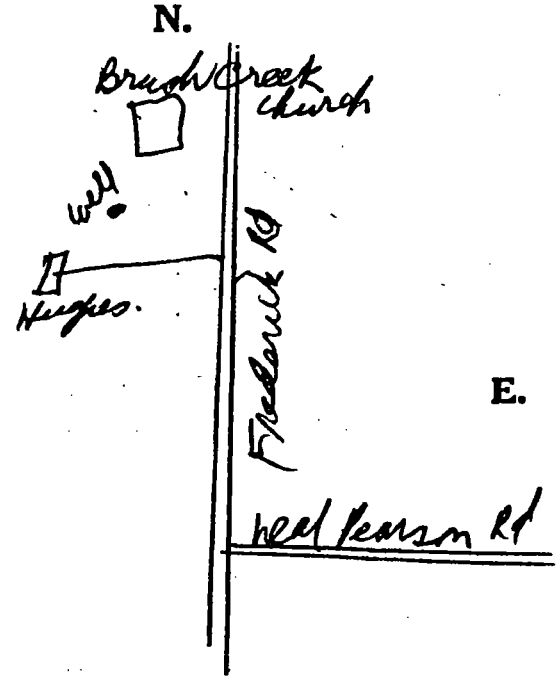
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 4 Ft. |
| Gravelly Clay | 4 | 11 |
| Dry Sand & Gravel | 11 | 18 |
| Hardpan | 18 | 23 |
| Sand & Gravel | 23 | 23 1/2 |
| Dry Gravel | 23 1/2 | 31 |
| Blue Clay | 31 | 52 |
| Hard Blue Rock | 52 | 55 |
| Well 23 ft deep. | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL WELL DRILLING-PUMPS

Address LAURA, O. RR. #1-MARKLEY RD.-PH. 698-4222

Date 3-16-66

Signed Lorin Snell

434

ORIGINAL

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

№ 278715

County Miami (Miami) Township Union Section of Township

Owner Floyd Wheelock Address RR 1 West Milton

Location of property Rt 48

## CONSTRUCTION DETAILS

Casing diameter 6 Length of casing 20

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 10 G.P.M. Duration of test 1 hrs.

Drawdown 23 ft. Date June 20, 196

Static level-depth to water 12 ft.

Quality (clear, cloudy, taste, odor) Clear

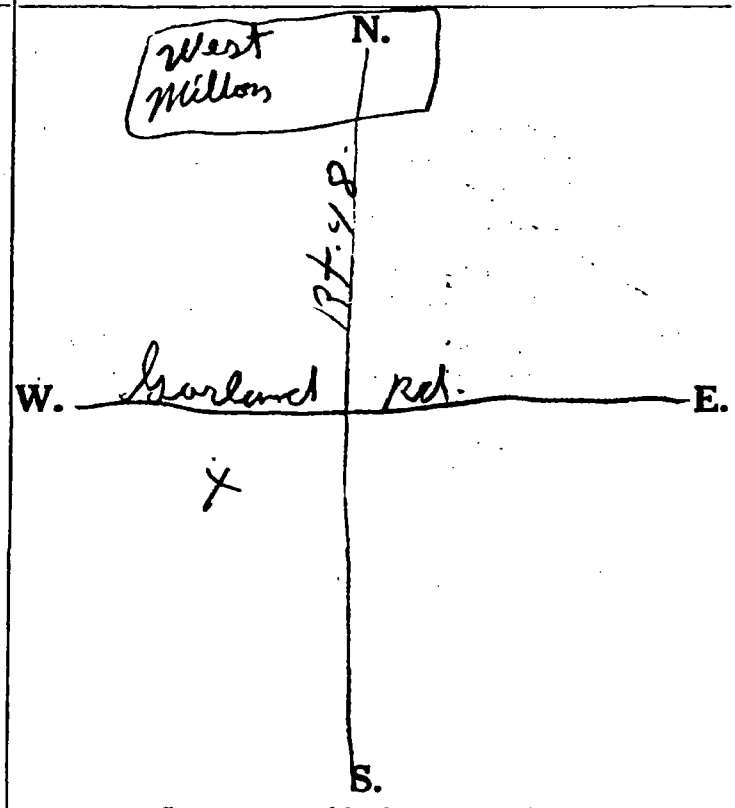
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top soil | 0 Feet | 5 Ft. |
| White Lime | 5 | 38 |
| Blue shale | 38 | 102 |
| Brown lime | 102 | 105 |
| Gray shale | 105 | 111 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm H. L. Stolz & Son Date Dec 10, 1963

Address RR #1 Vandalia O. Signed Gerald L. Stolz

478

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

488210

COUNTY Miami TOWNSHIP Union SECTION OF TOWNSHIP OR LOT NUMBER 33

OWNER James H. Harmon ADDRESS

LOCATION OF PROPERTY 7360 S. St Rt 48 West Milton N of Baker Rd

## CONSTRUCTION DETAILS

Casing diameter 6 5/8 Length of casing 26

Type of screen Length of screen

Type of pump Jet

Capacity of pump 10 gpm

Depth of pump setting 95'

Date of completion July 2, 1975

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 3 gpm Duration of test 2 hr

Drawdown 100 ft Date June 30 75

Static level (depth to water) 12 f

Quality (clear, cloudy, taste, odor) Clear

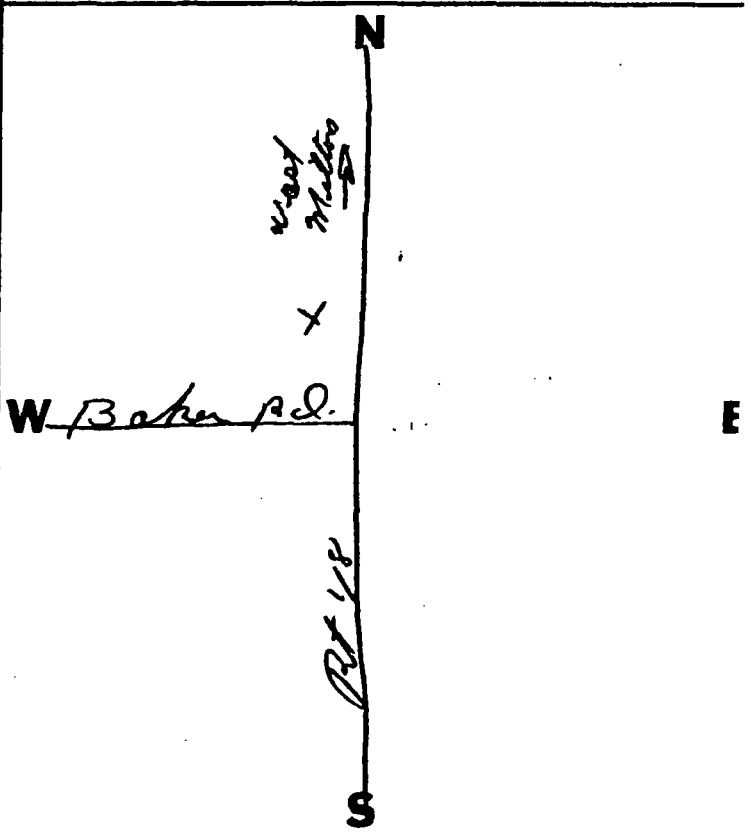
Pump installed by H. Stolz

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 6 ft |
| Limestone | 6 | 34 |
| Pink Shale | 34 | 36 |
| Shale & Lime | 36 | 98 |
| Limestone | 98 | 105 |
| | | |
| | | |
| | | |
| Water in | | |
| Pink Shale | | |
| & limestone | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM H. Stolz & Son DATE July 3, 75

ADDRESS Vandalia O SIGNED Gene D. Stolz

*If additional space is needed to complete well log, use next consecutive numbered form.

1979
County Permit No. 36

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

ORIGINAL

545785

COUNTY Miami TOWNSHIP Union SECTION OF TOWNSHIP 33

OWNER W. Milton Nazarene Church ADDRESS W. Milton

LOCATION OF PROPERTY 6150 W. Baker Rd. W. Milton, O

## CONSTRUCTION DETAILS

Casing diameter 3 5/8 Length of casing 36'-4"

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 3 gpm Duration of test 2 hrs

Drawdown _____ ft Date 3-26-79

Static level (depth to water) 15' ft

Quality (clear, cloudy, taste, odor) Clear - Sulphur

3 gpm total Cap.

Pump installed by _____

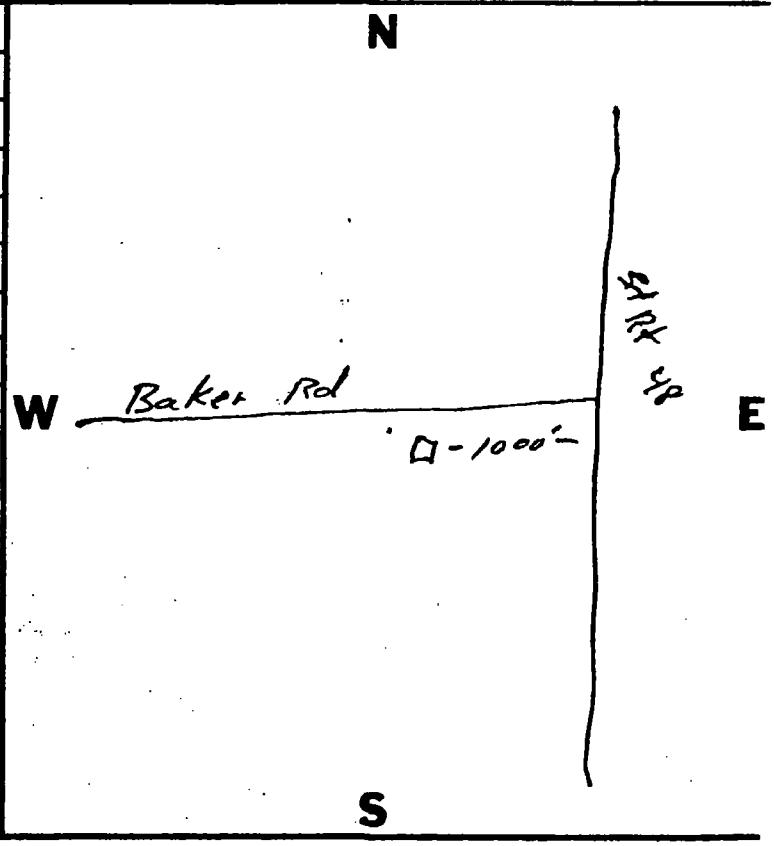
## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 3 ft |
| Limestone | 3 | 28 |
| Shale | 28 | 120 |

RECEIVED
MAR 29 1979
HEALTH DEPARTMENT
TROY, OHIO

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM Stoltz Well Drlg. DATE 3-29-79

ADDRESS Troy, O SIGNED [illegible]

*If additional space is needed to complete well log, use next consecutive numbered form.

LION

ORIGINA

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

№ 323404

County Miami Township Union Section of Township

Owner Don Mumme Address R.R.1 Union Ohio

Location of property 1 Mile N of County Line Rd on Rt 48

## CONSTRUCTION DETAILS

Casing diameter 5/8 Length of casing 27 ft

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 25 G.P.M. Duration of test hrs.

Drawdown to 10 ft. Date Jan 27 1965

Static level-depth to water 3 ft.

Quality (clear, cloudy, taste, odor) ok

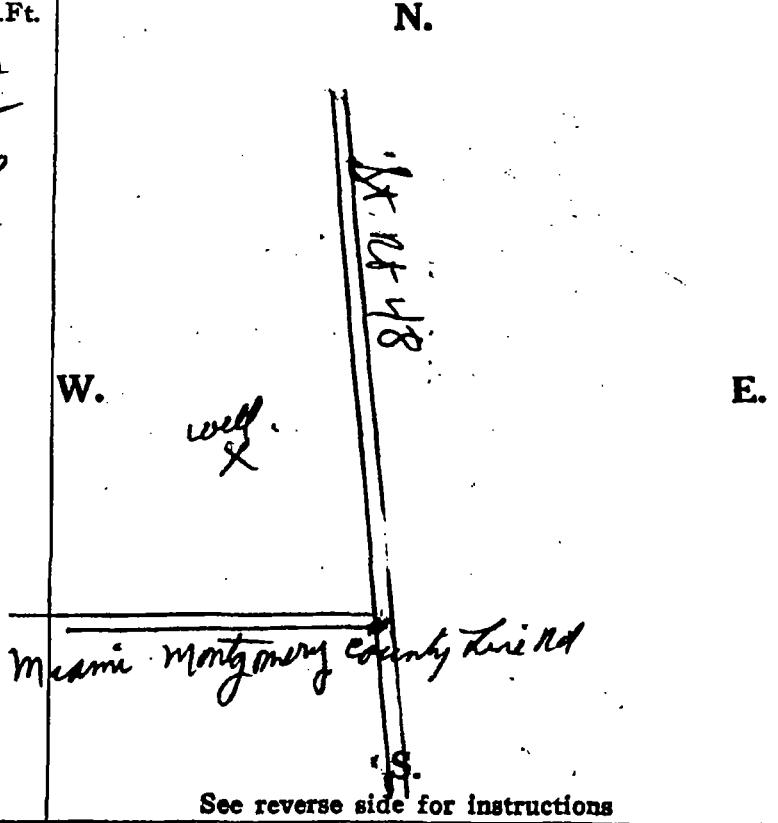
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top soil | 0 Feet | 5 Ft. |
| Limestone | 5 | 13 |
| Blue clay | 13 | 25 |
| Blue Rock | 25 | 48 |
| Blue Clay & Rock | 48 | 50 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL
WELL DRILLING-PUMPS
Address LAURA, O. RR. #1-MARKLEY RD.-PH. 6050422

Date 1-27-65

Signed Lorin Snell

481

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

№ 366836

County Miami Township Union Section of Township 34

Owner American Legion Post Address West Milton, O.

Location of property St. Rt. 48 1/2 mile N. Montgomery Co. Line

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 34'

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 2 1/2 G.P.M. Duration of test 4 hrs.

Drawdown ft. Date 8-24-67

Static level-depth to water 10 ft.

Quality (clear, cloudy, taste, odor)

2 1/2 gpm total cap.

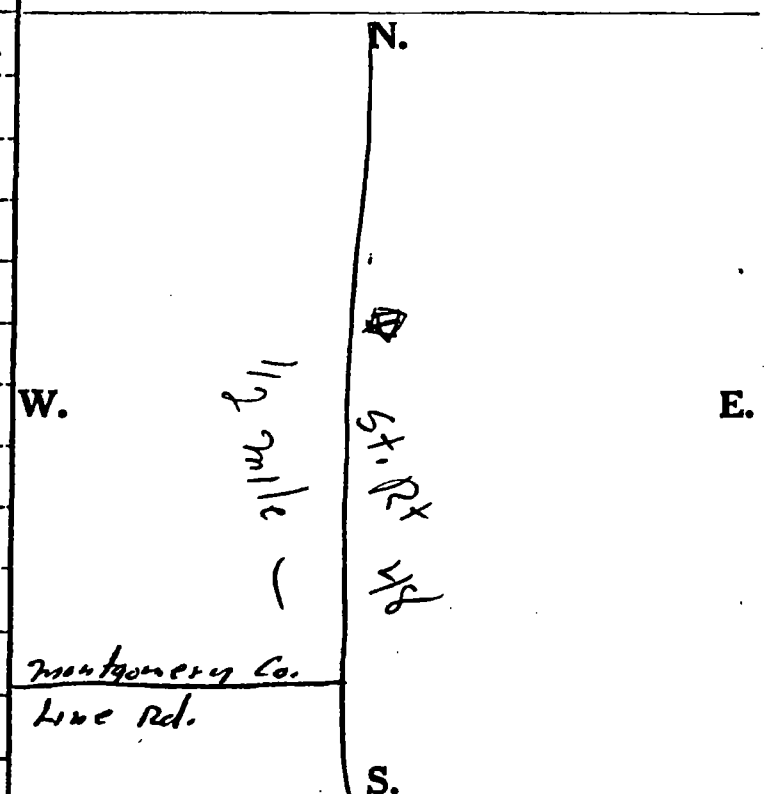
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 3 Ft. |
| Limestone | 3 | 23 |
| Blue Shale | 23 | 34 |
| Red shale | 34 | 36 |
| Blue shale | 36 | 175 |
| water at 36' | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Stoltz Well Drilling Date 8-24-67

Address 16 Windmere Dr. Troy, O. Signed RE [illegible]

*If additional space is needed to complete well log, use next consecutive numbered form.

L101

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 414721

County MIAMI Township UNION Section of Township 33 34

Owner AMERICAN LEGION Address WEST MILTON OHIO

Location of property S.R. #48, ½ MILE S. GARLAND RD.

## CONSTRUCTION DETAILS

Casing diameter 8" Length of casing 16'

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 4 G.P.M. Duration of test 1 hrs.

Drawdown TOTAL CAP. ft. Date 7 DEC 70

Static level-depth to water 4 ft.

Quality (clear, cloudy, taste, odor)

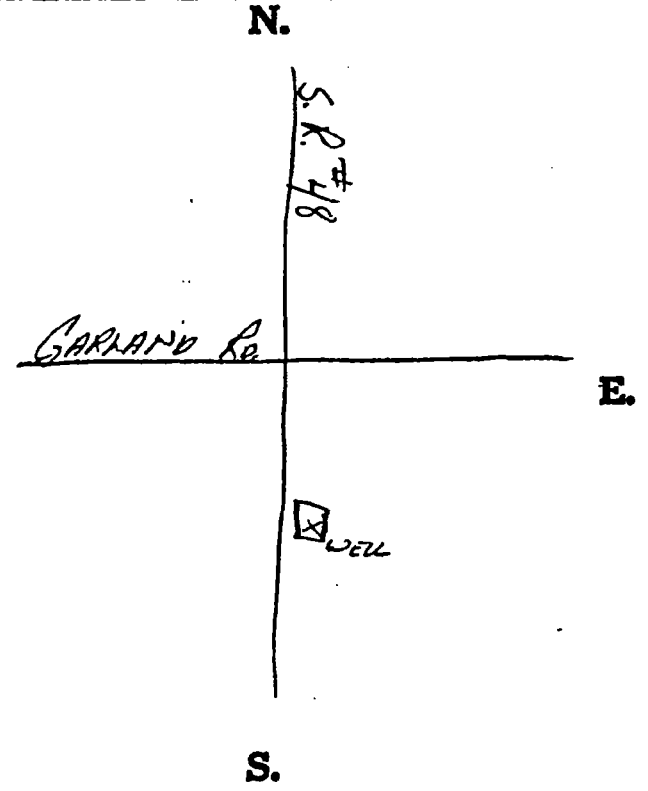
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| CLAY | 0 Feet | 3 Ft. |
| LIMESTONE | 3 | 17 |
| SHALE | 17 | 150 |
| WATER AT 17' | | |
| | | |
| ORIGINAL 6" WELL | | |
| 110', REAMED TO | | |
| 8" AND DRILLED | | |
| 40' FOOT DEEPER | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm STONTZ WELL DRLG Date 7 DEC 70

Address TROY, OHIO Signed C. R. Stontz

*If additional space is needed to complete well log, use next consecutive numbered form.

1101

County Permit No. 238

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

ORIGINAL 9-a

553680

COUNTY Miami TOWNSHIP Union SECTION OF TOWNSHIP ~~33~~ 34

OWNER American Legion ADDRESS W. Milton

LOCATION OF PROPERTY St. Rt. 48 1/4 mile S. of Garland Rd.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 28'-6"

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 4 gpm Duration of test 3 hrs

Drawdown 125' ft Date 9-13-79

Static level (depth to water) 34 ft

Quality (clear, cloudy, taste, odor) Clear

4 G.P.M. Total Cap.

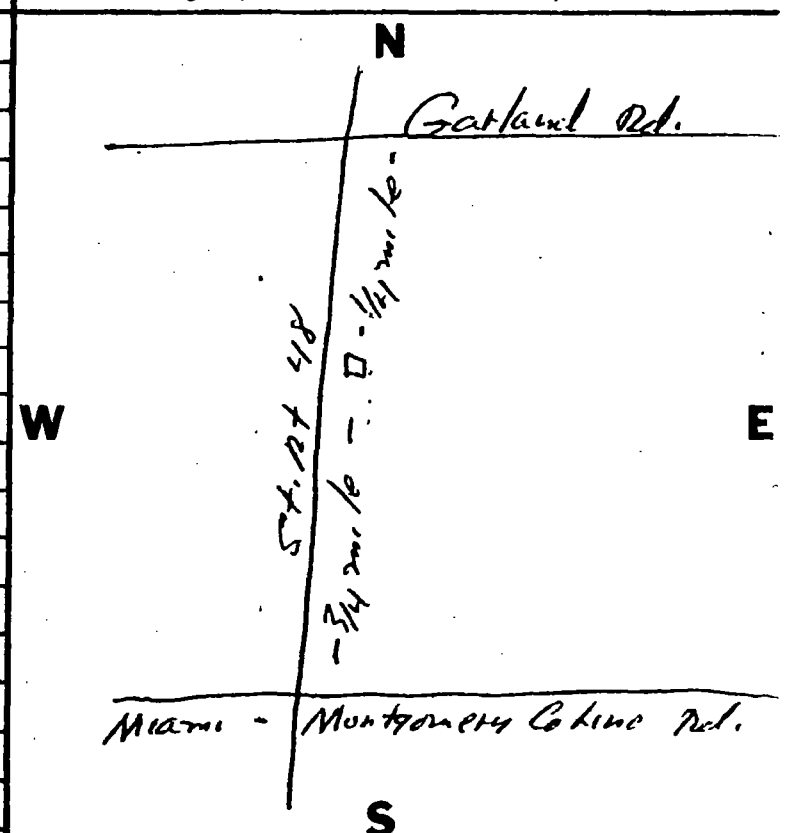
Pump installed by _____

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 2 ft |
| Limestone | 2 | 17 |
| Shale | 17 | 160' |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM R.F. Stolte Well Drlg. DATE 9-15-79

ADDRESS Troy, O SIGNED [signature]

*If additional space is needed to complete well log, use next consecutive numbered form.

1101

# WELL LOG AND DRILLING REPORT

ORIGINAL

PLEASE USE PENCIL
OR TYPEWRITER
DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

№ 294859

County Miami Township Union Section of Township

Owner Harold Osborn Address Wagon Wheel Farm RR1 Union Ohio

Location of property ½ mile NR Co Line Rd on Rt 48

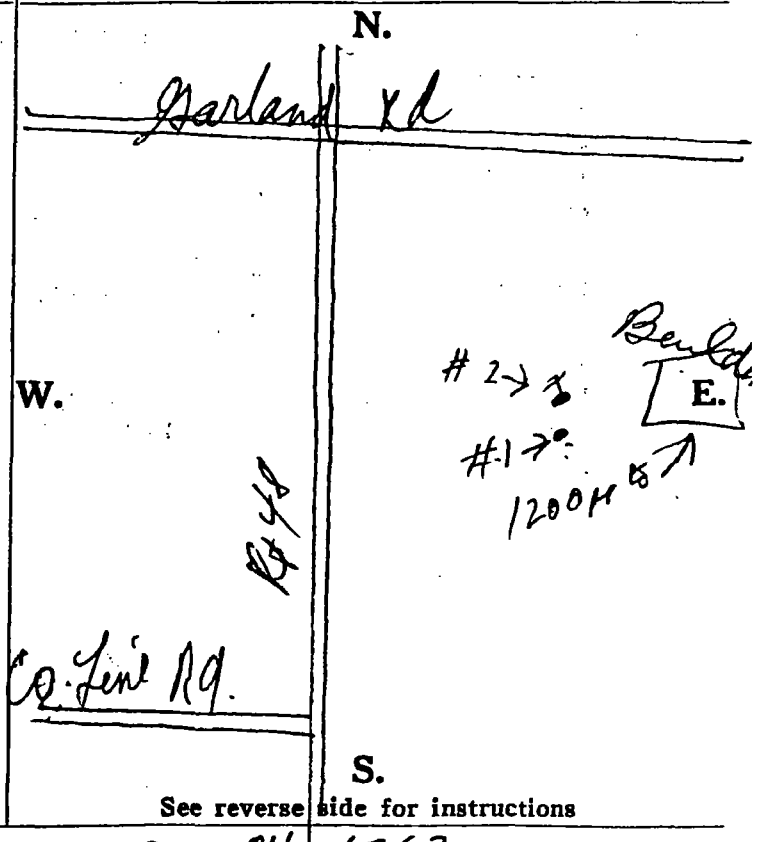
| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter 5 5/8 Length of casing 34½ | Pumping Rate 15 G.P.M. Duration of test ____ hrs. |
| Type of screen ____ Length of screen ____ | Drawdown ____ ft. Date Aug 24 1963 |
| Type of pump ____ | Static level-depth to water 10 ft. |
| Capacity of pump ____ | Quality (clear, cloudy, taste, odor) ____ |
| Depth of pump setting ____ | |
| Date of completion ____ | Pump installed by ____ |

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 6 Ft. |
| Yellow clay | 6 | 15 |
| Sand & Gravel | 15 | 32 |
| Coarse Sand & Fine Gravel | | |
| Casing Perforated ~~42~~ feet from Bottom 42½ | | |
| Well #2 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL
WELL DRILLING PUMPS
Address LAURA, O. RR. #1-MARKLEY RD.-PH.

Date Aug 24 1963
Signed Lorin C Snell

428

# WELL LOG AND DRILLING REPORT

ORIGINA

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

№ 29485

County Miami Township Union Section of Township 34

Owner Harold Ostrow Address Water Wheel Farm - Union RR1

Location of property ½ mile north B Co Line Rd on Rt 48.

## CONSTRUCTION DETAILS

Casing diameter 4½ Steel Length of casing 27½

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 40 G.P.M. Duration of test hrs.

Drawdown ft. Date Aug 21 1963

Static level-depth to water 10 ft.

Quality (clear, cloudy, taste, odor) Clear

Pump installed by

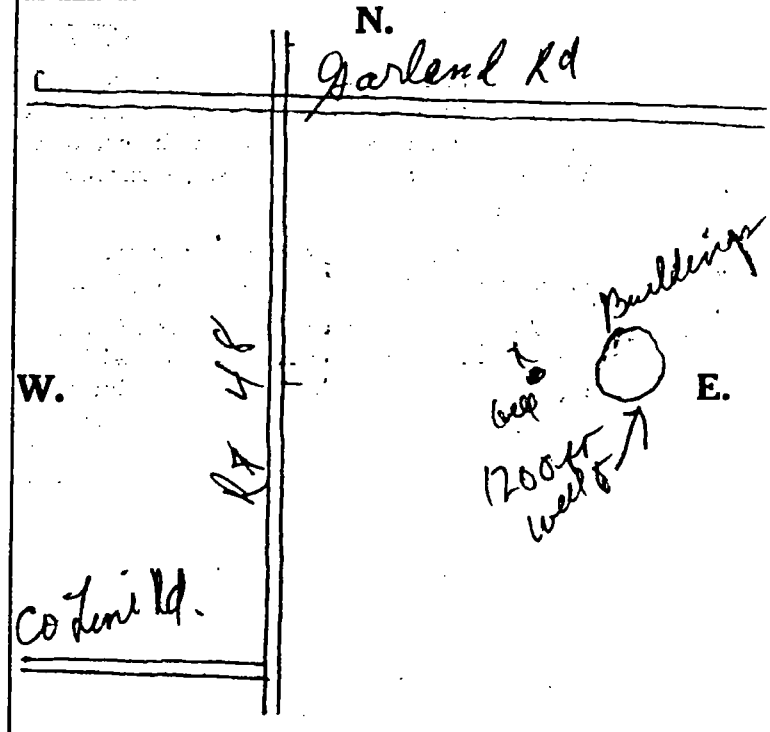
## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 6 Ft. |
| Yellow clay | 6 | 15 |
| ~~Gran~~ Sand / Gravel | 15 | 26½ |
| Fine & medium gravel | | |
| 5 GPM at 18½ | | |
| 10 GPM at 24½ | | |
| Test Pumped 40 GPM at 26½ | | |

Well #1

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL
WELL DRILLING—PUMPS
Address LAURA, O. RR. #1-MARKLEY RD.-PH.

Date Aug 21, 1963

Signed Lorin C. Snell

488

# WELL LOG AND DRILLING REPORT

ORIGINAL

38

NO CARBON PAPER NECESSARY - SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

496325

Permit # 103

COUNTY Miami TOWNSHIP Union SECTION OF TOWNSHIP OR LOT NUMBER

OWNER Ray Fogle, (836-5832) ADDRESS 401 Beechgrove Ave, Englewood, O.

LOCATION OF PROPERTY Intersection Karns Rd and Frederick-Garland Rd

## CONSTRUCTION DETAILS

Casing diameter 5 5/8Galv & drive shoe Length of casing 88 ft

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 20 GPM gpm Duration of test 1 hr

Drawdown to 60 ft ft Date May 3, 1977

Static level (depth to water) 40 f

Quality (clear, cloudy, taste, odor) _____

Pump installed by _____

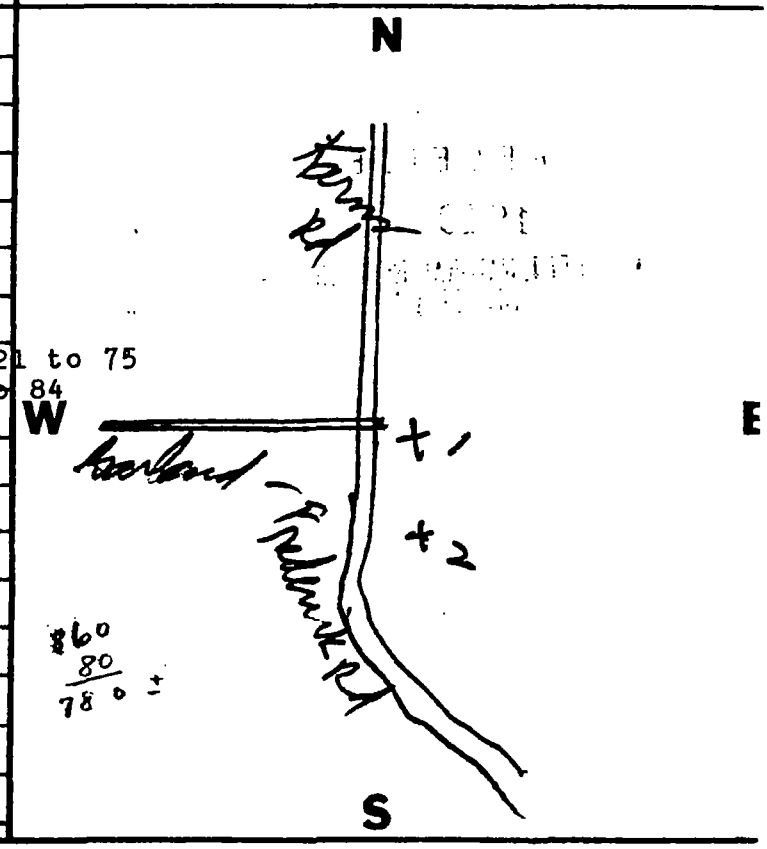
## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| ELL #1: Dirt | 0 ft | 3 ft |
| Yellow Clay | 3 | 15 |
| Brown Hardpan | 15 | 65 |
| Gravelly blue clay | 65 | 70 |
| Grey clay & rock | 70 | 79 |
| Hard blue shale rock | 79 | 100 |
| (DRY HOLE PULLED CASING) | | |
| WELL # 2: Dirt | 0 | 3 |
| Yellow clay | 3 | 21 |
| Silt, sand & water | at 21 ft | |
| Brown Hardpan (sandy & Gravelly | at 21 | to 75 |
| Very Sandy & Gravelly Hardpan | 75 | to 84 |
| Sand & Gravel | 84 | 88 |
| (hardpan below this) | | |

RECEIVED
MAY 05 1977
HEALTH DEPARTMENT
TROY, OHIO

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM Lorin C. Snell Well Drilling & Pump DATE

ADDRESS 9313 Markley Rd Laura, Ohio 45337 Phone 698-4288 SIGNED

*If additional space is needed to complete well log, use next consecutive numbered form

# WELL LOG AND DRILLING REPORT

ORIGINA

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

№ 139347

County Miami Township Union Section of Township or Lot Number ~~36~~ 35E

Owner Harold Brubaker Address RR1 W. Milton O.

Location of property 2nd hse S of Neal Pearson Rd. on Frederick Rd.

## CONSTRUCTION DETAILS

Casing diameter 5 7/8 Length of casing 27 Plum end down.

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

## PUMPING TEST

Pumping rate 42 G.P.M. Duration of test hr

Drawdown to 4 ft. Date 5-24-57

Developed capacity 2500-3000 GPH

Static level—depth to water 1 ft

Pump installed by

## WELL LOG

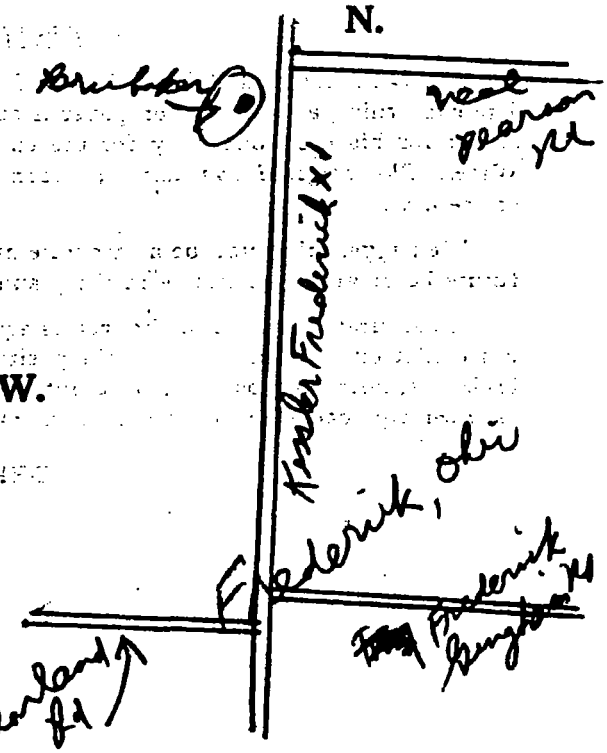
| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 3 Ft. |
| Clay | 3 | 8 |
| Soft Crumbly Limestone | 8 | 12 |
| Soft Limestone | 12 | 19 |
| Soft Blue Rock | 19 | 32 |
| Vein of water at 21-22 32 ft had sand in it. | | |

Well drilled during a very rainy week.

Casing driven as deep as possible of as tight as possible then grouted with fine Limestone. Cleared up very fast.

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Lowell C Snell Date 5-24-57

Address Laura Ohio RR1 Signed Lowell C Snell

ORIGINAL

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1500 Dublin Road
Columbus, Ohio

No. 200611

(35)

County Miami Township Union Section of Township 26 B

Owner Walter (Jack) Null Address W. Milton Ohio RR 1

Location of property 1 mi. S. of Veal Pearson Rd on Frederick Rd

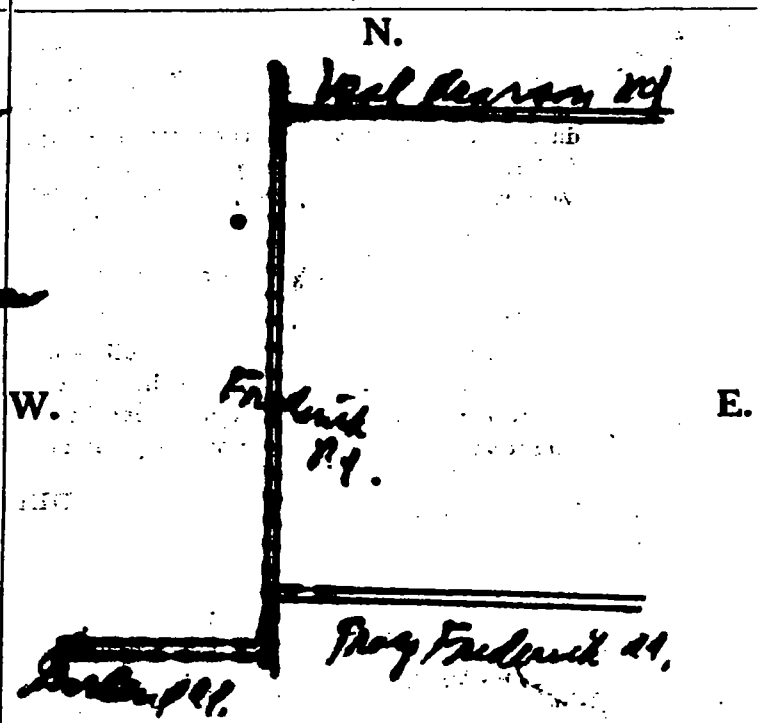
| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter 5 Length of casing 32 | Pumping rate ..... G.P.M. Duration of test ..... hrs. |
| Type of screen ..... Length of screen ..... | Drawdown ..... ft. Date 10-9-57 |
| Type of pump ..... | Developed capacity 4 GPM. |
| Capacity of pump ..... | Static level—depth to water 10 ft. |
| Depth of pump setting ..... | Pump installed by ..... |
| Date of completion ..... | |

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| | 0 Feet | 3 Ft. |
| Dirt | 3 | 15 |
| Clay | 15 | 35 |
| Gravelly Hayden | 35 | 37 |
| Blue Clay | | |
| Hard Very Thin Layer Sand or gravel at 27 ft | | |
| drilled on down the rocks hard | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm [redacted] Schell Date 10-9-57

Address Tarora Ohio RR Signed Tom Schell

ORIGINAL

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1500 Dublin Road
Columbus, Ohio

No. 200610

County Miami Township Union Section of Township 26 E (35)

Owner R L Pettman Address V. Milton Ohio RR 1

Location of property 1 Mi. S of Wed. Pearson Rd on Frederick Rd

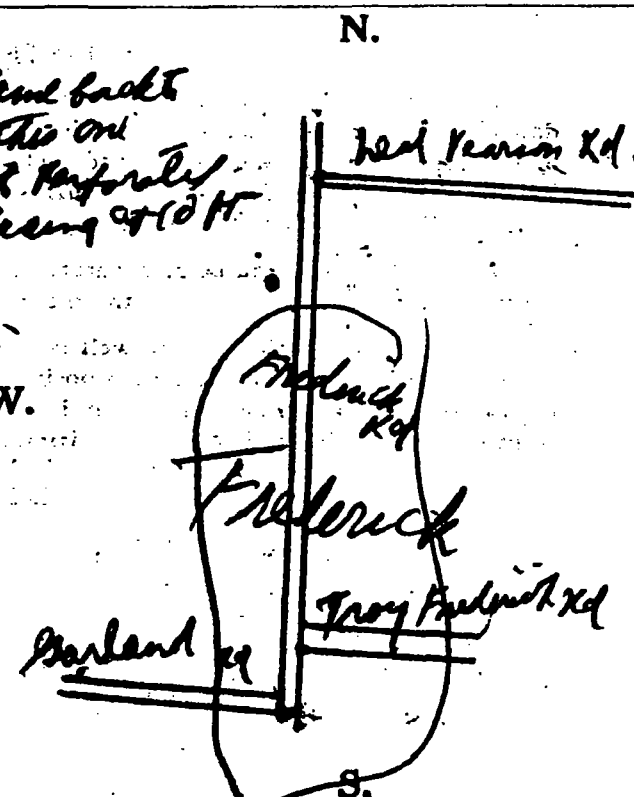
| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter 5/8 Pipe Length of casing 24 ft | Pumping rate ..... G.P.M. Duration of test ..... hrs |
| Type of screen ..... Length of screen ..... | Drawdown ..... ft. Date 10-5-57 |
| Type of pump ..... | Developed capacity 2½ GPM |
| Capacity of pump ..... | Static level—depth to water ..... ft |
| Depth of pump setting ..... | Pump installed by ..... |
| Date of completion ..... | |

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt #1 | 0 Feet | 3 Ft. |
| clay | 3 | 11 |
| gravel & clay | 11 | 39 |
| Blue clay | 39 | 57 |
| 2½ GPM at 10 ft. | | |
| Cased back this one & perforated casing at 10 ft | | |
| #2 Dry Hole Killed Casing | | |
| Dirt | 0 | 3 |
| clay & Gravel mixed | 3 | 33 |
| Blue Clay & blue Rock | 33 | 63 |
| #3 | 0 | 3 |
| Dirt | 3 | 33 |
| clay & Gravel mix | | |
| Dry Hole Killed Casing | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm [redacted] Snell

Address Laura Ohio RR

Date 10-5-57

Signed Loren C Snell

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

472086

Permit # 358

COUNTY Miami TOWNSHIP Monroe (Union) SECTION OF TOWNSHIP OR LOT NUMBER South - West

OWNER Harvey Lee Griffeth ADDRESS 7500 S. Kessler-Frederick Rd. Tipp

LOCATION OF PROPERTY 7500 S. Kessler-Frederick Rd. Tipp City, O

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 26

Type of screen PVC Length of screen 200'

Type of pump 1/2 Hp Sub.

Capacity of pump 300 gph

Depth of pump setting 190'

Date of completion 11-5-74

## BAILING OR PUMPING TEST (specify one by circling)

Test rate 3 gpm Duration of test 8 hrs

Drawdown 200 ft Date 11-5-74

Static level (depth to water) 70 ft

Quality (clear, cloudy, taste, odor) Clear

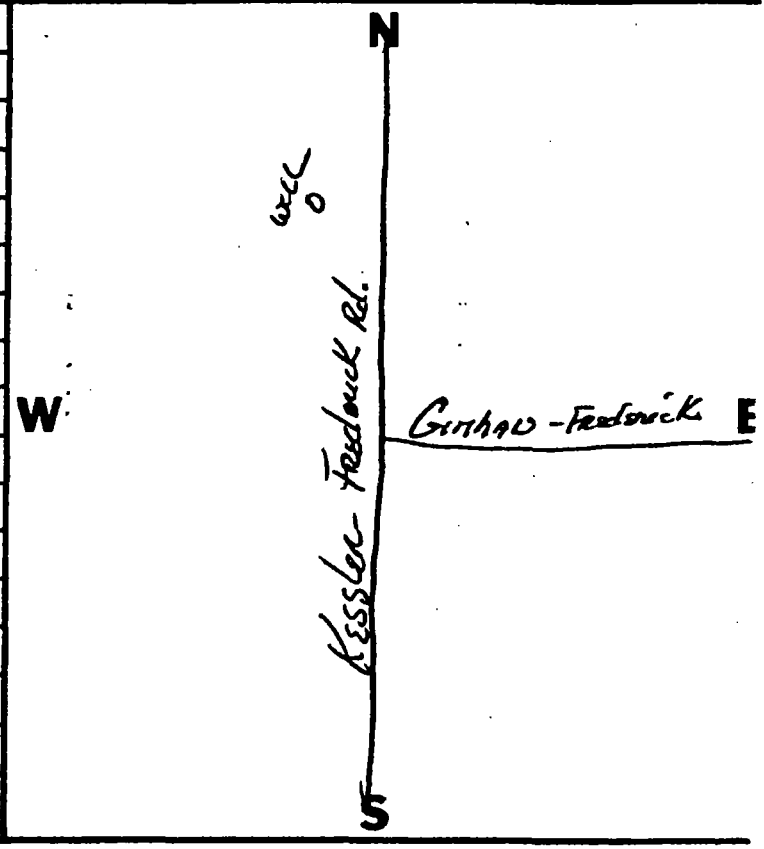
Pump installed by Ray Heckman

## WELL LOG

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 5 ft |
| Limestone | 5 | 80 |
| Blue Shale | 80 | 210 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




RECEIVED
DEC 16 1974
HEALTH DEPARTMENT
TROY, OHIO

DRILLING FIRM Heckman Well Drilling DATE 11-5-74

ADDRESS 920 E. Evanston Tipp City, O SIGNED Ray Heckman

X=1,502,300
Y= 706,000S

# WELL LOG AND DRILLING REPORT

ORIGINA

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

Nº 8335

County Miami Township Union Section of Township or Lot Number ~~36~~ 35

Owner Leslie Barbley Address Waverly Ohio

Location of property 2nd house S of Marland Mor Frederick Rd

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 galv Length of casing 10 ft

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

## PUMPING TEST

Pumping rate 7 G.P.M. Duration of test hr

Drawdown 106 ft. Date Nov 24 1953

Developed capacity 1 GPM

Static level—depth to water 32 ft

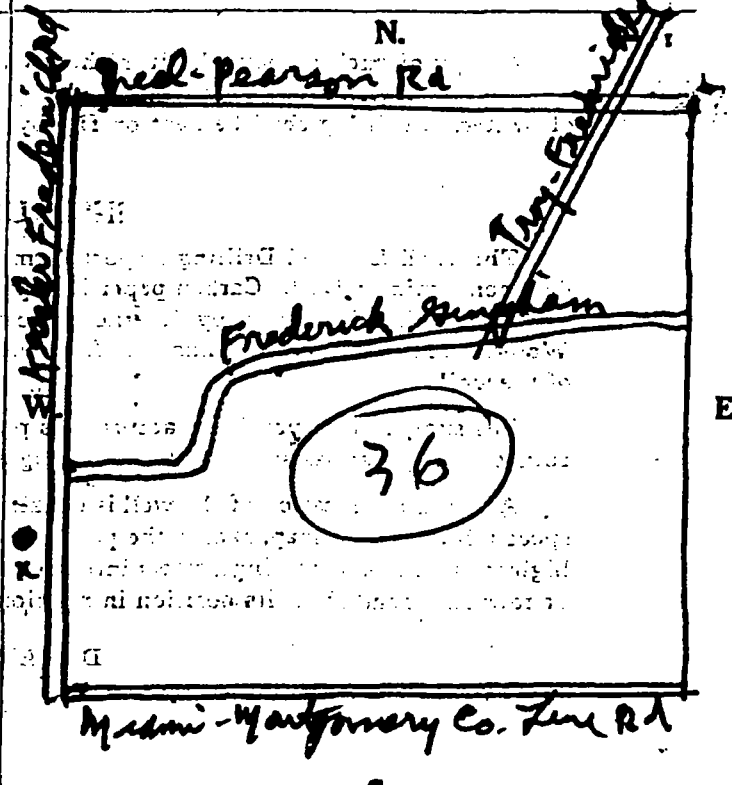
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 4 Ft. |
| Limestone | 4 | 13 |
| White Rock | 13 | 41 |
| Hard Blue Rock | 41 | 68 |
| Soft Blue Rock | 68 | 99 |
| Hard Blue Rock | 99 | 106 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm J C Tucker Date 11-24-53

Address Troy Ohio RR1 Signed John C Tucker

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

489747

COUNTY MONTGOMERY TOWNSHIP BUTLER SECTION OF TOWNSHIP OR LOT NUMBER

OWNER Mr. James E. Cannon ADDRESS 10330 Kley Road - Vandalia, 4537

LOCATION OF PROPERTY CORNER KLEY ROAD AND ANTIOCH SCHOOL ROAD

## CONSTRUCTION DETAILS

Casing diameter 6 Length of casing 26

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump NOT SET AS YET

Depth of pump setting _____

Date of completion JUNE 3, 1978

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 15 gpm Duration of test _____ hrs

Drawdown 40 ft Date JUNE 3, 1978

Static level (depth to water) 17 ft

Quality (clear, cloudy, taste, odor) CLEAR

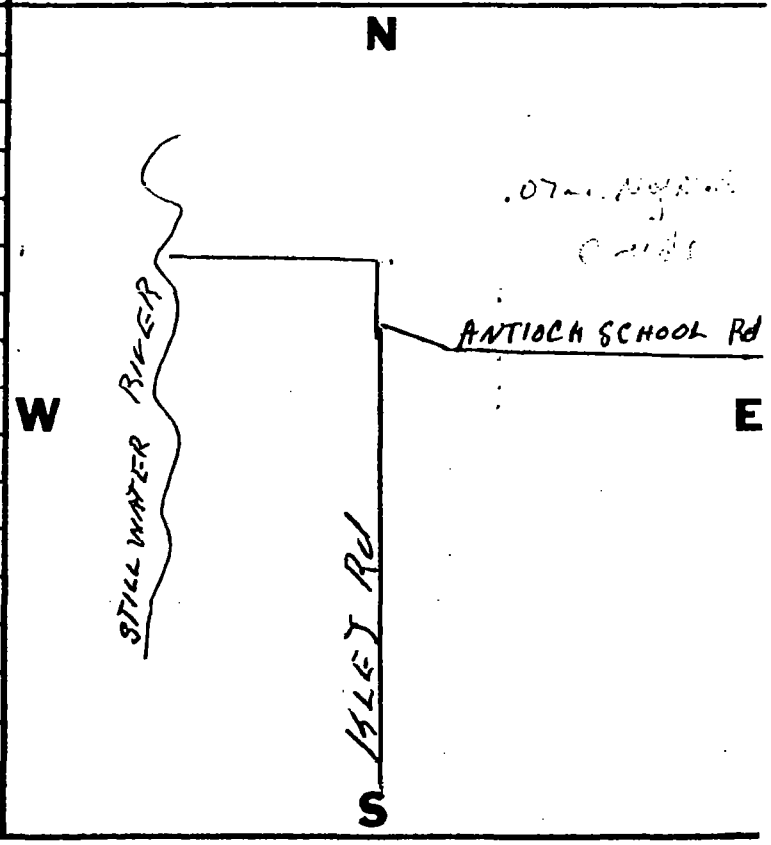
Pump installed by NOT INSTALLED YET

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| TOP SOIL | 0 ft | 3 ft |
| BROKEN LIME | 3 | 9 |
| WHITE LIMESTONE | 9 | 31 |
| LIME AND BLUE SHALE | 31 | 61 |
| BLUE SHALE - BEDROCK | 61 | 100 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM W.U. SCOTT COMPANY DATE JUNE 6, 1978

ADDRESS 11534 Peters Pike SIGNED W.U. Scott

Tipp City, Ohio 45371

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 421874

County Mont Township Butler Section of Township

Owner Lloyd F Viars Address 839 Martindale Rd.

Location of property 1/4 Mile West of Fredrick Pike on the north side of Martindale Rd.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 23

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 8 G.P.M. Duration of test 1 hrs.

Drawdown 30 ft. Date 10-6-71

Static level-depth to water 30 ft.

Quality (clear, cloudy, taste, odor) Clear

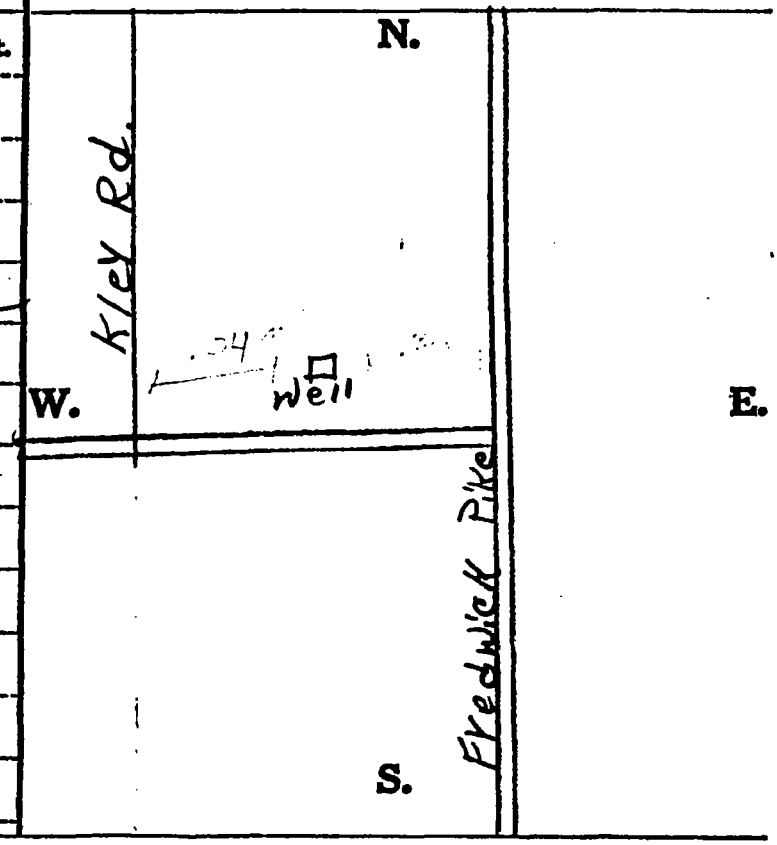
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 4 Ft. |
| Limestone | 4 | 24 |
| Shale | 24 | 30 |
| Limerock | 30 | 37 |
| Shale | 37 | 72 |
| 1299 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm Hell & Jenkins Date 10-6-71

Address 4449 Derwent Dr Signed Homer Hall

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

№ 374379

County Montgomery Township Butler Section of Township

Owner Mr. Harold Eakes Address 4475 Oren St.

Location of property ½ mile west of Frederick Rd on Martindale Rd.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 30

Type of screen Length of screen

Type of pump submergible

Capacity of pump 7 G.P.M.

Depth of pump setting 70 ft.

Date of completion 7/14/69

## BAILING OR PUMPING TEST

Pumping Rate 10 G.P.M. Duration of test hrs.

Drawdown 12 ft. Date 7/14/69

Static level-depth to water 21 ft.

Quality (clear, cloudy, taste, odor) clear

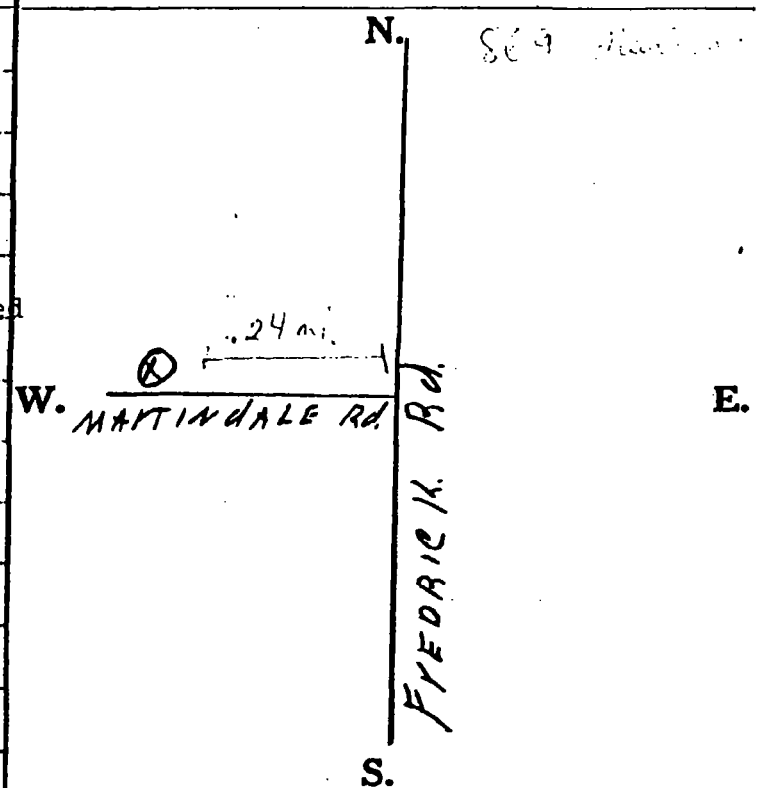
Pump installed by Scott Well & Pump Co.

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| clay | 0 Feet | 5 Ft. |
| limestone | 5 | 72 |
| blue shale & bedrock | 72 | 80 |
| | | |
| Reamed 8" to 30 ft. cased and cemented | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Scott Well & Pump Co. Date 7/14/69

Address 5959 Brantford Rd. Signed

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 415032

County Montgomery Township Butler Section of Township

Owner Mr. Ken Prior Address 1948 Ontario St. Dayton

Location of property ½ mile west of Fredrick Rd. on Martindale

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 30 ft

Type of screen Length of screen

Type of pump submergible

Capacity of pump 5 G.P.M.

Depth of pump setting 65 ft

Date of completion 8-7-71

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 12 G.P.M. Duration of test 4 hrs.

Drawdown 17 ft. Date 8-7-71

Static level-depth to water 21 ft.

Quality (clear, cloudy, taste, odor) clear

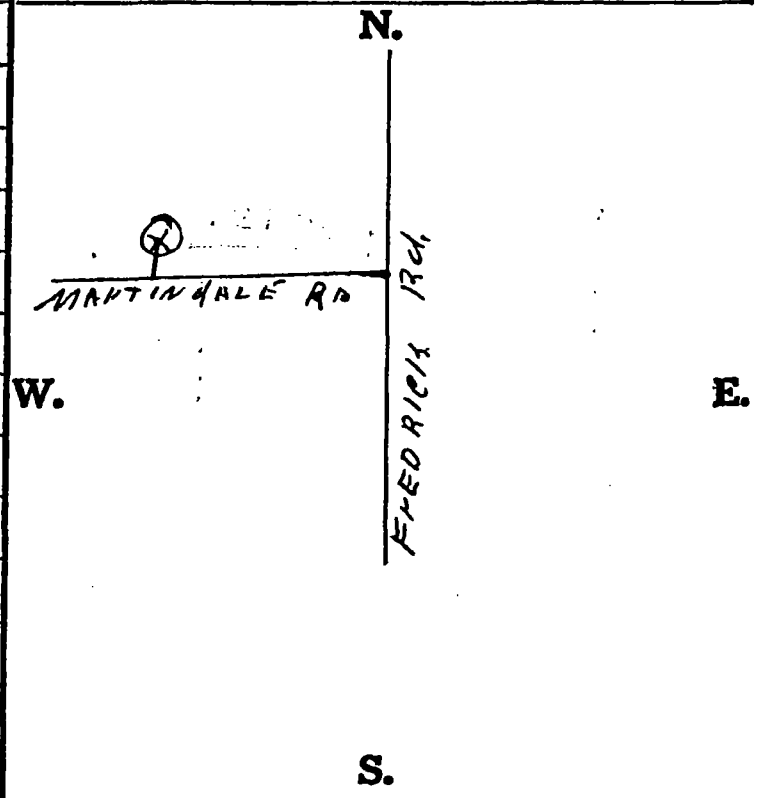
Pump installed by Scott Well & Pump Co.

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| top soil | 0 Feet | 3 Ft. |
| clay | 3 | 9 |
| limestone | 9 | 70 |
| blueshale | 70 | 75 |
| well reamed 8" to 30 ft. and cemented | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm Sobtt Well & Pump Co. Date 8-7-71

Address 5859 Brantford Rd. Signed

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

№ 341013

County Montgomery Township Butler Section of Township 11 Lot F

Owner Eugene Brandenburg Address 5467 Mengell Dr. Dayton, O.

Location of property 1½ mile south of Fairick on Fredrick Rd.

## CONSTRUCTION DETAILS

Casing diameter 6" OD Length of casing 19 ft.

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST

Pumping Rate 8 G.P.M. Duration of test 1 hrs.

Drawdown 59 ft. Date 6/24/66

Static level-depth to water 21 ft.

Quality (clear, cloudy, taste, odor) Clear

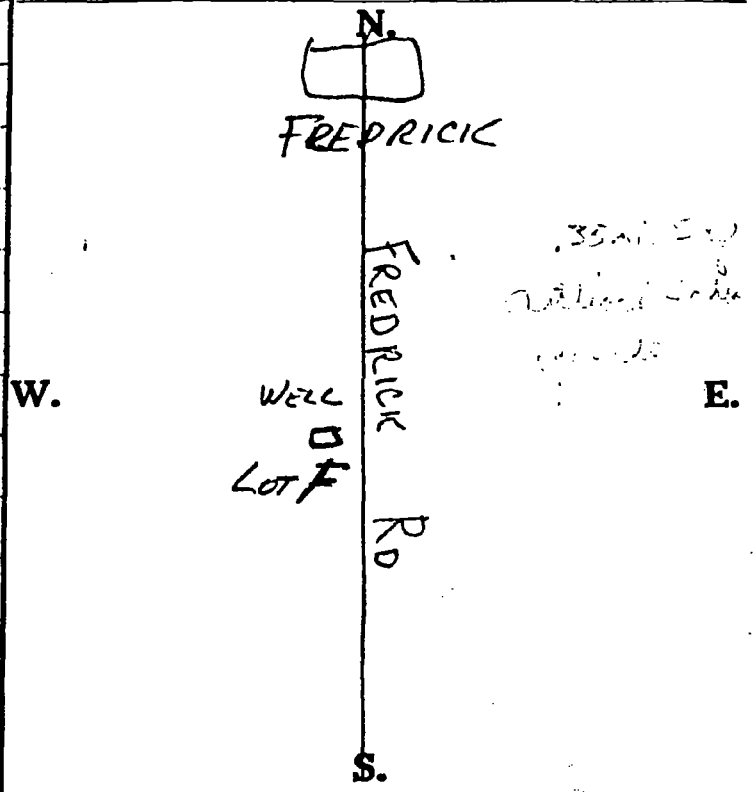
Pump installed by _____

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| topsoil & Clay | 0 Feet | 10 Ft. |
| Limestone | 10 | 87 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Brenner Well Drilling Date 6/24/66

Address 5001 Webster St. Dayton 14, Ohio Signed George C. Thompson Driller

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

451280

County Montgomery Township Butler Section of Township 11

Owner Butler Township fire Dept. Address Frederick Pike.

Location of property Frederick Pike & Wilmington Mantinsdale Vandalia O.

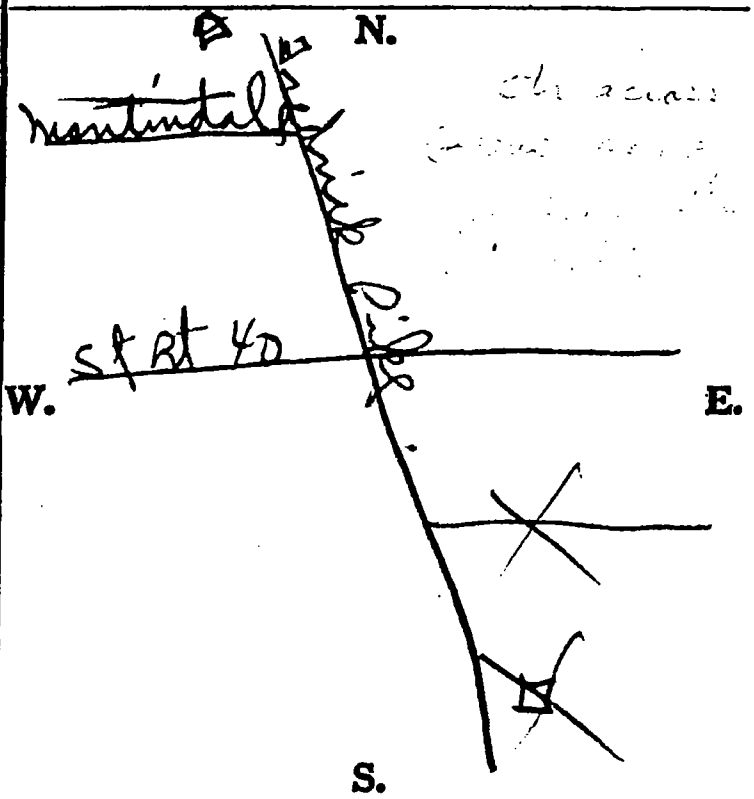
| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST (Specify one by circling) |
|---|---|
| Casing diameter 5 5/8 Length of casing 36 | Test Rate 17 G.P.M. Duration of test 1 hrs. |
| Type of screen Length of screen | Drawdown 10 ft. Date April 1973 |
| Type of pump | Static level-depth to water 30 ft. |
| Capacity of pump | Quality (clear, cloudy, taste, odor) |
| Depth of pump setting | |
| Date of completion | Pump installed by |

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 10 Ft. |
| Sandstone | 10 | 110 |
| Shale | 110 | 115 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm CLAY P. GARRISON WELL CONTRACTOR Date April 1973

Address 3901 S. DIXIE DRIVE DAYTON, OHIO 45439 Signed Clay P. Garrison

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone ~~(614) 469-2646~~
Columbus, Ohio 43215

447058 562

County Montgomery Township ~~Harrison~~ Butler Section ~~of Township~~ 11

Owner E. A. Wolfe Address 7260 - M Dixie Dayton, O.

Location of property 2 Miles North of RT 40 on Fredrick Rd

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 25 ft

Type of screen None Length of screen —

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST (specify one by circling)

Test Rate 11 G.P.M. Duration of test 1 hrs

Drawdown 20 ft. Date 4/29/73

Static level-depth to water 10 ft.

Quality (clear, cloudy, taste, odor) Clear

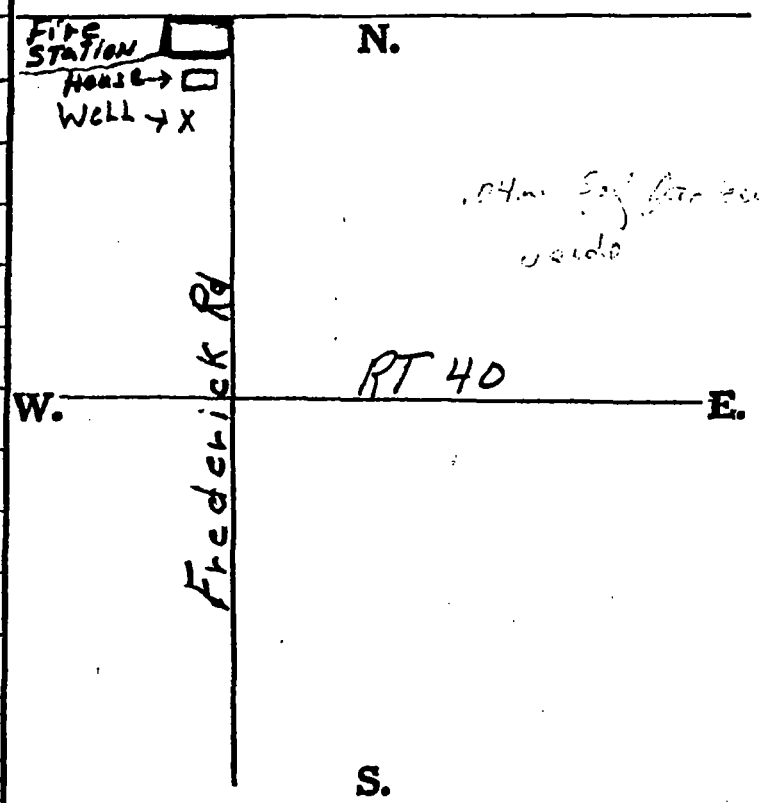
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 3 Ft. |
| Limestone | 3 | 70 |
| Water at 45 ft | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm Triple A Well Drilling Date 4/29/73

Address 10660 Putnam Rd Union, Ohio Signed Gene Rinney

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINA

625

# WELL LOG AND DRILLING REPORT

State of Ohio
OHIO WATER RESOURCES BOARD
Department of Public Works
553 E. Broad St., Columbus 15, Ohio

№ 46517

County Montgomery Township Butler Section of Township or Lot Number 11

Owner Robert Hall Address 10475 Frederick Rd,

Location of property 1 9/10 miles from Rt 40 + Frederick Rd north

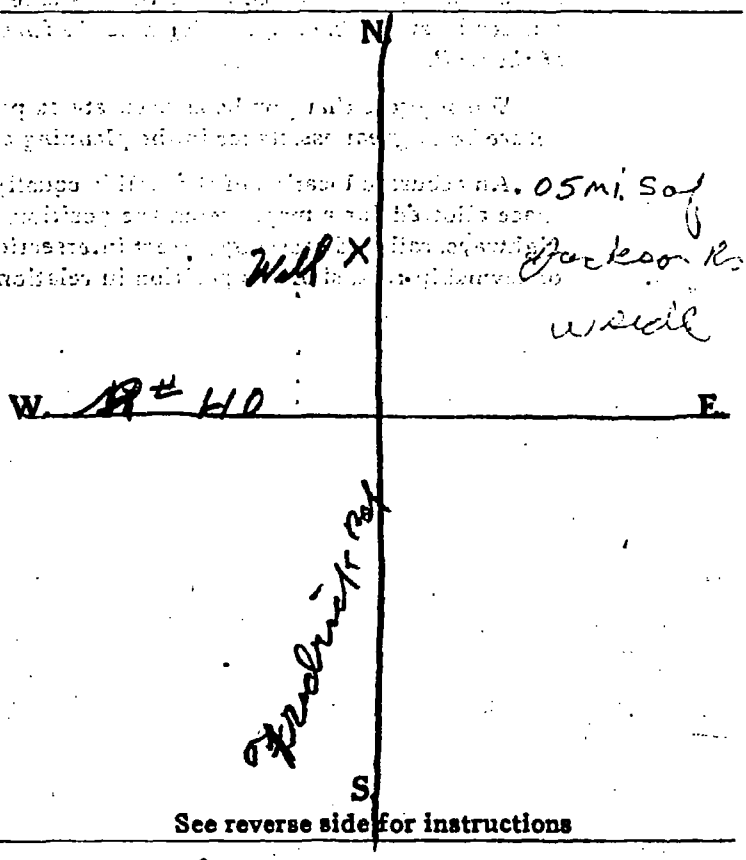
| CONSTRUCTION DETAILS | PUMPING TEST Bailer test |
|---|---|
| Casing diameter 5 5/8 Length of casing 18 | Pumping rate 18 G.P.M. Duration of test 10 hrs. |
| Type of screen Length of screen | Drawdown 30 ft. Date |
| Type of pump | Developed capacity |
| Capacity of pump | Static level of completed well 4 ft. |
| Depth of pump setting | Pump installed by |

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 6 Ft. |
| Limestone Gray | 6 | 44 |
| Clay yellow | 44 | 57 |
| Shale Blue | 57 | 60 |
| Water 3.5 + 57.1 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Cecil D Conway Date Jan 30 - 1959

Address Rt 1 Clayton O Signed Cecil D Conway

1666

71

X = 1,502,400
(5000 X 5000)

Y = 694,200-S

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

ORIG. NA

№ 82215

County Montgomery Township Butler Section of Township or Lot Number \\

Owner R. A. Seitz Address RR Vandalia

Location of property Fredrick Rd. 1½ mile N of St. Rt 40
200 ft N. of Martindale Rd.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 17 ft.

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

## PUMPING TEST

Pumping rate 8 G.P.M. Duration of test 1 hr.

Drawdown 10 ft. Date 7-25-53

Developed capacity

Static level—depth to water 28 ft.

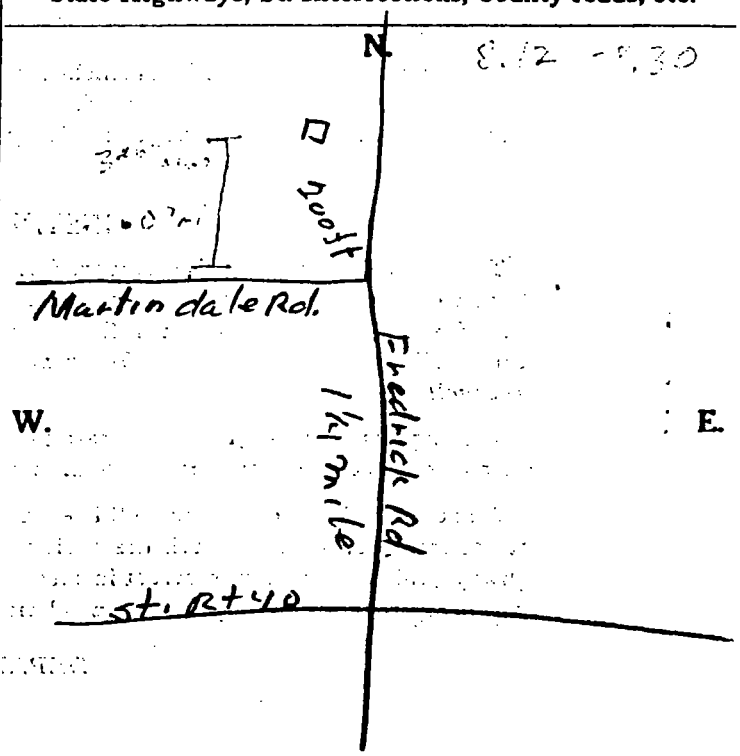
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 8 Ft. |
| Limestone | 8 | 52 |
| Shale | 52 | 64 |
| water at 42 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm H. L. Stolz & Son Date 8-2-53

Address RR 1 Clayton Signed R. Stolz

7

X = 1,502,400 (5000 x 5000)

Y = 694,200 - S

# WELL LOG AND DRILLING REPORT

ORIGINA

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

№ 82213

County Montgomery Township Butler Section of Township or Lot Number

Owner R. L. Fisher Address RR1 Clayton

Location of property Fredrick Rd. 1 mile N. of State Rt 40 350 ft S. of Martindale Rd.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 18 ft

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

## PUMPING TEST

Pumping rate 8 G.P.M. Duration of test 2 hrs

Drawdown 10 ft. Date 7-10-53

Developed capacity

Static level—depth to water 30 ft

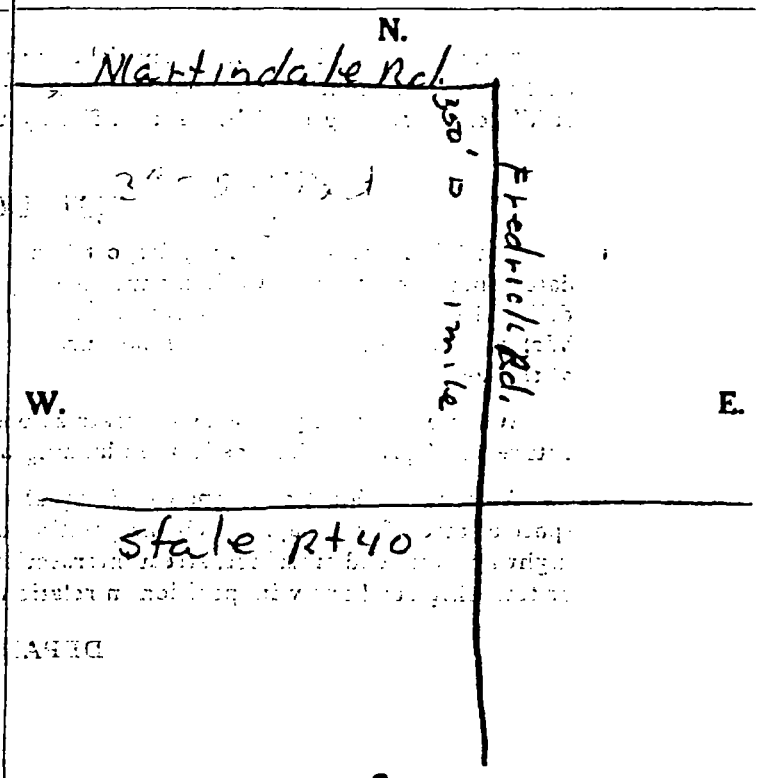
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 9 Ft. |
| Limestone | 9 | 58 |
| Shale | 58 | 60 |
| water at 48 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm H. L. Stilt & Son Date 7-10-53

Address RR1 Clayton Signed R. Stilt

1705

78

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

502198

COUNTY Montgomery TOWNSHIP Butler SECTION OF TOWNSHIP North West

OWNER Contemporary Builders Inc ADDRESS 7476 S. Kimmel Clayton O

LOCATION OF PROPERTY 705 Martindale Rd. Vandalia, Ohio

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 26'

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting 100'

Date of completion 9-3-77

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 8 gpm Duration of test 1 hrs

Drawdown 80 ft Date 9-3-77

Static level (depth to water) 15 ft

Quality (clear, cloudy, taste, odor) Clear - Slight Sulphur odor

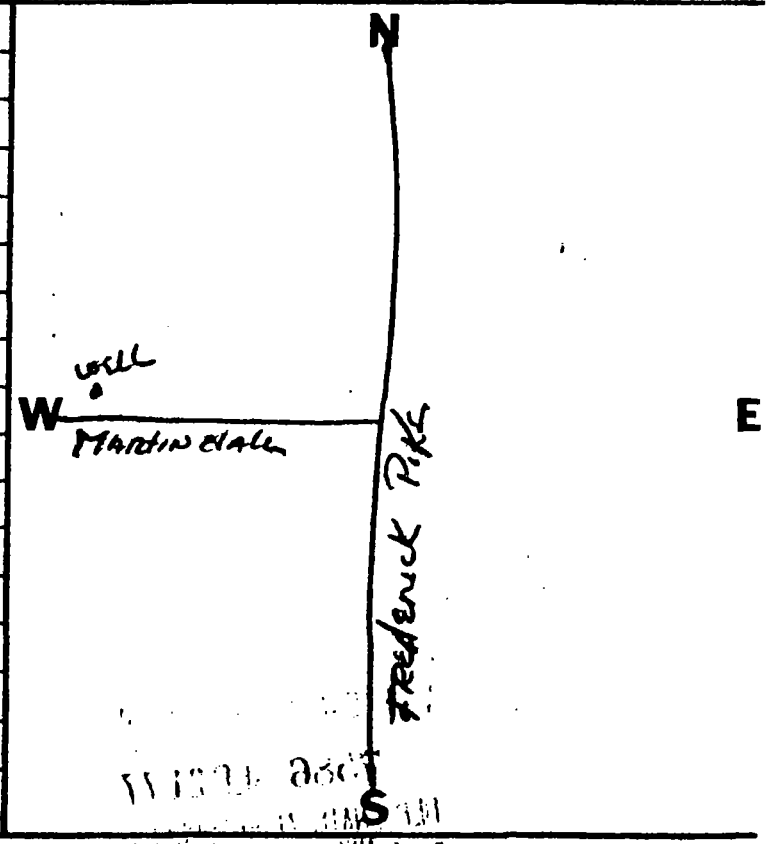
Pump installed by _____

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 3 ft |
| Limestone | 3 | 40 |
| Blue shale | 40 | 122 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




5237
DRILLING FIRM Glaser Water Serv. DATE 9-3-77

ADDRESS 6960 Curtwood Tipp City SIGNED Harold E. Glaser

*If additional space is needed to complete well log, use next consecutive numbered form.

HARKER

# WELL LOG AND DRILLING REPORT

ORIGINAL

31 J

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

471163

COUNTY Montgomery TOWNSHIP Butler SECTION OF TOWNSHIP OR LOT NUMBER 11

OWNER Dr. Lawerence B. Harker ADDRESS 10925 Kley Rd. Vandalia, OH

LOCATION OF PROPERTY ½ mile north of Martindale Rd. on Kley

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 30 ft.

Type of screen _____ Length of screen _____

Type of pump submergible

Capacity of pump 420 G.P.M.

Depth of pump setting 84 ft.

Date of completion 9-20-73

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 12 gpm Duration of test 8 hrs

Drawdown 22 ft Date 9-20-73

Static level (depth to water) 26 ft

Quality (clear, cloudy, taste, odor) clear

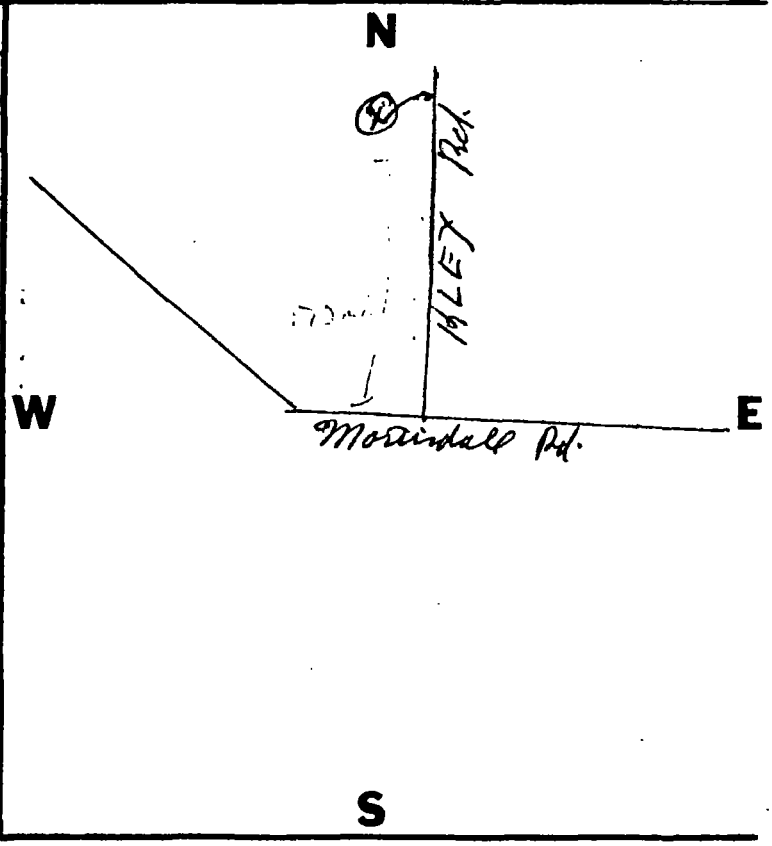
Pump installed by Scott Well & Pump Co.

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| clay | 0 ft | 4 ft |
| limestone | 4 | 76 |
| blue shale | 76 | 100 |
| | | |
| Well reamed 30 ft. | | |
| and 30 ft. of | | |
| caseing cemented in | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




55B

DRILLING FIRM Scott Well & Pump Co. DATE 9-20-73

ADDRESS 5859 Brantford Rd. SIGNED Opal Lee Scott

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

597726

COUNTY Mont TOWNSHIP Butler SECTION OF TOWNSHIP 11

OWNER Dr Larry Harker ADDRESS 10925 Kley Rd Vandalia

LOCATION OF PROPERTY ½ Mile n. Martindale Rd. on W/S Kley Rd

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 25

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 23 gpm Duration of test 3 hrs

Drawdown 20 ft Date 1-28-1982

Static level (depth to water) 18 ft

Quality (clear, cloudy, taste, odor) Clear

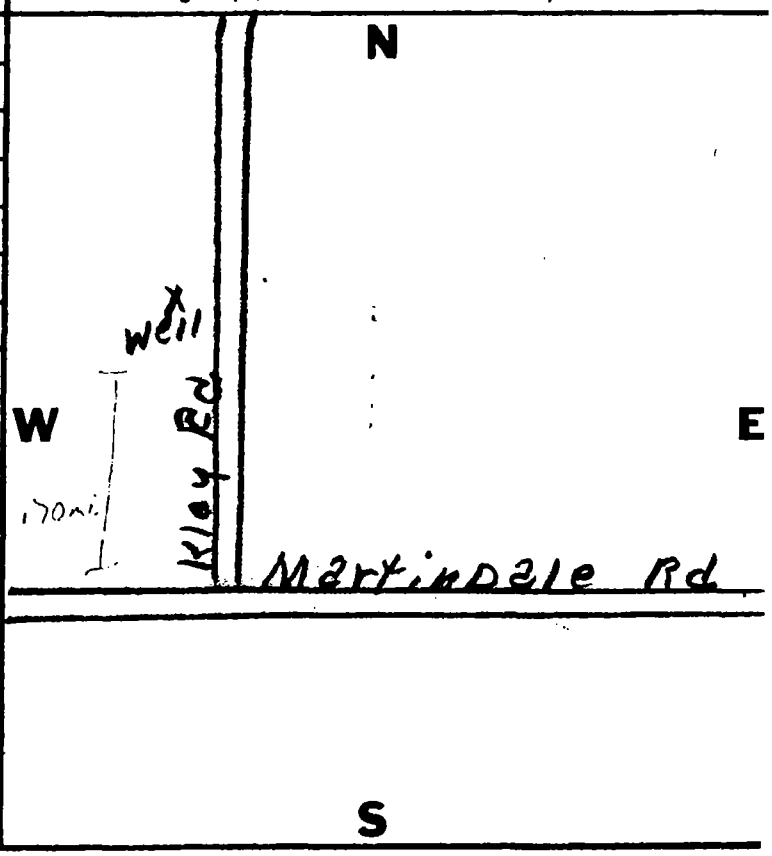
Pump installed by Plumer

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 3 ft |
| Limestone | 3 | 34 |
| Shale | 34 | 59 |
| For Geothermal Heating + Cooling Systems | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM Hall's Well Drilling DATE 1-28-1982

ADDRESS 3512 Charles Dr. SIGNED Homer Hall

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - ODNR DIVISION OF WATER, FOUNTAIN SQ., COLS., OHIO 43224

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

525227

COUNTY Montgomery TOWNSHIP Butler SECTION OF TOWNSHIP 11

OWNER Dr. Lawrence B. Harker ADDRESS 10925 Kley Road, Vandalia, Oh.

LOCATION OF PROPERTY ½ Mile North Of Martindale Road On Kley Road

## CONSTRUCTION DETAILS

Casing diameter 10" Gravel Pack Length of casing 60 Ft

Type of screen _____ Length of screen _____

Type of pump 1 H.P. Submergible

Capacity of pump 13 G.P.M.

Depth of pump setting 55 Ft

Date of completion June 22, 1979

## (BAILING) OR PUMPING TEST)
(specify one by circling)

Test rate 25 gpm Duration of test 1 + 2 hrs

Drawdown 42 ft Date June 22, 1979

Static level (depth to water) 18 ft

Quality (clear, cloudy, taste, odor) Clear

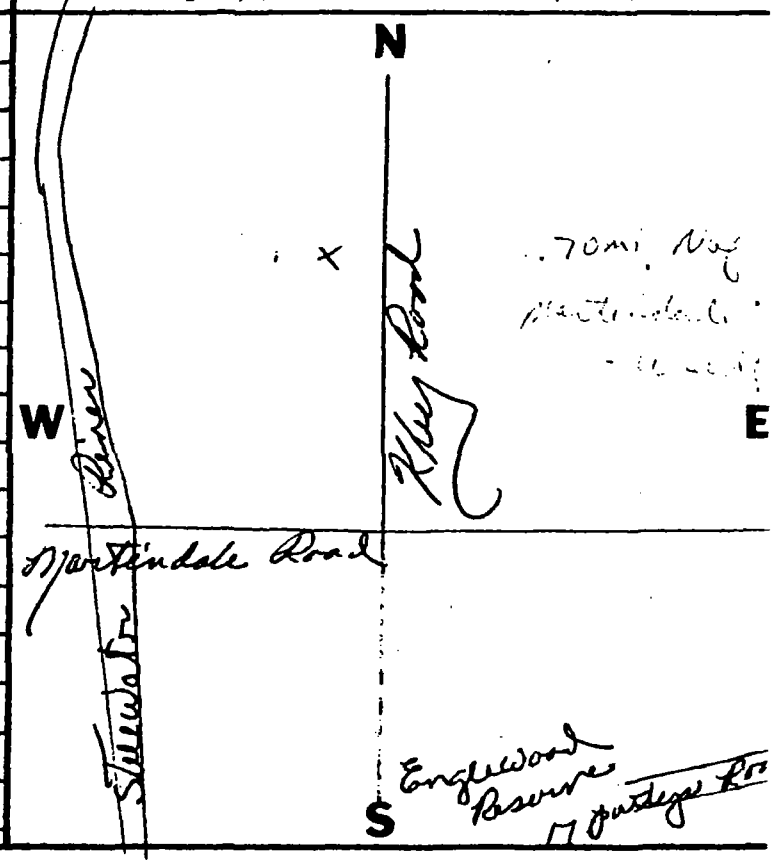
Pump installed by Scott Well Drilling Co

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Top Soil | 0 ft | 5 ft |
| Yellow Limestone | 5 | 8 |
| Blue Shale | 8 | 12 |
| White Limestone | 12 | 34 |
| Blue Shale | 34 | 35 |
| Pink Shale | 35 | 44 |
| Blue Shale | 44 | 60 |
| | | |
| 10" Gravel Pack | | |
| Well Reamed & Cemented | | |
| 25 Ft Depth | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




553

DRILLING FIRM Scott Well Drilling Co DATE June 26, 1979

ADDRESS 5859 Brantford Road, Dayton 45414 SIGNED Mr. C. Lee Scott

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

451832

County Montgomery Township Butler Section of Township

Owner Mr. M.L. Gallaway Address 409 Stuckhart Trotwood. OH

Location of property ½ mile north of Martindale Rd. on Kley

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 30 ft.

Type of screen Length of screen

Type of pump submergible

Capacity of pump 300 G.P.M.

Depth of pump setting 84 ft.

Date of completion 3-18-73

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 10 G.P.M. Duration of test hrs.

Drawdown 27 ft. Date 3-18-73

Static level-depth to water 40 ft.

Quality (clear, cloudy, taste, odor) clear

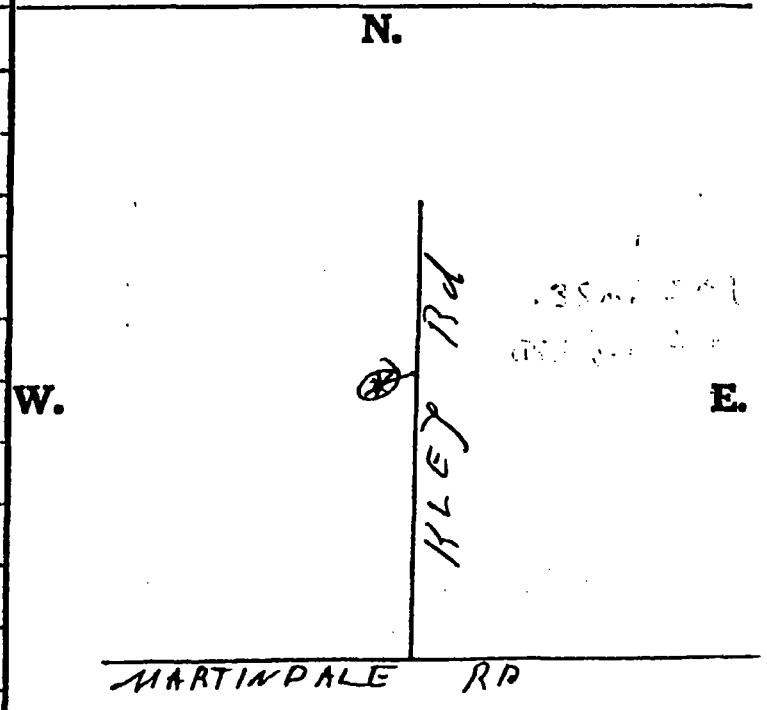
Pump installed by Scott Well & Pump Co.

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| | 0 Feet | Ft. |
| clay | | 6 |
| limestone | 6 | 74 |
| blue shale | 74 | 100 |
| | | |
| Well reamed to 30 ft. and | | |
| cemented | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| 1644 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm Scott Well & Pump Co. Date 3-18-73

Address 5859 Brantford Rd. Dayton. OH Signed M. L. Scott

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

517258
Permit # 72..

COUNTY Mont TOWNSHIP Butler SECTION OF TOWNSHIP 11

OWNER Richard Sykes ADDRESS Kley Rd.

LOCATION OF PROPERTY ½ Mile north of Martindale on the east side Kley Rd

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 27

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 10 gpm Duration of test 3 hrs

Drawdown 50 ft Date 8-24-77

Static level (depth to water) 18 ft

Quality (clear, cloudy, taste, odor) Clear

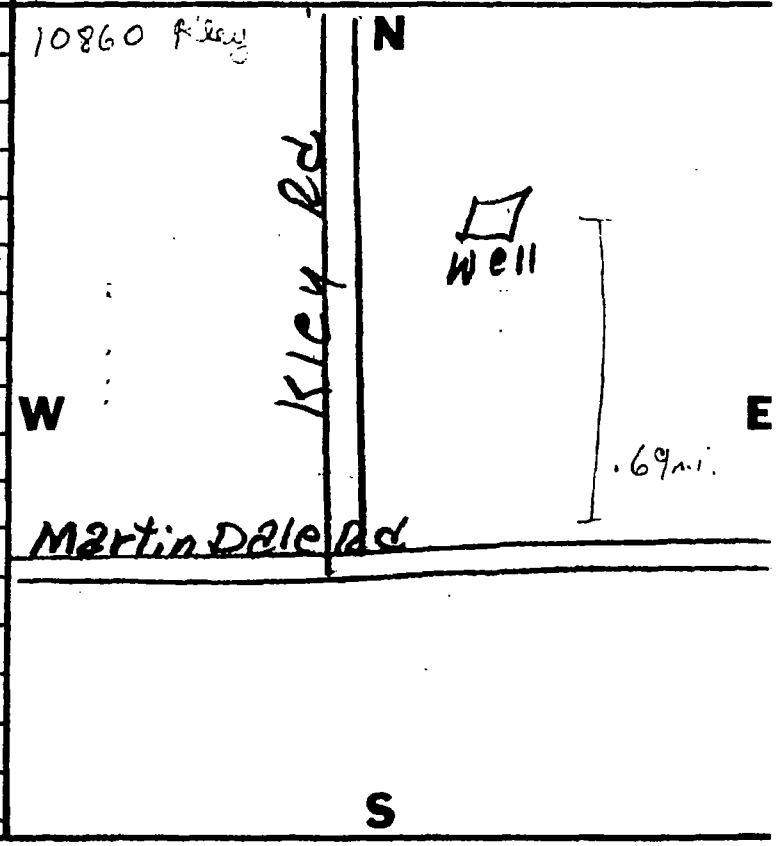
Pump installed by _____

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 10 ft |
| Limestone | 10 | 57 |
| Shale | 57 | 81 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




29

DRILLING FIRM Hall's Well Drilling DATE 8-24-1977

ADDRESS 4449 Derwent Dr. SIGNED Homer Hall

*If additional space is needed to complete well log, use next consecutive numbered form.

County Permit No. _____

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

ORIGINAL 31

536343

COUNTY MONTGOMERY TOWNSHIP BUTLER SECTION OF TOWNSHIP 11

OWNER MR. THOMAS BIHN ADDRESS 10585 KLEY ROAD - VANDALIA, OHIO

LOCATION OF PROPERTY 1000 FEET NORTH OF MARTINDALE ROAD ON KLEY ROAD

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 27

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump BY OTHERS

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 15 gpm Duration of test _____ hrs

Drawdown 17 ft Date MAY 1, 1980

Static level (depth to water) 42 ft

Quality (clear, cloudy, taste, odor) clear

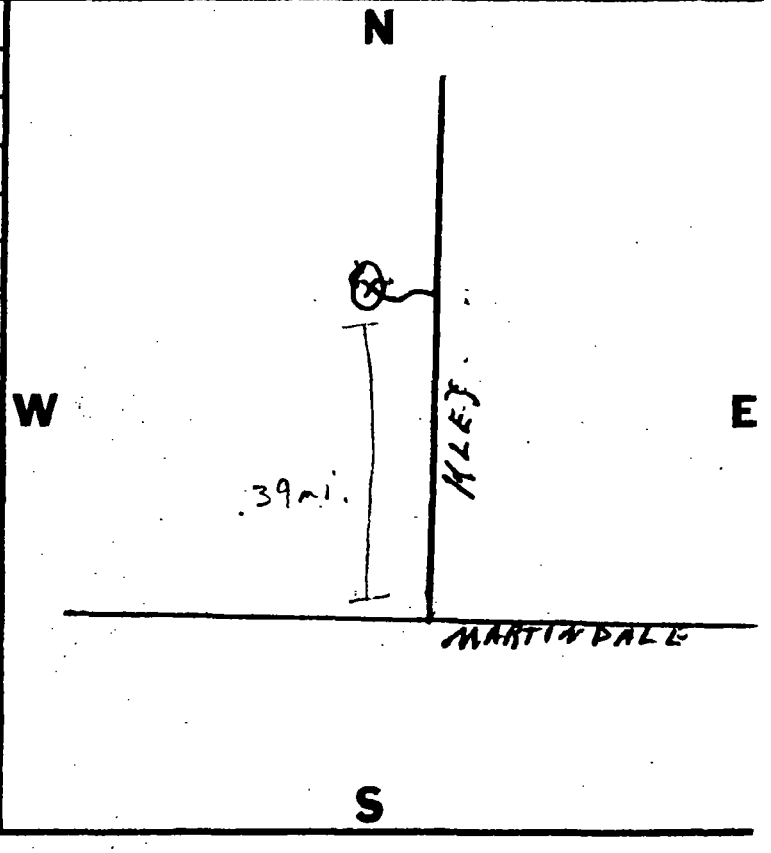
Pump installed by OTHERS

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| YELLOW CLAY | 0 ft | 5 ft |
| WHITE LIMESTONE | 5 | 67 |
| GREY LIMESTONE | 67 | 89 |
| BLUE SHALE & BEDROCK | 89 | 125 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




44

DRILLING FIRM W.U. SCOTT COMPANY DATE MAY 1, 1980

ADDRESS 11534 PETERS PIKE SIGNED W. U. Scott

TIPP CITY, OHIO 45371

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 420767

County Montgomery Township Butler Section of Township

Owner Reuben Jackson Address 10 495 Kley Rd Vandalia

Location of property 1040 Kley Rd. Vandalia, Ohio

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 27'

Type of screen Length of screen

Type of pump 1/3 H.P. Sub-pump.

Capacity of pump 1/3 H.P. Sub-pump 600 g

Depth of pump setting 80' 600 gal per hr

Date of completion 12-28-71

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 30 G.P.M. Duration of test 1 hrs.

Drawdown 60' ft. Date 12-28-71

Static level-depth to water 10' ft.

Quality (clear, cloudy, taste, odor) clear

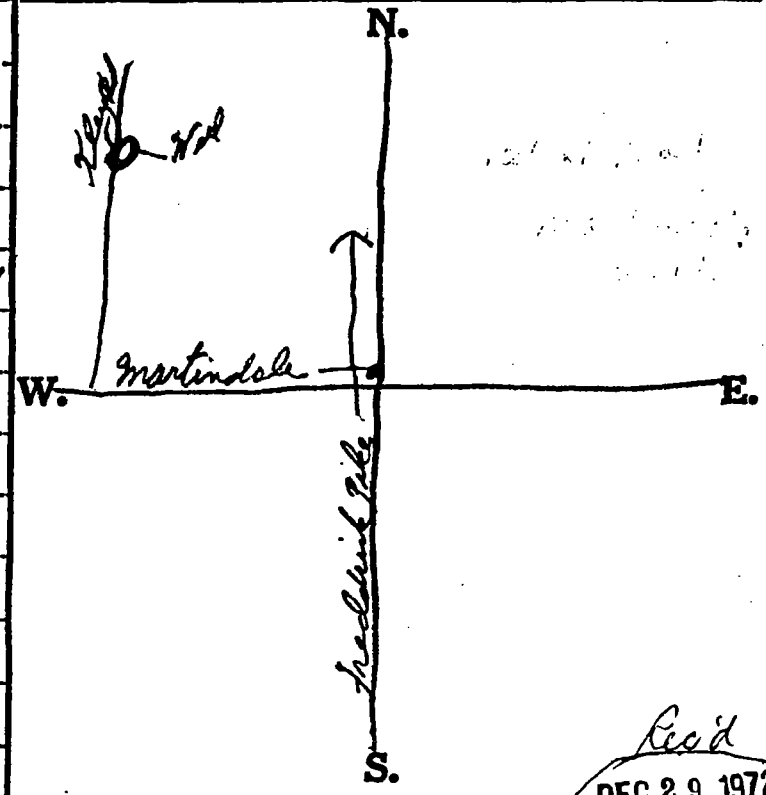
Pump installed by Ray Heckman

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 3' Ft. |
| Limestone | 3 | 40' |
| Blue Shale Rock | 40' | 70' |
| Limestone | 70' | 100' |
| Blue Shale | 120' | 130' |
| Main vein at 120' | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Rec'd DEC 29 1972

065 Drilling Firm Heckman Well Drilling Date 11-28-71

Address 920 East Evanston Rd. Signed Ray Heckman.
Tipp City, Ohio - ph. 667-6012

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 264392

County Montgomery Township Butler Section of Township N.W.

Owner Robert Grear Address RR#1 Vandalia

Location of property 3½ mile N-W of S.R.T. 440

## CONSTRUCTION DETAILS

Casing diameter 6" O.D. Length of casing 20 ft.

Type of screen ..... Length of screen .....

Type of pump .....

Capacity of pump .....

Depth of pump setting .....

Date of completion .....

## BAILING OR PUMPING TEST

Pumping rate 15 G.P.M. Duration of test ..... hrs.

Drawdown 10 ft. Date 9/5/63

Developed capacity 900 PH

Static level—depth to water 30 ft.

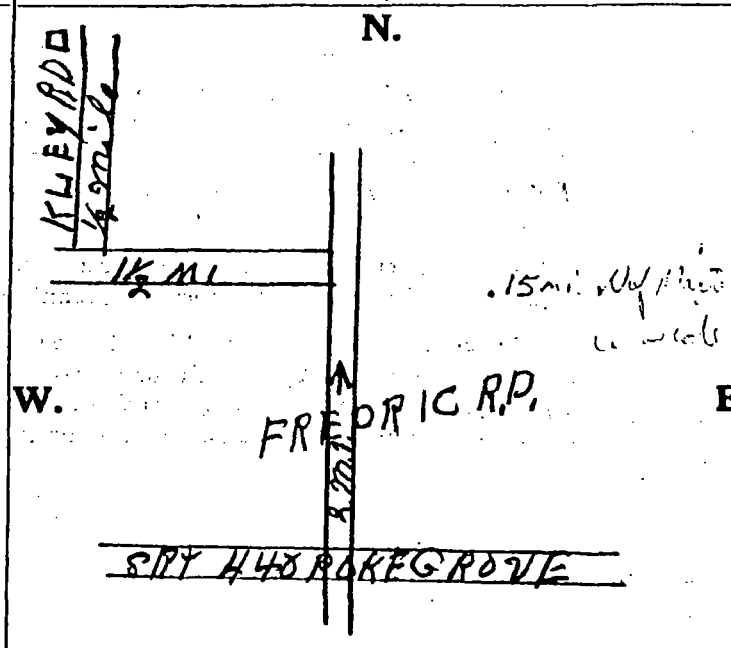
Pump installed by .....

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| CLAY | 0 Feet | 10 Ft. |
| REDROCK | 10 | 40 |
| WHITEROCK | 40 | 60 |
| BLUEROCK. | 60 | 79 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




S.

See reverse side for instructions

Drilling Firm Bremners Date 9/5/63

Address 6865 Troy St Signed L. Bremner

1094

17

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 419006

County Mont Township Butler Section of Township

Owner Skip MUM Address

Location of property Kley

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 25'

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 32 G.P.M. Duration of test 1 hrs.

Drawdown 15 ft. Date MARCH 5 1971

Static level-depth to water 25 ft.

Quality (clear, cloudy, taste, odor) Clear

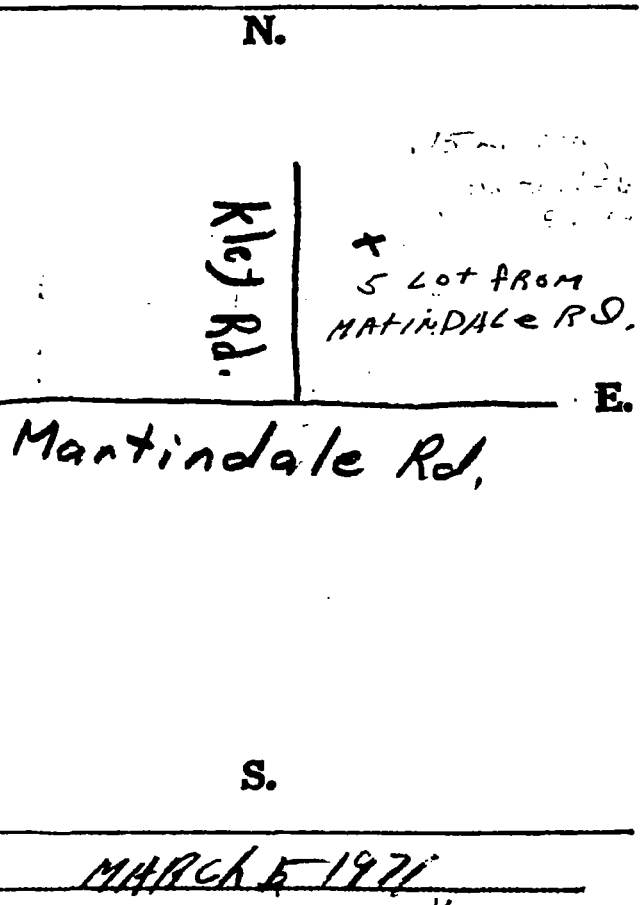
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 8 Ft. |
| Lime Stone | 8 | 45 |
| White Lime Stone | 45 | 85 |
| Shale | 85 | 100 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm H.L. STOLTZ & Son Date MARCH 5 1971

Address 852 Martindale Rd Signed Larry D. Stoltz

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

600936

COUNTY Montgomery TOWNSHIP Butler SECTION OF TOWNSHIP 2

OWNER Mr. John Mastbaum ADDRESS 4255 Fishburg Rd. Dayton, OH

LOCATION OF PROPERTY Kyle Road near Antioch School Rd.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 97

Type of screen SS WW Length of screen 3 ~~70~~

Type of pump none

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 1 gpm Duration of test hr

Drawdown 95 ft Date 5-27-82

Static level (depth to water) f

Quality (clear, cloudy, taste, odor) clear

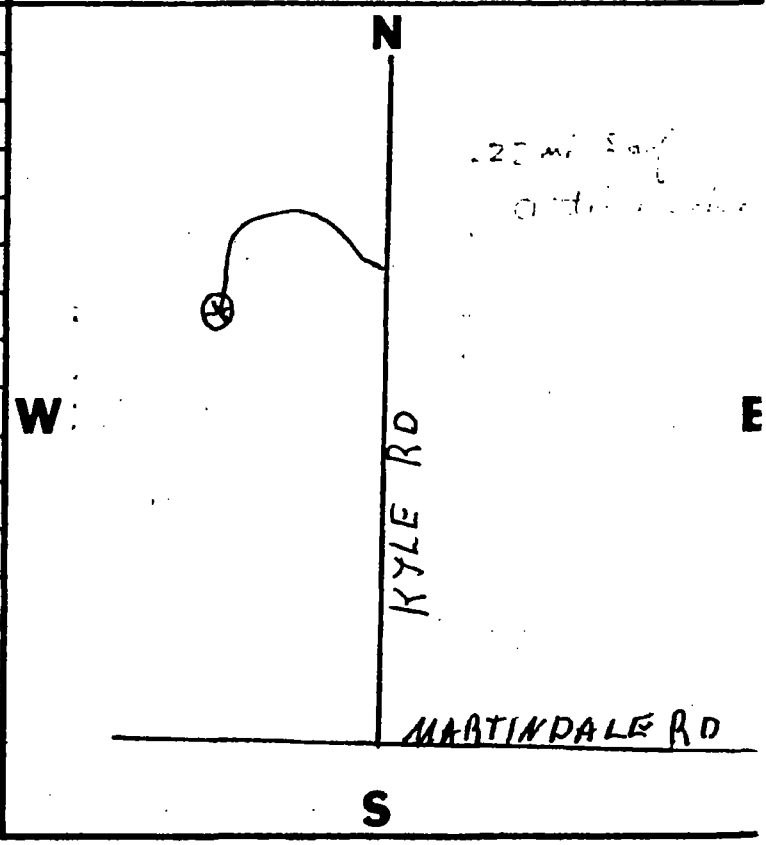
Pump installed by none

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| yellow clay | 0 ft | 11 ft |
| blue shale | 11 | 72 |
| soft blue shale | 72 | 76 |
| blue shale | 76 | 100 |
| | | |
| well reamed 10" to 100 ft. | | |
| 100 ft 6" caseing installed with 3 ft. | | |
| stainless steel screen at 90 ft. and | | |
| gravel packed to 27 ft. and cemented | | |
| back to ~~gravel~~ GROUND level | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM W.U. Scott Co. DATE 5-27-82

ADDRESS 11534 Peters Pike Tipp City, OH SIGNED W. U. Scott

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - ODNR, DIVISION OF WATER, FOUNTAIN SQ., COLS., OHIO 43224

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 404949

County MONT Township BUTLER Section of Township

Owner MR. MUSIC Address Frederick Rd

Location of property

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 25'
Type of screen None Length of screen
Type of pump Submersible
Capacity of pump
Depth of pump setting
Date of completion

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 4 G.P.M. Duration of test ½ hrs.
Drawdown 20 ft. Date JAN 4, 1977
Static level-depth to water 30 ft.
Quality (clear, cloudy, taste, odor) Cloudy

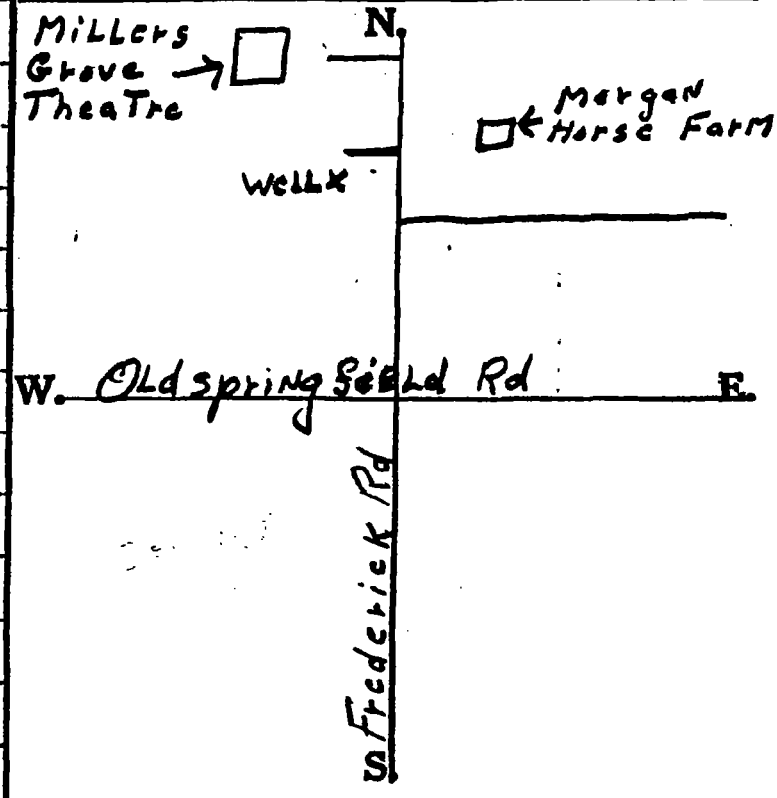
Pump installed by H.L. STOLTZ + SON

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 5 Ft. |
| Limestone | 5 | 60 |
| Soft Shale | 60 | 80 |
| Water at 50' | | |
| Started Drilling at 30' in Old Well Pulled 8' of Casing out of Well. Reamed hole to 8" and put 25' of casing in | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm 1705 H.L. STOLTZ + SON Date Jan 4 1977
Address 852 Martindale Rd Signed Jane Ramey

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

№ 152627

County Montgomery Township Butler ~~Section of Township~~ or Lot Number 7

Owner Robert Hall Address RR Vandalia

Location of property Lot No. 7 ON old springfield Rd – 2 miles North of State Rt 40

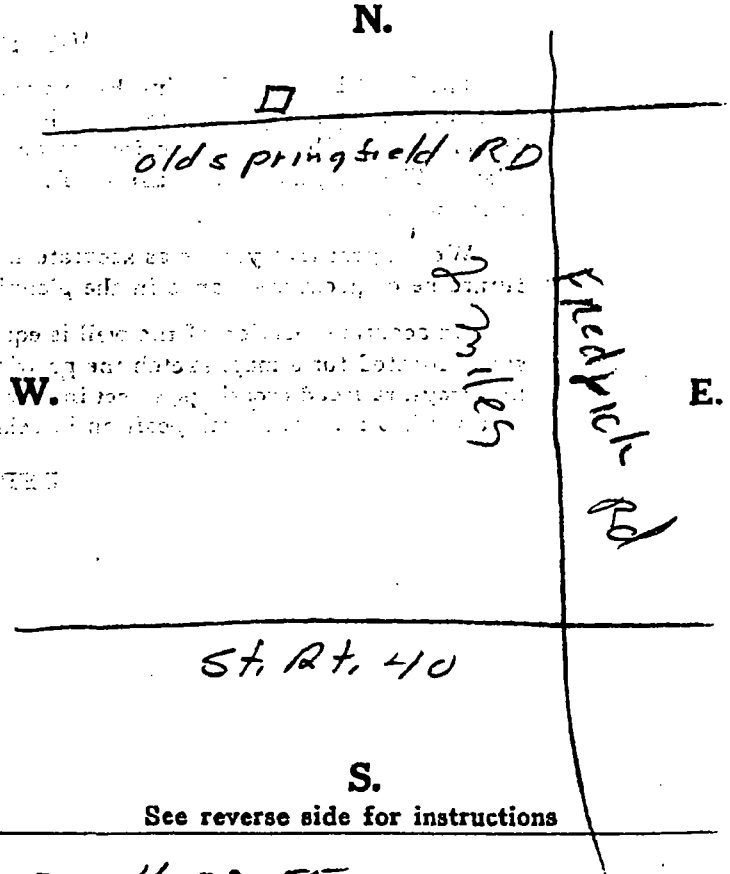
| CONSTRUCTION DETAILS | PUMPING TEST |
|---|---|
| Casing diameter 5 5/8 Length of casing 16' | Pumping rate 7 G.P.M. Duration of test 1 hrs |
| Type of screen Length of screen | Drawdown 11 ft. Date 11-11-55 |
| Type of pump | Developed capacity |
| Capacity of pump | Static level—depth to water 12 ft. |
| Depth of pump setting | Pump installed by |

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| clay | 0 Feet | 9 Ft. |
| Limestone | 9 | 40 |
| water at 22 + 34' | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm H. L. Stitt & Son Date 11-28-55

Address RR 1 Clayton Signed R. Stitt

1705

A8

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 419007

County Mont Township Butler Section of Township

Owner Don PHILLIPS Address

Location of property Old Spring field & Fredrick Rd

## CONSTRUCTION DETAILS

Casing diameter 6' Length of casing 25'

Type of screen Length of screen

Type of pump Sub.

Capacity of pump ~~60~~

Depth of pump setting 60'

Date of completion

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 4 G.P.M. Duration of test 1 hrs.

Drawdown 0 ft. Date APRIL 15, 1971

Static level-depth to water 18 FT ft.

Quality (clear, cloudy, taste, odor) Clear

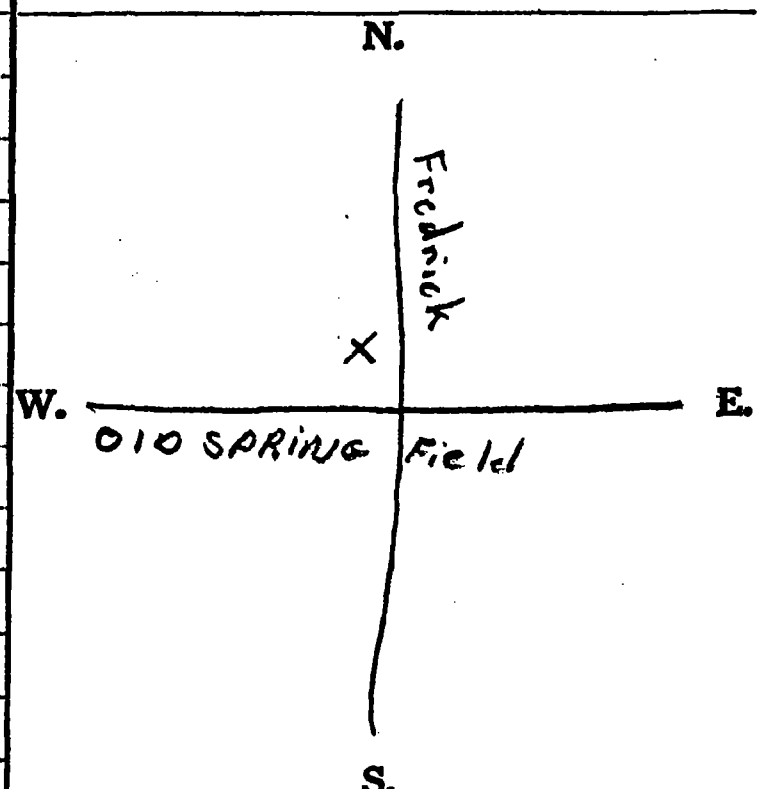
Pump installed by Gerald L. Stoltz

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 11 Ft. |
| Lime Stone | 11 | 32 |
| Shale | 32 | 35 |
| Lime Stone | 35 | 43 |
| Shale | 43 | 29 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm 1705 HL Stoltz & Son Date APRIL 15, 1971

Address 852 Martindale Rd. Signed Larry O. Stoltz

*If additional space is needed to complete well log, use next consecutive numbered form.

NO

# WELL LOG AND DRILLING REPORT

ORIGINAL

$H_2C$

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

**Nº 152604**

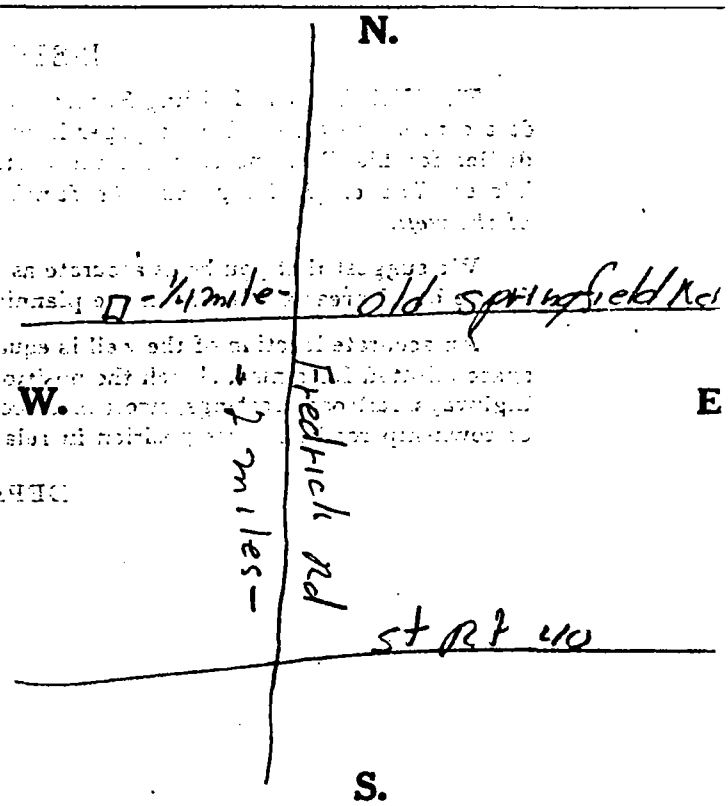
County Montgomery Township Butler Section of Township or Lot Number 2

Owner Robert Hall Address RR 1 Vandalia

Location of property old Springfield Rd. ¼ mile W. of Fredricks
2 miles N. of St. Rt 40

| CONSTRUCTION DETAILS | PUMPING TEST |
|---|---|
| Casing diameter 5 5/8 Length of casing 18' | Pumping rate 7 G.P.M. Duration of test 1 hr |
| Type of screen Length of screen | Drawdown 18 ft. Date 5-14-55 |
| Type of pump | Developed capacity |
| Capacity of pump | Static level—depth to water 16 f |
| Depth of pump setting | Pump installed by |

| WELL LOG | | | SKETCH SHOWING LOCATION |
|---|---|---|---|
| Formations Sandstone, shale, limestone, gravel and clay | From | To | Locate in reference to numbered State Highways, St. Intersections, County roads, etc. |
| clay | 0 Feet | 8 Ft. | |
| Limestone | 8 | 42 | |
| water at 40' | | | |




See reverse side for instructions

1705

Drilling Firm H. L. Stolz & Son Date

Address RR1 Clayton Signed R. Stolz

A

# WELL LOG AND DRILLING REPORT

ORIGINAL

H

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1500 Dublin Road
Columbus, Ohio

No. 18232[1]

SW

County Montgomery Township Butler Section of Township

Owner Robert Hall Address RR Vandalia

Location of property old springfield Rd 2 mile N. of St. Rt 40 1/4 mile W. of Frederick Rd.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 20'

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping rate 6 G.P.M. Duration of test 1 hrs.

Drawdown ft. Date 3-13-57

Developed capacity 6 gpm

Static level—depth to water 15 ft.

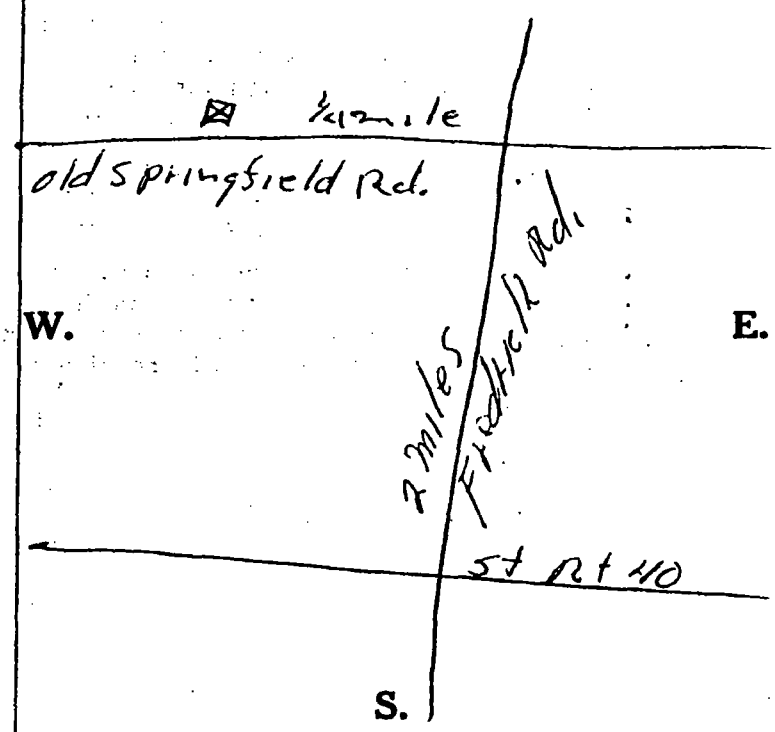
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| clay | 0 Feet | 11 Ft. |
| Limestone | 11 | 45 |
| water at 27 + 43 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm H. L. Stalb & Son Date 3-29-57

Address RR 1 Clayton Signed R. Stalb

A

X = 1,501,800
(5000 x 5000)

Y = 702,700-S

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

ORIGIN. H

Nº 82230

County Montgomery Township Butler Section of Township or Lot Number

Owner Robert Hall Address RR 1 Vandalia

Location of property old springfield Rd. 2 mile N. of St. Rt 40

## CONSTRUCTION DETAILS

Casing diameter 5 3/8 Length of casing 16

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

## PUMPING TEST

Pumping rate 7 G.P.M. Duration of test 2 hr

Drawdown 5 ft. Date 10-20-53

Developed capacity

Static level—depth to water 7 f

Pump installed by

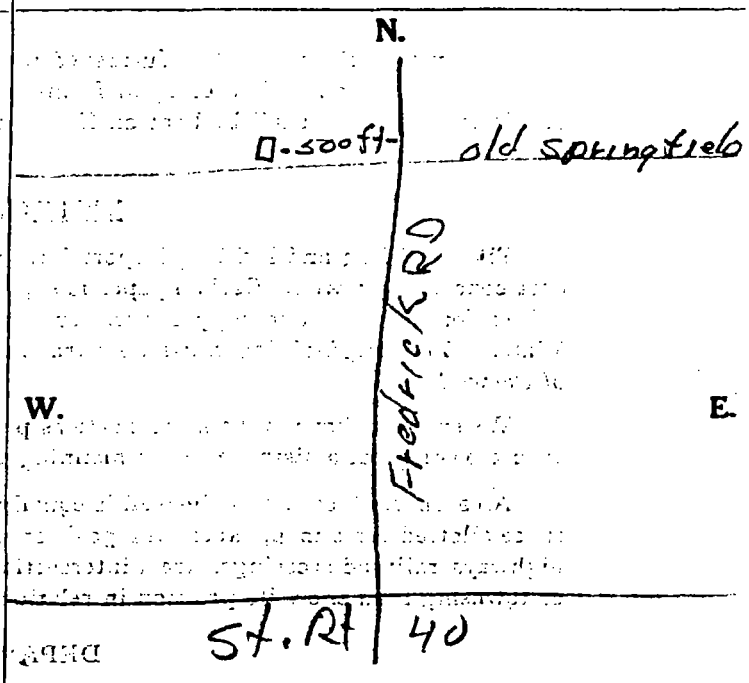
## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| clay | 0 Feet | 13 Ft. |
| Limestone | 13 | 39 |

water at 34'

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm 1705 H. L. Stolz & Son Date 10-20-53

Address RR 1 Clayton Signed R. Stolz

A

# WELL LOG AND DRILLING REPORT

ORIGINAL

H

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

№ 152612

County Montgomery Township Butler Section of Township or Lot Number

Owner Robert Hall Address RR 1 Vandalia

Location of property old springfield Rd 2 mile N. of St. Rt 40 1/4 mile W. of Fredrickbel

| CONSTRUCTION DETAILS | PUMPING TEST |
|---|---|
| Casing diameter 5 5/8 Length of casing 17 | Pumping rate 7 G.P.M. Duration of test 1 hr |
| Type of screen Length of screen | Drawdown 16 ft. Date 7-24-55 |
| Type of pump | Developed capacity |
| Capacity of pump | Static level—depth to water 74 ft |
| Depth of pump setting | Pump installed by |

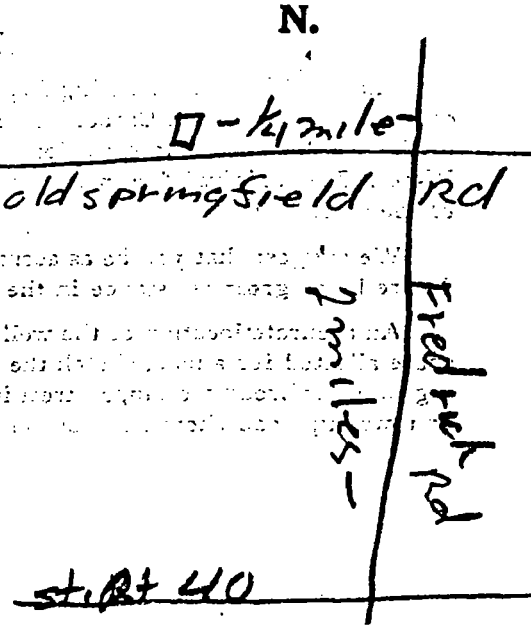
## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 11 Ft. |
| Limestone | 11 | 21 |
| Shale | 21 | 26 |
| Limestone | 26 | 45 |

water at 21+58

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

1705

Drilling Firm H. L. Stultz & Son Date 8-2-55

Address RR 1 Clayton Signed R. Stultz

A

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 419009

County Mont. Township Butler Section of Township

Owner Mrs. Waymyer Address 613 MARTINDALE RD.

Location of property Martindale Rd

## CONSTRUCTION DETAILS

Casing diameter 6' Length of casing 34'

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 2 1/2 G.P.M. Duration of test 4 hrs.

Drawdown 0 ft. Date MAY 1 1971

Static level-depth to water 15 ft.

Quality (clear, cloudy, taste, odor) Clear

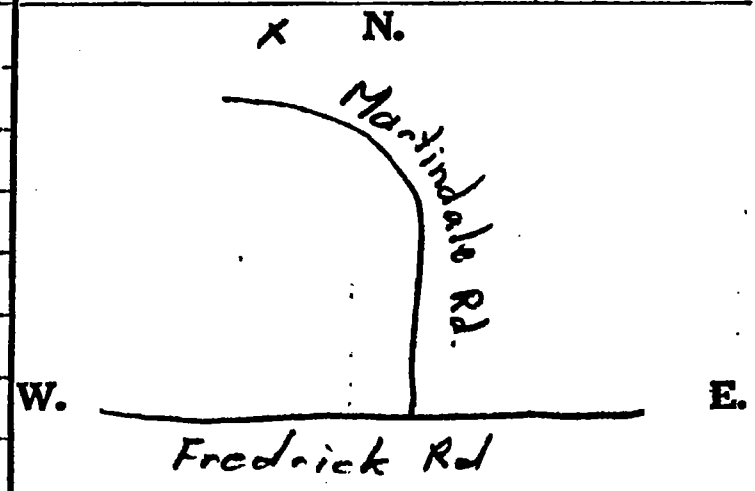
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Soil | 0 Feet | 2 Ft. |
| Gravel | 2 | 31 |
| Shale | 31 | 100 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




1705 Drilling Firm H L Stoltz & Son Date MAY 1 1971

Address 852 Martindale Rd Signed Larry D. Stoltz

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL 19

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 404940

County MONT Township BUTLER Section of Township 11

Owner Mrs Way Mire Address Martindale Rd

Location of property West on Martindale Rd Last house on right

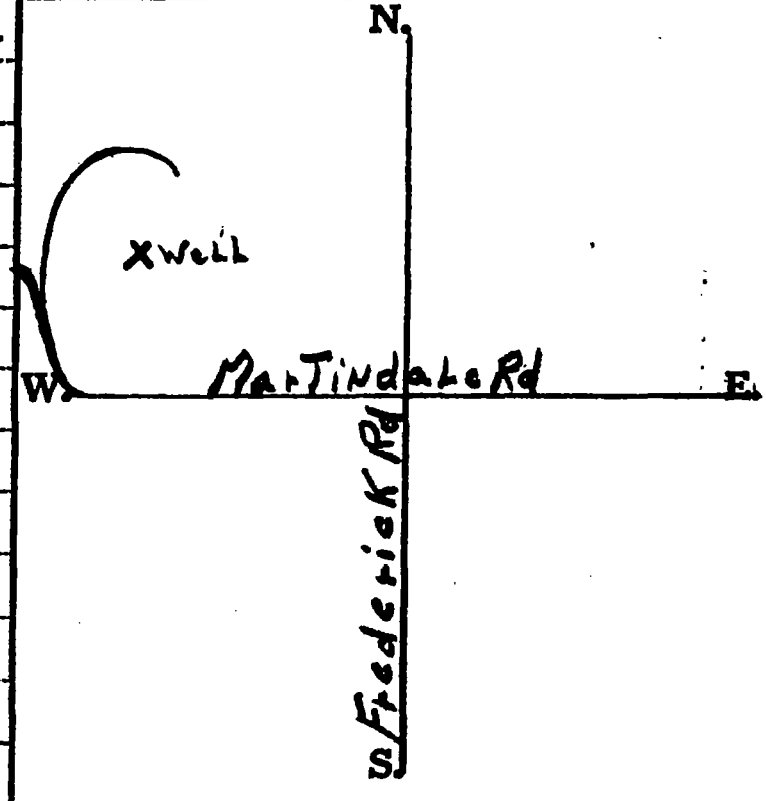
| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST (specify one by circling) |
|---|---|
| Casing diameter 8" Length of casing 41' | Test Rate 20 G.P.M. Duration of test 1/2 hrs. |
| Type of screen None Length of screen | Drawdown 10 ft. Date 10/19/70 |
| Type of pump Submersible | Static level-depth to water 30 ft. |
| Capacity of pump | Quality (clear, cloudy, taste, odor) Cloudy |
| Depth of pump setting | |
| Date of completion 10/19/70 | Pump installed by H.L. Stoltz + Son |

**WELL LOG***

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 5 Ft. |
| Gravel | 5 | 20 |
| Sand | 20 | 23 |
| Limestone | 23 | 100 |

**SKETCH SHOWING LOCATION**

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm 1705 H.L. Stoltz + Son Date 10/19/70

Address 852 Martindale Rd Signed Gene Ramey

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

470799

COUNTY Montgomery TOWNSHIP Randolph SECTION OF TOWNSHIP OR LOT NUMBER ? 1Q

OWNER Village of Union ADDRESS City Bldg

LOCATION OF PROPERTY Union Well Field

## CONSTRUCTION DETAILS

Casing diameter 16 Length of casing 74

Type of screen Cook brass Length of screen 30

Type of pump See below

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 600 gpm Duration of test 24 hrs

Drawdown 12'4" ft Date 10/17/74

Static level (depth to water) 11'3" ft

Quality (clear, cloudy, taste, odor)

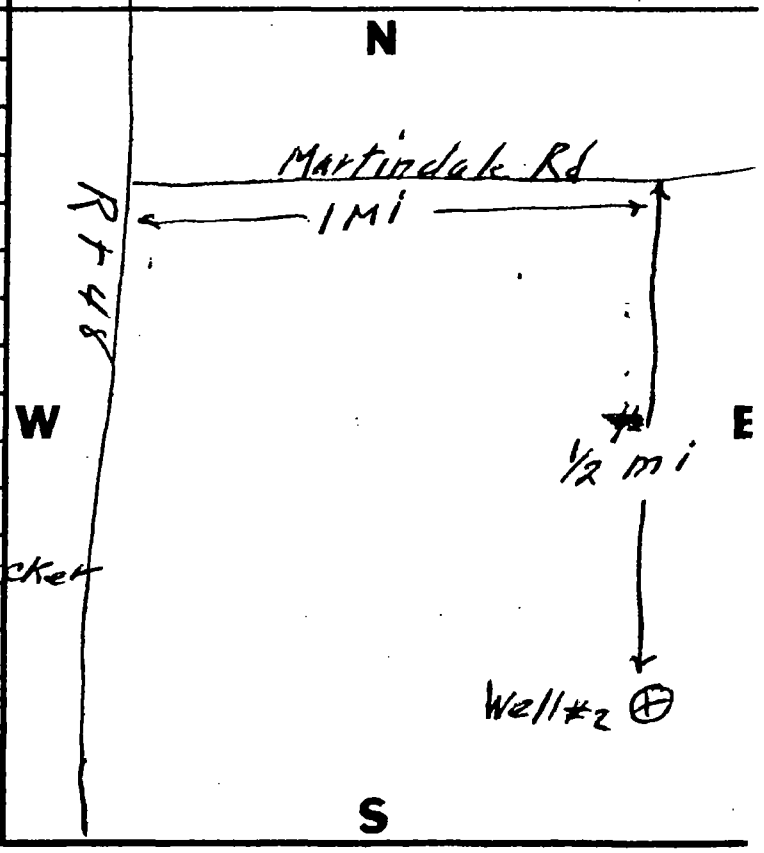
Pump installed by

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Top soil | 0 ft | 6 ft |
| Brown clay | 6 | 8 |
| Sand & gravel | 8 | 14 |
| Blue clay | 14 | 64 |
| Blue clay & gravel | 64 | 75 |
| Sand & gravel | 75 | 90 |
| Med sand & gravel | 90 | 106 |
| Clay | 106 | — |
| | | |
| | | |
| | | |
| Casing detail 12" screen with packer | | |
| Top 15 ft # | 100 | |
| Bottom 15 ft # | 40 | |
| | | |
| | | |
| 5129 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM Wm Crane DATE 3/28/75

ADDRESS Shandon, O SIGNED [signature]

*If additional space is needed to complete well log, use next consecutive numbered form.

EC

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

ORIGINAL

502173

COUNTY Montgomery TOWNSHIP Butler SECTION OF TOWNSHIP North-West

OWNER Barton Wilgus ADDRESS 11600 Ballinger Rd. Vandalia,

LOCATION OF PROPERTY 11600 Ballinger Rd. Vandalia, O

## CONSTRUCTION DETAILS

Casing diameter 6 Length of casing 26

Type of screen PVC Liner Length of screen 100'

Type of pump 1/3 HP Sub.

Capacity of pump 240 gph.

Depth of pump setting 110'

Date of completion 11-27-76

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 3 gpm Duration of test 2 hrs

Drawdown 90 ft Date 11-27-76

Static level (depth to water) 30 ft

Quality (clear, cloudy, taste, odor) Clear

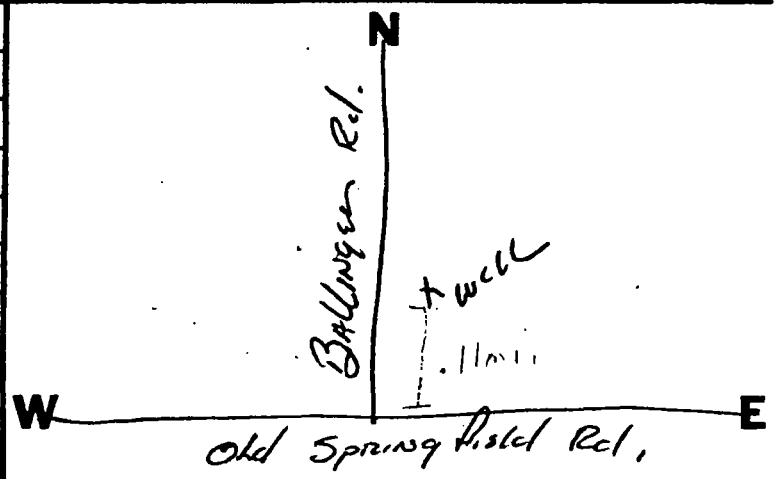
Pump installed by Glaser Water Ser.

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 6 ft |
| Blue Shale | 6 | 120 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




5237
DRILLING FIRM Glaser Water Ser DATE 11-27-76

ADDRESS 6960 Cuntwood Dr Tipp City, O SIGNED David E. Glaser

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

MR

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 404946

County MONT Township BUTLER Section of Township

Owner Mr + Mrs Roush Address Oldspringfield R

Location of property ½ Mile West of Frederick Rd Last House on Left

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 80'

Type of screen None Length of screen

Type of pump Submersible

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 3 G.P.M. Duration of test 1 hrs.

Drawdown 80 ft. Date NOV 15/1970

Static level-depth to water 40 ft.

Quality (clear, cloudy, taste, odor) Clear

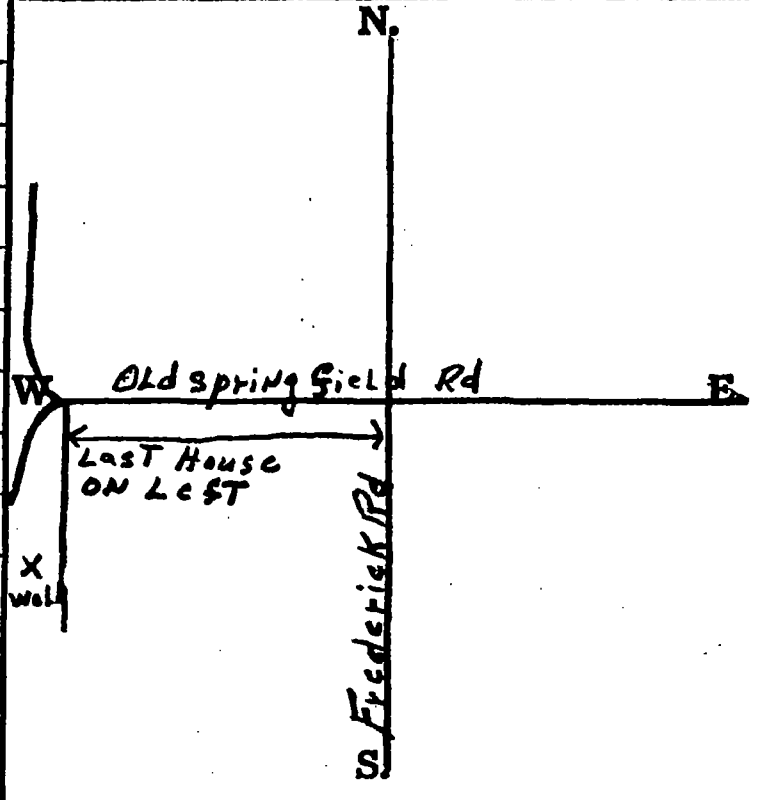
Pump installed by H.L. Stoltz + Son

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 4 Ft. |
| Limestone | 4 | 20 |
| Shale | 20 | 28 |
| Limestone | 28 | 33 |
| Shale | 33 | 35 |
| Limestone | 35 | 37 |
| Shale | 37 | 60 |
| Soft Shale | 60 | 80 |
| Limestone | 80 | 100 |
| Shale | 100 | 120 |
| | | |
| Water at 65' | | |
| | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




1705

Drilling Firm H.L. Stoltz + Son Date NOV 15 1970

Address 852 Martindale Rd Signed Gene Ramey

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

50c

WELL # 2

No. 230356

County Montgomery Township Butler Section of Township 2

Owner MR Fred H Finsterwald Address 787 Antioch school rd Vandalia Ohio.

Location of property 1 ½ miles east of rt # 48 On Antioch school rd

## CONSTRUCTION DETAILS

Casing diameter 5Ø5/8 Length of casing 50

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion 5/18/59

## BAILING OR PUMPING TEST

Pumping rate 10 G.P.M. Duration of test hrs.

Drawdown 40 ft. Date 5/18/59

Developed capacity 600g.p.h.

Static level—depth to water 10 ft.

Pump installed by

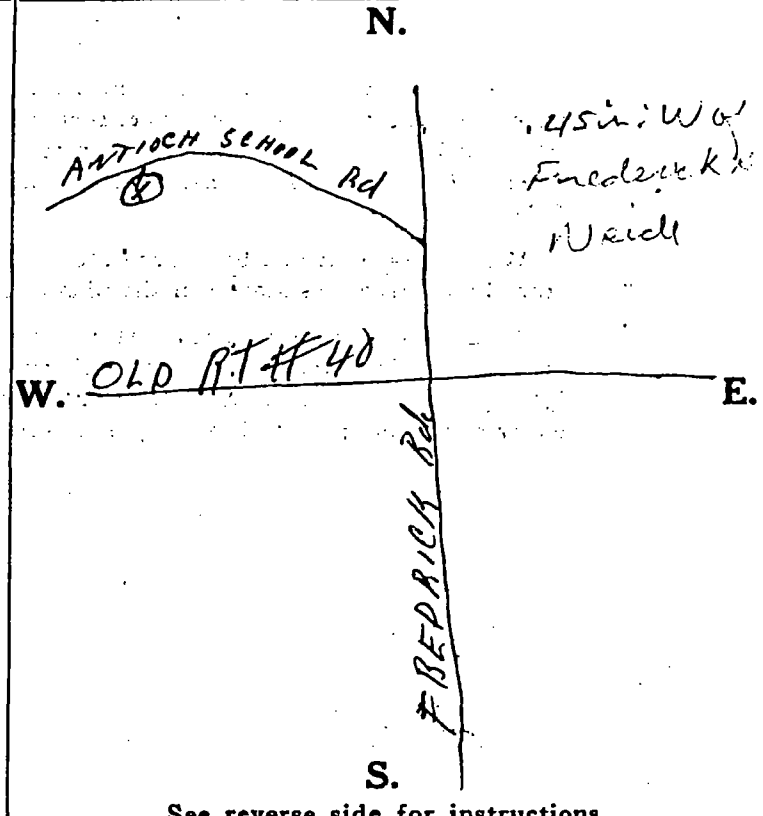
## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| top soil & clay | 0 Feet | 6 Ft. |
| Broken lime | 6 | 14 |
| blue shale | 14 | 47 |
| Bed Rock | 47 | 50 |

10" Gravel wall 50' with 30' of slots
11' of 10" pipe left in ground.

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

1644

Drilling Firm SCOTT WELL DRILLING Date 5/18/59

Address 5859 Brantford rd Signed W. U. Scott

Dayton Ohio W.U.SCOTT

#1

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 230355

County Montgomery Township Butler Section of Township

Owner Mr Fred H Finsterwald Jr Address 787 Antioch School Rd, Vandalia Ohio.

Location of property 1 ½ Mile east of rt # 48 on Antioch school rd.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing

Type of screen Length of screen

Type of pump

Capacity of pump DRY HOLE

Depth of pump setting

Date of completion 5/12/59

## BAILING OR PUMPING TEST

Pumping rate G.P.M. Duration of test hrs.

Drawdown ft. Date

Developed capacity ~~DRY HOLE~~

Static level—depth to water ft.

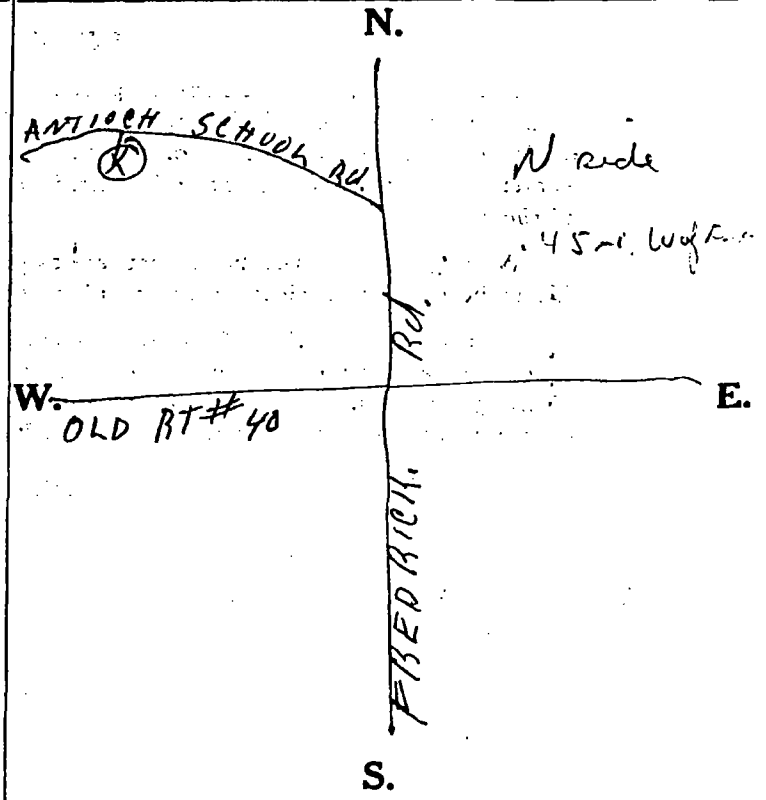
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top Soil | 0 Feet | 7 Ft. |
| Blue shale | 7 | 55 |
| bed rock | 55 | 65 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm SCOTT WELL DRILLING 1644

Address 5859 Brantford
Dayton Ohio.

Date 5/12/59

Signed W. U. Scott
W.U.SCOTT.

3

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY-SELF-TRANSCRIBING

600911

COUNTY Montgomery TOWNSHIP Butler SECTION OF TOWNSHIP

OWNER Billy T. Atherton ADDRESS 787 Antioch School Rd. Vandalia,

LOCATION OF PROPERTY ½ mile west of Fredrick Road

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 26

Type of screen Length of screen

Type of pump submergible

Capacity of pump 10 G.P.M.

Depth of pump setting 120

Date of completion 8-28-81

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 1 gpm Duration of test hrs

Drawdown 115 ft Date 8-28-81

Static level (depth to water) 43 ft

Quality (clear, cloudy, taste, odor) clear

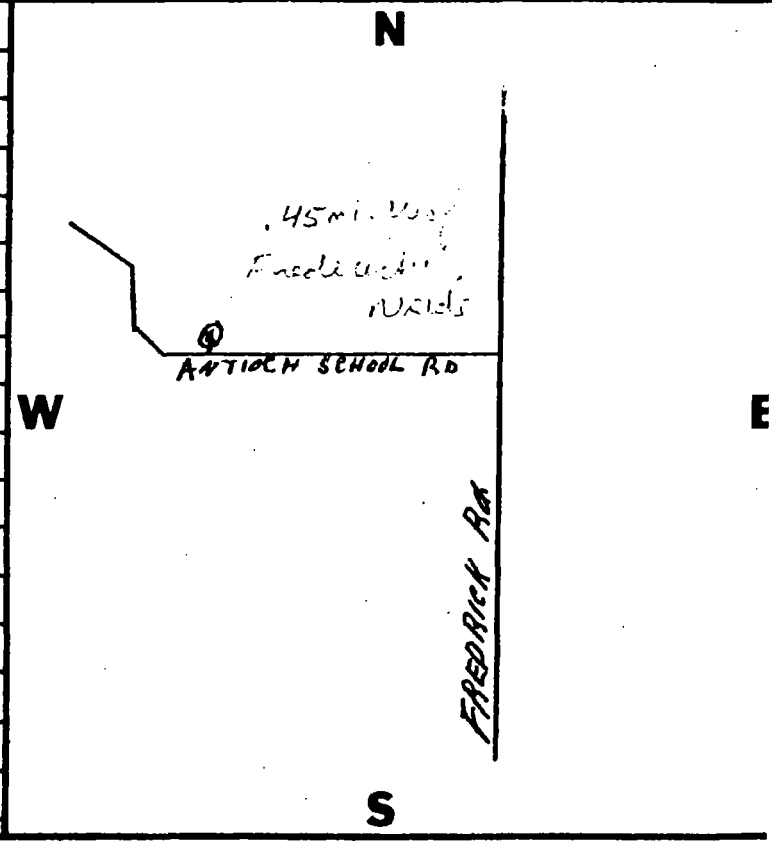
Pump installed by W.U. Scott Co.

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| clay | 0 ft | 4 ft |
| yellow limestone | 4 | 37 |
| white limestone | 37 | 65 |
| blue shale & bedrock | 65 | 125 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM W.U. Scott Co. DATE 8-28-81

ADDRESS 11534 Peters Pike SIGNED W. U. Scott

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - OPND DIVISION OF WATER FOUNTAIN SQ COLS OHIO 43224

2

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

525228

COUNTY Montgomery TOWNSHIP Butler SECTION OF TOWNSHIP

OWNER Mr. Thomas Bihn ADDRESS 787 Antioch School Road, Vandali 453

LOCATION OF PROPERTY 1 Mile West Of Frederick Road at 787 Antioch School Road

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 25 Ft

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting Well Finished 7- 5 - 79

Date of completion Pump Installed By Others

## (BAILING) OR PUMPING TEST
(specify one by circling)

Test rate 2 gpm Duration of test 1 hrs

Drawdown 38 ft Date 7 - 5 - 79

Static level (depth to water) 35 ft

Quality (clear, cloudy, taste, odor) Clear

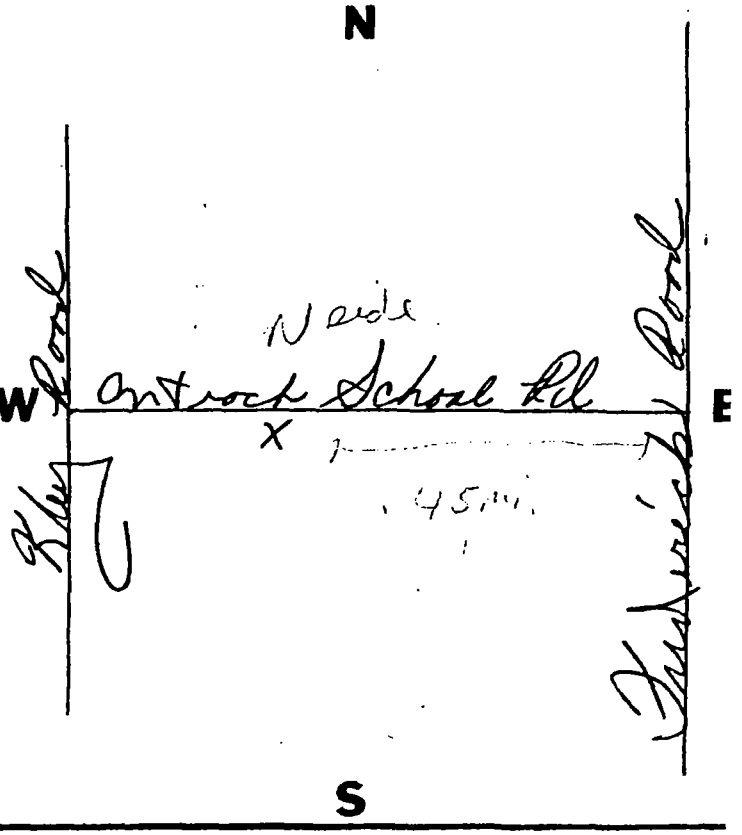
Pump installed by By Others

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Top Soil | 0 ft | 4 ft |
| Yellow Limestone | 4 | 38 |
| Blue Shale | 38 | 73 |
| | | |
| Well Reamed And Cemented | | |
| To The 25 Ft Depth | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM Scott Well Drilling Company DATE July 5, 1979

ADDRESS 5859 Brantford Road, Dayton 45414 SIGNED Mrs. O Lee Scott

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 380017

County Mont Township Butler Section of Township

Owner Robert Hall Address Antioch School Rd.

Location of property 1/4 mile West of Fredrick Pike on South Side of Antioch School Rd.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 18 ft

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR (PUMPING) TEST
(Specify one by circling)

Test Rate 8 G.P.M. Duration of test 1 hrs.

Drawdown 35 ft. Date 10-31-68

Static level-depth to water 11 ft.

Quality (clear, cloudy, taste, odor) Clear

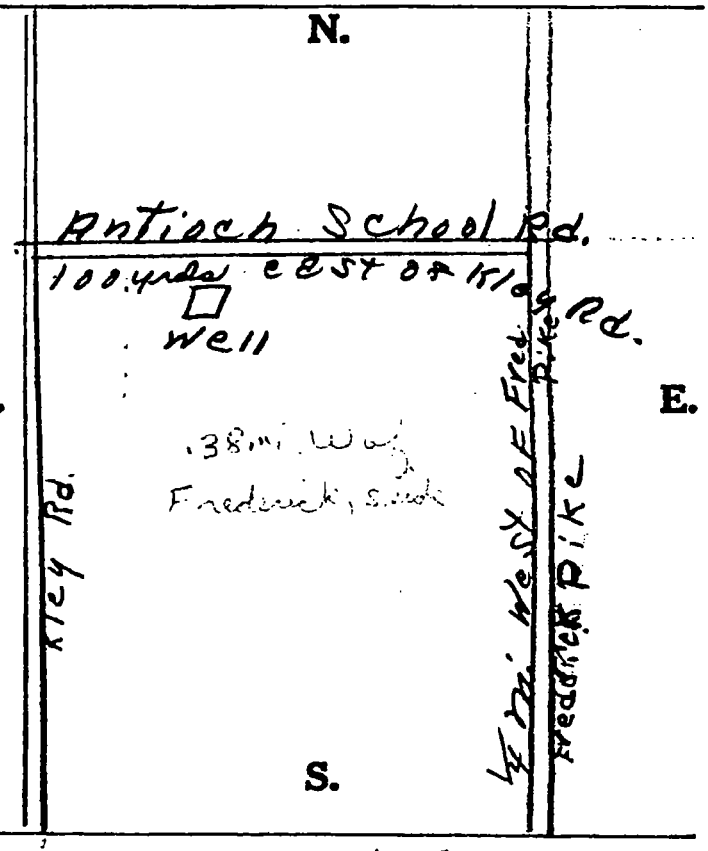
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 5 Ft. |
| Limestone | 5 | 35 |
| Shale | 35 | 52 |
| Water at | 34 | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm Hall & Jenkins Date 10-31-68

Address 740 N. Smithville Rd Dayton Ohio Signed Homer Hall

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

489748

COUNTY MONTGOMERY TOWNSHIP BUTLER SECTION OF TOWNSHIP OR LOT NUMBER 2

OWNER Mr. Paul R. Banks ADDRESS 801 Martindale Road - Vandalia,O 4537

LOCATION OF PROPERTY 1000 feet south of Antioch School Road on Kley Road

## CONSTRUCTION DETAILS

Casing diameter 6 Length of casing 26

Type of screen _____ Length of screen _____

Type of pump Not set

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 15 gpm Duration of test _____ hrs

Drawdown 50 ft Date June 24, 1978

Static level (depth to water) 19 ft

Quality (clear, cloudy, taste, odor) Clear

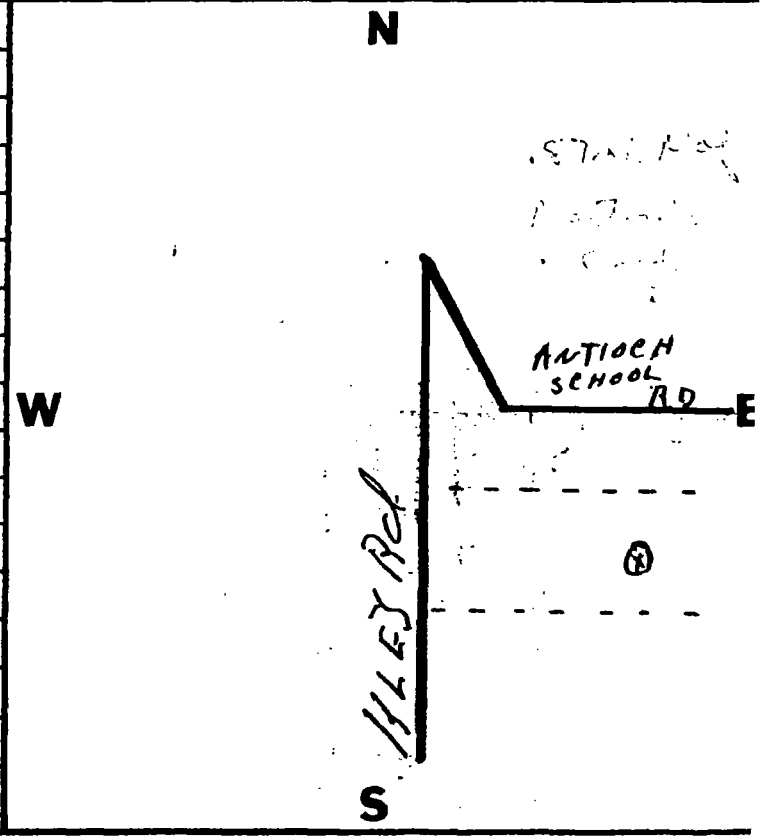
Pump installed by Not installed yet

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| | 0 ft | ft |
| TOP SOIL | 0 | 3 |
| BROKEN LIMESTONE | 3 | 12 |
| WHITE LIMESTONE | 12 | 37 |
| YELLOW LIMESTONE | 37 | 56 |
| SOFT SHALE | 56 | 78 |
| BLUE SHALE & BEDROCK | 78 | 100 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM W.U. SCOTT COMPANY DATE June 30, 1978

ADDRESS 11534 Peters Pike
Tipp City, Ohio 45371

SIGNED W. U. Scott

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

600935

COUNTY Montgomery TOWNSHIP Butler SECTION OF TOWNSHIP 2

OWNER John Mastbaum ADDRESS 4255 Fishburg Road Dayton, OHio

LOCATION OF PROPERTY Kyle Road near Antioch School Road

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 0

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump dry hole

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 0 gpm Duration of test _____ hrs

Drawdown 0 ft Date _____

Static level (depth to water) 0 ft

Quality (clear, cloudy, taste, odor) dry hole

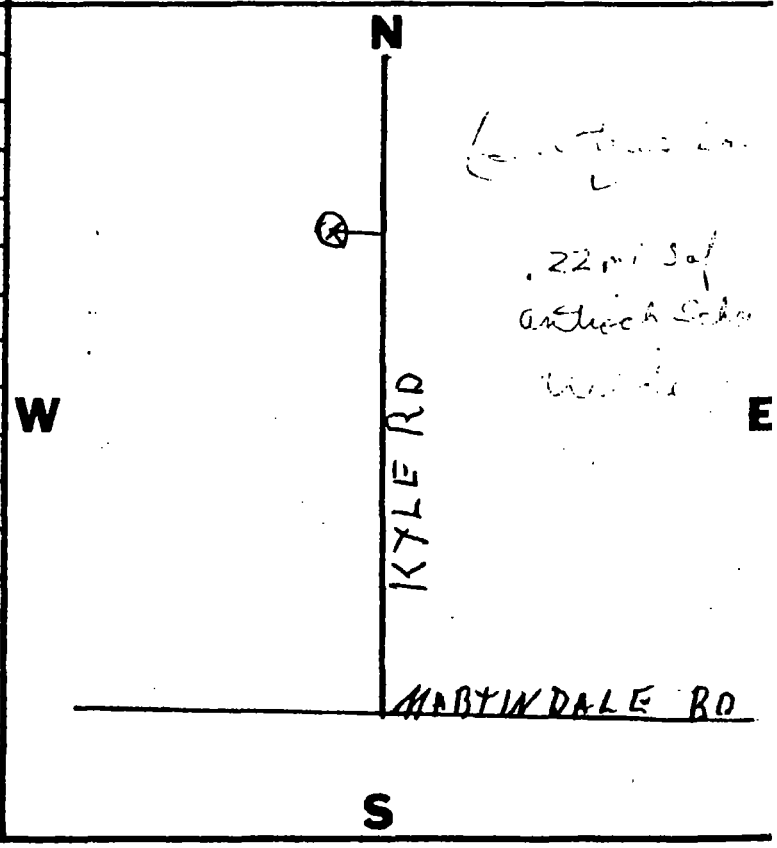
Pump installed by _____

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| clay | 0 ft | 4 ft |
| limestone | 4 | 70 |
| blue shale & bedrock | 70 | 103 |
| | | |
| DRY HOLE | | |
| Caseing removed and well plugged with | | |
| oncrete | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM W.U. Scott Co. DATE 5-20-82

ADDRESS 11534 Peters Pike Tipp City, OH SIGNED W. U. Scott

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - ODNR DIVISION OF WATER, FOUNTAIN SQ., COLS., OHIO 43224

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 232367

County Montgomery Township Randolph Section of Township 10

Owner VILLAGE OF UNION Address UNION, OHIO

Location of property APP, 500' SOUTH OF SEWAGE PLANT

## CONSTRUCTION DETAILS

Casing diameter 6 Length of casing 15

Type of screen ..... Length of screen .....

Type of pump .....

Capacity of pump .....

Depth of pump setting .....

Date of completion .....

## BAILING OR PUMPING TEST

Pumping rate ..... G.P.M. Duration of test ..... hrs.

Drawdown ..... ft. Date .....

Developed capacity .....

Static level—depth to water JUST SEEP WATER ft.

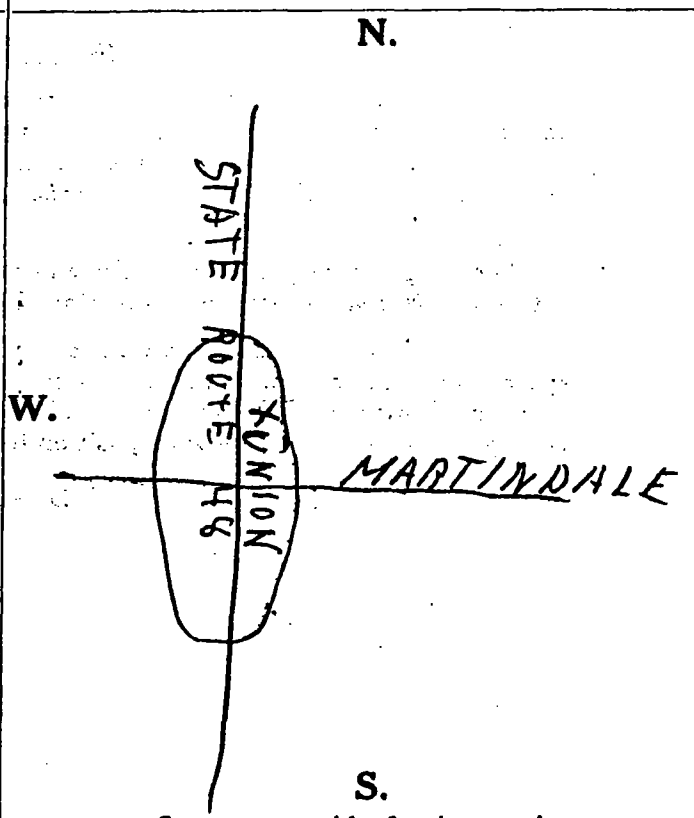
Pump installed by .....

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| | 0 Feet | Ft. |
| SOFT SHALE | 0 | 15 |
| SHALE | 15 | 85 |
| 5307 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm C.W. JACKSON & SON Date SEPT 29, 1959

Address CELINA Signed Carl Jackson

54

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

Nº 342990

County Montgomery Township Randolph Section of Township

Owner Village of Union Address Union, Ohio

Location of property

## Test Hole #2 CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 93'

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion June, 1967

## BAILING OR PUMPING TEST - None

Pumping Rate G.P.M. Duration of test hrs.

Drawdown ft. Date

Static level-depth to water ft.

Quality (clear, cloudy, taste, odor)

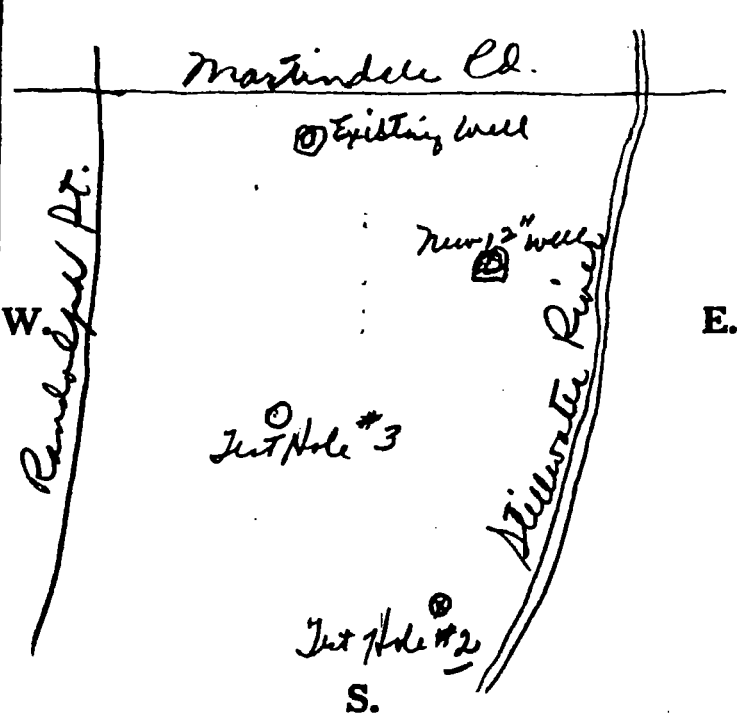
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top Soil | 0 Feet | 4 Ft. |
| Large Gravel | 4 | 17 |
| Coarse sand & gravel | 17 | 26 |
| Soft blue clay | 26 | 35 |
| Sorgy sandy clay | 35 | 50 |
| Tight Coarse sand & boulders | 50 | 70 |
| Coarse sand & gravel | 70 | 78 |
| Medium sand & Coarse gravel | 78 | 80 |
| Coarse sand & boulders | 80 | 99 |
| Bottom | 99 | 100 |
| | | |
| | | |
| 5412 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Moody's of Dayton, Inc. Date November 20, 1967

Address 150 N. Dixie Dr. P.O. Box 156 Vandalia, Ohio 45377 Signed V. C. Cooper

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

№ 342991

County Montgomery Township Randolph Section of Township

Owner Village of Union Address Union, Ohio

Location of property

## CONSTRUCTION DETAILS

Test Hole #3

Casing diameter 6" Length of casing 111'

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion June, 1967

## BAILING OR PUMPING TEST - None

Pumping Rate G.P.M. Duration of test hrs.

Drawdown ft. Date

Static level-depth to water ft.

Quality (clear, cloudy, taste, odor)

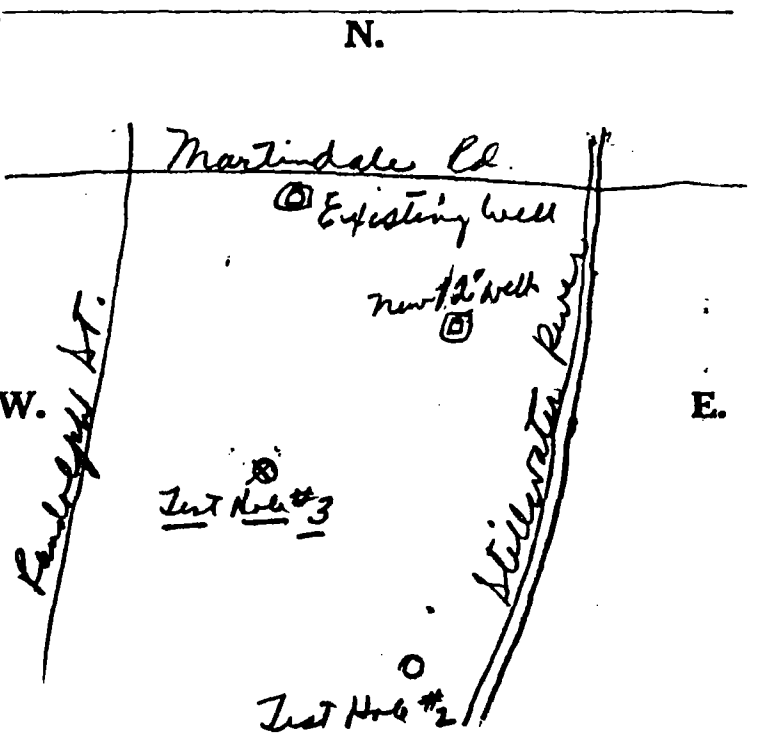
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top soil | 0 Feet | 4 Ft. |
| Large gravel | 4 | 16 |
| Blue Clay | 16 | 54 |
| Clean coarse gravel | 54 | 56 |
| Dirty sand & gravel | 56 | 60 |
| Coarse sand & coarse gravel | 60 | 65 |
| Coarse sand & coarse gravel | 65 | 77 |
| Tight sand-streaks of clay | 77 | 80 |
| Coarse sand & coarse gravel | 80 | 100 |
| " " " " " | 100 | 116 |
| Limestone | 116 | 118 |
| | | |
| 5412 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Moody's of Dayton, Inc. Date November 20, 1967

Address 150 N. Dixie Dr. P.O. Box 155, Vandalia, Ohio 45377 Signed T. C. Cooper

*If additional space is needed to complete well log, use next consecutive numbered form.

County Permit No. _____

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

ORIGINAL

547530 Vnc

COUNTY Montgomery TOWNSHIP Randolph ? SECTION OF TOWNSHIP 11

OWNER Village of Union ADDRESS Union, Ohio

LOCATION OF PROPERTY Valley View Rd – Along Stillwater River

## CONSTRUCTION DETAILS

Casing diameter 16" Length of casing _____

Type of screen _____ Length of screen _____

Type of pump Byron Jackson Submersible

Capacity of pump 400 GPM @ 390 TDH

Depth of pump setting 65'

Date of completion 9/4/79

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate _____ gpm Duration of test _____ hrs

Drawdown _____ ft Date _____

Static level (depth to water) 11'3" ft

Quality (clear, cloudy, taste, odor) _____

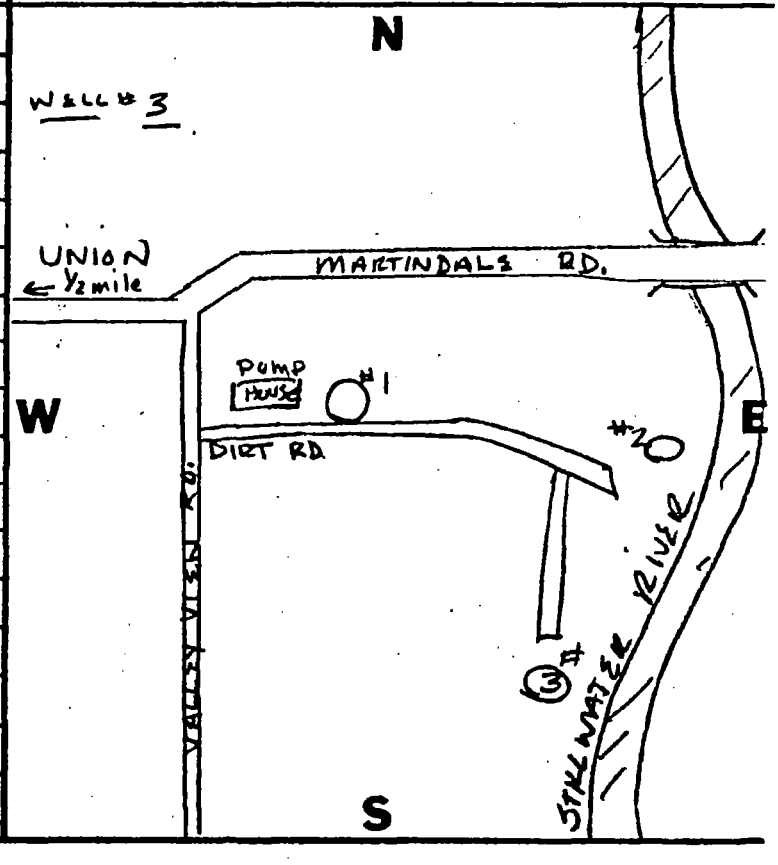
Pump installed by _____

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Fill | 0 ft | 6 ft |
| Brown clay & gravel | 6 | 8 |
| Sand & gravel | 8 | 14 |
| Silty blue clay | 14 | 55 |
| Clay & gravel | 55 | 64 |
| dirty gravel | 64 | 75 |
| Sand & gravel | 75 | 85 |
| Med. sand & gravel | 85 | 106 |
| 5412 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM Moody's of Dayton, Inc.

ADDRESS 4359 Infirmary Raod, PO. Box 123
Miamisburg, Ohio 45342

DATE June 27, 1980

SIGNED [signature]

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

Uni

No. 232369

County Mont. Township Randolph Section of Township 11

Owner VILLAGE OF UNION Address UNION, OHIO

Location of property APP 75' WEST OF STILLWATER RIVE ON MARTINDALE RD SOUT SID.

## CONSTRUCTION DETAILS

Casing diameter #6 Length of casing 116

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping rate 800 G.P.M. Duration of test ? hrs.

Drawdown 21 ft. Date

Developed capacity

Static level—depth to water ? ft.

Pump installed by

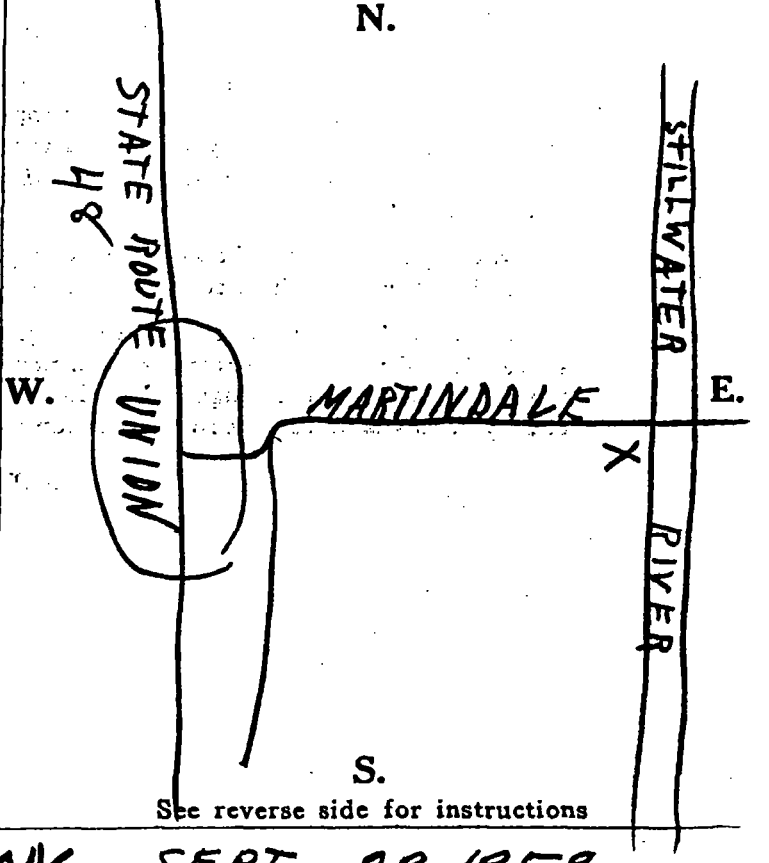
## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| | 0 Feet | Ft. |
| TOP SOIL | 0 | 4 |
| CLAY | 4 | 6 |
| DIRTY SAND & GRAV | 6 | 30 |
| * SAND & GRAVEL | 30 | 73 |
| DIRTY SAND & GRAVEL | 73 | 80 |
| CLAY WITH SAND | 80 | 116 |

* LOTS OF WATER
COULD USE 100 SLOT SCREEN

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm W JACKSON & SON Date SEPT 29, 1959

Address CELINA, OHIO Signed Carl Jackson

5307

55

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 232368

County Montgomery Township Randolph Section of Township 11

Owner VILLAGE OF UNION Address UNION OHIO

Location of property APP 1500 WEST OF STILLWATER RIVER ON MARTINDALE RD. SOUTH SIDE

## CONSTRUCTION DETAILS

Casing diameter 6 Length of casing 17

Type of screen ..... Length of screen .....

Type of pump .....

Capacity of pump .....

Depth of pump setting .....

Date of completion .....

## BAILING OR PUMPING TEST

Pumping rate ..... G.P.M. Duration of test ..... hrs.

Drawdown ..... ft. Date .....

Developed capacity .....

Static level—depth to water ..... ft.

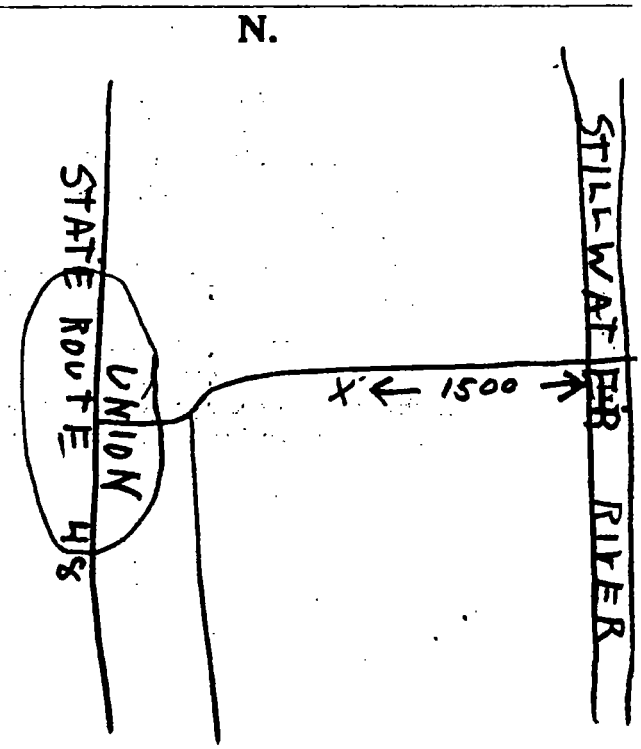
Pump installed by .....

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| | 0 Feet | ..... Ft. |
| TOP SOIL | | |
| BLACK | 0 | 9 |
| CLAY | 9 | 16 |
| SAND & GRAVEL | 16 | 17 |
| SHALE | 17 | 33 |
| WATER IN THIS GRAVEL | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm C W JACKSON & SON Date SEPT 29, 1959

Address CELINA, OHIO Signed Carl Jackson

5307

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 232370

County Mont. Township Randolph Section of Township 11

Owner VILLAGE OF UNION Address UNION, OHIO

Location of property APP 1100' WEST OF STILLWATER RIVE ON MARTINDALE RD SOUTH SIDE

## CONSTRUCTION DETAILS

Casing diameter 6 Length of casing 54

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping rate G.P.M. Duration of test hrs.

Drawdown ft. Date

Developed capacity

Static level—depth to water ft.

Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| | 0 Feet | Ft. |
| TOP SOIL | 0 | 3 |
| CLAY | 3 | 4 |
| SAND & GRAVEL | 4 | 54 |

THIS WELL WAS DRILLED APP 50' NE OF 12" WELL AND WAS USED FOR AN OBSERVATION WELL FOR 12" PERMAIVENT WELL AND FOR THE 6" TEST WELL WITH PREFERATED PIPE

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

W. E.

S.

See reverse side for instructions

Drilling Firm C.W. JACKSON & SON Date SEPT 29, 1959

Address CELINA OHIO Signed Carl Jackson

5307

EC

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 232371

County Montgomery Township Randolph Section of Township 11

Owner VILLAGE OF UNION Address UNION OHIO

Location of property APP 1100' WEST OF STILLWATER RIVER ON MARTINDALE RD SOUTH SIDE

## CONSTRUCTION DETAILS

Casing diameter 6 Length of casing 73

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping rate G.P.M. Duration of test hrs.

Drawdown ft. Date

Developed capacity

Static level—depth to water ft.

Pump installed by

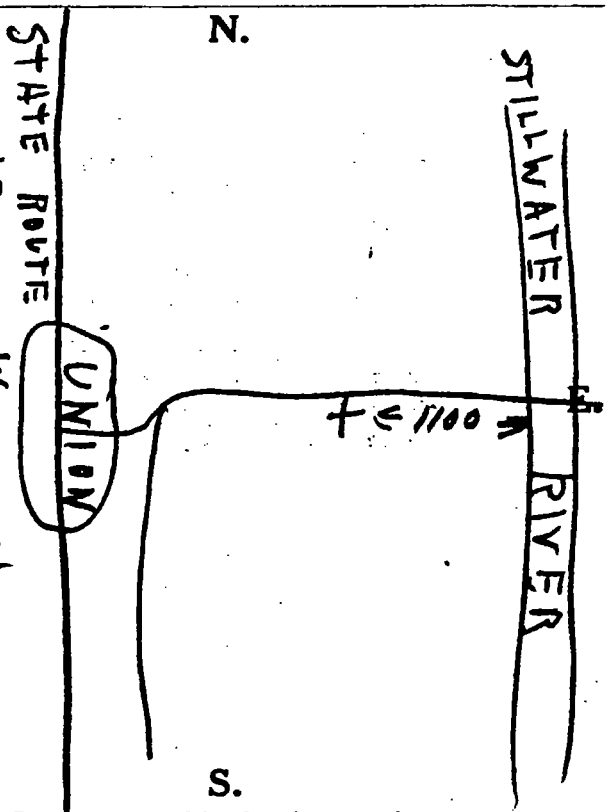
## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| | 0 Feet | Ft. |
| TOP SOIL | 0 | 3 |
| CLAY | 3 | 4 |
| SAND & GRAVEL | 4 | 73 |

THE 6" PIPE WAS PREFERRATE BETWEEN 60-68'
THIS PIPE TO BE LEFT IN FOR AN OBSERVATION WELL

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm C W Jackson & Son Date Sept 29, 1959

Address Piqua Ohio Signed Carl Jackson

5307

55

# WELL LOG AND DRILLING REPORT

Page 1 of 2

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

№ 342988

Also SEE WELL LOG # 342989

County Montgomery Township Randolph Section of Township

Owner Village of Union Address Union, Ohio

Location of property New Well Field

## CONSTRUCTION DETAILS

Test Hole # 1-12" Production Well

Casing diameter 12" Length of casing 114'

Type of screen Red Brass Length of screen 41'

Type of pump Turbine (Test)

Capacity of pump 1000 G.P.M.

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 610 G.P.M. Duration of test 8 hrs.

Drawdown 34 ft. Date 9/20/67

Static level-depth to water 13'2" ft.

Quality (clear, cloudy, taste, odor) Clear

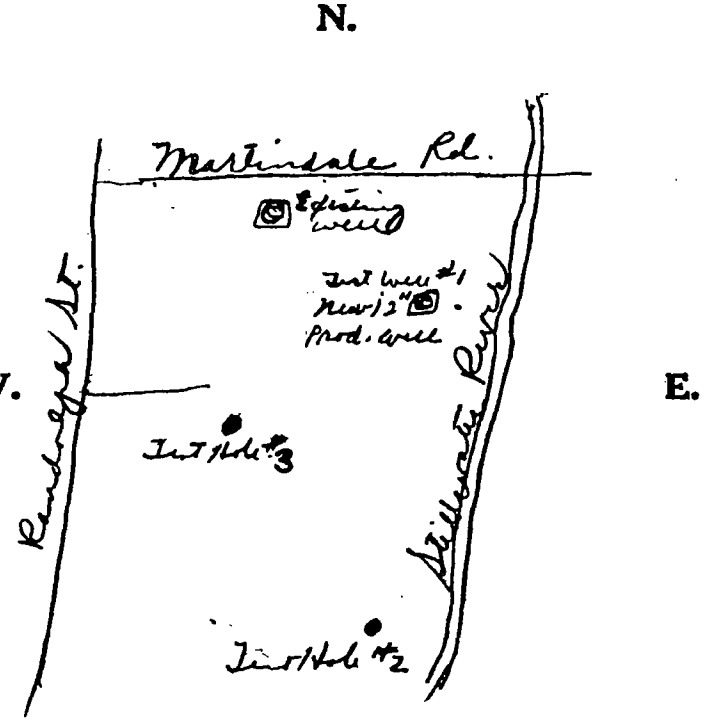
Pump installed by No permanent pump

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top soil | 0 Feet | 4 Ft. |
| Coarse sand & gravel | 4 | 16 |
| Coarse sand | 16 | 21 |
| Soft sandy silt | 21 | 38 |
| Till | 38 | 49 |
| Good coarse sand & gravel | 49 | 51 |
| Dirty sand & gravel | 51 | 55 |
| Good Coarse sand & gravel | 55 | 60 |
| " " " " " | 60 | 66 |
| Coarse sand | 66 | 72 |
| Good Coarse sand & gravel | 72 | 77 |
| " " " " " | 77 | 90 |
| " " " " " | 90 | 108 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Moody's of Dayton Date November 20, 1967

Address 120 N. Dixie Dr. P.O. Box 155, Vandalia, Ohio 45377 Signed V. C. Caspee

5412

*If additional space is needed to complete well log, use next consecutive numbered form.

55

ORIGINAL

# WELL LOG AND DRILLING REPORT

Page 2

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

№ 342989

Also SEE Well Log #34.18

County Montgomery Township Randolph Section of Township

Owner Village of Union Address Union, Ohio

Location of property

## CONSTRUCTION DETAILS

Test Hole #1

Casing diameter 12" Length of casing 118'

Type of screen Red Brass Length of screen 4'

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate G.P.M. Duration of test hrs.

Drawdown ft. Date

Static level-depth to water ft.

Quality (clear, cloudy, taste, odor)

Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| (Continued) | 0 Feet | Ft. |
| Dirty sand & gravel | 108 | 122 |
| Limestone (bedrock) | 122 | 123 |
| 5412 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

W. E.

S.

See reverse side for instructions

Drilling Firm Moodyers of Dayton Date November 20, 1967

Address 50 N. Dixie Dr. P.O. Box 155, Vandalia, Ohio 45377 Signed V. C. Gasper

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL 23

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY-SELF-TRANSCRIBING

518321

HORSE BARN:-

COUNTY Montgomery TOWNSHIP Randolph SECTION OF TOWNSHIP 4

OWNER Dr Robert Gersh 836-6009 ADDRESS 3240 Miami-Montgomery Co Line Rd

LOCATION OF PROPERTY 3240 Miami-Montgomery Co Line Rd, Union, Ohio 45322

## CONSTRUCTION DETAILS

Casing diameter 28 ft 5 5/8 Length of casing drive shoe

Type of screen _____ Length of screen _____

Type of pump 1/3 h.p. Gould 2 wire 115 volt

Capacity of pump operated manually

Depth of pump setting _____

Date of completion 10-30-78

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 7 GPM gpm Duration of test _____ hrs

Drawdown _____ ft Date _____

Static level (depth to water) 10 ft ft

Quality (clear, cloudy, taste, odor) clear

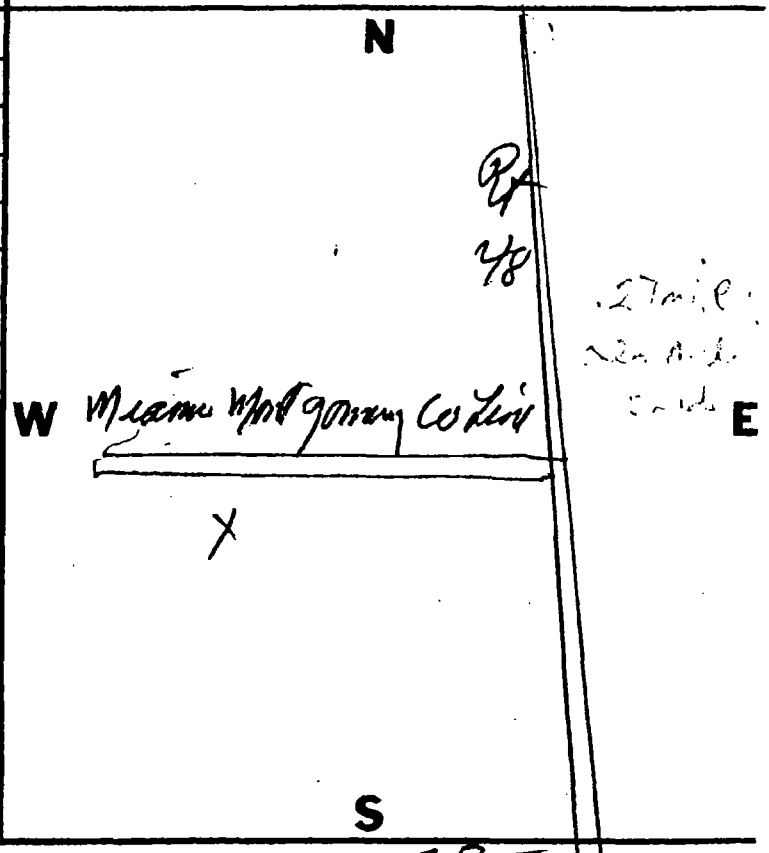
Pump installed by Snell Well Drilling & Pumps

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Dirt | 0 ft | 3 ft |
| clay & boulders | 3 | 26 |
| thin layer S & G | 26 | 26½ |
| blue clay | 26½ | - |
| | | |
| perforated casing above blue clay | | |
| 5541 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM Snell DATE 09 30 1978

ADDRESS _____ SIGNED _____

Lorin G. Snell
9313 W. Markley Road
Laura, Ohio 45337
698-4222

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 231472 16 6 C

County Montgomery Township Randolph Section of Township 3

Owner John M Smith Address Union Ohio RR 1

Location of property 1 Mile South of County Line, Rd on Rt 48

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing /

Type of screen Length of screen

Type of pump 1/3 HP myers jet

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping rate G.P.M. Duration of test hrs

Drawdown ft. Date 11-20-59

Developed capacity 1/2 GPM

Static level—depth to water 38 ft

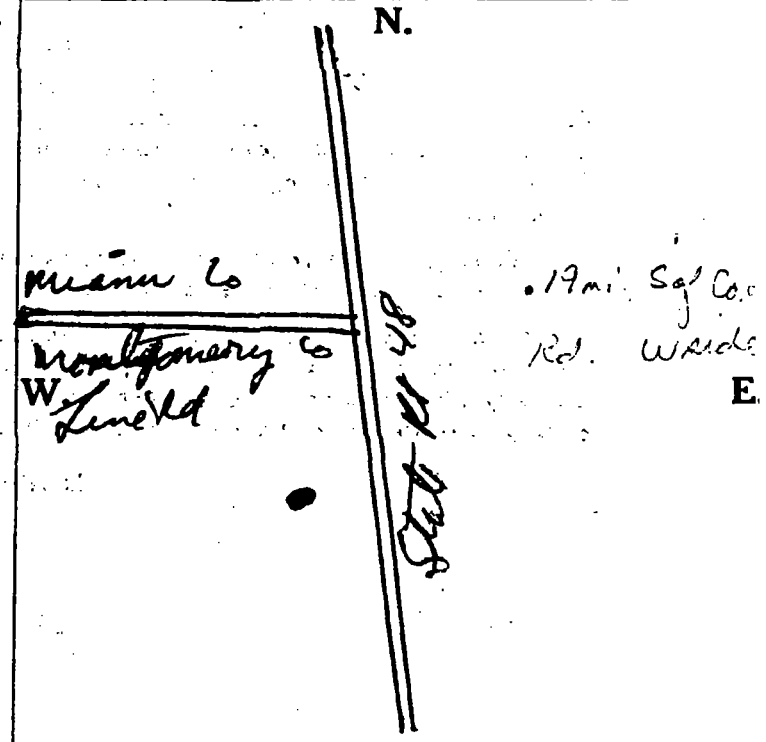
Pump installed by Kessler plg

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| old well | 0 Feet | 68 Ft. |
| Hard Blue Shale Rock | 68 | 115 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm John C Sull

Address Tura Ohio RR 1

Date 11-20-59

Signed John C Sull

28

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

ORIGINAL

№ 351691

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

County Montgomery Township Randolph Section of Township

Owner Clarence Winert Address RR1 Union Ohio

Location of property 1 mile S of County Line on St Rt 48

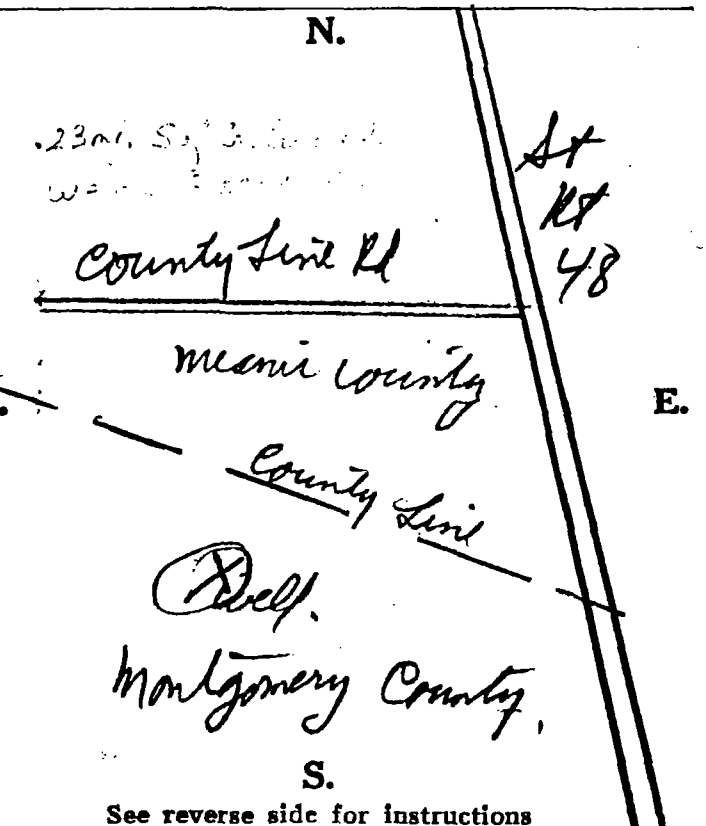
| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter ..... Length of casing ..... | Pumping Rate ..... G.P.M. Duration of test ..... hrs. |
| Type of screen ..... Length of screen ..... | Drawdown ..... ft. Date 10-23-67 |
| Type of pump Pulled Casing | Static level-depth to water 45.5 W ft. |
| Capacity of pump ..... | Quality (clear, cloudy, taste, odor) ..... |
| Depth of pump setting ..... | 1 GPM |
| Date of completion ..... | Pump installed by ..... |

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 1 Ft. |
| Limestone (Soft) | 1 | 28 |
| Blue clay & Rock | 28 | 54 |
| Blue Rock | 54 | 127 |
| Well #1 | | |
| 5541 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL WELL DRILLING-PUMPS Date 10-23-67

Address LAURA, O. RR. #1-MARKLEY RD.-PH. Signed Lorin C Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

468692

PERMIT # 6175
6176

County Montgomery Township Randolph Section of Township 3

Owner Billy D. Fisher (836-1232) Address 11897 Dayton Covington Pike, Union, Ohio (St. Rt 48)

Location of property 11897 Dayton Covington Pike

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 35 ft

Type of screen Length of screen

Type of pump 1/2h.p. Gould Sub, WX 202 tank ~~Dickens Adapter, 63 ft from pit~~

Capacity of pump adapter, 1" PVC Pipe

Depth of pump setting

Date of completion March 19, 1976

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 15 G.P.M. Duration of test 1/2 hr hrs.

Drawdown to 75 (TOD) ft. Date March 18, 1976

Static level-depth to water 35 ft.

Quality (clear, cloudy, taste, odor) clear

Well Capacity 15 GPM ?

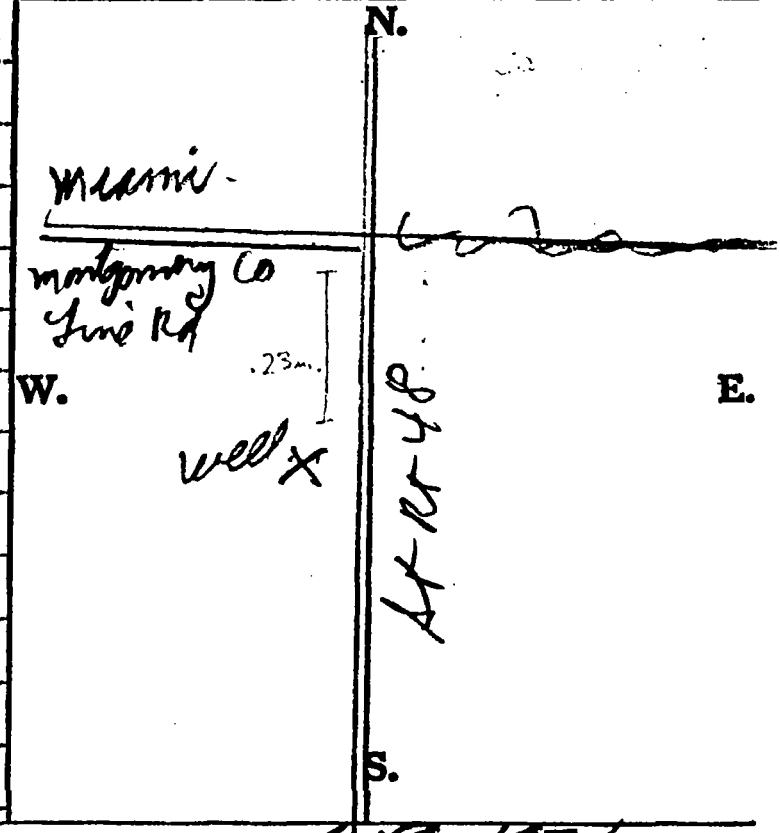
Pump installed by Snell Well Dlg.

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 2 Ft. |
| Limestone | 2 | 16 |
| Blue Clay | 16 | 28 |
| Blue Limestone | 28 | 40 |
| Grey Rock | 40 | 55 |
| Blue Rock | 55 | 75 |
| 8" hole to 28 ft- casing drove to 34 ~~grouted limestone dust.~~ OLD WELL FILLED LIMESTONE DUST. | | |
| 5541 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm Lorin C. Snell Well Drilling - Pump Date March 19 1976

Address 9313 Markley Rd. Laura, Ohio 45337 Phone 698-4222

Signed Lorin C. Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

№ 374018

County Montgomery Township Randolph Section of Township 36

Owner Wm Snyder Address RR 1 Union Ohio

Location of property 2 Mile South of Miamisburg Montgomery Co. Twin Rd on St Rt 48

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 31 ft

Type of screen _____ Length of screen _____

Type of pump 1/3 Hp Gould Sent. Pat adapt

Capacity of pump 42 gal tank.

Depth of pump setting 115 ft.

Date of completion 7-7-68

## BAILING OR PUMPING TEST

Pumping Rate _____ G.P.M. Duration of test _____ hrs.

Drawdown _____ ft. Date _____

Static level-depth to water 30 ft _____ ft.

Quality (clear, cloudy, taste, odor) _____

Capacity of well — 1 GPM.

Pump installed by Lorin C. Snell

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 3 Ft. |
| Soft Limestone | 3 | 10 |
| Blue clay | 10 | 15 |
| Blue Rock (some blue clay) | 15 | 62 |
| Hard blue Shale Rock | 62 | 132 |
| | | |
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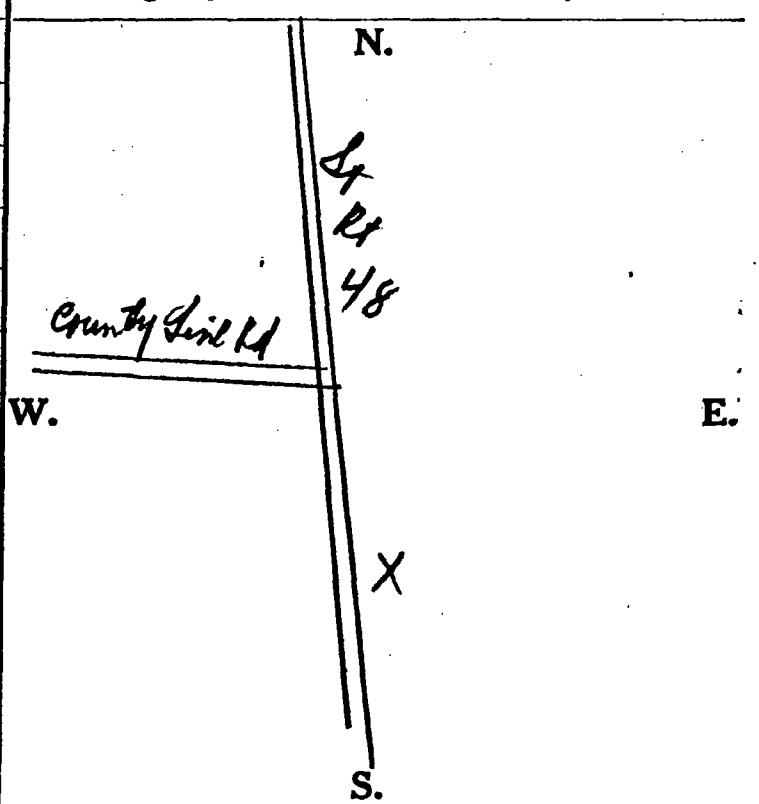
| 5541 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL WELL DRILLING—PUMPS Date 7-7-68

Address LAURA, O. RR. #1 MARKLEY RD.—PH. 698-4222 Signed Lorin C. Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

517297
Permit # 78S
78S5

COUNTY Mont TOWNSHIP Randolph SECTION OF TOWNSHIP 9

OWNER Clarence R Smith ADDRESS 3594 Phillsburg Union Rd

LOCATION OF PROPERTY ½ mile West of Rt 48 on the S/side Phillsburg Union Rd

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 25

Type of screen _____ Length of screen _____

Type of pump ½ Horse

Capacity of pump 8 GPM.

Depth of pump setting 65 Ft.

Date of completion 7-18-1978

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 2½ gpm Duration of test 3 hrs

Drawdown 45 ft Date 7-17-1978

Static level (depth to water) 20 ft

Quality (clear, cloudy, taste, odor) Clear

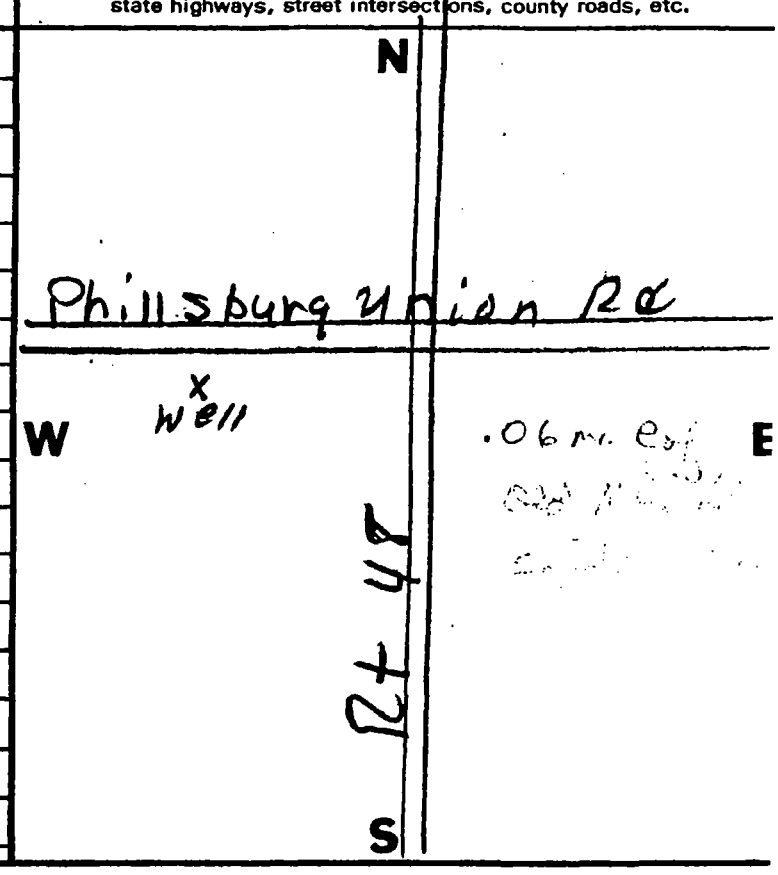
Pump installed by Homer Hall + Owner

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 4 ft |
| Limestone | 4 | 68 |
| 1299 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM Hall's Well Drilling DATE 7-18-1978

ADDRESS 4449 Derwent Dr. SIGNED Homer Hall

*If additional space is needed to complete well log, use next consecutive numbered form.

4

# WELL LOG AND DRILLING REPORT

ORIGINAL

26

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 418835

County Montgomery Township Randolph Section of Township 9

Owner Mr Bonecutter Address Rt 1 Phillipsburg Rd Union O.

Location of property Phillipsburg Rd. Union, Ohio

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 25'

Type of screen None Length of screen —

Type of pump Submersible

Capacity of pump 800 G.P.H.

Depth of pump setting 60'

Date of completion 9-11-71

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 15 G.P.M. Duration of test 1 hrs.

Drawdown 4 ft. Date 9/11/71

Static level-depth to water 40' ft.

Quality (clear, cloudy, taste, odor) Clear

Pump installed by Gene Renney

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 4 Ft. |
| Limestone | 4 | 49 |
| Clay + Gravel | 49 | 65 |
| Blue Shale | 65 | 71 |
| | | |
| Water at 49' | | |
| | | |
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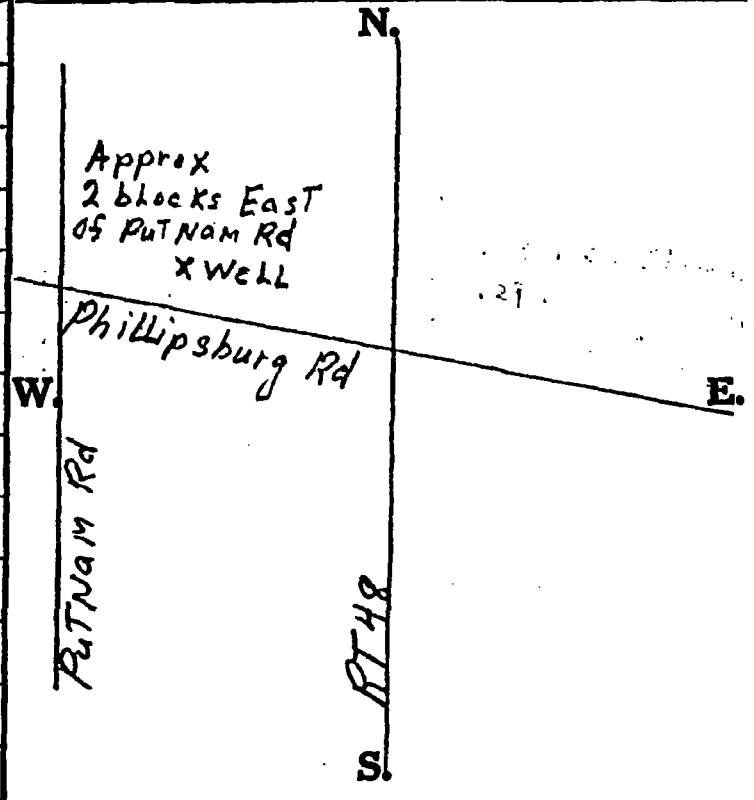
| | | |
| 1608 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm Triple A Well Drilling Date 9/11/71

Address 11661 Putnam Rd. Signed Gene Renney

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL

16d

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1500 Dublin Road
Columbus, Ohio

No. 200622

County Montgomery Township Randolph Section of Township

Owner George Manoff Address 16 Dublin ave Morgan Rd

Location of property 2 Mile S of Hillsboro Rd on Slaw Rd

| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter 5 5/8 Length of casing 9 | Pumping rate 24 G.P.M. Duration of test hrs. |
| Type of screen Length of screen | Drawdown 2 ft. Date March 27 1958 |
| Type of pump | Developed capacity 1500 GPH + |
| Capacity of pump | Static level—depth to water ft. |
| Depth of pump setting | Pump installed by |
| Date of completion | |

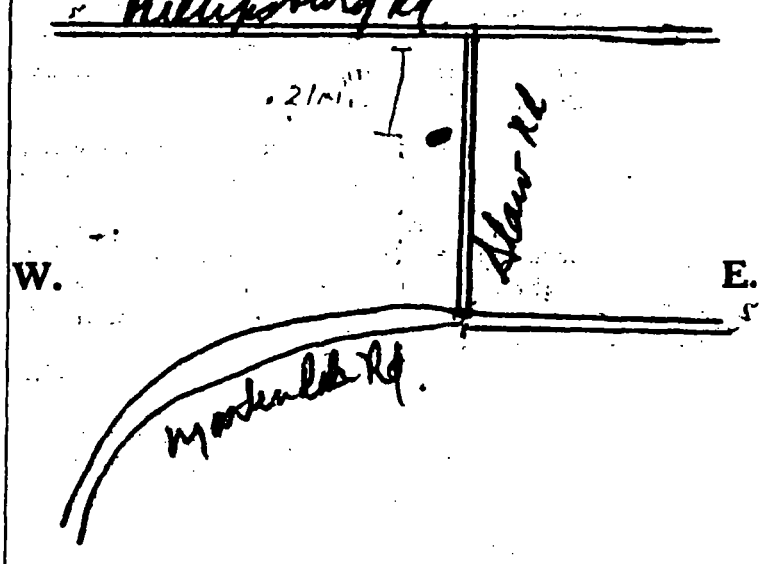
## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 4 Ft. |
| Limestone | 4 | 31 |
| Hit Spring over at 31 | | |
| Blue Rock | 31 | 58 |

5541

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




S.

See reverse side for instructions

Drilling Firm John C Snell Date 3-27-58

Address Laura Ohio RR1 Signed John C Snell

51

# WELL LOG AND DRILLING REPORT

ORIGINAL

16

NO. CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 394820

County Montgomery Township Randolph Section of Township 9

Owner Charles C. Lightner Address [illegible]

Location of property [illegible]

| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST (Specify one by circling) |
|---|---|
| Casing diameter 5 5/8 Length of casing 30' | Test Rate 2 1/2 G.P.M. Duration of test 2 hrs. |
| Type of screen None Length of screen | Drawdown 67 ft. Date 10-25-71 |
| Type of pump Myers Deep Well Submersible | Static level-depth to water 30 ft. |
| Capacity of pump 3 H.P. | Quality (clear, cloudy, taste, odor) |
| Depth of pump setting 90-92 ft. | |
| Date of completion ? | Pump installed by Myers Pump Co |

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 7 Ft. |
| Limestone | 7 | 80 |
| Blue Rock | 80 | 85 |
| Brown Rock | 85 | 95 |
| Gray Lime | 95 | 100 |
| | | |
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| | | |
| | | |
| 5028 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

W. E.

S.

Drilling Firm Jack D. Barnes Sons Date 10-25-71

Address 2235 Catalpa Dr. Dayton Signed Bryan T. Barnes Driller

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 419462

County MONTGOMERY Township Randolph Section of Township 10

Owner DALLAS BROCK Address OLD SPRINGFIELD

Location of property OLD SPRINGFIELD RD

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 26'5"

Type of screen — Length of screen

Type of pump SUB

Capacity of pump 5 GPM

Depth of pump setting 45 ft

Date of completion 2-28-72

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 3 G.P.M. Duration of test 2 hrs.

Drawdown NO ft. Date 1-18-72

Static level-depth to water 15 ft.

Quality (clear, cloudy, taste, odor) CLEAR

Pump installed by DRILLER

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| TOP SOIL | 0 Feet | 3 Ft. |
| BLAK | 3 | 15 |
| BLUE SHALE | 15 | 24 |
| LIME | 24 | 50 |
| | | |
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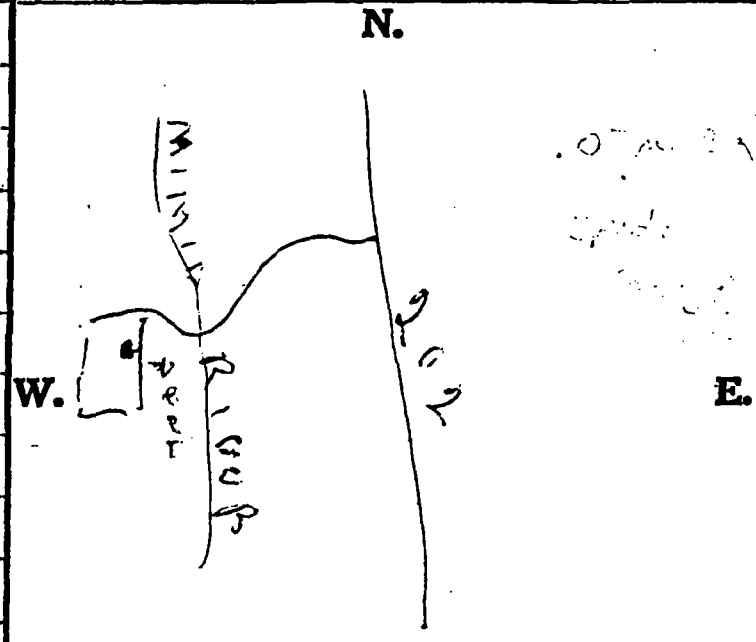
| | | |
| 1400 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm H.E. KIPP Date 2-21 72

Address 149 ROGERS ST XENIA OHIO Signed Harry E. Kipp

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

601872 (2d)

COUNTY Montgomery TOWNSHIP Randolph SECTION OF TOWNSHIP 5

OWNER Charles F. Kleptz ADDRESS Union, Oh

LOCATION OF PROPERTY 4217 Phillipsburg-Union Rd.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 26'-8"

Type of screen _____ Length of screen _____

Type of pump Shallow well Jet

Capacity of pump 5 GPM

Depth of pump setting 30'

Date of completion 3-6-82

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 12 gpm Duration of test 1 1/2 hrs

Drawdown 57 ft Date 3-1-82

Static level (depth to water) 3 ft

Quality (clear, cloudy, taste, odor) Clear

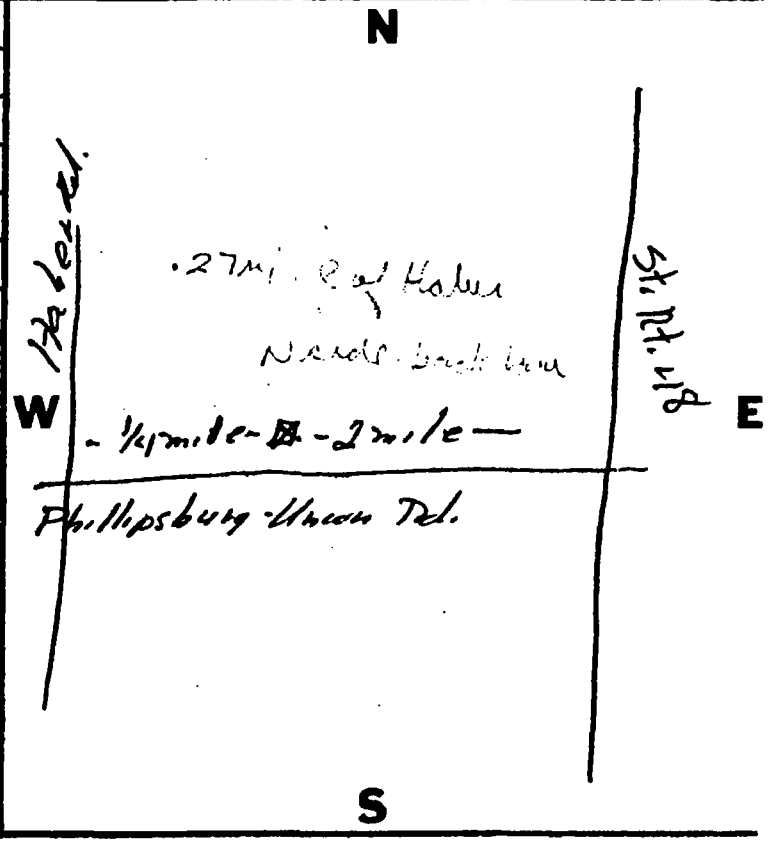
Pump installed by _____

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 9 ft |
| Limestone | 9 | 73 |
| Shale | 73 | 83 |
| 170S | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM R.E. Stoltz Well Drlg. DATE 3-6-82

ADDRESS 1683 Swailes Rd Troy, Oh SIGNED [signature]

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - ODNR, DIVISION OF WATER, FOUNTAIN SQ., COLS., OHIO 43224

19

X= 1,[illegible]
Y= 706,200S

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

№ 114908

County ~~Miami~~ MONTGOMERY Township ~~Union~~ RANDOLPH Section of Township or Lot Number ~~32~~ 4Y

Owner Jean Kendall Address Union RR #1

Location of property County line Rd - 1½ Mi. west of Route 48

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 10

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

## PUMPING TEST

Pumping rate 10 G.P.M. Duration of test 1 hrs.

Drawdown 4 ft. Date 10/31/53

Developed capacity

Static level—depth to water 7 ft.

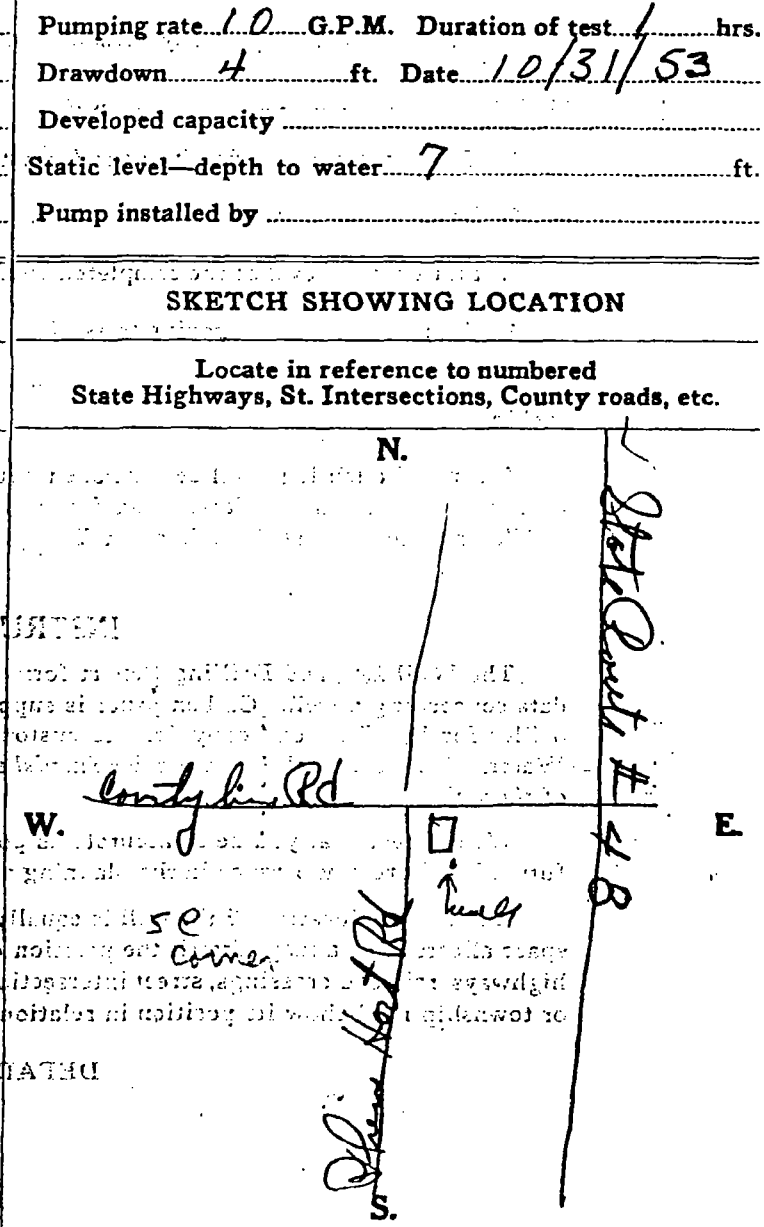
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| clay | 0 Feet | 5 Ft. |
| stone | 5 | 27 |
| clay | 27 | 31 |
| stone | 31 | 32 |
| Water at | 25 | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

1465

Drilling Firm Gilbert McCullough Date oct 31, 1953

Address Shelby Ohio Signed

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

518342

COUNTY Montgomery TOWNSHIP Randolph SECTION OF TOWNSHIP 4

OWNER Dennis Lochner ADDRESS Rinehart Rd, Union, Ohio

LOCATION OF PROPERTY 1/2 mile S of Miami Mont. Co. Line Rd on Rinehart Rd East S.

## CONSTRUCTION DETAILS

Casing diameter 5¼" OD with packer Length of casing 28 ft

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 3¼ gpm Duration of test 1hr hr.

Drawdown _____ ft Date Oct 29, 1979

Static level (depth to water) 7 ft to Water f

Quality (clear, cloudy, taste, odor) clear

MONDAY MORNING: 7 ft from top, bailed out 270 gal.

Pump installed by _____

## WELL LOG*

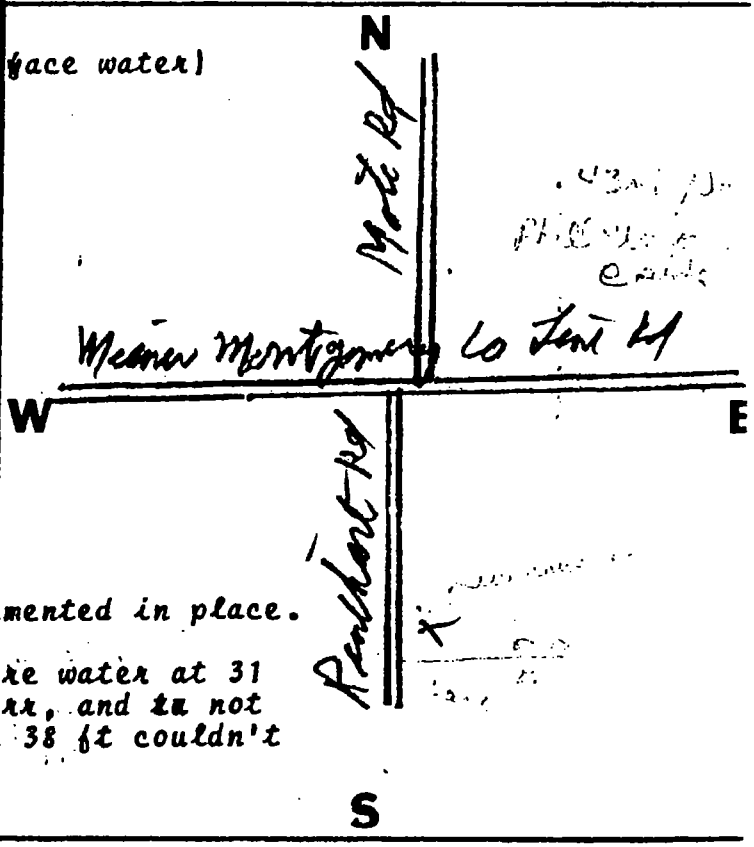
| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Dirt & Clay | 0 ft | 10 ft |
| Mud and sand | 10 | 12 (surface water) |
| Limestone | 10 | 22 |
| Blue Clay | 22 | 25 |
| Hard Light blue rock | 25 | 42 |
| Whtte and Brown rock | 42 | 52 |
| Hard blue rock | 52 | 57 |
| blue rock | 57 | 65 |
| grey rock | 65 | 82 |
| blue rock | 82 | 94 |
| blue clay & rock | 94 | 102 |
| Hard blue shale rock | 102 | 105 |

17 ft 8" pipe left in hole, 5¼" cemented in place.

REGARDING SURFACE WATER:
first checked at 28 ft, 5¼ GPM, more water at 31 could be because bailer hole deeper, and is not taking as long to fill bailer. At 38 ft couldn't bail dry. (bailer 20 ft long)

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




5541

DRILLING FIRM Lorin C. Snell
~~8313 W. Markley Road~~
Laura, Ohio 45337
~~698-4222~~

ADDRESS

DATE Oct 7, 1979

SIGNED Lorin C. Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

# WE . LOG AND DRILLING REI RT

ORIGINA

PLEASE USE PENCIL
OR TYPEWRITER
DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

Nº 32289

County Montgomery Township Randolph Section of Township 4

Owner Carl McGillvary Address RR 1 Union

Location of property OLD MILL Rd 500' So. of Miami Co. Line Rd
½ mile west of ST RT 48

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 23

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 1 G.P.M. Duration of test 2 hrs.

Drawdown ft. Date 4-21-66

Static level-depth to water 12 ft.

Quality (clear, cloudy, taste, odor)
1 G.P.M. Total cap.

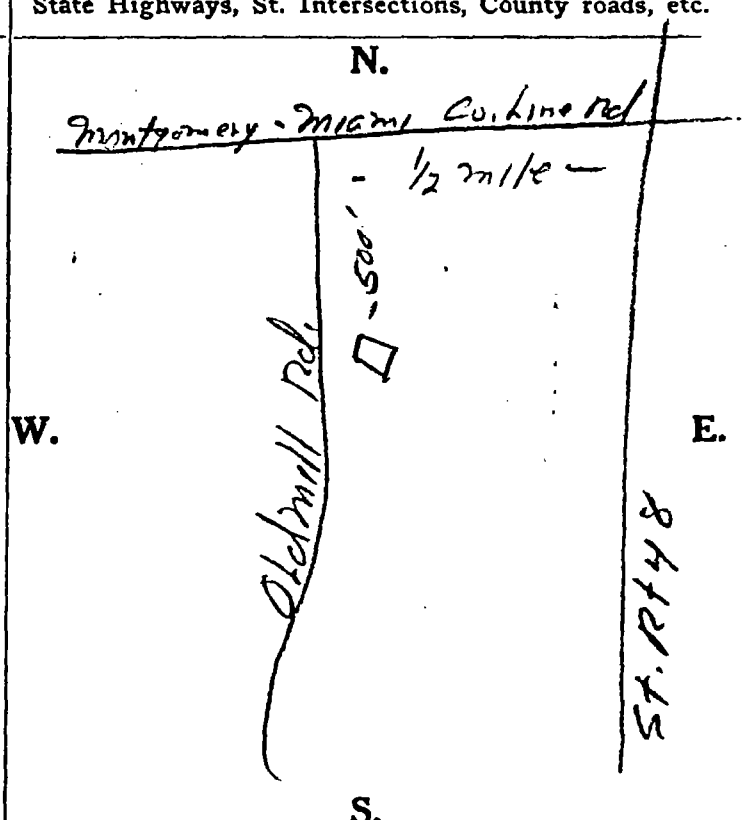
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 12 Ft. |
| Shale | 12 | 110 |
| 1705 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Stolte Well Drilling Date 4-21-66

Address Troy, O Signed [illegible]

22

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

518341

COUNTY Montgomery TOWNSHIP Randolph SECTION OF TOWNSHIP 4

OWNER Jay C Cassell, Jr ADDRESS 7630 Mote Rd, Union, Ohio

LOCATION OF PROPERTY Old Mill Road 1/2 mile south of Miami Mont. Co Line Rd.

## CONSTRUCTION DETAILS

Casing diameter _____ Length of casing _____

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate _____ gpm Duration of test _____ hrs

Drawdown _____ ft Date _____

Static level (depth to water) _____ ft

Quality (clear, cloudy, taste, odor) _____

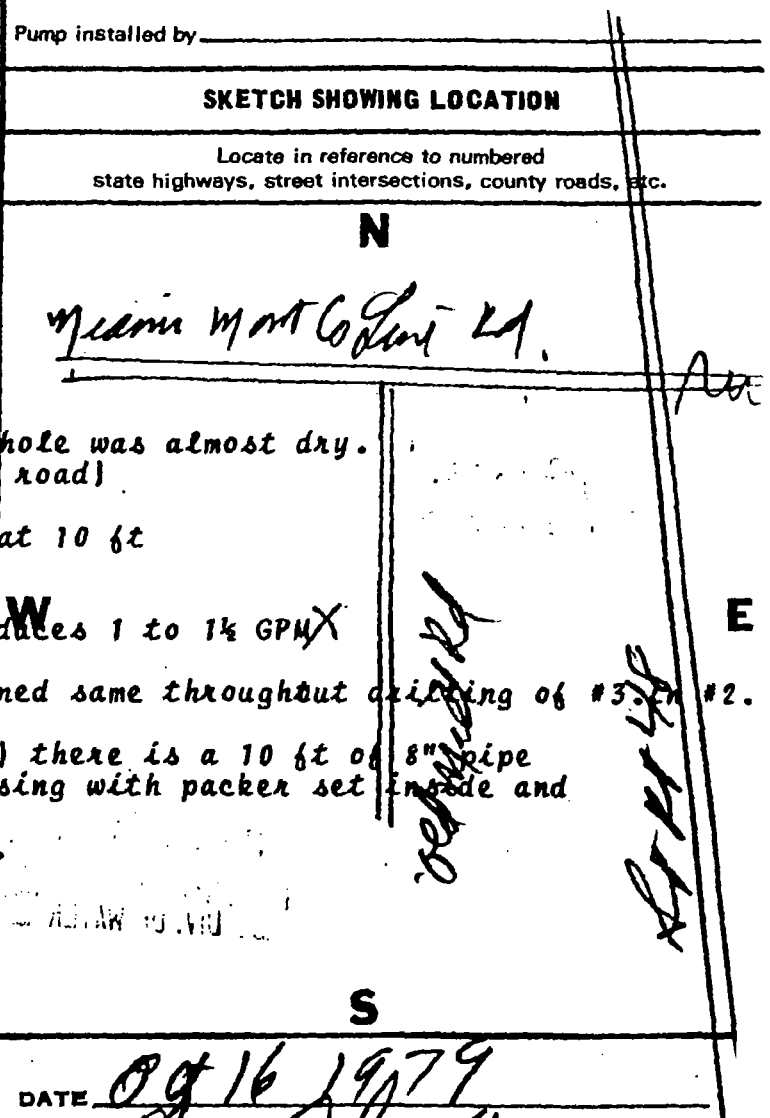
Pump installed by _____

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| TEST HOLE # 1: (on top of hill) | | ft |
| ~~rt & Clay~~ | ~~0~~ | ~~14~~ |
| Limestone | 14 | ~~22~~ 32 |
| Grey Rock | 32 | 42 |
| ~~Blue Clay & Rock~~ | ~~42~~ | ~~50~~ |
| Hard Blue rock | 50 | 75 |
| Blue Clay & Rock | 75 | 98 |
| ~~Hard Blue shale rock~~ | ~~98~~ | ~~158~~ #1 hole was almost dry. |
| TEST HOLE # 2: (farther east, closer to road) | | |
| Dirt & clay | 0 | 15 |
| ~~streak of sand & mud with surface water~~ at 10 ft | | |
| Grey rock (hard) | 15 | 35 |
| Blue clay & rock | 35 | 68 |
| Hard blue shale rock | 68 | 85 Produces 1 to 1½ GPM |
| PRODUCTION WELL #3: (5 ft away from #2) | | |
| Formations same as #2- Water level remained same throughout drilling of #3 in #2. | | |
| The two are not connected. | | |
| 8" hole drilled top to bottom (to 120 ft) there is a 10 ft of 8" pipe | | |
| left in #3 hole, with 21 ft of 5¾" OD casing with packer set inside and | | |
| cemented in place. | | |
| WELL #3 RECOVERS about 135 gal OVERNIGHT. | | |
| | | |
| | | |
| 5541 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM Lorin C. Snell
ADDRESS 9313 W. Markley Road
Laura, Ohio 45337
698-4222

DATE Oct 16 1979

SIGNED Lorin C. Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

591143

COUNTY Montgomery TOWNSHIP Randolph SECTION OF TOWNSHIP Northeast

OWNER Willy Quinter ADDRESS 11628 Old Hill Rd.

LOCATION OF PROPERTY 1/2 mile North of Union-Phillipsburg Rd. West side of Old Hill Rd.

## CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 43'

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 10+ gpm Duration of test 4 hrs

Drawdown 35 ft Date _____

Static level (depth to water) 7 ft

Quality (clear, cloudy, taste, odor) Clear

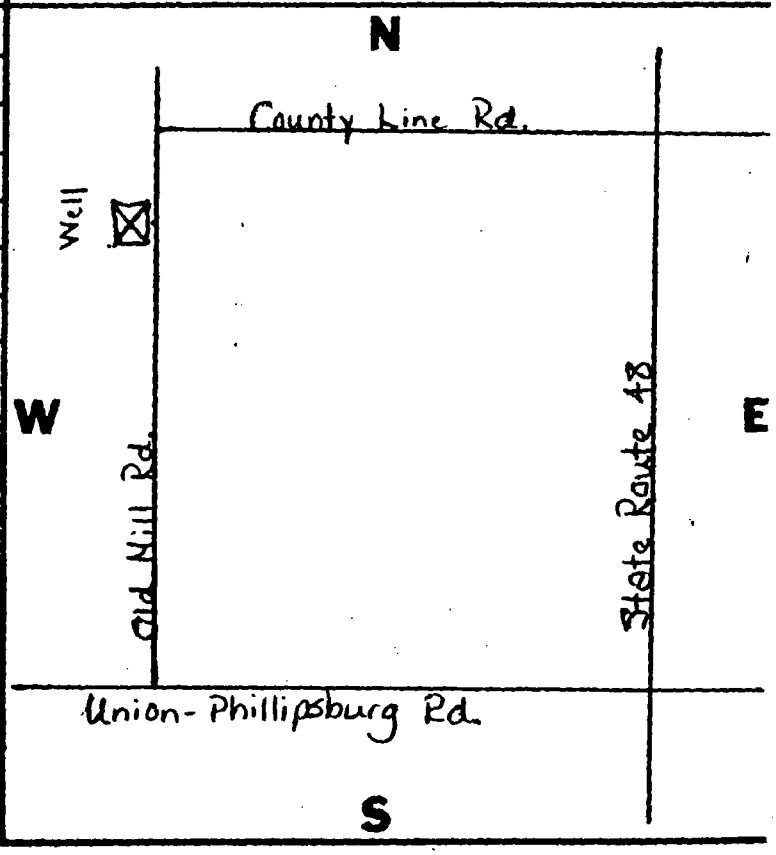
Pump installed by Owner

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Topsoil & Clay | 0 ft | 7 ft |
| Limestone | 7 ft. | 60 ft. |
| Limebreaks & Blue Shale | 60 ft. | 93 ft. |
| Brown Shale | 93 ft. | 95 ft. |
| Blue Shale | 95 ft. | 104 ft. |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM M.D. & I. Well Drilling DATE 4-08-81

ADDRESS 8750 S. 2nd. St. R.R.#1 Tipp City SIGNED George E. Bonville

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - OPND DIVISION OF WATER FOUNTAIN SQ COLS OHIO 43224

# WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

23c

598290

COUNTY Montgomery TOWNSHIP Randolph SECTION OF TOWNSHIP 4T 5, R5 E

OWNER Morland McCarty ADDRESS 6373 County Line Rd.

LOCATION OF PROPERTY Same

## CONSTRUCTION DETAILS

Casing diameter 8" Length of casing 150'

Type of screen Plastic Length of screen 30'

Type of pump Submersible

Capacity of pump 15 GPM

Depth of pump setting 144'

Date of completion Sept 13, 1982

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 4 gpm Duration of test 3 h

Drawdown Total ft Date Sept 13, 198

Static level (depth to water) 44

Quality (clear, cloudy, taste, odor) Clear

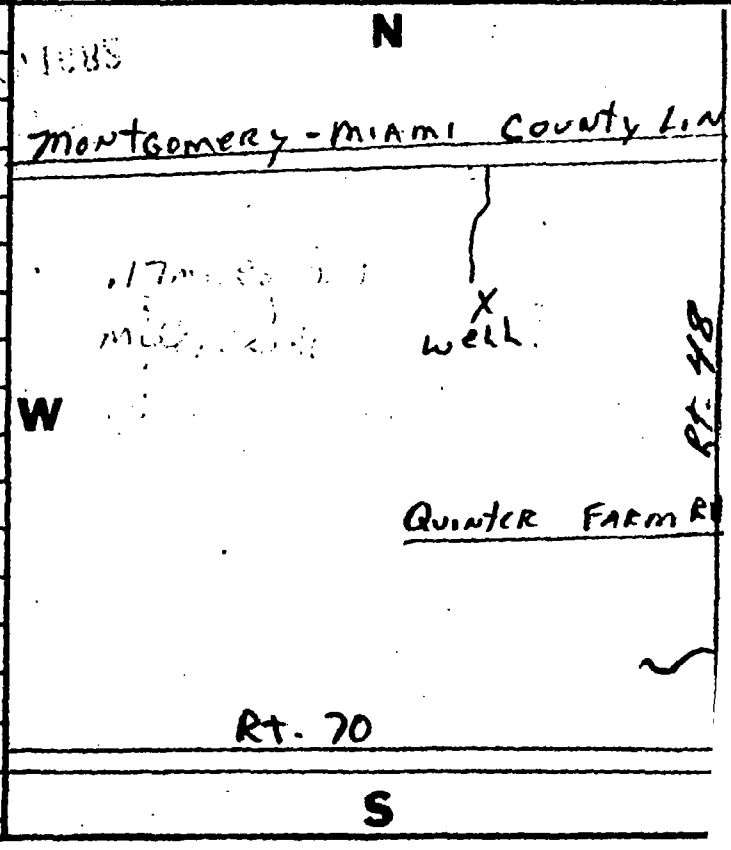
Pump installed by Chas. E Hamilton

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 4 ft |
| Sandstone | 4 | 20 |
| Limestone | 20 | 44 |
| Shale | 44 | 93 |
| Limestone | 93 | 126 |
| Shale | 126 | 150' |
| 5255 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM Hamilton Well Drilling DATE Sept 13, 1982

ADDRESS 616 Waneta Ave SIGNED Chas E Hamilton

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY – ODNR DIVISION OF WATER FOUNTAIN SQ COLS OHIO 43224

# WELL LOG AND DRILLING REPORT

ORIGINAL
23

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

№ 373192

County Montgomery Township Randolph Section of Township Randolph

Owner L. G. Studebaker Address 223 West Hamilton West Milton, Oh

Location of property 2 mile West of S.R. #48 on County Line Rd.

## CONSTRUCTION DETAILS

Casing diameter 6" OD Length of casing 35'

Type of screen — Length of screen —

Type of pump 1/3 Sub

Capacity of pump 480 GPH

Depth of pump setting 120'

Date of completion 9/4/68

## BAILING OR PUMPING TEST

Pumping Rate 5 G.P.M. Duration of test 3 hrs.

Drawdown 77' ft. Date 8/31/68

Static level-depth to water 38' ft.

Quality (clear, cloudy, taste, odor) Clear

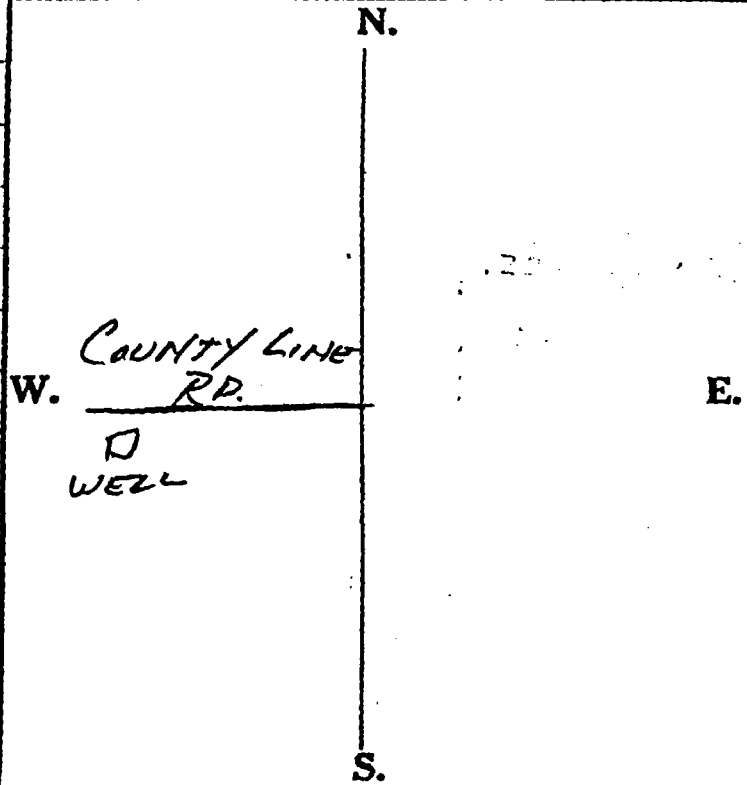
Pump installed by Ray Heckman

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| top soil & Clay | 0 Feet | 16 Ft. |
| Blue Shale | 16 | 130 |
| Note - 4" OD. Liner | | |
| to 130 ft. | | |
| 1734 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Heckman Well Drilling Date 9/4/68

Address 920 E. Lowrie St. Troy City, Ohio 45371 Signed George G. Thompson (Driller)

*If additional space is needed to complete well log, use next consecutive numbered form.

# GARLAND ROAD TEST PIT SUMMARY

| Test Pit # | Date | Location | Depth Observations |
|---|---|---|---|
| TP1A | 10/11/94 | Area V | 2 ft Dark Sandy Loam mixed debris<br>N side 4 ft Brown Sandy Gravel<br>mixed debris plastic, metal<br>5 ft MT 55 drum<br>5-7 ft 5 x 5 gal, 2 x 55 gal<br><br>Width 8 ft, Length 10 ft |
| TP1B | 10/11/94 | Area V | 2 ft Dark Sandy Loam mixed debris,<br>S side 4 ft Tan Sandy Gravel mixed debris<br>plastic, foam, metal<br>5-7 ft crushed cardboard quart oil containers<br><br>Width 8 ft, Length 10 ft |
| TP2 | 10/11/94 | Area I | 2 ft Dark Organic Loam<br>S fence 4 ft Dark Organic Loam Gravel<br>Width 8 ft, Length 15 ft |
| TP3 | 10/11/94 | Area IV<br><br>Staging Area | 2 ft Tan Sandy Loam Gravel<br>plastic, dash debris<br>4 ft tan Sandy Gravel Drum carcass<br><br>Width 8 ft, Length 25 ft |
| TP4 | 10/11/94 | Area IV<br><br>Staging Area | 2 ft Tan Sandy Loam Gravel<br>plastic, dash debris<br>4 ft Tan Sandy Gravel<br><br>Width 8 ft, Length 25 ft |
| TP5 | 10/11/94 | Area IV<br><br>Staging Area | 2 ft Tan Sandy Loam Gravel<br>plastic, dash debris<br>4 ft Tan Sandy Gravel<br><br>Width 8 ft, Length 25 ft |
| TP6 | 10/11/94 | Area IV | 2 ft Tan Sandy Gravel<br>plastic, dash debris<br>4 ft Tan Sandy Gravel<br><br>Width 8 ft, Length 20 ft |
| TP7 | 10/11/94 | Area II | 2 ft Dark Sandy Loam Gravel<br>*mixed debris, water heater*<br>4 ft Tan Sandy Gravel<br><br>Width 8 ft, Length 25 ft |

| | | | |
|---|---|---|---|
| TP8 | 10/11/94 | Area II | 2 ft Dark Sandy Loam Gravel<br>mixed debris, plastic<br>4 ft Tan Sandy Gravel<br><br>Width 8 ft Length 25 ft |
| TP9 | 10/12/94 | Area IV | 1 ft Tan Sandy Loam Gravel<br>mixed debris, plastic, metal<br>2-3 ft Tan Sandy Gravel<br><br>Width 8 ft, Length 20 ft |
| TP10 | 12/2/94 | Area IV | 1 ft Tan Sandy Loam Gravel<br>mixed debris, plastic, metal<br>2-3 ft Tan Sand Gravel<br><br>Width 6 ft, Length 25 ft |
| TB 11 | 11/17/94 | Area I<br>D&G | 3 ft Dark Sandy Loam mixed debris<br>plastic, dash material, foam<br><br>Width 2 ft, Length 15 ft |
| TP12 | 11/17/94 | Area I<br>D&G | 3 ft Dark Sandy Loam mixed debris<br>plastic, dash material, foam<br><br>Width 2 ft, Length 15 ft |
| TP13 | 11/17/94 | Area I<br>D&G | 3 ft Dark Sandy Loam mixed debris<br>plastic, dash material, foam<br><br>Width 2 ft, Length 15 ft |
| TP14 | 1/5/95 | Area IV<br><br>River Bank | Surficial MT 55<br>2 ft Dark Sandy Loam<br>6 ft Dark Sandy Loam Gravel<br>no debris<br>PID=DL<br><br>Width 2 ft, Length 6 ft |
| TP15 | 1/5/95 | Area IV<br><br>Berm | Surficial MT 2 x 5 Ag<br>2 ft Dark Loam, Tire<br>4 ft Dark Sandy Loam<br>PID=DL<br><br>Width 2 ft, Length 6 ft |

| | | | |
|---|---|---|---|
| TP16 | 1/5/95 | Area IV<br>a series of<br>3 Test Pits | Surficial MTs 3 x 55s<br>2 ft Dark Sandy Loam<br>5 ft Dark Sandy Loam Gravel<br>MT 5 gal minor debris, tires, car parts<br>PID=DL |
| | | each | Width 2 ft, Length 6 ft |
| TP17 | 1/6/95 | Area IV<br><br>Roadway<br>S end | Surficial Trash Burner<br>2 ft Tan Sandy Gravel<br>6 ft Tan Sandy Gravel<br>PID=DL |
| | | | Width 2 ft, Length 6 ft |
| TP18 | 1/6/95 | Area IV<br><br>a series of<br>2 Test Pits<br>roadway<br>midway | Surficial MT 55 x 5 gal<br>2 ft Tan Sandy Loam Gravel<br>mixed debris, auto parts, metal,<br>tires, construction<br>4 ft Dark Sandy Gravel mixed debris<br>5 gal MT, auto parts, tubing, wheels<br>PID=DL |
| | | each | Width 2 ft, Length 6 ft |
| TP19 | 1/6/95 | Area IV | Surficial MT 55, Metal Trough<br>2 ft Dark Sandy Loam<br>6 ft Sandy Loam Gravel<br>PID=DL |
| | | each | Width 2 ft, Length 6 ft |
| TP20 | 1/6/95 | Area IV<br>haul road<br>back of<br>staging | Surficial MT 55, Metal<br>2 ft Dark Sandy Loam Gravel<br>mixed debris metal, rubber, plastic<br>4 ft Sandy Loam Gravel<br>dense area mixed debris<br>6 ft Sandy Gravel<br>PID=500 |
| | | | Width 2 ft, Length 6 ft |
| TP21 | 1/6/95 | Area IV<br>10 ft S<br>of TP 20 | 2 ft Dark Sandy Loam Gravel<br>4 ft Sandy Gravel mixed debris<br>rubber, plastic, metal<br>6 ft Sandy Gravel<br>PID=DL |
| | | | Width 2 ft, Length 6 ft |

| | | | |
|---|---|---|---|
| TP22 | 1/6/95 | Area IV<br><br>haul road<br>E of Staging<br>area | 2 ft Sandy Loam Gravel<br>dispersed mixed debris<br>plastic, dash, metal<br>4 ft Sandy Gravel mixed debris<br>6 ft Sandy Gravel<br>PID=DL<br><br>Width 2 ft, Length 6 ft |
| TP23 | 1/6/95 | Area IV<br><br>roadway<br>north | 2 ft Tan Sandy Loam Gravel<br>mixed debris, construction, auto, trash<br>4 ft Tan Sandy Gravel mixed debris<br>MT 5, auto, construction, trash<br>6 ft Sandy Gravel mixed debris<br>PID=DL<br><br>Width 2 ft, Length 6 ft |
| TP24 | 1/6/95 | Area IE<br>E of HL4<br>S of HL3<br>20 ft | 2 ft Dark Sandy Loam<br>4 ft Dark Sandy Loam<br>debris, 55 gal drums<br><br>Width 2 ft, Length 6 ft |
| TP25 | 1/6/95 | Area IE<br>E of HL4<br>S of HL3<br>40 ft | 2 ft Dark Sandy Loam<br>4 ft Dark Sandy Loam<br>55 gal Drums<br><br>Width 2 ft, Length 6 ft |
| TP26 | 3/21/95 | Area V<br><br>bend in<br>road | 2 ft Tan Sandy Loam Gravel<br>mixed debris, trash<br>4 ft Sandy Gravel Grey-Black<br>mixed debris, trash, wood<br>6 ft Sandy Gravel Brown-Black<br>mixed debris, trash, wood<br>PID=DL<br><br>Width 2 ft, Length 15 ft |

| | | | |
|---|---|---|---|
| TP27 | 3/23/95<br>3/27 & 3/30 | Area V<br><br>N of<br>Pad III | 2 ft Tan Sandy Loam Gravel<br>mixed debris, trash, auto muffler<br>4 ft Sandy Gravel Grey-Brown<br>mixed debris, trash, metal, rubber<br>2 MT drum, 1 drum asbestos<br>6 ft Sandy Gravel Grey-Dark Brown<br>mixed debris, pipe, plastic, tire, rubber, trash<br>8 ft Dark Sandy Loam Gravel<br>1 drum asbestos, 2 drums,<br>mixed debris, plastic<br>10 ft Dark Sandy Loam Gravel<br>8 drums, 1 yd soil, mixed debris<br>12 ft Dark Sandy Loam Gravel<br>light debris<br>PID= (soil 100 drums -150)<br><br>Width 8 ft (center), Length 25 ft |
| TP28 | 3/23/95 | Area V<br><br>6 ft W<br>TP1 | 2 ft Dark Brown Sandy Loam Gravel<br>mixed debris, trash<br>4 ft Sandy Gravel brown-black<br>mixed debris, plastic, trash<br>6 ft Sandy Gravel, grey, brown-black<br>MT 6 gal, mixed debris, trash, tire<br>rubber, plastic<br>7 ft Sandy Gravel brown-black<br>impacted soil, mixed trash, plastic<br>PID = DL-500<br><br>Width 2 ft, Length 30 ft |
| TP29 | 3/23/95 | Area V<br><br>6 ft E<br>TP1 | 2 ft Dark Brown Sandy Loam Gravel<br>mixed debris, trash<br>4 ft Sandy Gravel, grey, brown-black<br>mixed debris, trash<br>6 ft Sandy Gravel grey, brown-black<br>mixed debris, trash, Qt. oil cont.<br>7 ft Sandy Gravel brown black<br>mixed debris, plastic<br>PID=DL<br><br>Width 2 ft, Length 25 ft |
| TP30 | 3/24/95 | Area IV<br><br>E-W | 2 ft Dark Tan-Brown Sandy Loam<br>4 ft Sandy Loam Gravel brown-black<br>mixed debris, trash, plastic<br>6 ft Sandy Gravel 5 in. grey lens<br>@ 5 ft brown-black, Laundry Washer<br>mixed debris, trash, plastic, wood<br>8 ft Sandy Gravel brown-black, plastic<br>PID=DL<br>Width 2 ft, Length 25 ft |

| | | | |
|---|---|---|---|
| TP31 | 3/27/95 | Area V<br><br>E to W<br>S of<br>TP1 | 2 ft Dark Tan-Brown Sandy Loam Gravel<br>4 ft Sandy Gravel grey-brown<br>mixed debris, trash, plastic, metal<br>6 ft Sandy Gravel brown-grey @ E end<br>mixed debris, plastic, trash, wood<br>7 ft Sandy Gravel brown-black<br>2x5 gal MT 2x5 gal carcass PID=DL<br>PID=DL<br><br>Width 2 ft, Length 25 ft |
| TP32 | 3/27/95 | Area III<br>along<br>ridge<br><br>N-S | 2 ft Dark Tan-Brown Sandy Loam<br>4 ft Sandy Gravel brown-tan<br>6 ft Sandy Gravel black-grey<br>mixed debris, trash, plastic<br>PID=DL<br><br>Width 2 ft, Length 25 ft |
| TP33 | 3/27/95 | Area III<br>S of<br>II-III<br>line<br><br>E-W | 2 ft Dark Brown Sandy Loam<br>4 ft Sandy Gravel, grey-black<br>mixed debris, plastic, metal,<br>wood, trash<br>2 drums @ E end (paint)<br>6 ft Sandy Gravel grey-black<br>mixed debris, wood, plastic, rubber<br>tires, trash, 2 drum carcass @ E end<br>8 ft Sandy Gravel grey-black<br>mixed debris, wood, plastic, rubber<br>tires, trash<br>PID=DL<br><br>Width 2 ft, Length 30 ft |
| TP34 | 3/28/95 | Area IG | 2 ft Dark Sandy Loam<br>MT 5 gal drums, mixed debris<br>4 ft Dark Sandy Loam/Tan Sandy Loam<br>mixed debris, plastic, dash<br>6 ft Tan-Orange Sandy Loam S end<br>plastic, dash, metal banding N end<br>8 ft Brown Sandy Loam large metal<br>objects, N end banding,<br>homogenous soil S end<br>10 ft Brown Sandy Loam,<br>PID=DL<br><br>Width 2 ft, Length 37 ft |

| | | | |
|---|---|---|---|
| TP35 | 3/28/95 | Area IG | 2 ft Dark Sandy Loam<br>4 ft Dark Sandy Loam/Tan Sandy Gravel<br>plastic E end, 5 gal drums W end,<br>6 ft Brown Sandy Loam plastic E end,<br>W end orange paint material<br>8 ft Brown Sandy Loam, plastic E end<br>10 ft Brown Sandy Loam,<br>homogenous soil<br>PID (soil=DL, 5 gal drum=12)<br><br>Width 2 ft, Length 58 ft |
| TP36 | 3/28/95 | Area IG | 2 ft Dark Sandy Loam<br>55 gal paint drum W end<br>plastic, dash<br>4 ft Dark Sandy Loam<br>plastic, dash<br>6 ft Dark Sandy Loam<br>8 ft Dark Sandy Loam<br>homogenous soil<br>10 ft Dark Sandy Loam<br>homogenous soil<br>PID (soil=DL, 55 gal drum=55)<br><br>Width 2 ft, Length 2 ft |
| TP37 | 3/31/95 | Area IG | 6 inch - 2 ft Tan Sandy Gravel<br>4 ft Brown Sandy Gravel w/plastic, dash debris |
| | | NW-SE | 6 ft Dark Sandy Loam; homogenous soil<br>8 ft Dark Sandy Loam; homogenous soil<br><br>Width 2 ft, Length 25 ft |
| TP38 | 3/31/95 | Area IG | 1 ft Tan Sandy Gravel<br>6 ft Brown Sandy Gravel w/plastic, dash debris<br>One RCRA empty found midway in trench |
| | | E-W | 8 ft Dark Sandy Loam; homogenous soil<br><br>Width 2 ft, Length 30 ft |
| TP39 | 3/31/95 | Area IG | 1 ft Tan Sandy Gravel<br>3 ft Brown Sandy Gravel w/plastic, dash debris |
| | | E-W | 5 ft Dark Sandy Loam; homogenous soil<br>6 ft Dark Sandy Loam; homogenous soil |
| TP40 | 4/1/95 | Area IE | 2 ft Tan Sandy Gravel<br>8 ft Brown Sandy Gravel w/plastic, dash<br>debris, metal banding. Six RCRA empties |
| | | N-S | 16 ft Dark Brown Loam; Minimal debris.<br><br>Width 2 ft, Length 25 ft |

| | | | |
|---|---|---|---|
| TP 41 | 4/1/95 | Area IE | 2 ft Tan Sandy Gravel<br>8 ft Brown Sandy Gravel 2/plastic, dash debris, banding material |
| | | N-S | 18 ft Dark Brown Loam; Minimal debris |
| | | | Width 2 ft, Length 30 ft |
| TP42 | 4/1/95 | Area IE | 3ft Tan Sandy Gravel<br>8 ft Brown Sandy Gravel w/plastic, dash debris |
| | | N-S | 16 ft Dark Brown Loam; Minimal debris. |
| | | | Width 2 ft, Length 25 ft |
| TP43 | 4/10/95 | Area IG | 1 ft Tan Sandy Gravel<br>3 ft Plastic, dash debris<br>12 ft Homogenous brown gravel material |
| | | | Width 2 ft, Length 30 ft |
| TP44 | 5/2/95 | Area IIB | 1 ft Tan Sandy Gravel<br>6 ft Municipal Waste, dash debris |
| | | E-W | |
| | | | Width 2 ft, Length 30 ft |
| TP45 | 5/2/95 | Area II | 1 ft Tan Sandy Gravel<br>1.5 ft Grey Gravel Vein<br>6 ft Municipal waste, some dash debris |
| | | E-W | 8 ft Dash debris |
| | | | Width 2 ft, Length 30 ft |
| TP46 | 5/2/95 | Area II | 2 ft Tan sandy Gravel<br>8 ft Municipal waste, dash debris |
| | | N-W | 10 ft Dash debris |
| | | | Width 2 ft, Length 45 ft |
| TP47 | 5/8/95 | Area IIB | .5 ft Tan Sandy Gravel<br>4 ft Municipal waste, some dash debris |
| | | E-W | 7 ft Light municipal waste |
| | | | Two drums were found at opposite ends of excavation. No impacted soil. |
| | | | Width 2 ft, Length 25 ft |

| | | | |
|---|---|---|---|
| TP48 | 5/8/95 | Area IIB | .5 ft Tan Sandy Gravel<br>6 ft Municipal waste, dash debris<br>8 ft Light municipal debris |
| | | N-S | A potential "cache" of drums were located at the south end of the excavation. Several drums were removed, w/more visible<br><br>Width 2 ft, Length 35 ft |
| TP49 | 5/8/95 | Area IIB | .5 ft Tan Sandy Gravel<br>5 ft Municipal waste; dash debris<br>3 ft Light municipal debris |
| | | NE-SW | Black impacted soil was found in the southwest end of the trench. PID readings were @ 200 PPM.<br><br>Width 2 ft, Length 40 ft |
| TP 50 | 5/8/95 | Area IIB | "Cache" of drums were found on the first swipe of the bucket. At least 10 drums became visible. Extent of the "cache" is unknown. |
| TP51 | 5/8/95 | Area IIB | 1 ft Tan Sandy Gravel<br>2 ft Dash debris |
| | | NE-SW | 6 ft Dark brown clean fill<br>10 ft Municipal debris<br><br>No drums or impacted materials were found in the excavation.<br><br>Width 2 ft, Length 25 ft |
| TP52 | 5/8/95 | Area IIB | 2 ft Tan sandy gravel<br>3 ft Dash debris |
| | | E-W | 5 ft Brown clean fill<br>8 ft Municipal debris<br><br>No drums or impacted materials were found in the excavation.<br><br>Width 2 ft, Length 25 ft |
| TP53 | 5/8/95 | Area II | 3 ft Tan sandy gravel<br>6 ft Dash debris<br>8 ft Mixed municipal/dash debris<br><br>No drums or impacted materials were found in the excavation.<br><br>Width 2 ft, Length 33 ft |

| | | | |
|---|---|---|---|
| TP54 | 5/19/95 | Area IIB | .5 ft Tan sandy gravel<br>6 ft Dash debris/ municipal debris |
| | | N-S | 10 ft Light municipal debris<br><br>No drums or impacted material found in the excavation.<br><br>Width 2 ft, Length 15 ft |
| TP55 | 5/19/95 | N of IIB<br>N-S | 1 ft Tan sandy gravel<br>6 ft Municipal debris<br><br>No drums or impacted material found in the excavation.<br><br>Width 2 ft, Length 15 ft |
| TP56 | 5/23/95 | Area IIB | 8 ft Dash debris/ municipal waste<br>10 ft Dark brown homogenous material |
| | | N-S | Excavation was placed in the bottom of the first excavation in Area IIb. Total depth from original grade was approximately 15 ft.<br><br>Width 2 ft, Length 15 ft |
| TP57 | 5/31/95 | Area IIB | 2 ft Tan sandy gravel<br>8 ft Heavy dash debris, municipal waste<br>15 ft Light municipal debris |
| | | N-S | Two drums and 3 RCRA empties were removed from the excavation. No "caches" were found.<br><br>Width 2 ft, Length 30 ft |
| TPA | 6/29/95 | | 15 ft x 3 ft x 4 ft deep<br>PID=ND<br>All native, no debris<br>Brown moist, silty sand, trace gravel |
| TPB | 6/29/95 | | 15 ft x 3 ft x 5 ft deep<br>PID=ND<br>All native, no debris<br>4-5 Silty sand w/gravel |
| TPC | 6/29/95 | | 15 ft x 3 ft x 5 ft deep<br>PID=ND<br>All native, no debris |
| TPD | 6/29/95 | | 15 ft x 3 ft x 5 ft deep<br>PID=ND<br>All native, no debris |

Landfill Side of Berm

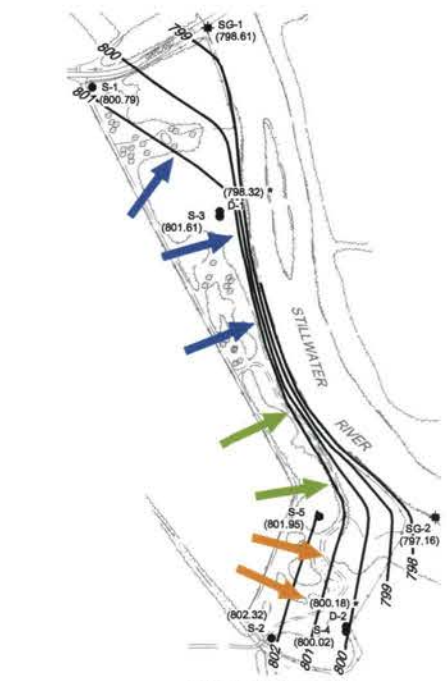
| | | | |
|---|---|---|---|
| TPE | 6/29/95 | | 12 ft x 3ft x 6 ft deep<br>PID=ND<br>All native - no debris<br>Brown moist silty sand, trace gravel<br>4-5 larger stone |
| TPF | 6/29/95 | | 12 x 3' x 6' deep<br>PID=ND<br>All native - no debris<br>Brown sand with trace silt and gravel<br>Water at 6 ft<br>4 - 6 ft larger stone |
| TPG | 6/29/95 | | 12 ft x 3 ft x 6 ft deep<br>PID=ND<br>Debris on surface (0 to 1 ft bgs)<br>All natural from 1 to 6 ft bgs<br>Brown sand w/gravel<br>5 ft larger stone |
| TPH | 6/29/95 | | 15 ft x 3 ft x 6 ft deep<br>PID=ND<br>All native - no debris<br>Dry brown sand w/gravel |
| TPI | 6/29/95 | Area I | 15 ft x 3 ft x 10 inches deep<br>PID=ND<br>All native - no debris<br>gravelly sand, brown, dry |

B

# APPENDIX B

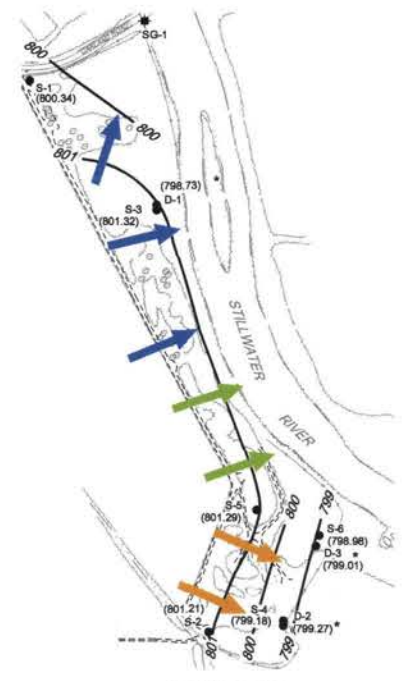
## GROUNDWATER CONTOUR FIGURES

Figure B.1 - Shallow Groundwater Contours
Figure B.2 - June 2001 Deep Groundwater Contours
Figure B.3 - June 2002 Deep Groundwater Contours



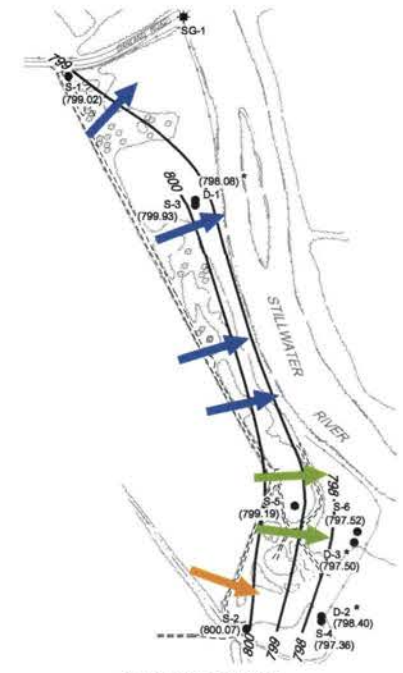

AUGUST 1995

0 200 400ft



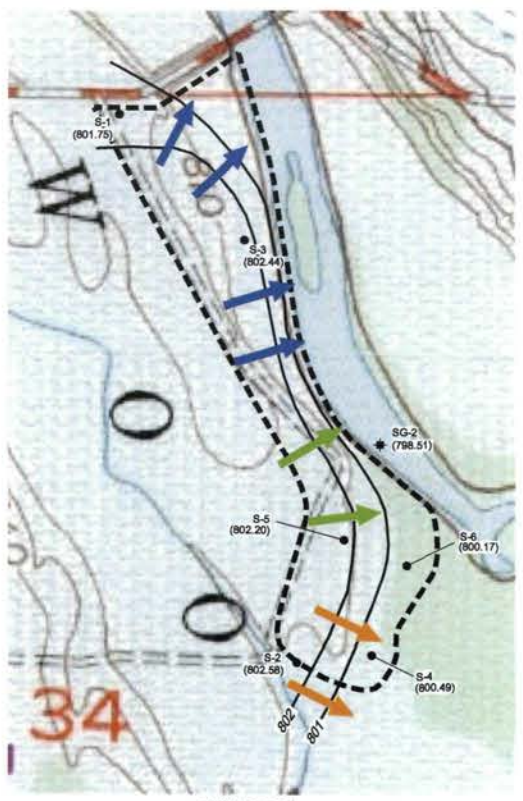

AUGUST 1996

0 200 400ft



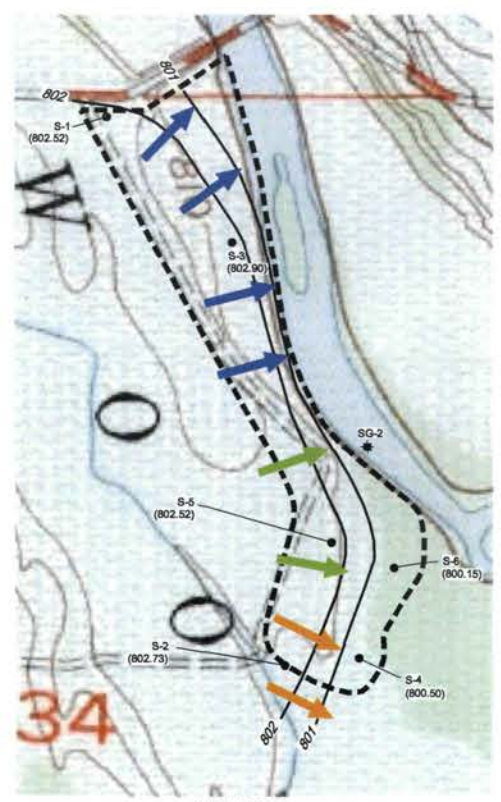

SEPTEMBER 1997

0 200 400ft



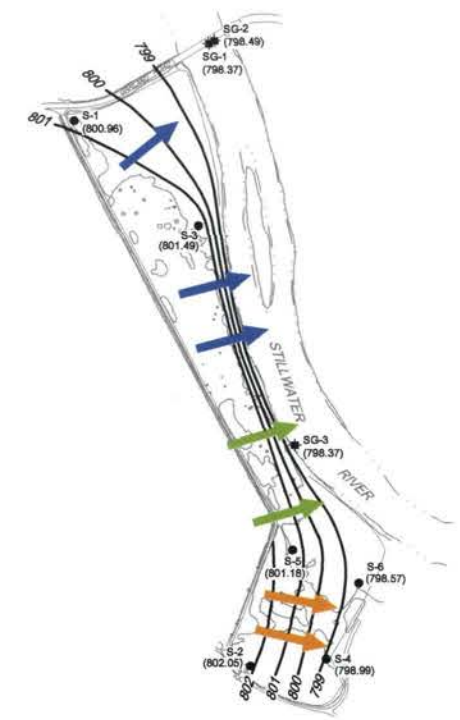

JUNE 2001

0 200 400ft




JUNE 2002

0 200 400ft




MARCH 2006

0 200 400ft

LEGEND

- LIMIT OF SITE
- D-1 MONITORING WELL LOCATION
- SG-1 STAFF GAUGE
- * NOT USED TO CREATE CONTOURS
- (801.21) WATER LEVEL
- —799— GROUNDWATER ELEVATION CONTOUR (FT. AMSL)
- GROUNDWATER FLOW TOWARDS RIVER
- LOCATION OF GROUNDWATER FLOW DIVIDE TO BE CONFIRMED BY ADDITIONAL INVESTIGATION
- GROUNDWATER FLOW TO THE SOUTH

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

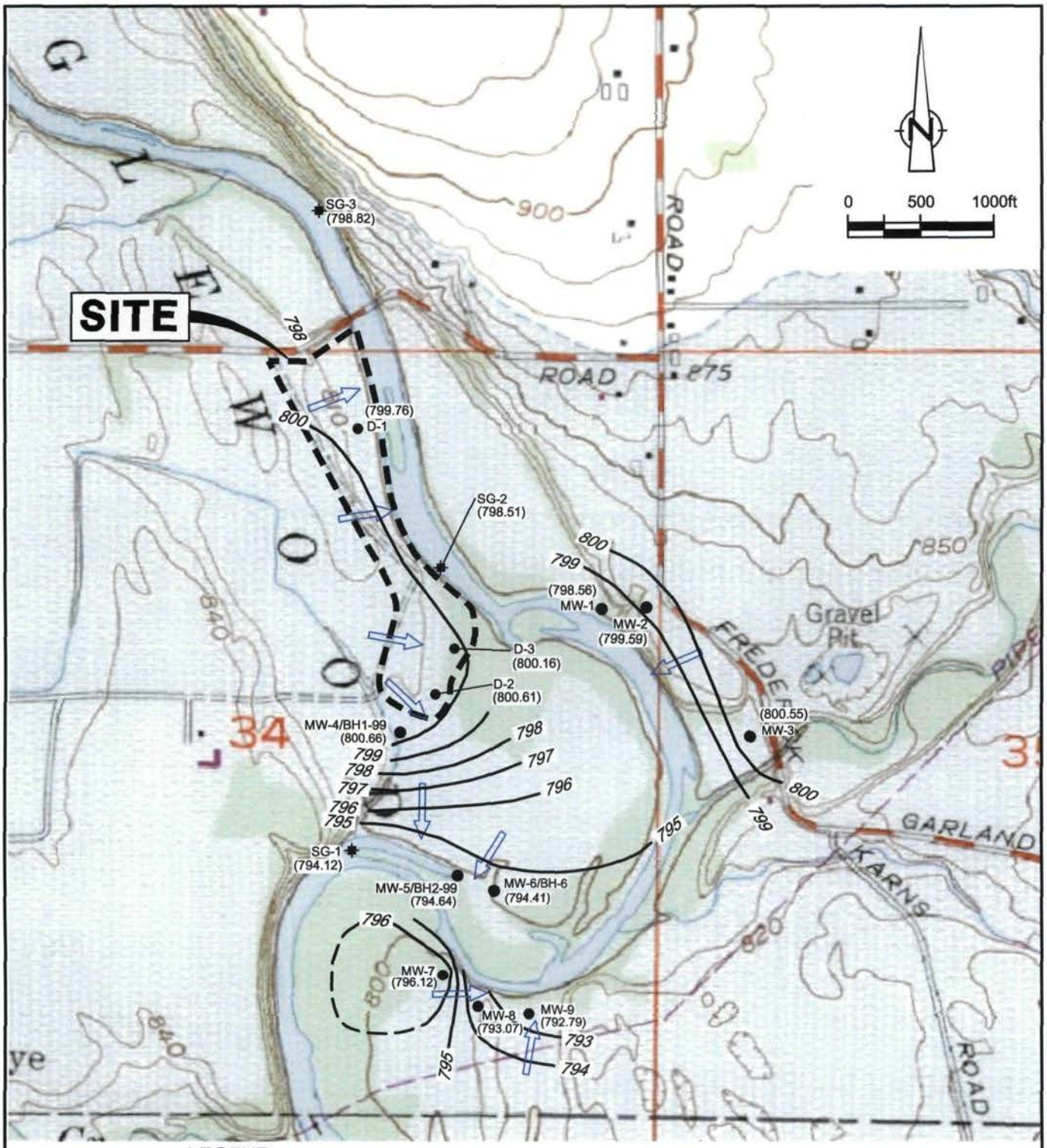
SHALLOW WATER TABLE
GROUNDWATER CONTOURS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: | Reviewed By: | Date: | |
|---|---|---|---|
| MT | JEP | JUNE 2006 | |
| Scale: AS SHOWN | Project N°: 07043-90 | Report N°: 014 | Drawing N°: B.1 |

07043-90(014)GN-WA046 JUN 26/2006




LEGEND

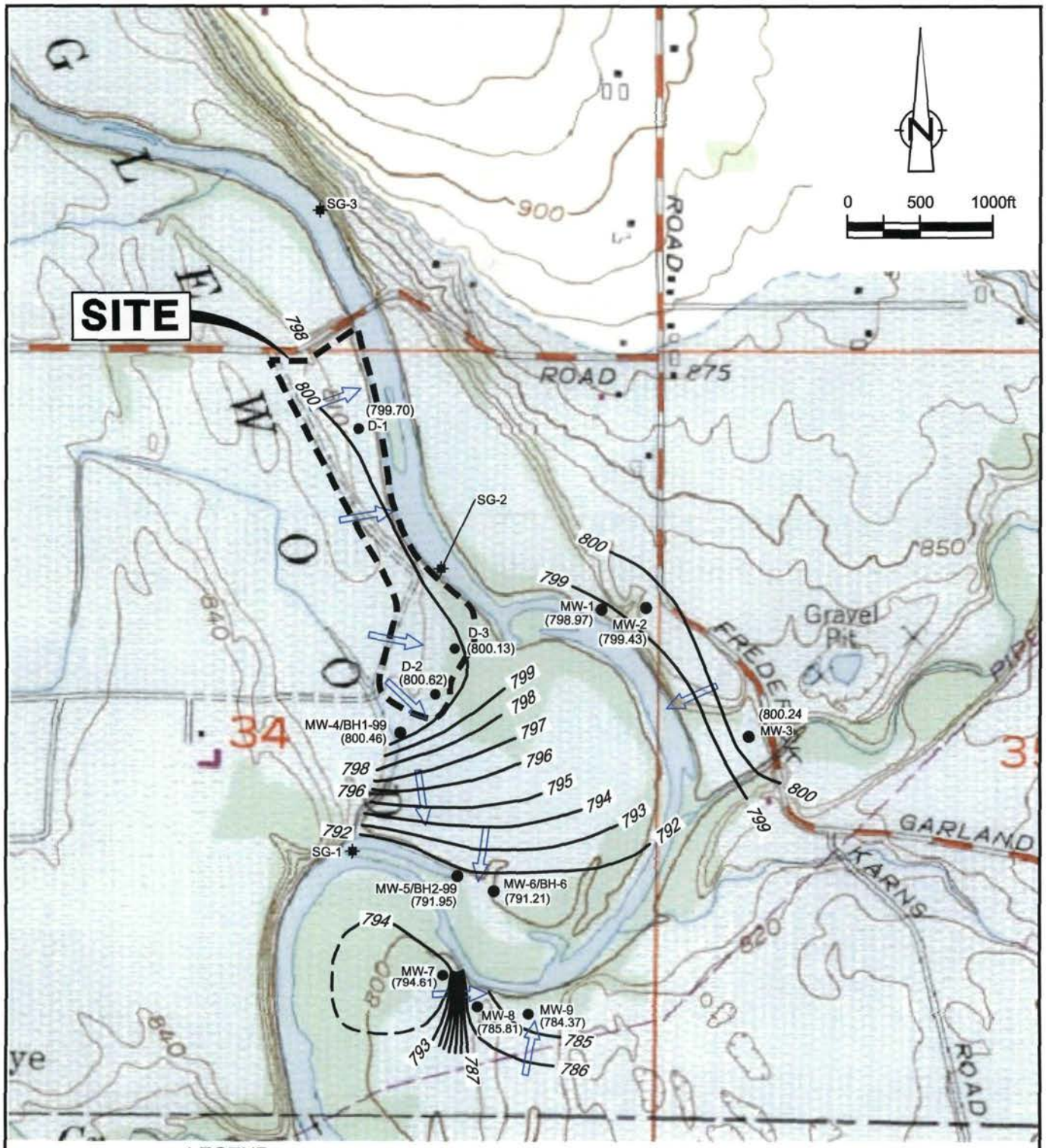
| | |
|---|---|
| —— 799 —— | GROUNDWATER ELEVATION (FT. AMSL) |
| ● MW-9 | MONITORING WELL LOCATION |
| ✱ SG-1 | STAFF GAUGE LOCATION |
| (795.01) | WATER LEVEL AUGUST 2000 |
| ⇨ | GROUNDWATER FLOW DIRECTION |

SOURCES: U.S.G.S. QUADRANGLE MAP; WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000 AND JUNE 2001
NOVA CONSULTING INC.

figure B.2

DEEP OVERBURDEN
GROUNDWATER CONTOURS - JUNE 2001
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA048 JUN 26/2006




LEGEND

| | |
|---|---|
| —— 799 —— | GROUNDWATER ELEVATION (FT. AMSL) |
| ● MW-9 | MONITORING WELL LOCATION |
| ✱ SG-1 | STAFF GAUGE LOCATION |
| (797.07) | WATER LEVEL |
| ⇨ | GROUNDWATER FLOW DIRECTION |

SOURCES: U.S.G.S. QUADRANGLE MAP;
WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000
AND JUNE 2001
NOVA CONSULTING INC.

figure B.3

DEEP OVERBURDEN
GROUNDWATER CONTOURS - JUNE 2002
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(014)GN-WA047 JUN 26/2006

C

# APPENDIX C

# SLUG TEST RESULTS

GARLAND ROAD LANDFILL SITE
SLUG TEST CALCULATION SPREADSHEET
TAKEN FROM BOUWER AND RICE, 1976. (REVISED 1986)

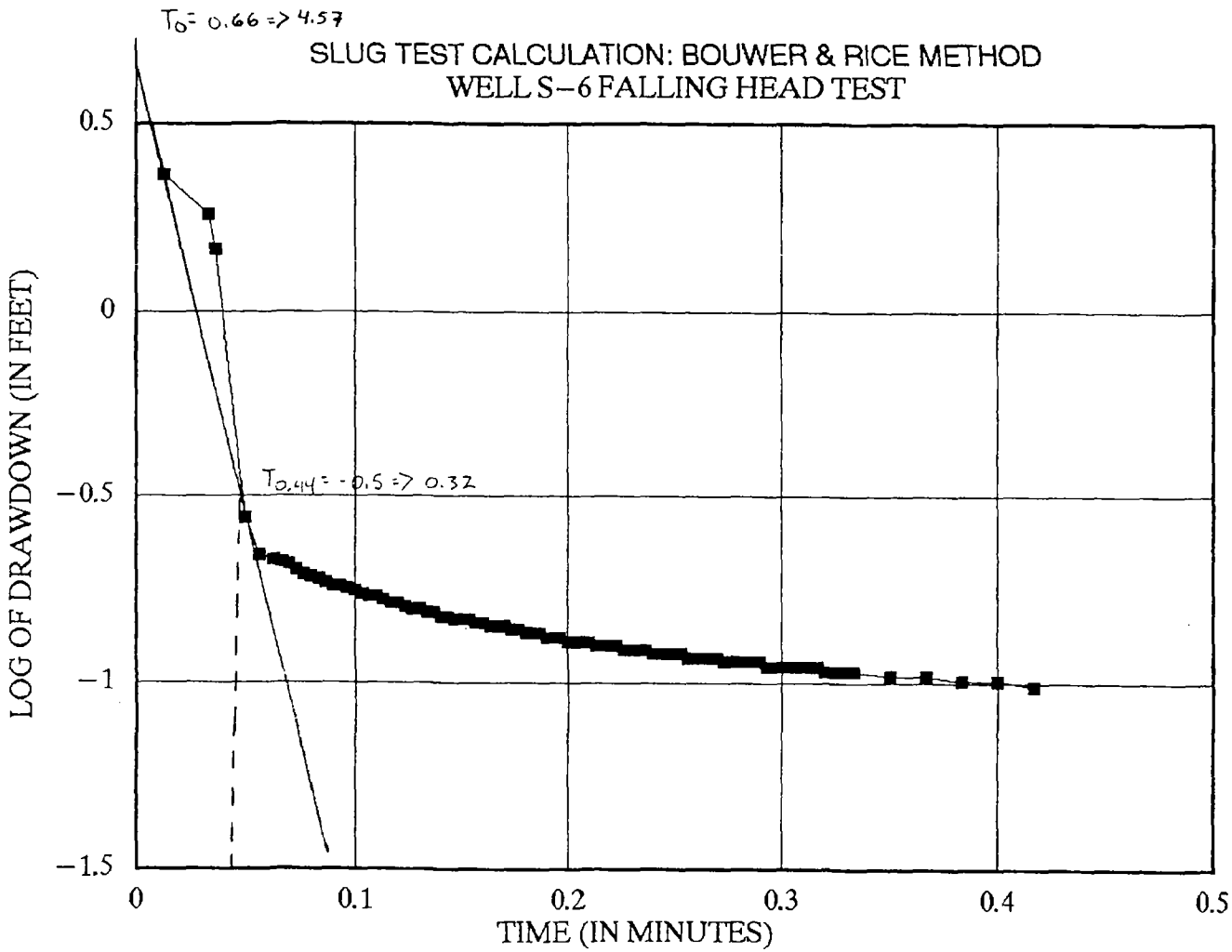
DEFINITION OF PARAMETERS

T = TRANSMISSIVITY OF AQUIFER (LENGTH^2/TIME)
K = HYDRAULIC CONDUCTIVITY OF THE AQUIFER (LENGTH/TIME)
Y = DRAWDOWN IN THE WELL (LENGTH): Yt & Yo taken from semilog graph
t = TIME: taken from semilog graph
Rw = HORIZONTAL DISTANCE FROM WELL CENTER TO ORIGINAL AQUIFER
(WELL RADIUS OR RADIUS OF CASING PLUS THICKNESS OF FILTER PACK)
Re = EFFECTIVE RADIUS OF CONE OF DEPRESSION
Rc = INSIDE RADIUS OF THE CASING OR RADIUS OF FILTER PACK (LENGTH)
H = DISTANCE FROM SWL TO BOTTOM OF SCREEN (LENGTH)
D = THICKNESS OF SATURATED AQUIFER (LENGTH)
L = LENGTH OF SCREENED INTERVAL (LENGTH)
C = VALUE FROM BOUWER AND RICE CURVE

SECOND SCENARIO: WHEN THE DISTANCE FROM SWL TO THE BOTTOM OF THE SCREEN (H) IS EQUAL TO THE THICKNESS OF THE SATURATED AQUIFER (D): H=D

| PARAMETER | WELL S-6(Falling) | WELL S-6(Rising) | WELL D-3(Falling) | WELL D-3(Rising) |
|---|---|---|---|---|
| C | 1.8 | 1.8 | 2 | 2 |
| D | 7.92 | 7.92 | 15.92 | 15.92 |
| H | 7.92 | 7.92 | 15.92 | 15.92 |
| L | 7.92 | 7.92 | 10 | 10 |
| Rw | 0.33 | 0.33 | 0.33 | 0.33 |
| ln(Re/Rw) for C | 2.374599 | 2.374599 | 2.858938 | 2.858938 |
| Rc | 0.083 | 0.083 | 0.083 | 0.083 |
| t | 0.44 | 0.027 | 0.045 | 0.044 |
| Yo | 4.57 | 0.95 | 2.75 | 4.57 |
| Yt | 0.32 | 0.63 | 0.32 | 0.32 |
| K (in ft/min) | 0.006241 | 0.015711 | 0.047072 | 0.05951 |
| K (in cm/sec) | 0.00317 | 0.007981 | 0.023913 | 0.030231 |
| T (in ft2/min) | 0.049428 | 0.124429 | 0.749392 | 0.947395 |
| T (in gpd/ft) | 532.3995 | 1340.251 | 8071.85 | 10204.58 |

WHERE: ln(Re/Rw) = [1.1/ln(H/Rw) + C/(L/Rw)]^(-1)
K = [(Rc^2)*ln(Re/Rw)]/2L * (1/t) * ln(Yo/Yt) in ft/min
T = K*D in ft^2/min


$T_0$= 0.66 => 4.57
SLUG TEST CALCULATION: BOUWER & RICE METHOD
WELL S–6 FALLING HEAD TEST
$T_{0.44}$= -0.5 => 0.32
LOG OF DRAWDOWN (IN FEET)
0.5
0
−0.5
−1
−1.5
0
0.1
0.2
0.3
0.4
0.5
TIME (IN MINUTES)

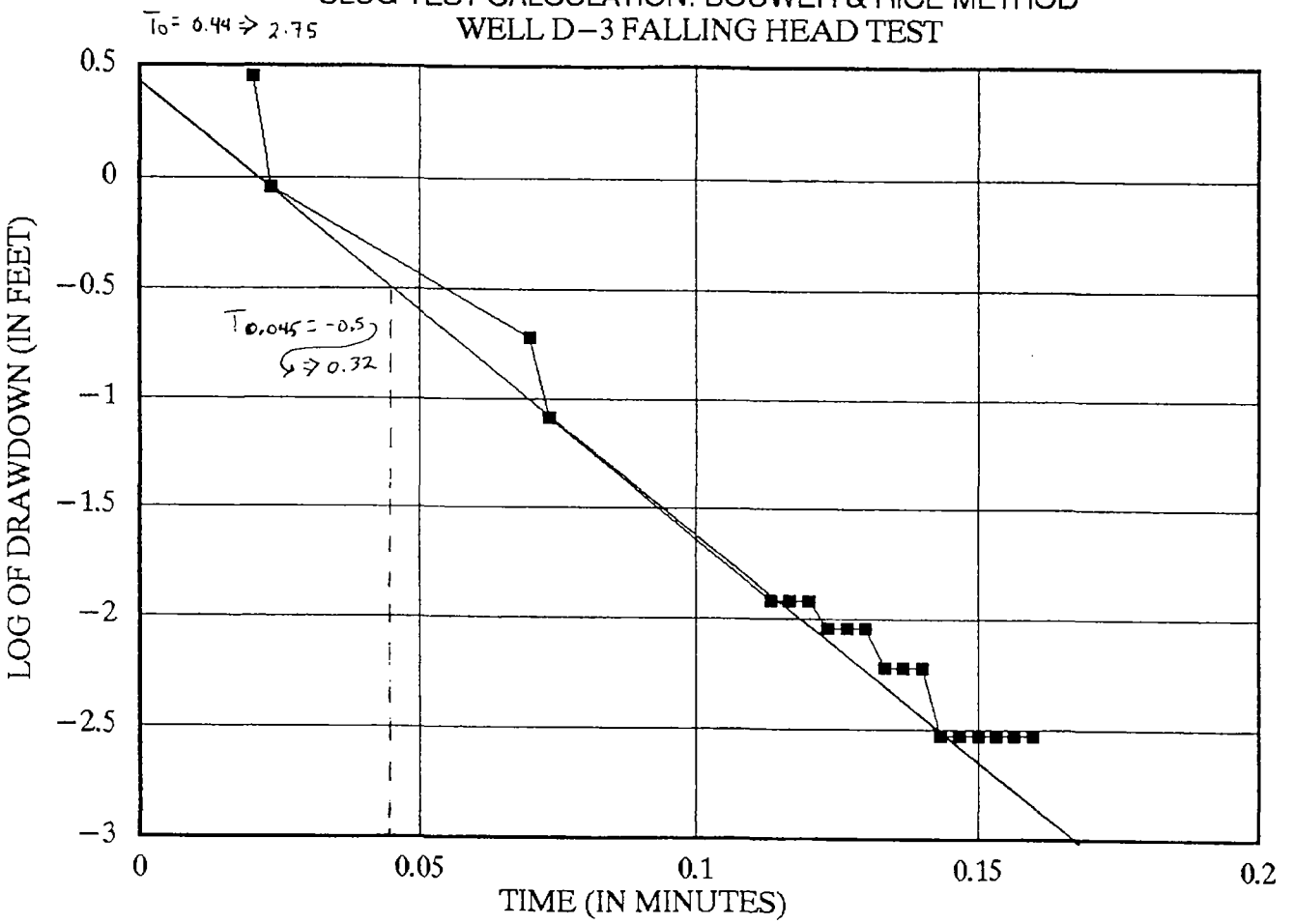
S-6 FALLING HEAD TEST

| ELAPSED TIME MINUTES | DRAWDOWN FEET | DRAWDOWN FEET | LOG OF DRAWDOWN |
|---|---|---|---|
| 0.0133 | -2.305 | 2.305 | 0.362671 |
| 0.0333 | -1.814 | 1.814 | 0.258637 |
| 0.0366 | -1.466 | 1.466 | 0.166134 |
| 0.05 | -0.278 | 0.278 | -0.55596 |
| 0.0566 | -0.221 | 0.221 | -0.65561 |
| 0.0633 | -0.215 | 0.215 | -0.66756 |
| 0.0666 | -0.212 | 0.212 | -0.67366 |
| 0.07 | -0.209 | 0.209 | -0.67985 |
| 0.0733 | -0.202 | 0.202 | -0.69465 |
| 0.0766 | -0.196 | 0.196 | -0.70774 |
| 0.08 | -0.193 | 0.193 | -0.71444 |
| 0.0833 | -0.19 | 0.19 | -0.72125 |
| 0.0866 | -0.186 | 0.186 | -0.73049 |
| 0.09 | -0.183 | 0.183 | -0.73755 |
| 0.0933 | -0.183 | 0.183 | -0.73755 |
| 0.0966 | -0.18 | 0.18 | -0.74473 |
| 0.1 | -0.177 | 0.177 | -0.75203 |
| 0.1033 | -0.174 | 0.174 | -0.75945 |
| 0.1066 | -0.171 | 0.171 | -0.767 |
| 0.11 | -0.171 | 0.171 | -0.767 |
| 0.1133 | -0.167 | 0.167 | -0.77728 |
| 0.1166 | -0.164 | 0.164 | -0.78516 |
| 0.12 | -0.164 | 0.164 | -0.78516 |
| 0.1233 | -0.161 | 0.161 | -0.79317 |
| 0.1266 | -0.158 | 0.158 | -0.80134 |
| 0.13 | -0.158 | 0.158 | -0.80134 |
| 0.1333 | -0.155 | 0.155 | -0.80967 |
| 0.1366 | -0.155 | 0.155 | -0.80967 |
| 0.14 | -0.151 | 0.151 | -0.82102 |
| 0.1433 | -0.151 | 0.151 | -0.82102 |
| 0.1466 | -0.148 | 0.148 | -0.82974 |
| 0.15 | -0.148 | 0.148 | -0.82974 |
| 0.1533 | -0.148 | 0.148 | -0.82974 |
| 0.1566 | -0.145 | 0.145 | -0.83863 |
| 0.16 | -0.145 | 0.145 | -0.83863 |
| 0.1633 | -0.142 | 0.142 | -0.84771 |
| 0.1666 | -0.142 | 0.142 | -0.84771 |
| 0.17 | -0.142 | 0.142 | -0.84771 |
| 0.1733 | -0.139 | 0.139 | -0.85699 |
| 0.1766 | -0.139 | 0.139 | -0.85699 |
| 0.18 | -0.136 | 0.136 | -0.86646 |
| 0.1833 | -0.136 | 0.136 | -0.86646 |
| 0.1866 | -0.136 | 0.136 | -0.86646 |
| 0.19 | -0.133 | 0.133 | -0.87615 |
| 0.1933 | -0.133 | 0.133 | -0.87615 |
| 0.1966 | -0.133 | 0.133 | -0.87615 |
| 0.2 | -0.129 | 0.129 | -0.88941 |
| 0.2033 | -0.129 | 0.129 | -0.88941 |
| 0.2066 | -0.129 | 0.129 | -0.88941 |
| 0.21 | -0.129 | 0.129 | -0.88941 |
| 0.2133 | -0.126 | 0.126 | -0.89963 |
| 0.2166 | -0.126 | 0.126 | -0.89963 |

| | | | |
|---|---|---|---|
| 0.22 | -0.126 | 0.126 | -0.89963 |
| 0.2233 | -0.126 | 0.126 | -0.89963 |
| 0.2266 | -0.123 | 0.123 | -0.91009 |
| 0.23 | -0.123 | 0.123 | -0.91009 |
| 0.2333 | -0.123 | 0.123 | -0.91009 |
| 0.2366 | -0.123 | 0.123 | -0.91009 |
| 0.24 | -0.12 | 0.12 | -0.92082 |
| 0.2433 | -0.12 | 0.12 | -0.92082 |
| 0.2466 | -0.12 | 0.12 | -0.92082 |
| 0.25 | -0.12 | 0.12 | -0.92082 |
| 0.2533 | -0.12 | 0.12 | -0.92082 |
| 0.2566 | -0.117 | 0.117 | -0.93181 |
| 0.26 | -0.117 | 0.117 | -0.93181 |
| 0.2633 | -0.117 | 0.117 | -0.93181 |
| 0.2666 | -0.117 | 0.117 | -0.93181 |
| 0.27 | -0.117 | 0.117 | -0.93181 |
| 0.2733 | -0.114 | 0.114 | -0.9431 |
| 0.2766 | -0.114 | 0.114 | -0.9431 |
| 0.28 | -0.114 | 0.114 | -0.9431 |
| 0.2833 | -0.114 | 0.114 | -0.9431 |
| 0.2866 | -0.114 | 0.114 | -0.9431 |
| 0.29 | -0.114 | 0.114 | -0.9431 |
| 0.2933 | -0.11 | 0.11 | -0.95861 |
| 0.2966 | -0.11 | 0.11 | -0.95861 |
| 0.3 | -0.11 | 0.11 | -0.95861 |
| 0.3033 | -0.11 | 0.11 | -0.95861 |
| 0.3066 | -0.11 | 0.11 | -0.95861 |
| 0.31 | -0.11 | 0.11 | -0.95861 |
| 0.3133 | -0.11 | 0.11 | -0.95861 |
| 0.3166 | -0.11 | 0.11 | -0.95861 |
| 0.32 | -0.107 | 0.107 | -0.97062 |
| 0.3233 | -0.107 | 0.107 | -0.97062 |
| 0.3266 | -0.107 | 0.107 | -0.97062 |
| 0.33 | -0.107 | 0.107 | -0.97062 |
| 0.3333 | -0.107 | 0.107 | -0.97062 |
| 0.35 | -0.104 | 0.104 | -0.98297 |
| 0.3666 | -0.104 | 0.104 | -0.98297 |
| 0.3833 | -0.101 | 0.101 | -0.99568 |
| 0.4 | -0.101 | 0.101 | -0.99568 |
| 0.4166 | -0.098 | 0.098 | -1.00877 |

SLUG TEST CALCULATION: BOUWER & RICE METHOD

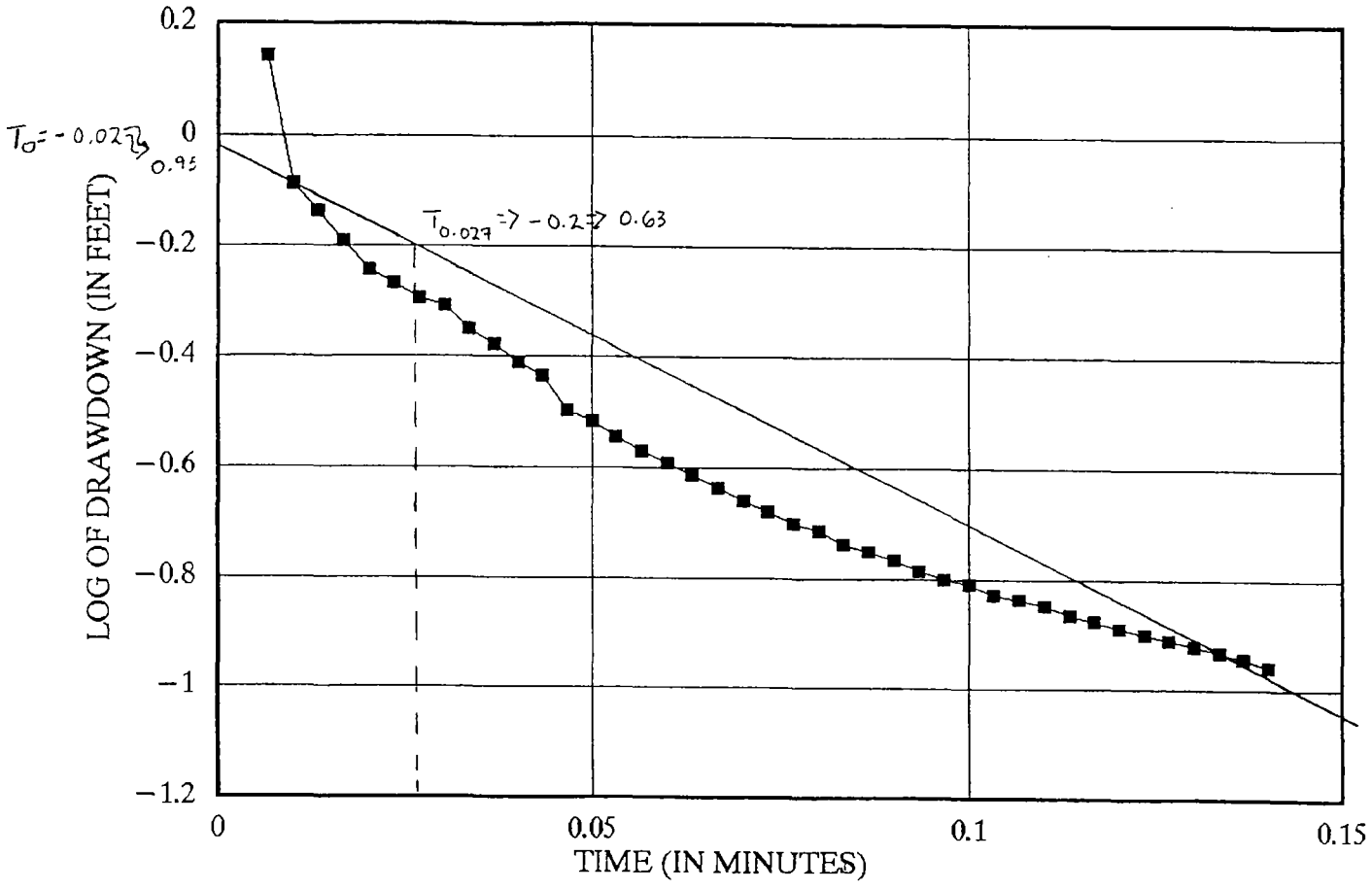
WELL D–3 FALLING HEAD TEST



D-3 FALLING HEAD TEST

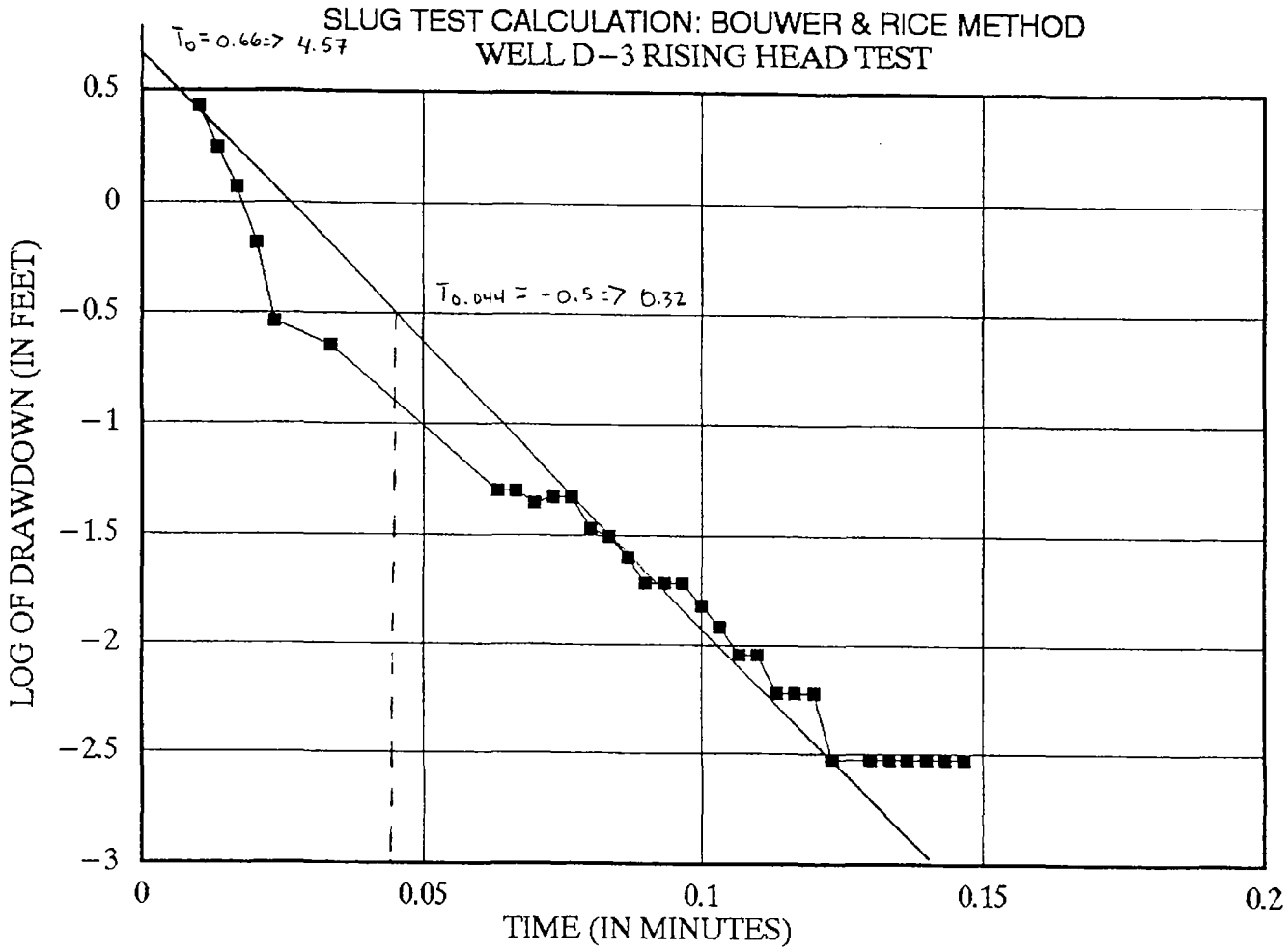
| ELAPSED TIME MINUTES | DRAWDOWN FEET | DRAWDOWN FEET | LOG OF DRAWDOWN |
|---|---|---|---|
| 0.02 | -2.806 | 2.806 | 0.448088 |
| 0.0233 | -0.896 | 0.896 | -0.04769 |
| 0.07 | -0.19 | 0.19 | -0.72125 |
| 0.0733 | -0.082 | 0.082 | -1.08619 |
| 0.1133 | -0.012 | 0.012 | -1.92082 |
| 0.1166 | -0.012 | 0.012 | -1.92082 |
| 0.12 | -0.012 | 0.012 | -1.92082 |
| 0.1233 | -0.009 | 0.009 | -2.04576 |
| 0.1266 | -0.009 | 0.009 | -2.04576 |
| 0.13 | -0.009 | 0.009 | -2.04576 |
| 0.1333 | -0.006 | 0.006 | -2.22185 |
| 0.1366 | -0.006 | 0.006 | -2.22185 |
| 0.14 | -0.006 | 0.006 | -2.22185 |
| 0.1433 | -0.003 | 0.003 | -2.52288 |
| 0.1466 | -0.003 | 0.003 | -2.52288 |
| 0.15 | -0.003 | 0.003 | -2.52288 |
| 0.1533 | -0.003 | 0.003 | -2.52288 |
| 0.1566 | -0.003 | 0.003 | -2.52288 |
| 0.16 | -0.003 | 0.003 | -2.52288 |
| 0.1633 | 0 | 0 | ERR |

SLUG TEST CALCULATION: BOUWER & RICE METHOD
WELL S–6 RISING HEAD TEST



S-6 RISING HEAD TEST

| ELAPSED TIME MINUTES | DRAWDOWN FEET | LOG OF DRAWDOWN |
|---|---|---|
| 0.0066 | 1.387 | 0.142076 |
| 0.01 | 0.817 | -0.08778 |
| 0.0133 | 0.728 | -0.13787 |
| 0.0166 | 0.646 | -0.18977 |
| 0.02 | 0.573 | -0.24185 |
| 0.0233 | 0.541 | -0.2668 |
| 0.0266 | 0.509 | -0.29328 |
| 0.03 | 0.494 | -0.30627 |
| 0.0333 | 0.446 | -0.35067 |
| 0.0366 | 0.418 | -0.37882 |
| 0.04 | 0.389 | -0.41005 |
| 0.0433 | 0.367 | -0.43533 |
| 0.0466 | 0.319 | -0.49621 |
| 0.05 | 0.304 | -0.51713 |
| 0.0533 | 0.285 | -0.54516 |
| 0.0566 | 0.269 | -0.57025 |
| 0.06 | 0.256 | -0.59176 |
| 0.0633 | 0.243 | -0.61439 |
| 0.0666 | 0.231 | -0.63639 |
| 0.07 | 0.218 | -0.66154 |
| 0.0733 | 0.209 | -0.67985 |
| 0.0766 | 0.199 | -0.70115 |
| 0.08 | 0.193 | -0.71444 |
| 0.0833 | 0.183 | -0.73755 |
| 0.0866 | 0.177 | -0.75203 |
| 0.09 | 0.171 | -0.767 |
| 0.0933 | 0.164 | -0.78516 |
| 0.0966 | 0.158 | -0.80134 |
| 0.1 | 0.155 | -0.80967 |
| 0.1033 | 0.148 | -0.82974 |
| 0.1066 | 0.145 | -0.83863 |
| 0.11 | 0.142 | -0.84771 |
| 0.1133 | 0.136 | -0.86646 |
| 0.1166 | 0.133 | -0.87615 |
| 0.12 | 0.129 | -0.88941 |
| 0.1233 | 0.126 | -0.89963 |
| 0.1266 | 0.123 | -0.91009 |
| 0.13 | 0.12 | -0.92082 |
| 0.1333 | 0.117 | -0.93181 |
| 0.1366 | 0.114 | -0.9431 |
| 0.14 | 0.11 | -0.95861 |


SLUG TEST CALCULATION: BOUWER & RICE METHOD
WELL D-3 RISING HEAD TEST
$T_0 = 0.66 \Rightarrow 4.57$
$T_{0.044} = -0.5 \Rightarrow 0.32$
LOG OF DRAWDOWN (IN FEET)
0.5
0
−0.5
−1
−1.5
−2
−2.5
−3
0
0.05
0.1
0.15
0.2
TIME (IN MINUTES)

D-3 RISING HEAD TEST

| ELAPSED TIME MIN | DRAWDOWN FEET | LOG OF DRAWDOWN |
|---|---|---|
| 0.01 | 2.695 | 0.430559 |
| 0.0133 | 1.77 | 0.247973 |
| 0.0166 | 1.162 | 0.065206 |
| 0.02 | 0.655 | -0.18376 |
| 0.0233 | 0.291 | -0.53611 |
| 0.0333 | 0.228 | -0.64207 |
| 0.0633 | 0.05 | -1.30103 |
| 0.0666 | 0.05 | -1.30103 |
| 0.07 | 0.044 | -1.35655 |
| 0.0733 | 0.047 | -1.3279 |
| 0.0766 | 0.047 | -1.3279 |
| 0.08 | 0.034 | -1.46852 |
| 0.0833 | 0.031 | -1.50864 |
| 0.0866 | 0.025 | -1.60206 |
| 0.09 | 0.019 | -1.72125 |
| 0.0933 | 0.019 | -1.72125 |
| 0.0966 | 0.019 | -1.72125 |
| 0.1 | 0.015 | -1.82391 |
| 0.1033 | 0.012 | -1.92082 |
| 0.1066 | 0.009 | -2.04576 |
| 0.11 | 0.009 | -2.04576 |
| 0.1133 | 0.006 | -2.22185 |
| 0.1166 | 0.006 | -2.22185 |
| 0.12 | 0.006 | -2.22185 |
| 0.1233 | 0.003 | -2.52288 |
| 0.13 | 0.003 | -2.52288 |
| 0.1333 | 0.003 | -2.52288 |
| 0.1366 | 0.003 | -2.52288 |
| 0.14 | 0.003 | -2.52288 |
| 0.1433 | 0.003 | -2.52288 |
| 0.1466 | 0.003 | -2.52288 |
| 0.15 | 0 | ERR |

D

# APPENDIX D

# LETTERS REGARDING ECOLOGICAL ASSESSMENTS

# United States Department of the Interior

Fish and Wildlife Service
Reynoldsburg Field Office
6950-H Americana Parkway
Reynoldsburg, Ohio 43068-4115

COMM: 614/469-6923 FAX: 614/469-6919


TAKE PRIDE IN AMERICA

In Reply Refer to:

July 26, 1995

Mr. Pete Guria
Emergency Support Section, HSE-5J
U.S. Environmental Protection Agency
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Dear Mr. Guria:

We send this letter in response to your request to immediately address habitat issues for the Federally endangered Indiana bat (Myotis sodalis) at the Garland Road Landfill. The landfill is adjacent to the Stillwater River and is located south of the town of West Milton in Miami County, Ohio. Note that the Stillwater River has scenic river status. Our endangered species biologist, Buddy B. Fazio, met on site on July 20, 1995, with Linda Martin, from your agency's Superfund office. Buddy and Linda reviewed specific sites in terms of immediate, emergency barrel removal. They also reviewed the general landfill area in terms of capping or other long-term actions.

Only portions of the landfill boundary, adjacent to the Stillwater River, have potential Indiana bat habitat. The interior of the landfill is not Indiana bat habitat. Of the nine sites (R1 through R9) identified for emergency barrel removal from the west bank of the Stillwater River, only sites R1 through R4 show potential as possible Indiana bat habitat. Sites R5 through R9 are not Indiana bat habitat, and barrel removal may begin at these sites as soon as your work teams are ready. We suggest you begin at site R9 and work backwards toward R5 to delay disturbance near sites R4 through R1 where additional assessment for Indiana bats should occur. Note that potential Indiana bat habitat also exists just downriver from the southern boundary of the landfill, but information from you and Linda Martin indicates this downriver reach will not be impacted by U.S. EPA short term or long-term actions.

Sites R1 through R4 are parallel to an oblong island in the middle of the Stillwater River. The four sites and the island are separated by one channel of the river. The four sites and parallel island should first be further evaluated using models which assess Indiana bat habitat potential. If the reach of river defined by the channel and its vegetation are found to be of moderate to high potential for Indiana bats, we recommend that mist net surveys be conducted to identify if Indiana bats are actually present. The placement of nets and number of net nights should be left to the best professional judgement of the experts conducting the net surveys. If Indiana bats are found, please contact our office (before removing barrels) to discuss additional options.

If we can be of further assistance, please contact endangered species biologist Buddy B. Fazio at this office.

Sincerely,

Kent E. Kronemeyer
Supervisor

cc: Linda Martin, Office of Superfund, HSR-6J, U.S. EPA,
77 W. Jackson Blvd., Chicago, IL 60604-3590
Adam Black and Russ Romme, 3D/Environmental Services, 781 Neeb Road,
Cincinnati, OH 45233-4625

DOW, Wildlife Environmental Section, Columbus, OH
ODNR, Division of Real Estate and Land Management, Columbus, OH
Ohio Division of Natural Areas and Preserves, Columbus, OH
Ohio EPA, Water Quality Monitoring, Columbus, OH

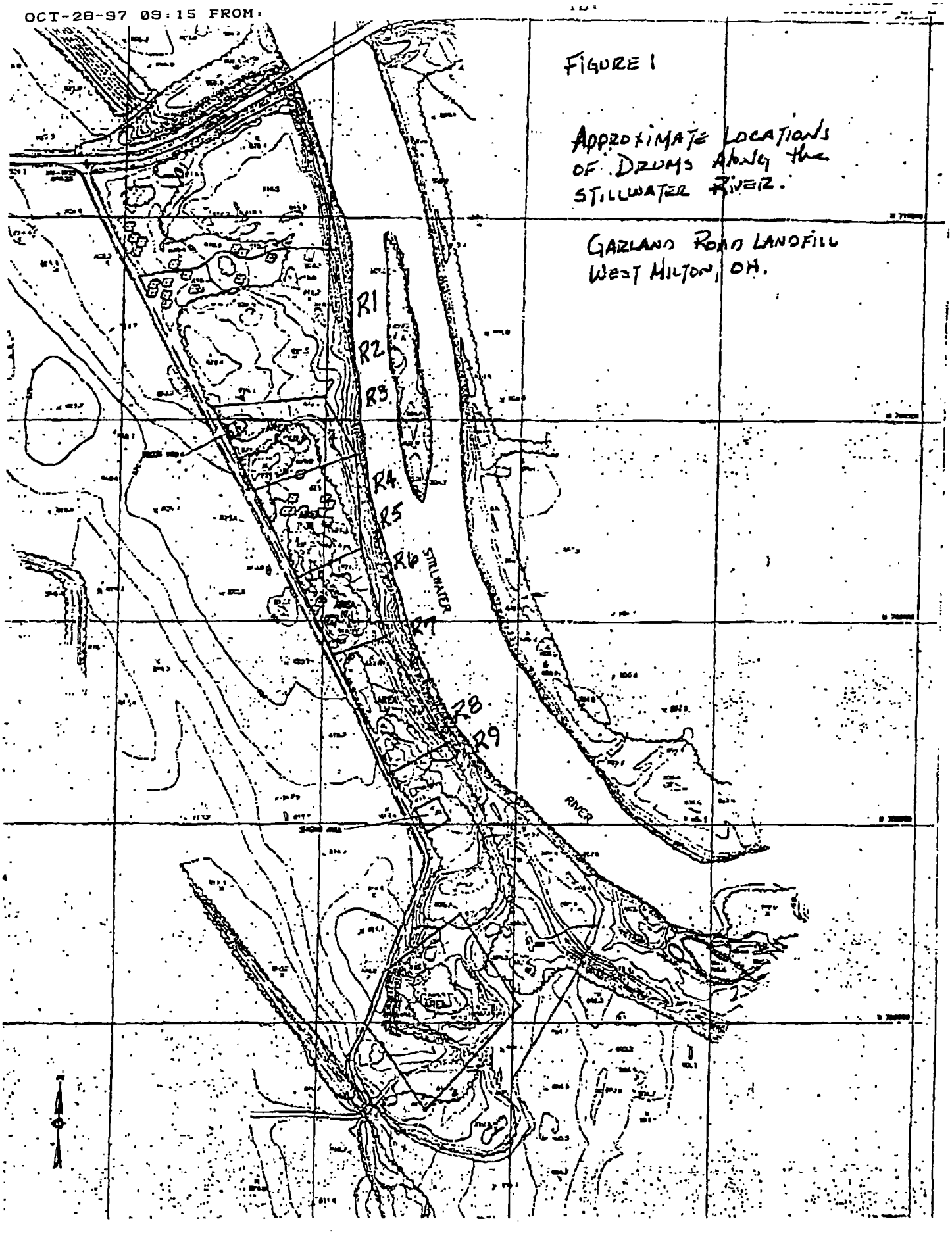



FIGURE 1

APPROXIMATE LOCATIONS OF DRUMS ALONG THE STILLWATER RIVER.

GARLAND ROAD LANDFILL
WEST MILTON, OH.

# United States Department of the Interior

Fish and Wildlife Service
Reynoldsburg Field Office
6950-H Americana Parkway
Reynoldsburg, Ohio 43068-4115

COMM: 614/469-6923 FAX: 614/469-6919


TAKE PRIDE IN AMERICA

In Reply Refer to:

August 11, 1995

Mr. Pete Guria
Emergency Support Section, HSE-5J
U.S. Environmental Protection Agency
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Dear Mr. Guria:

We send this second letter in response to your request to immediately address habitat issues for the Federally endangered Indiana bat (Myotis sodalis) at the Garland Road Landfill. The landfill is adjacent to the Stillwater River and is located south of the town of West Milton in Miami County, Ohio. We note, once again, that the Stillwater River has scenic river status.

Our endangered species biologist, Buddy B. Fazio, met on site on July 20, 1995, with Linda Martin, from your agency's Superfund office. Buddy and Linda reviewed specific sites in terms of immediate, emergency barrel removal. They also reviewed the general landfill area in terms of capping or other long-term actions.

In our late July 1995 letter, we explained that, of the nine sites (R1 through R9) identified for emergency barrel removal from the west bank of the Stillwater River, only sites R1 through R4 show potential as possible Indiana bat habitat. We suggested you could begin immediate barrel removal at site R9 and work backwards toward R5 to delay disturbance near sites R4 through R1. Such an approach would allow additional assessment for Indiana bat habitat at sites R1 through R4.

We are pleased to see that sites R1 through R4 were further evaluated using a habitat suitability index model applied by 3D/Environmental Services, Inc. We have read a copy of the August 11, 1995, report by 3D/Environmental which describes the level of potential for Indiana bat habitat at barrel removal sites R1 through R4. Upon reviewing the report, we agree with 3D's conclusion that the trees along sites R1 through R4 provide little or no roosting habitat. We further agree that the vicinity of the sites does provide some value as foraging habitat. Since Indiana bat roosting habitat is the more critical feature, and since sites R1 through R4 provide no such roosting habitat, we believe immediate barrel removal can proceed at sites R1 through R4 without causing adverse impacts to Indiana bats.

OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL # of pages ▶ FIVE

| | |
|---|---|
| To BOB RULE | From PETE GURIA |
| Dept./Agency | Phone # |
| Fax # 423.691.6485 | Fax # 312 353 9176 |

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

We appreciate the opportunity to coordinate with you and Linda Martin regarding habitat issues at the Garland Road Landfill. If we can be of further assistance, please contact endangered species biologist Buddy B. Fazio at this office.

Sincerely,

Ken Mullener

for Kent E. Kroonemeyer
Supervisor

cc: Linda Martin, Office of Superfund, HSR-6J, U.S. EPA,
77 W. Jackson Blvd., Chicago, IL 60604-3590
Adam Black and Russ Romme, 3D/Environmental Services, 781 Neeb Road,
Cincinnati, OH 45233-4625

DOW, Wildlife Environmental Section, Columbus, OH
ODNR, Division of Real Estate and Land Management, Columbus, OH
Ohio Division of Natural Areas and Preserves, Columbus, OH
Ohio EPA, Water Quality Monitoring, Columbus, OH

7043

OHIO Department of Natural Resources

Rec'd CRA
SEP 23 1997

George V. Voinovich • *Governor*
Donald C. Anderson • *Director*

September 11, 1997

Sylvie Eastman
Conestoga-Rovers & Associates
651 Colby Dr.
Waterloo, Ontario
CANADA N2V 1C2

Dear Ms. Eastman:

After reviewing our Natural Heritage maps and files, I find that the Division of Natural Areas and Preserves has no records of rare or endangered species in the Garland Road Landfill project site, including a one mile radius, on the West Milton Quad in Miami County (#7043).

However, please note that the project site is next to the Stillwater River which is a designated State Scenic River in Ohio. Therefore, the approval of the Director of ODNR may be required in accordance with Ohio Revised Code section 1517.16. Please contact the Scenic River Coordinator for further information. Bob Gable can be reached at 4675 N. Diamond Mill, Trotwood, OH, 45426; phone 937-854-0350; fax 937-854-9407.

There are no existing or proposed state nature preserves at the project site. We are also unaware of any geologic features, breeding or non-breeding animal concentrations, champion trees, or state parks, forests or wildlife areas in the project vicinity.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Please note that although we inventory all types of plant communities, we only maintain records on the highest quality areas. Also, we do not have data for all Ohio wetlands. For additional information on wetlands and National Wetlands Inventory maps, please contact Jim Given in the Division of Real Estate and Land Management at 614-265-6770.

Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely,

Debbie Woischke

Debbie Woischke, Ecological Analyst
Division of Natural Areas & Preserves

cc: Bob Gable, Southwest Ohio Scenic River Coordinator

wat ds still largely primitive and shorelines largely undeveloped but accessible in places by roads;

(C) "Recreational river areas" to include those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Sec. 1517.16. No state department, state agency, or political subdivision shall build or enlarge any highway, road, or structure or modify or cause the modification of the channel of any watercourse within a wild, scenic, or recreational river area outside the limits of a municipal corporation without first having obtained approval of the plans for the highway, road, or structure or channel modification from the director of natural resources or his representative. The court of common pleas having jurisdiction, upon petition by the director, shall enjoin work on any highway, road, or structure or channel modification for which such approval has not been obtained.

Sec. 1517.17. The chief of the division of natural areas and preserves may administer federal financial assistance programs for wild, scenic, and recreational river areas.

The director of natural resources may make a lease or agreement with a political subdivision to administer all or part of a wild, scenic, or recreational river area.

The director may acquire real property or any estate, right, or interest therein for protection and public recreational use as a wild, scenic, or recreational river area.

The chief may expend funds for the acquisition, protection, construction, maintenance, and administration of real property and public use facilities in wild, scenic, or recreational river areas when the funds are so appropriated by the general assembly. The chief may condition such expenditures, acquisition of land or easements, or construction of facilities within a wild, scenic, or recreational river area upon adoption and enforcement of adequate floodplain zoning rules.

Sec. 1517.18. The director of natural resources shall appoint an advisory council for each wild, scenic, or recreational river area, composed of not more than ten persons who are representative of local government and local organizations and interests in the vicinity of the wild, scenic, or recreational river area, who shall serve without compensation. The chief of the division of natural areas and preserves or his representative shall serve as an ex officio member of each council.

The terms of all members serving on any advisory council under this section on the effective date of this admendment shall end on January 31, 1995. The director shall appoint new members to serve on each council for terms beginning on February 1, 1995, provided that a member serving on a council on the effective date of this admendment may be appointed to such a new term. The initial members appointed to each council shall serve for terms of not more than three years, with the terms of not more than four members of any council ending in the same year. Thereafter, terms of office shall be for three years commencing on the first day of February and ending on the last day of January.

Each council shall advise the chief on the acquisition of land and easements and on the lands and waters that should be included in a wild, scenic, or recreational river area or a proposed wild, scenic, or recreational river area, facilities therein, and other aspects of establishment and administration of the area that may affect the local interest.

Sec. 1513.02. (B)The chief, by rule, may designate as unsuitable for coal mining natural areas maintained on the registry of natural areas of the department of natural resources pursuant to Chapter 1517. of the Revised Code, wild, scenic, or recreational river areas designated pursuant to that chapter, publicly owned or dedicated parks, and other areas of unique and irreplaceable natural beauty or condition, or areas within specified distances of a public road, occupied dwelling, public building, school, church, community, or institutional building, public park, or cemetery. Such a designation may include land adjacent to the perimeters of those areas that may be necessary to protect their integrity.

Ohio Department of Natural Resources
Division of Natural Areas & Preserves
1889 Fountain Square Court
Columbus, Ohio 43224
614/265-6453

# The Ohio Wild, Scenic and Recreational River Act

**Scenic Rivers Progam**
**Ohio Department of Natural Resources**
**Division of Natural Areas & Preserves**

# THE OHIO, WILD, SCENIC AND RECREATIONAL RIVER ACT

The act appears to the right in the exact wording as passed and signed into law in 1968 and amended to present. It is the legal basis for the Ohio Scenic Rivers Program and provides for the following authorities:

- *The Director of Ohio Department of Natural Resources may designate streams as a component of the state's scenic rivers system.*
- *The Director of Ohio Department of Natural Resources appoints a local advisory council to assist in protection of each river.*
- *The Director of Ohio Department of Natural Resources has approval authority over public projects where building or enlargement of a highway, road, or structure or modification of the channel of any watercourse takes place within the designated river area. This authority does not apply within the limits of municipal corporations.*
- *The Chief of Reclamation of Ohio Department of Natural Resources may rule as unsuitable for strip mining of coal, any lands where the integrity of a designated river is threatened.*

# OHIO WILD, SCENIC AND RECREATIONAL RIVER LAW

## AN ACT

As enacted by the General Assembly of the State of Ohio:

Sec. 1501.16. As used in sections 1501.16 to 1501.19 of the Revised Code, "watercourse" means a substantially natural channel with recognized banks and bottom, in which a flow of water occurs, with an average of at least ten feet mean surface water width and at least five miles of length. The Director of natural resources may create, supervise, operate, protect, and maintain wild, scenic, and recreational river areas, under the classifications contained in section 1501.161 of the Revised Code. The Director may prepare and maintain a plan for the establishment, development, use, and administration of such areas as a part of the comprehensive state plans for water management and outdoor recreation. The Director may cooperate with federal agencies administering any federal program concerning wild, scenic, or recreational river areas.

The Director may propose for establishment as a wild, scenic, or recreational river area a part or parts of any watercourse in this state, with adjacent lands, which in his judgement possesses water conservation, scenic, fish, wildlife, historic, or outdoor recreation values which should be preserved, using the classifications contained in section 1501.161 of the Revised Code. The area shall include lands adjacent to the watercourse in sufficient width to preserve, protect, and develop the natural character of the watercourse, but may not include any lands more than one thousand feet from the normal waterlines of the watercourse unless an additional width is necessary to preserve water conservation, scenic, fish, wildlife, historic, or outdoor recreation values.

The Director shall publish his intention to declare an area a wild, scenic, or recreational river area at least once in a newspaper of general circulation in each county, any part of which is within the area, and shall send written notice of such intention to the legislative authority of each county, township, and municipal corporation and to each conservancy district, any part of which is within the area, and to the Director of highways, the Director of development, the Director of public works, the Director of health, and the water pollution control board. Such notices shall include a copy of a map and description of the area.

After thirty days from the date of publication or dispatch of written notice as required in this section, the Director shall enter a declaration in his journal that the area is a wild, scenic, or recreational river area. When so entered, the area is a wild, scenic, or recreational river area. The Director, after thirty days notice as prescribed in this section and upon approval of the recreation and resources commission, may terminate the status of an area as a wild, scenic, or recreational river area by an entry in his journal.

Declaration by the Director that an area is a wild, scenic, or recreational river area does not authorize the Director or any governmental agency or political subdivision to restrict the use of land by the owner thereof or any person acting under his authority, or to enter upon such land.

Sec. 1501.161. As used in this section, "impoundment" means the reservoir created by a dam or other artificial barrier across a watercourse that causes water to be stored deeper than and generally beyond the banks of the natural channel of the watercourse during periods of normal flow, but does not include water stored behind rock piles, rock riffle dams, and low channel dams where the depth of water is less than ten feet above the channel bottom and is essentially confined within the banks of the natural channel during periods of normal stream flow.

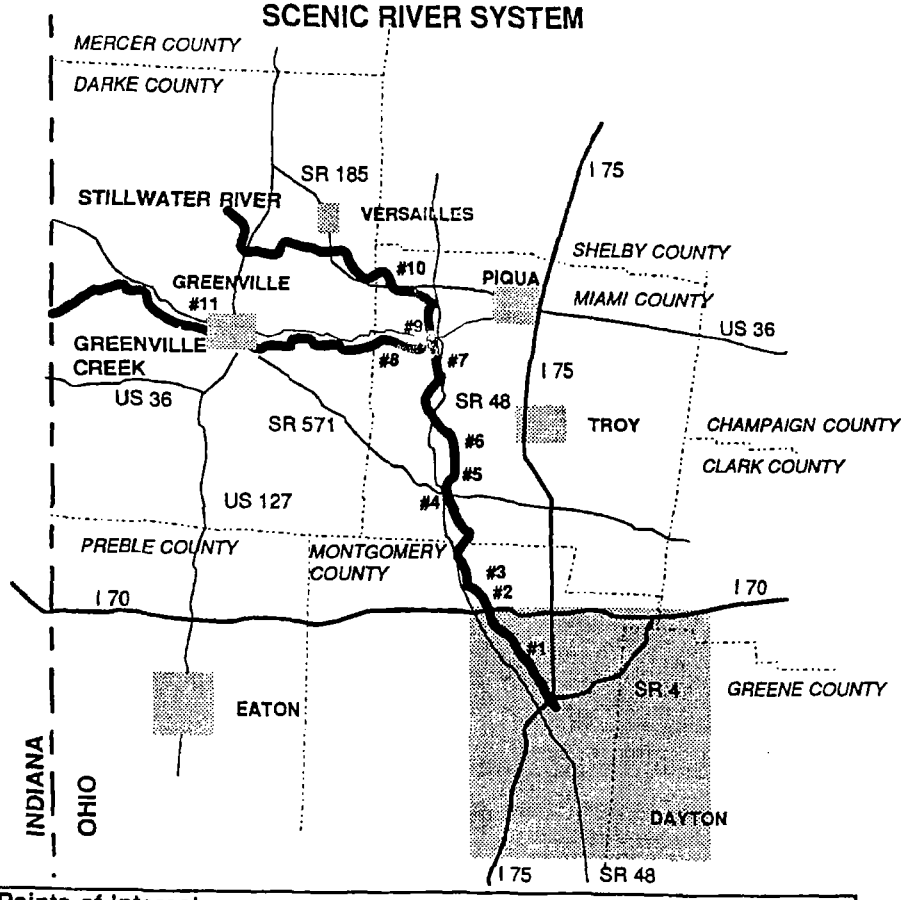
In creating wild, scenic, or recreational river areas, the Director of natural resources shall use the following classifications:

(A) "Wild river area" to include those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted, representing vestiges of primitive America;

(B) "Scenic river area" to include those rivers or sections of rivers that are free of impoundments, with shorelines of watersheds still largely primitive and shorelines largely undeveloped but accessible in places by roads;

(C) "Recreational river areas" to include those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have

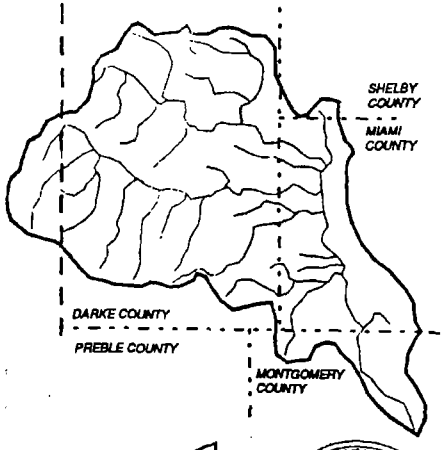
## STILLWATER AND GREENVILLE CREEK STATE SCENIC RIVER SYSTEM




**Points of Interest:**

#1- DeWeese Park
#2- Aullwood Audubon Center & Farm
#3- Englewood Dam and Reserve
#4- West Milton Park
#5- West Milton Dam
#6- Brukner Nature Center
#7- F.L. Blankenship Riverside Sanctuary
#8- Greenville Falls Scenic River Preserve
#9- Covington Park
#10- Stillwater Prairie Reserve
#11- Greenville City Park and Tecumseh Pt.

## Stillwater and Greenville Creek State Scenic River Watershed




For more information contact:

**Ohio Department of Natural Resources**
**Division of Natural Areas and Preserves**
**Scenic Rivers Program**
**1889 Fountain Square Court**
**Columbus, Ohio 43224-1331**
**(614) 265-6453**

*George V. Voinovich* — *Governor*
*Donald C. Anderson* — *Director*

An Equal Opportunity Employer - M/F/H

# Stillwater Scenic River System

## Ohio's Scenic Rivers Program

# The Stillwater Scenic River System

The valley of the Stillwater has long known human occupation. Shawnee and Miami Indians were living in the area when the first white traders arrived. In 1750, Christopher Gist, a British trader, explored the area and produced the first map (published in 1755) which showed the Stillwater River.

After the American Revolution, hostilities between Indians and white traders kept most of the land north of the Ohio River closed to settlement. The federal government sent General "Mad" Anthony Wayne to lead a military campaign against the Indians. In 1793, Wayne's army reached a tributary of the Stillwater and built Fort Greene Ville in honor of Nathanael Greene (a Revolutionary War general). The adjacent creek soon took on the fort's name. Wayne's army marched north and defeated the Indians at the Battle of Fallen Timbers on the Maumee River. In 1795, a treaty was signed at Fort Greene Ville that resulted in opening the southern half of Ohio to settlement.

In 1975, the Stillwater River and Greenville Creek System became Ohio's eighth scenic river. Designated sections include the Stillwater from Riffle Road bridge in Darke County to its junction with the Great Miami River in Dayton (58 miles) and Greenville Creek from the Ohio border to its confluence with the Stillwater (35 miles).

Through most of their courses, the Stillwater River and Greenville Creek meander with a gentle grade across the glaciated plains of western Ohio. Near Covington, the rivers pass through steep ravines and bluffs. Greenville Falls is located in a gorge-like area. A variety of wildlife can be observed along the rivers. Deer, raccoon, fox and squirrel, as well as birds such as the Great Blue Heron and the Kingfisher are commonly seen.

Insuring the natural heritage of the Stillwater River system is not limited to protecting the immediate streamside environment. Land use activities within the watershed, such as urban and residential development and agricultural practices may have a direct and adverse effect on the long-term protection and preservation of the designated river. Without local support and enactment of appropriate local regulations, new developments may jeopardize the water resources that scenic river designation seeks to protect.

## How You Can Help

Citizens within the drainage area (shown on the map) can participate in river protection efforts through citizen action and land preservation options.

Citizen action begins with education about the watershed and the practices and activities which adversely affect the river. Local authorities and citizen groups work to improve river conditions by encouraging local officials to adopt and enforce sediment control regulations, enact zoning and building codes which protect the river, and improve individual and collective sewer discharges. Individuals can also take part in periodic litter clean-ups. Some of these recommendations have already been adopted, others are under review, while others are in need of action.

Landowners who want to protect the natural value of their land may work with ODNR as well as local preservation groups to determine the best method of land preservation. Once a riverfront landowner adopts one or more of the practices described in this brochure, he or she joins others along the river who together are helping to establish permanent protection for the Scenic River.

# Preservation Options

## Land Purchase

Contingent upon departmental funding, the Division of Natural Areas and Preserves may purchase land along scenic rivers. ODNR will implement effective management to maintain and preserve the natural values of the land.

## Donation

Donating property or conservation easements to ODNR is often an attractive option to landowners who want to protect their property in perpetuity. An advantage to the landowner is the opportunity to deduct the appraised value of the donated land as a charitable contribution on their federal income taxes.

## Bargain Sale

A bargain sale is a combination of a cash sale and gift. The landowner sells land for less than "fair market value," and is allowed a tax deduction based on the difference between the current fair market value of the land and the cash received.

## Reforestation

Landowners who want to increase the width of the forested river corridor may receive native tree seedlings in exchange for an agreement not to cut or damage the trees as long as they own the land. If desired, Division staff can organize volunteers to assist with tree planting.

## Conservation Easement

A conservation easement is a method of land protection available to landowners who want to have legal protection for their property while retaining title to the land. An easement is a written, legal agreement between the landowner and ODNR, stipulating that the land will not be used for purposes that would threaten its natural integrity. Conservation easements do not grant public use of the property; the landowner determines the use of the land and the terms of the easement. It is written in deed form, filed with the county recorder and remains thereafter with the title to the land. The Scenic Rivers Program of the Division of Natural Areas and Preserves can either purchase or accept donations of conservation easements. In many cases donations are tax deductible and landowners may also realize reductions in property taxes.

7043

Rec'd CRA

OCT 9 0 1997

OHIO Department of Natural Resources

# Division of Wildlife

George V. Voinovich • *Governor*
Frances S. Buchholzer • *Director*
Michael J. Budzik • *Chief*

1840 Belcher Drive, Columbus, Ohio 43224-1329 • 614-265-6330

October 10, 1997

Sylvie Eastman
Conestoga-Rovers & Associates
651 Colby Drive
Waterloo, Ontario, Canada N2V 1C2

RE: Garland Road Landfill Site, Miami County, Ohio

Dear Sylvie Eastman:

This letter is in response to your request for information regarding sensitive ecosystems and sensitive and/or endangered species which exist within one mile of the boundaries for the project referenced above. The ODNR, Division of Natural Areas & Preserves maintains the Ohio Natural Heritage Program, which is the state's most comprehensive source of information on the location of listed flora, fauna, and unique natural areas. Your request has been forwarded to their office for response. The Division of Wildlife is available to provide guidance on avoiding or minimizing impacts to any listed fauna and/or their habitat.

You also request information regarding sensitive ecosystems in the area. The site location map shows the landfill is proposed to be located directly adjacent to the Stillwater River. The USGS Topographic Map, revised in 1973, shows the landfill will be located in an inundated area in the Englewood Reservoir of the Miami Conservancy District. The Division of Wildlife, therefore, sees the proposed site located in a sensitive ecosystem. For this reason, the Division of Wildlife strongly recommends the proposed landfill be relocated to an upland area.

If you should need further assistance, feel free to contact Becky Jenkins at (614)265-6631.

Sincerely,

John Marshall, Environmental Administrator

cc: Patricia Jones, DNAP

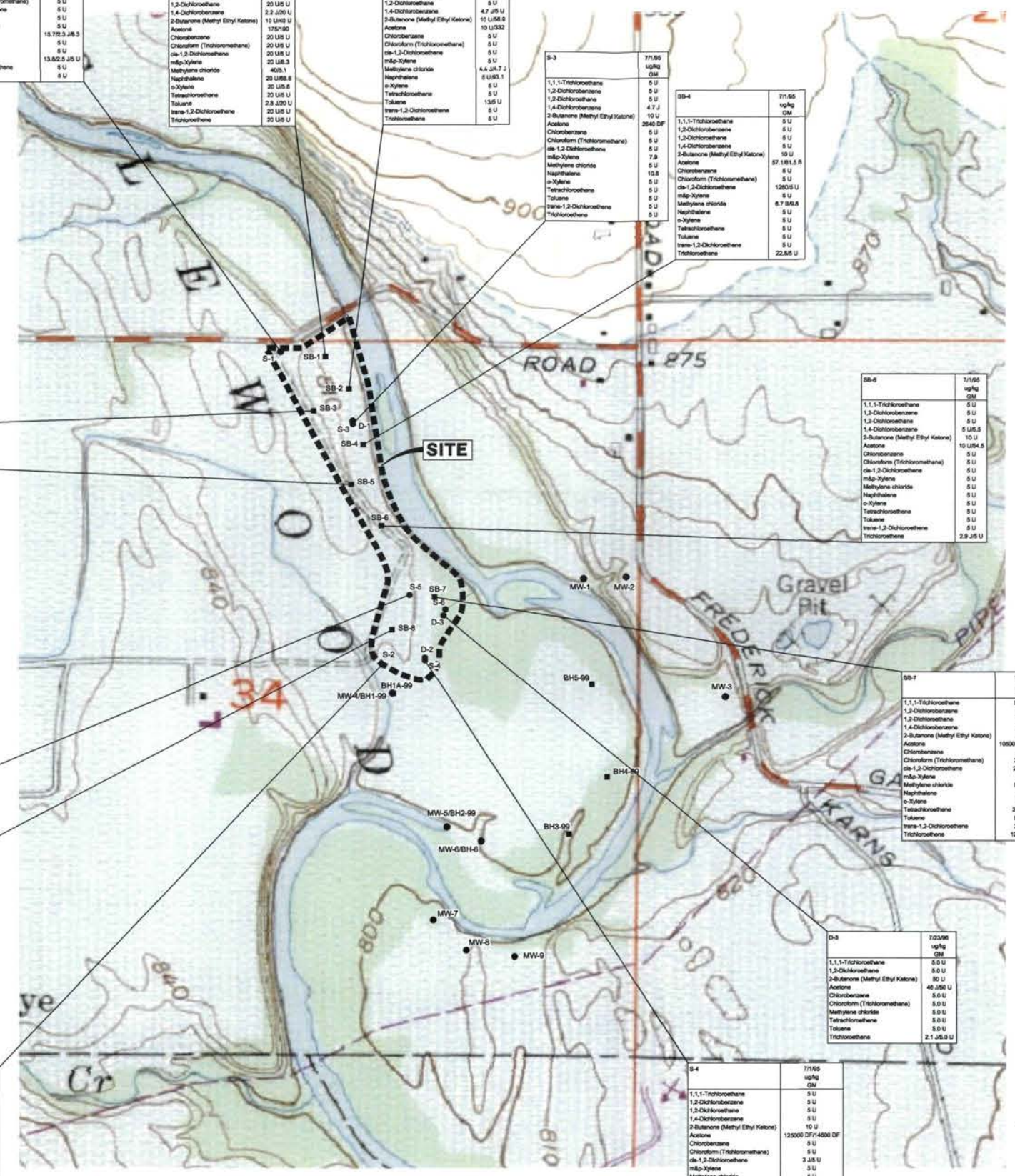
RECYCLED PAPER
SOY-BASED INK
DNR 0018

E

APPENDIX E

SOIL SAMPLE ANALYTICAL RESULTS


Figure E.1 - Soil Data Summary - VOCs
Figure E.2 - Soil Data Summary - SVOCs
Figure E.3 - Soil Data Summary - Metals
Figure E.4 - Soil Data Summary - Other
Table E.1 - Soil Analytical Results Summary (Database)
Table E.2 - Summary of Detections - Container and Soil Sample Results (OEPA - July 1992)
Table E.3 - Summary of Detections - Container and Soil Sample Results (TAT - March 1993)
Table E.4 - Summary of Detections - Soil Sample Results (FIT - April 1993)




| S-1 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U |
| 1,4-Dichlorobenzene | 5 U |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U |
| Acetone | 10 U/462 DF |
| Chlorobenzene | 5 U |
| Chloroform (Trichloromethane) | 5 U |
| cis-1,2-Dichloroethene | 5 U |
| m&p-Xylene | 5 U |
| Methylene chloride | 5 U |
| Naphthalene | 15.7/2.3 J/5.3 |
| o-Xylene | 5 U |
| Tetrachloroethene | 5 U |
| Toluene | 13.8/2.5 J/5 U |
| trans-1,2-Dichloroethene | 5 U |
| Trichloroethene | 5 U |

| SB-1 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 20 U/5 U |
| 1,2-Dichlorobenzene | 14.7/20 U |
| 1,2-Dichloroethane | 20 U/5 U |
| 1,4-Dichlorobenzene | 2.2 J/20 U |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U/40 U |
| Acetone | 175/195 |
| Chlorobenzene | 20 U/5 U |
| Chloroform (Trichloromethane) | 20 U/5 U |
| cis-1,2-Dichloroethene | 20 U/5 U |
| m&p-Xylene | 20 U/8.3 |
| Methylene chloride | 40/5.1 |
| Naphthalene | 20 U/88.8 |
| o-Xylene | 20 U/5.6 |
| Tetrachloroethene | 20 U/5 U |
| Toluene | 2.8 J/20 U |
| trans-1,2-Dichloroethene | 20 U/5 U |
| Trichloromethane | 20 U/5 U |

| SB-2 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U |
| 1,4-Dichlorobenzene | 4.7 J/5 U |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U/56.8 |
| Acetone | 10 U/532 |
| Chlorobenzene | 5 U |
| Chloroform (Trichloromethane) | 5 U |
| cis-1,2-Dichloroethene | 5 U |
| m&p-Xylene | 5 U |
| Methylene chloride | 4.4 J/4.7 J |
| Naphthalene | 5 U/93.1 |
| o-Xylene | 5 U |
| Tetrachloroethene | 5 U |
| Toluene | 13/5 U |
| trans-1,2-Dichloroethene | 5 U |
| Trichloroethene | 5 U |

| S-3 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U |
| 1,4-Dichlorobenzene | 4.7 J |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U |
| Acetone | 2640 DF |
| Chlorobenzene | 5 U |
| Chloroform (Trichloromethane) | 5 U |
| cis-1,2-Dichloroethene | 5 U |
| m&p-Xylene | 7.9 |
| Methylene chloride | 5 U |
| Naphthalene | 15.8 |
| o-Xylene | 5 U |
| Tetrachloroethene | 5 U |
| Toluene | 5 U |
| trans-1,2-Dichloroethene | 5 U |
| Trichloroethene | 5 U |

| SB-4 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U |
| 1,4-Dichlorobenzene | 5 U |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U |
| Acetone | 57.1/61.5 B |
| Chlorobenzene | 5 U |
| Chloroform (Trichloromethane) | 5 U |
| cis-1,2-Dichloroethene | 128/3 U |
| m&p-Xylene | 5 U |
| Methylene chloride | 6.7/9/5.6 |
| Naphthalene | 5 U |
| o-Xylene | 5 U |
| Tetrachloroethene | 5 U |
| Toluene | 5 U |
| trans-1,2-Dichloroethene | 5 U |
| Trichloroethene | 22.5/5 U |

| SB-3 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U/5.5 |
| 1,4-Dichlorobenzene | 15.3/5 U |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U |
| Acetone | 273.9/70.4 |
| Chlorobenzene | 5 U |
| Chloroform (Trichloromethane) | 5 U |
| cis-1,2-Dichloroethene | 5 U |
| m&p-Xylene | 3.9 J/5 U |
| Methylene chloride | 12.4 B/5.6 |
| Naphthalene | 4.2 J/5 U |
| o-Xylene | 28.3/5 U |
| Tetrachloroethene | 5 U |
| Toluene | 3.4 J/5.3 |
| trans-1,2-Dichloroethene | 5 U |
| Trichloroethene | 5 U |

| SB-6 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U |
| 1,4-Dichlorobenzene | 5 U/5.5 |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U |
| Acetone | 10 U/54.5 |
| Chlorobenzene | 5 U |
| Chloroform (Trichloromethane) | 5 U |
| cis-1,2-Dichloroethene | 5 U |
| m&p-Xylene | 5 U |
| Methylene chloride | 5 U |
| Naphthalene | 5 U |
| o-Xylene | 5 U |
| Tetrachloroethene | 5 U |
| Toluene | 5 U |
| trans-1,2-Dichloroethene | 5 U |
| Trichloroethene | 2.9 J/5 U |

| SB-5 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U |
| 1,4-Dichlorobenzene | 5 U/60.2 |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U |
| Acetone | 44.4/84.4 |
| Chlorobenzene | 3.8 J/5 U |
| Chloroform (Trichloromethane) | 5 U |
| cis-1,2-Dichloroethene | 5 U |
| m&p-Xylene | 5 U |
| Methylene chloride | 5 U |
| Naphthalene | 5 U |
| o-Xylene | 5 U |
| Tetrachloroethene | 5 U |
| Toluene | 5 U/5.1 |
| trans-1,2-Dichloroethene | 5 U |
| Trichloroethene | 5 U |

| S-5 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U |
| 1,4-Dichlorobenzene | 5 U |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U |
| Acetone | 10 U/170 DF |
| Chlorobenzene | 5 U |
| Chloroform (Trichloromethane) | 5 U |
| cis-1,2-Dichloroethene | 5 U |
| m&p-Xylene | 5 U |
| Methylene chloride | 5 U |
| Naphthalene | 5 U |
| o-Xylene | 5 U |
| Tetrachloroethene | 5 U |
| Toluene | 5 U |
| trans-1,2-Dichloroethene | 5 U |
| Trichloroethene | 15.1/21.2 |

| SB-7 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U/5.4 |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U |
| 1,4-Dichlorobenzene | 5 U |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U |
| Acetone | 10600 DF/12600 B |
| Chlorobenzene | 5 U |
| Chloroform (Trichloromethane) | 2 J/5 U |
| cis-1,2-Dichloroethene | 208/5 U |
| m&p-Xylene | 5 U |
| Methylene chloride | 5 U/5.9 |
| Naphthalene | 5 U |
| o-Xylene | 5 U |
| Tetrachloroethene | 35.8/5 U |
| Toluene | 5 U/7.6 |
| trans-1,2-Dichloroethene | 2 J/5 U |
| Trichloroethene | 1230/27.5 |

| SB-8 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U |
| 1,4-Dichlorobenzene | 5 U |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U |
| Acetone | 10 U/353 |
| Chlorobenzene | 5 U |
| Chloroform (Trichloromethane) | 5 U |
| cis-1,2-Dichloroethene | 191/46.4 |
| m&p-Xylene | 5 U |
| Methylene chloride | 5 U/6.8 |
| Naphthalene | 5 U |
| o-Xylene | 5 U |
| Tetrachloroethene | 5 U |
| Toluene | 2.9 J/5 U |
| trans-1,2-Dichloroethene | 5 U |
| Trichloroethene | 120/51.0 |

| D-3 | 7/23/96 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5.0 U |
| 1,2-Dichloroethane | 5.0 U |
| 2-Butanone (Methyl Ethyl Ketone) | 50 U |
| Acetone | 46 J/50 U |
| Chlorobenzene | 5.0 U |
| Chloroform (Trichloromethane) | 5.0 U |
| Methylene chloride | 5.0 U |
| Tetrachloroethene | 5.0 U |
| Toluene | 5.0 U |
| Trichloroethene | 2.1 J/5.0 U |

| S-2 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U |
| 1,4-Dichlorobenzene | 5 U |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U |
| Acetone | 10 U/170 DF |
| Chlorobenzene | 5 U |
| Chloroform (Trichloromethane) | 5 U |
| cis-1,2-Dichloroethene | 5 U |
| m&p-Xylene | 5 U |
| Methylene chloride | 5 U |
| Naphthalene | 5 U |
| o-Xylene | 5 U |
| Tetrachloroethene | 5 U |
| Toluene | 3 J/5 U |
| trans-1,2-Dichloroethene | 5 U |
| Trichloroethene | 5 U/8.6 |

| S-4 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U |
| 1,4-Dichlorobenzene | 5 U |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U |
| Acetone | 125000 DF/14600 DF |
| Chlorobenzene | 5 U |
| Chloroform (Trichloromethane) | 5 U |
| cis-1,2-Dichloroethene | 3 J/5 U |
| m&p-Xylene | 5 U |
| Methylene chloride | 5 U |
| Naphthalene | 5 U |
| o-Xylene | 5 U |
| Tetrachloroethene | 5 U |
| Toluene | 2 J/5 U |
| trans-1,2-Dichloroethene | 5 U |
| Trichloroethene | 148 DF/6.0 |

SOURCES: U.S.G.S. QUADRANGLE MAP;
WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000
AND JUNE 2001
NOVA CONSULTING INC.

| Nº | Revision | Date | Initial |
|---|---|---|---|
| | | | |

LEGEND

- LIMIT OF SITE
- BH4-99 BOREHOLE LOCATION
- MW-9 MONITORING WELL LOCATION

SAMPLE LOCATION

| SB-4 | 7/1/95 ug/kg GM |
|---|---|
| 1,1,1-Trichloroethane | 5 U |
| 1,2-Dichlorobenzene | 5 U |
| 1,2-Dichloroethane | 5 U |
| 1,4-Dichlorobenzene | 5 U/5.5 |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U |
| Acetone | 10 U/54.5 |
| Chlorobenzene | 5 U |
| Chloroform (Trichloromethane) | 5 U |
| cis-1,2-Dichloroethene | 5 U |
| m&p-Xylene | 5 U |
| Methylene chloride | 5 U |
| Naphthalene | 5 U |
| o-Xylene | 5 U |
| Tetrachloroethene | 5 U |
| Toluene | 5 U |
| trans-1,2-Dichloroethene | 5 U |
| Trichloroethene | 2.9 J/5 U |

SAMPLE DATE
RESULT UNIT
SAMPLED BY
CONCENTRATION
PARAMETER

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

| Status | Date | Initial |
|---|---|---|
| | | |

GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

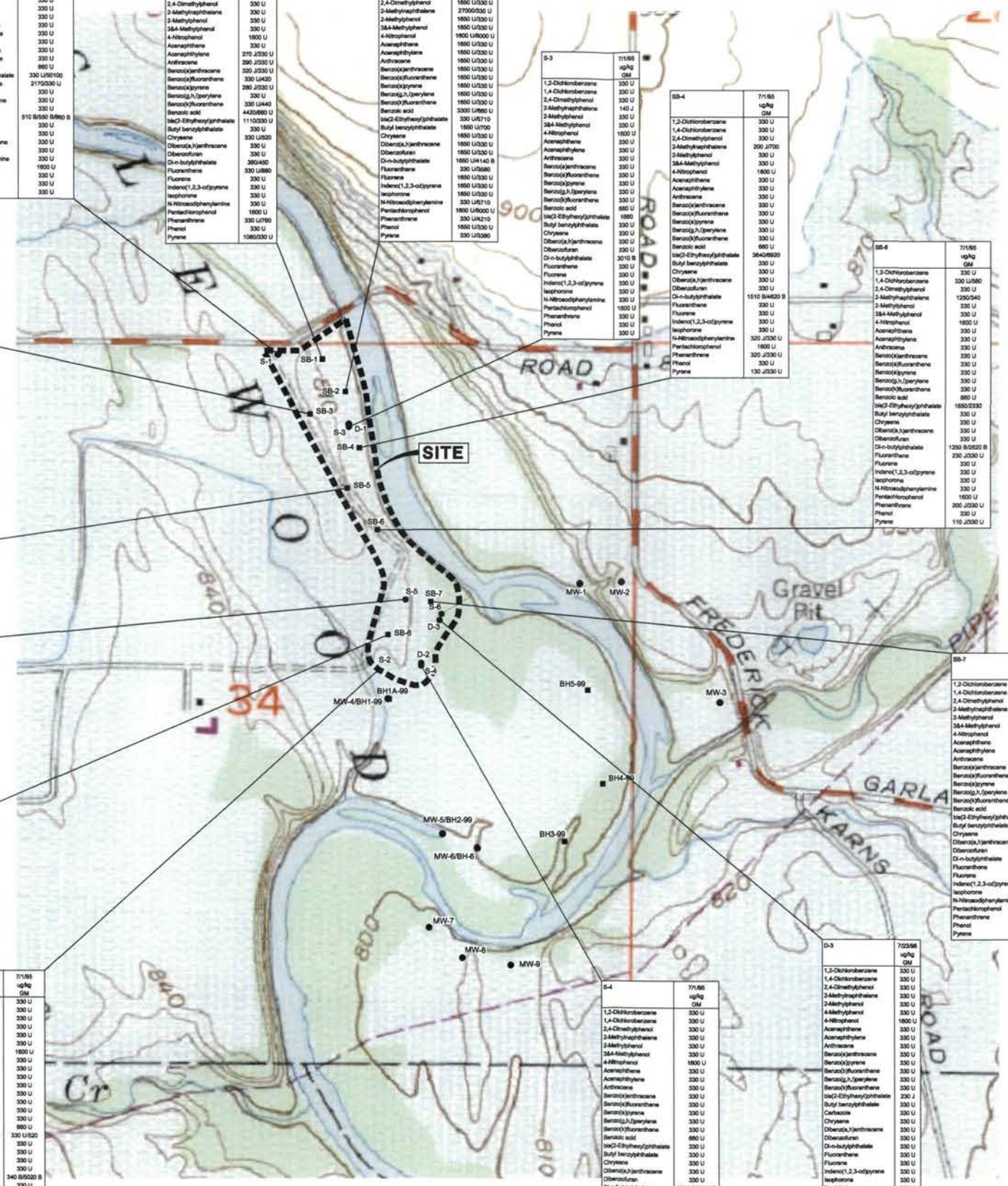
SOIL DATA SUMMARY
VOC's

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: | Reviewed By: | Date: | |
|---|---|---|---|
| IKR | MRT | MAY 2006 | |
| Scale: 1"=500' | Project Nº: 07043-90 | Report Nº: 014 | Drawing Nº: figure E.1 |

07043-90(014)GN-WA006 MAY 31/2006




| S-1 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U |
| 1,4-Dichlorobenzene | 330 U |
| 2,4-Dimethylphenol | 330 U |
| 2-Methylnaphthalene | 330 U |
| 2-Methylphenol | 330 U |
| 3&4-Methylphenol | 330 U |
| 4-Nitrophenol | 1600 U |
| Acenaphthene | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 330 U |
| Benzo(a)fluoranthene | 330 U |
| Benzo(a)pyrene | 330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U |
| Benzoic acid | 660 U |
| bis(2-Ethylhexyl)phthalate | 330 U/50100 |
| Butyl benzylphthalate | 210/330 U |
| Chrysene | 330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Di-n-butylphthalate | 510 B/560 B/660 B |
| Fluoranthene | 330 U |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Isophorone | 330 U |
| N-Nitrosodiphenylamine | 330 U |
| Pentachlorophenol | 1600 U |
| Phenanthrene | 330 U |
| Phenol | 330 U |
| Pyrene | 330 U |

| SB-1 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U |
| 1,4-Dichlorobenzene | 330 U |
| 2,4-Dimethylphenol | 330 U |
| 2-Methylnaphthalene | 330 U |
| 2-Methylphenol | 330 U |
| 3&4-Methylphenol | 330 U |
| 4-Nitrophenol | 1600 U |
| Acenaphthene | 330 U |
| Acenaphthylene | 270 J/330 U |
| Anthracene | 290 J/330 U |
| Benzo(a)anthracene | 320 J/330 U |
| Benzo(a)fluoranthene | 330 U/420 |
| Benzo(a)pyrene | 280 J/330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U/440 |
| Benzoic acid | 4420/660 U |
| bis(2-Ethylhexyl)phthalate | 1110/330 U |
| Butyl benzylphthalate | 330 U |
| Chrysene | 330 U/520 |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Di-n-butylphthalate | 380/450 |
| Fluoranthene | 330 U/880 |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Isophorone | 330 U |
| N-Nitrosodiphenylamine | 330 U |
| Pentachlorophenol | 1600 U |
| Phenanthrene | 330 U/750 |
| Phenol | 330 U |
| Pyrene | 1080/330 U |

| SB-2 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 1650 U/330 U |
| 1,4-Dichlorobenzene | 1650 U/330 U |
| 2,4-Dimethylphenol | 1650 U/330 U |
| 2-Methylnaphthalene | 27000/530 U |
| 2-Methylphenol | 1650 U/330 U |
| 3&4-Methylphenol | 1650 U/330 U |
| 4-Nitrophenol | 1600 U/8000 U |
| Acenaphthene | 1650 U/330 U |
| Acenaphthylene | 1650 U/330 U |
| Anthracene | 1650 U/330 U |
| Benzo(a)anthracene | 1650 U/330 U |
| Benzo(a)fluoranthene | 1650 U/330 U |
| Benzo(a)pyrene | 1650 U/330 U |
| Benzo(g,h,i)perylene | 1650 U/330 U |
| Benzo(k)fluoranthene | 1650 U/330 U |
| Benzoic acid | 3300 U/660 U |
| bis(2-Ethylhexyl)phthalate | 330 U/5710 |
| Butyl benzylphthalate | 1650 U/700 |
| Chrysene | 1650 U/330 U |
| Dibenz(a,h)anthracene | 1650 U/330 U |
| Dibenzofuran | 1650 U/330 U |
| Di-n-butylphthalate | 1650 U/H 140 B |
| Fluoranthene | 330 U/5080 |
| Fluorene | 1650 U/330 U |
| Indeno(1,2,3-cd)pyrene | 1650 U/330 U |
| Isophorone | 1650 U/330 U |
| N-Nitrosodiphenylamine | 330 U/5710 |
| Pentachlorophenol | 1650 U/8000 U |
| Phenanthrene | 330 U/4210 |
| Phenol | 1650 U/330 U |
| Pyrene | 330 U/3080 |

| S-3 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U |
| 1,4-Dichlorobenzene | 330 U |
| 2,4-Dimethylphenol | 330 U |
| 2-Methylnaphthalene | 140 J |
| 2-Methylphenol | 330 U |
| 3&4-Methylphenol | 330 U |
| 4-Nitrophenol | 1600 U |
| Acenaphthene | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 330 U |
| Benzo(a)fluoranthene | 330 U |
| Benzo(a)pyrene | 330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U |
| Benzoic acid | 660 U |
| bis(2-Ethylhexyl)phthalate | 1680 |
| Butyl benzylphthalate | 330 U |
| Chrysene | 330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Di-n-butylphthalate | 3010 B |
| Fluoranthene | 330 U |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Isophorone | 330 U |
| N-Nitrosodiphenylamine | 330 U |
| Pentachlorophenol | 1600 U |
| Phenanthrene | 330 U |
| Phenol | 330 U |
| Pyrene | 330 U |

| SB-4 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U |
| 1,4-Dichlorobenzene | 330 U |
| 2,4-Dimethylphenol | 330 U |
| 2-Methylnaphthalene | 200 J/700 |
| 2-Methylphenol | 330 U |
| 3&4-Methylphenol | 330 U |
| 4-Nitrophenol | 1600 U |
| Acenaphthene | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 330 U |
| Benzo(a)fluoranthene | 330 U |
| Benzo(a)pyrene | 330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U |
| Benzoic acid | 660 U |
| bis(2-Ethylhexyl)phthalate | 3640/6920 |
| Butyl benzylphthalate | 330 U |
| Chrysene | 330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Di-n-butylphthalate | 1510 B/4620 B |
| Fluoranthene | 330 U |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Isophorone | 330 U |
| N-Nitrosodiphenylamine | 320 J/330 U |
| Pentachlorophenol | 1600 U |
| Phenanthrene | 320 J/330 U |
| Phenol | 330 U |
| Pyrene | 130 J/330 U |

| SB-3 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U/330 U |
| 1,4-Dichlorobenzene | 330 U/330 U |
| 2,4-Dimethylphenol | 330 U/330 U |
| 2-Methylnaphthalene | 330 U/330 U |
| 2-Methylphenol | 330 U/330 U |
| 3&4-Methylphenol | 330 U/330 U |
| 4-Nitrophenol | 1600 U/16000 U |
| Acenaphthene | 330 U/330 U |
| Acenaphthylene | 330 U/330 U |
| Anthracene | 330 U/330 U |
| Benzo(a)anthracene | 330 U/330 U |
| Benzo(a)fluoranthene | 3300 U/420 |
| Benzo(a)pyrene | 330 U/330 U |
| Benzo(g,h,i)perylene | 330 U/330 U |
| Benzo(k)fluoranthene | 3300 U/440 |
| Benzoic acid | 660 U/6600 U |
| bis(2-Ethylhexyl)phthalate | 14400/330 U |
| Butyl benzylphthalate | 330 U/330 U |
| Chrysene | 330 U/330 U |
| Dibenz(a,h)anthracene | 330 U/330 U |
| Dibenzofuran | 330 U/330 U |
| Di-n-butylphthalate | 330 U/330 U |
| Fluoranthene | 330 U/330 U |
| Fluorene | 330 U/330 U |
| Indeno(1,2,3-cd)pyrene | 330 U/330 U |
| Isophorone | 330 U/140 |
| N-Nitrosodiphenylamine | 330 U/330 U |
| Pentachlorophenol | 1600 U/16000 U |
| Phenanthrene | 330 U/330 U |
| Phenol | 330 U/330 U |
| Pyrene | 330 U/330 U |

| SB-5 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U |
| 1,4-Dichlorobenzene | 330 U |
| 2,4-Dimethylphenol | 330 U |
| 2-Methylnaphthalene | 330 U |
| 2-Methylphenol | 330 U |
| 3&4-Methylphenol | 330 U |
| 4-Nitrophenol | 1600 U |
| Acenaphthene | 280 J/330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U/820 |
| Benzo(a)anthracene | 1480/330 U |
| Benzo(a)fluoranthene | 1020/330 U |
| Benzo(a)pyrene | 1160/330 U |
| Benzo(g,h,i)perylene | 330 U/570 |
| Benzo(k)fluoranthene | 1210/330 U |
| Benzoic acid | 660 U |
| bis(2-Ethylhexyl)phthalate | 330 U/380 |
| Butyl benzylphthalate | 330 U |
| Chrysene | 1540/330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Di-n-butylphthalate | 330 U/380 |
| Fluoranthene | 330 U/3610 |
| Fluorene | 280 J/330 U |
| Indeno(1,2,3-cd)pyrene | 330 U/560 |
| Isophorone | 330 U |
| N-Nitrosodiphenylamine | 330 U |
| Pentachlorophenol | 1600 U |
| Phenanthrene | 2630/330 U |
| Phenol | 330 U |
| Pyrene | 330 U/3330 |

| S-5 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U |
| 1,4-Dichlorobenzene | 330 U |
| 2,4-Dimethylphenol | 330 U |
| 2-Methylnaphthalene | 330 U |
| 2-Methylphenol | 330 U |
| 3&4-Methylphenol | 330 U |
| 4-Nitrophenol | 1600 U |
| Acenaphthene | 330 U/570 |
| Acenaphthylene | 330 U |
| Anthracene | 330 U/910 |
| Benzo(a)anthracene | 230 J/2540 |
| Benzo(a)fluoranthene | 170 J/2230 |
| Benzo(a)pyrene | 200 J/2190 |
| Benzo(g,h,i)perylene | 110 J/1180 |
| Benzo(k)fluoranthene | 2590/210 J |
| Benzoic acid | 660 U |
| bis(2-Ethylhexyl)phthalate | 310 J/420 |
| Butyl benzylphthalate | 330 U |
| Chrysene | 230 J/2720 |
| Dibenz(a,h)anthracene | 330 U/560 |
| Dibenzofuran | 280 J/330 U |
| Di-n-butylphthalate | 280 B/280 B J |
| Fluoranthene | 490/6030 |
| Fluorene | 330 U/440 |
| Indeno(1,2,3-cd)pyrene | 100 J/1200 |
| Isophorone | 330 U |
| N-Nitrosodiphenylamine | 330 U |
| Pentachlorophenol | 1600 U |
| Phenanthrene | 300 J/4820 |
| Phenol | 330 U |
| Pyrene | 450/5170 |

| SB-6 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U |
| 1,4-Dichlorobenzene | 330 U |
| 2,4-Dimethylphenol | 330 U |
| 2-Methylnaphthalene | 330 U |
| 2-Methylphenol | 330 U |
| 3&4-Methylphenol | 330 U |
| 4-Nitrophenol | 1600 U |
| Acenaphthene | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 330 U |
| Benzo(a)fluoranthene | 330 U |
| Benzo(a)pyrene | 330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U |
| Benzoic acid | 660 U |
| bis(2-Ethylhexyl)phthalate | 1870/330 U |
| Butyl benzylphthalate | 330 U |
| Chrysene | 330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Di-n-butylphthalate | 330 U |
| Fluoranthene | 330 U |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Isophorone | 330 U |
| N-Nitrosodiphenylamine | 330 U |
| Pentachlorophenol | 1600 U |
| Phenanthrene | 330 U |
| Phenol | 330 U |
| Pyrene | 330 U |

| S-2 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U |
| 1,4-Dichlorobenzene | 330 U |
| 2,4-Dimethylphenol | 330 U |
| 2-Methylnaphthalene | 330 U |
| 2-Methylphenol | 330 U |
| 3&4-Methylphenol | 330 U |
| 4-Nitrophenol | 1600 U |
| Acenaphthene | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 330 U |
| Benzo(a)fluoranthene | 330 U |
| Benzo(a)pyrene | 330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U |
| Benzoic acid | 660 U |
| bis(2-Ethylhexyl)phthalate | 330 U/520 |
| Butyl benzylphthalate | 330 U |
| Chrysene | 330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Di-n-butylphthalate | 340 B/5020 B |
| Fluoranthene | 330 U |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Isophorone | 330 U |
| N-Nitrosodiphenylamine | 330 U |
| Pentachlorophenol | 1600 U |
| Phenanthrene | 330 U |
| Phenol | 330 U |
| Pyrene | 330 U |

| S-4 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U |
| 1,4-Dichlorobenzene | 330 U |
| 2,4-Dimethylphenol | 330 U |
| 2-Methylnaphthalene | 330 U |
| 2-Methylphenol | 330 U |
| 3&4-Methylphenol | 330 U |
| 4-Nitrophenol | 1600 U |
| Acenaphthene | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 330 U |
| Benzo(a)fluoranthene | 330 U |
| Benzo(a)pyrene | 330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U |
| Benzoic acid | 660 U |
| bis(2-Ethylhexyl)phthalate | 330 U |
| Butyl benzylphthalate | 330 U |
| Chrysene | 330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Di-n-butylphthalate | 2740 B/2840 B |
| Fluoranthene | 330 U |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Isophorone | 330 U |
| N-Nitrosodiphenylamine | 330 U |
| Pentachlorophenol | 1600 U |
| Phenanthrene | 330 U |
| Phenol | 330 U |
| Pyrene | 330 U |

| D-3 | 7/23/96 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U |
| 1,4-Dichlorobenzene | 330 U |
| 2,4-Dimethylphenol | 330 U |
| 2-Methylnaphthalene | 330 U |
| 2-Methylphenol | 330 U |
| 3&4-Methylphenol | 330 U |
| 4-Nitrophenol | 1600 U |
| Acenaphthene | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 330 U |
| Benzo(a)pyrene | 330 U |
| Benzo(a)fluoranthene | 330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U |
| Benzoic acid | 660 U |
| bis(2-Ethylhexyl)phthalate | 1650/2330 |
| Butyl benzylphthalate | 330 U |
| Chrysene | 330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Di-n-butylphthalate | 1250 B/2620 B |
| Fluoranthene | 230 J/330 U |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Isophorone | 330 U |
| N-Nitrosodiphenylamine | 330 U |
| Pentachlorophenol | 1600 U |
| Phenanthrene | 200 J/330 U |
| Phenol | 330 U |
| Pyrene | 110 J/330 U |

| SB-7 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U |
| 1,4-Dichlorobenzene | 330 U |
| 2,4-Dimethylphenol | 330 U |
| 2-Methylnaphthalene | 330 U |
| 2-Methylphenol | 330 U |
| 3&4-Methylphenol | 330 U/470 |
| 4-Nitrophenol | 1600 U |
| Acenaphthene | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 160 J/330 U |
| Benzo(a)fluoranthene | 330 U/540 |
| Benzo(a)pyrene | 260 J/330 U |
| Benzo(g,h,i)perylene | 190 J/330 U |
| Benzo(k)fluoranthene | 330/330 U |
| Benzoic acid | 660 U |
| bis(2-Ethylhexyl)phthalate | 330 U/820 |
| Butyl benzylphthalate | 330 U |
| Chrysene | 240 J/330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Di-n-butylphthalate | 820 B/990 B |
| Fluoranthene | 330/330 U |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 160 J/330 U |
| Isophorone | 330 U |
| N-Nitrosodiphenylamine | 330 U |
| Pentachlorophenol | 1600 U |
| Phenanthrene | 330 U |
| Phenol | 330 U |
| Pyrene | 330 U/570 |

SOURCES: U.S.G.S. QUADRANGLE MAP; WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000 AND JUNE 2001
NOVA CONSULTING INC.

| N° | Revision | Date | Initial |
|---|---|---|---|
| | | | |

LEGEND

- LIMIT OF SITE
- BH4-99 BOREHOLE LOCATION
- MW-9 MONITORING WELL LOCATION

| SB-6 | 7/1/95 ug/kg GM |
|---|---|
| 1,2-Dichlorobenzene | 330 U |
| 1,4-Dichlorobenzene | 330 U/680 |
| 2,4-Dimethylphenol | 330 U |
| 2-Methylnaphthalene | 1250/540 |
| 2-Methylphenol | 330 U |
| 3&4-Methylphenol | 330 U |
| 4-Nitrophenol | 1600 U |
| Acenaphthene | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 330 U |
| Benzo(a)fluoranthene | 330 U |
| Benzo(a)pyrene | 330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U |
| Benzoic acid | 660 U |
| bis(2-Ethylhexyl)phthalate | 1650/2330 |
| Butyl benzylphthalate | 330 U |
| Chrysene | 330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Di-n-butylphthalate | 1250 B/2620 B |
| Fluoranthene | 230 J/330 U |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Isophorone | 330 U |
| N-Nitrosodiphenylamine | 330 U |
| Pentachlorophenol | 1600 U |
| Phenanthrene | 200 J/330 U |
| Phenol | 330 U |
| Pyrene | 110 J/330 U |

SAMPLE LOCATION
SAMPLE DATE
RESULT UNIT
SAMPLED BY
CONCENTRATION
PARAMETER

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

| Status | Date | Initial |
|---|---|---|
| | | |

GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

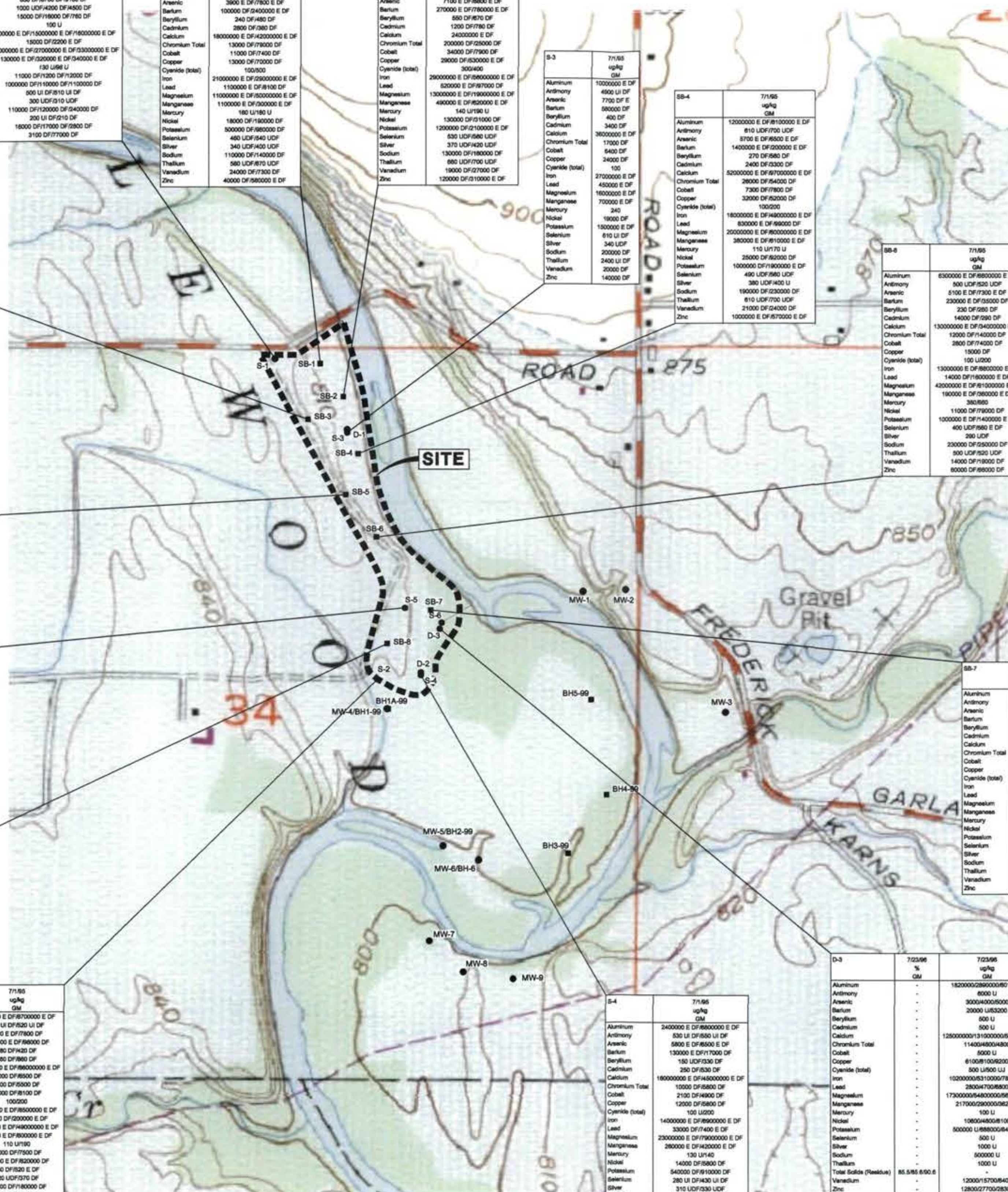
SOIL DATA SUMMARY
SVOC's

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: | Reviewed By: | Date: | |
|---|---|---|---|
| IKR | MRT | MAY 2006 | |
| Scale: 1"=500' | Project N°: 07043-90 | Report N°: 014 | Drawing N°: figure E.2 |

07043-90(014)GN-WA015 MAY 31/2006




| S-1 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 310000 E DF/7200000 E DF/7300000 E DF |
| Antimony | 200 UI DF |
| Arsenic | 11000 E DF/680 E DF/8100 E DF |
| Barium | 4100 UDF/41000 DF |
| Beryllium | 150 UDF/300 DF/350 DF |
| Cadmium | 150 UDF/420 DF/500 DF |
| Calcium | 250000000 E DF/65000000 E DF/78000000 E DF |
| Chromium Total | 830 DF/8700 DF/9100 DF |
| Cobalt | 1000 UDF/4200 DF/4500 DF |
| Copper | 15000 DF/16000 DF/760 DF |
| Cyanide (total) | 100 U |
| Iron | 1400000 E DF/15000000 E DF/16000000 E DF |
| Lead | 15000 DF/2200 E DF |
| Magnesium | 120000000 E DF/27000000 E DF/33000000 E DF |
| Manganese | 130000 E DF/320000 E DF/340000 E DF |
| Mercury | 130 U/98 U |
| Nickel | 11000 DF/1200 DF/12000 DF |
| Potassium | 1000000 DF/110000 DF/1100000 DF |
| Selenium | 500 UI DF/510 UI DF |
| Silver | 300 UDF/310 UDF |
| Sodium | 110000 DF/120000 DF/240000 DF |
| Thallium | 200 UI DF/210 DF |
| Vanadium | 16000 DF/17000 DF/2800 DF |
| Zinc | 3100 DF/77000 DF |

| SB-1 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 3500000 E DF/9900000 E DF |
| Antimony | 580 UDF/670 UDF |
| Arsenic | 3900 E DF/7800 E DF |
| Barium | 100000 DF/2400000 E DF |
| Beryllium | 240 DF/480 DF |
| Cadmium | 2800 DF/380 DF |
| Calcium | 18000000 E DF/42000000 E DF |
| Chromium Total | 13000 DF/79000 DF |
| Cobalt | 11000 DF/7400 DF |
| Copper | 13000 DF/70000 DF |
| Cyanide (total) | 100/500 |
| Iron | 21000000 E DF/29000000 E DF |
| Lead | 1100000 E DF/8100 DF |
| Magnesium | 11000000 E DF/50000000 E DF |
| Manganese | 1100000 E DF/300000 E DF |
| Mercury | 180 U/180 U |
| Nickel | 18000 DF/190000 DF |
| Potassium | 500000 DF/980000 DF |
| Selenium | 460 UDF/540 UDF |
| Silver | 340 UDF/400 UDF |
| Sodium | 110000 DF/140000 DF |
| Thallium | 580 UDF/670 UDF |
| Vanadium | 24000 DF/7300 DF |
| Zinc | 40000 DF/580000 E DF |

| SB-2 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 14000000 E DF/9600000 E DF |
| Antimony | 880 UDF/700 UDF |
| Arsenic | 7100 E DF/8800 E DF |
| Barium | 270000 E DF/780000 E DF |
| Beryllium | 550 DF/670 DF |
| Cadmium | 1200 DF/780 DF |
| Calcium | 24000000 E DF |
| Chromium Total | 200000 DF/25000 DF |
| Cobalt | 34000 DF/7900 DF |
| Copper | 29000 DF/530000 E DF |
| Cyanide (total) | 300/400 |
| Iron | 29000000 E DF/58000000 E DF |
| Lead | 520000 E DF/97000 DF |
| Magnesium | 13000000 E DF/19000000 E DF |
| Manganese | 490000 E DF/620000 E DF |
| Mercury | 140 U/190 U |
| Nickel | 130000 DF/31000 DF |
| Potassium | 1200000 DF/2100000 E DF |
| Selenium | 530 UDF/580 UDF |
| Silver | 370 UDF/420 UDF |
| Sodium | 130000 DF/180000 DF |
| Thallium | 880 UDF/700 UDF |
| Vanadium | 19000 DF/27000 DF |
| Zinc | 120000 DF/310000 E DF |

| S-3 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 10000000 E DF |
| Antimony | 4900 UI DF |
| Arsenic | 7700 DF E |
| Barium | 580000 DF |
| Beryllium | 400 DF |
| Cadmium | 3400 DF |
| Calcium | 36000000 E DF |
| Chromium Total | 17000 DF |
| Cobalt | 6400 DF |
| Copper | 24000 DF |
| Cyanide (total) | 100 |
| Iron | 27000000 E DF |
| Lead | 450000 E DF |
| Magnesium | 16000000 E DF |
| Manganese | 700000 E DF |
| Mercury | 240 |
| Nickel | 19000 DF |
| Potassium | 1500000 E DF |
| Selenium | 610 UI DF |
| Silver | 340 UDF |
| Sodium | 200000 DF |
| Thallium | 2400 UI DF |
| Vanadium | 20000 DF |
| Zinc | 140000 DF |

| SB-4 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 12000000 E DF/8100000 E DF |
| Antimony | 610 UDF/700 UDF |
| Arsenic | 5700 E DF/6500 E DF |
| Barium | 1400000 E DF/200000 E DF |
| Beryllium | 270 DF/580 DF |
| Cadmium | 2400 DF/3300 DF |
| Calcium | 52000000 E DF/97000000 E DF |
| Chromium Total | 26000 DF/54000 DF |
| Cobalt | 7300 DF/7800 DF |
| Copper | 32000 DF/52000 DF |
| Cyanide (total) | 100/200 |
| Iron | 18000000 E DF/49000000 E DF |
| Lead | 830000 E DF/99000 DF |
| Magnesium | 20000000 E DF/80000000 E DF |
| Manganese | 380000 E DF/610000 E DF |
| Mercury | 110 U/170 U |
| Nickel | 25000 DF/92000 DF |
| Potassium | 1000000 DF/1900000 E DF |
| Selenium | 490 UDF/560 UDF |
| Silver | 380 UDF/400 U |
| Sodium | 190000 DF/230000 DF |
| Thallium | 610 UDF/700 UDF |
| Vanadium | 21000 DF/24000 DF |
| Zinc | 1000000 E DF/570000 E DF |

| SB-6 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 6300000 E DF/6800000 E DF |
| Antimony | 500 UDF/520 UDF |
| Arsenic | 5100 E DF/7300 E DF |
| Barium | 230000 E DF/35000 DF |
| Beryllium | 230 DF/260 DF |
| Cadmium | 14000 DF/290 DF |
| Calcium | 130000000 E DF/34000000 E DF |
| Chromium Total | 12000 DF/140000 DF |
| Cobalt | 2800 DF/74000 DF |
| Copper | 15000 DF |
| Cyanide (total) | 100 U/200 |
| Iron | 13000000 E DF/6800000 E DF |
| Lead | 14000 DF/1600000 E DF |
| Magnesium | 42000000 E DF/81000000 E DF |
| Manganese | 190000 E DF/360000 E DF |
| Mercury | 380/660 |
| Nickel | 11000 DF/79000 DF |
| Potassium | 1000000 E DF/1400000 E DF |
| Selenium | 400 UDF/560 E DF |
| Silver | 290 UDF |
| Sodium | 230000 DF/250000 DF |
| Thallium | 500 UDF/520 UDF |
| Vanadium | 14000 DF/19000 DF |
| Zinc | 60000 DF/66000 DF |

| SB-3 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 2400000 E DF/5000000 E DF |
| Antimony | 500 UDF/540 UDF |
| Arsenic | 5800 E DF/6000 E DF |
| Barium | 1200000 E DF/13000 DF |
| Beryllium | 180 DF/230 DF |
| Cadmium | 220 DF/3800 DF |
| Calcium | 84000000 E DF/86000000 E DF |
| Chromium Total | 20000 DF/4300 DF |
| Cobalt | 2800 DF/3000 DF |
| Copper | 11000 DF/13000 DF |
| Cyanide (total) | 100 U/12000 |
| Iron | 11000000 E DF/9300000 E DF |
| Lead | 130000 E DF/6100 DF |
| Magnesium | 30000000 E DF/38000000 E DF |
| Manganese | 170000 E DF/370000 E DF |
| Mercury | 230 U/590 |
| Nickel | 10000 DF/21000 DF |
| Potassium | 600000 DF/540000 DF |
| Selenium | 400 UDF/440 UDF |
| Silver | 310 UDF/330 UDF |
| Sodium | 160000 DF/180000 DF |
| Thallium | 500 UDF/540 UDF |
| Vanadium | 11000 DF/13000 DF |
| Zinc | 220000 DF/43000 DF |

| SB-5 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 2000000 E DF/5600000 E DF |
| Antimony | 540 UDF/550 UDF |
| Arsenic | 6800 E DF/7400 E DF |
| Barium | 180000 DF/9900 DF |
| Beryllium | 160 UDF/240 DF |
| Cadmium | 190 DF/440 DF |
| Calcium | 160000000 E DF/92000000 E DF |
| Chromium Total | 4200 DF/9000 DF |
| Cobalt | 2200 DF/3800 DF |
| Copper | 15000 DF/8400 DF |
| Cyanide (total) | 100 U |
| Iron | 13000000 E DF/7200000 E DF |
| Lead | 5500 DF/67000 DF |
| Magnesium | 36000000 E DF/65000000 E DF |
| Manganese | 180000 E DF/350000 E DF |
| Mercury | 110 U/190 |
| Nickel | 14000 DF/6700 DF |
| Potassium | 430000 DF/580000 DF |
| Selenium | 550 DF |
| Silver | 320 UDF/340 UDF |
| Sodium | 170000 DF/240000 DF |
| Thallium | 540 UDF/550 UDF |
| Vanadium | 12000 DF/7700 DF |
| Zinc | 22000 DF/48000 DF |

| S-5 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 4200000 E DF/6800000 E DF |
| Antimony | 210 UI DF/520 UI DF |
| Arsenic | 6700 E DF/8000 E DF |
| Barium | 110000 E DF/150000 E DF |
| Beryllium | 200 DF/310 DF |
| Cadmium | 310 DF/330 DF |
| Calcium | 120000000 E DF/97000000 E DF |
| Chromium Total | 11000 DF/6100 DF |
| Cobalt | 2400 DF/4400 DF |
| Copper | 11000 DF/19000 DF |
| Cyanide (total) | 100 U |
| Iron | 16000000 E DF/8700000 E DF |
| Lead | 32000 DF/37000 DF |
| Magnesium | 43000000 E DF/53000000 E DF |
| Manganese | 230000 E DF/410000 E DF |
| Mercury | 100 U/210 |
| Nickel | 11000 DF/17000 DF |
| Potassium | 850000 DF/700000 DF |
| Selenium | 270 DF/420 UI DF |
| Silver | 220 UDF/310 UDF |
| Sodium | 140000 DF/160000 DF |
| Thallium | 2100 UI DF/250 DF |
| Vanadium | 11000 DF/15000 DF |
| Zinc | 42000 DF/52000 DF |

| SB-8 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 3500000 E DF/5800000 E DF |
| Antimony | 490 DF/530 UDF |
| Arsenic | 3300 E DF/4400 E DF |
| Barium | 190000 E DF/410000 E DF |
| Beryllium | 150 UDF/190 DF |
| Cadmium | 1300 DF/300 DF |
| Calcium | 130000000 E DF/150000000 E DF |
| Chromium Total | 11000 DF/12000 DF |
| Cobalt | 3100 DF/3500 DF |
| Copper | 23000 DF/24000 DF |
| Cyanide (total) | 100/100 U |
| Iron | 10000000 E DF |
| Lead | 140000 E DF/97000 DF |
| Magnesium | 57000000 E DF/82000000 E DF |
| Manganese | 240000 E DF/320000 E DF |
| Mercury | 200 U |
| Nickel | 15000 DF/20000 DF |
| Potassium | 560000 DF/790000 DF |
| Selenium | 430 UDF/470 DF |
| Silver | 300 UDF/320 UDF |
| Sodium | 210000 DF/230000 DF |
| Thallium | 490 UDF/530 UDF |
| Vanadium | 16000 DF/9100 DF |
| Zinc | 65000 DF/79000 DF |

| S-2 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 3800000 E DF/8700000 E DF |
| Antimony | 210 UI DF/520 UI DF |
| Arsenic | 4800 E DF/7800 DF |
| Barium | 1700000 E DF/98000 DF |
| Beryllium | 180 DF/420 DF |
| Cadmium | 380 DF/860 DF |
| Calcium | 140000000 E DF/86000000 E DF |
| Chromium Total | 11000 DF/8500 DF |
| Cobalt | 2400 DF/5500 DF |
| Copper | 18000 DF/8100 DF |
| Cyanide (total) | 100/200 |
| Iron | 18000000 E DF/8500000 E DF |
| Lead | 19000 DF/200000 E DF |
| Magnesium | 41000000 E DF/49000000 E DF |
| Manganese | 290000 E DF/800000 E DF |
| Mercury | 110 U/190 |
| Nickel | 16000 DF/7500 DF |
| Potassium | 440000 E DF/820000 DF |
| Selenium | 380 DF/520 E DF |
| Silver | 320 UDF/370 DF |
| Sodium | 140000 DF/180000 DF |
| Thallium | 2100 UI DF/250 DF |
| Vanadium | 18000 DF/9600 DF |
| Zinc | 31000 DF/51000 DF |

| S-4 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 2400000 E DF/6800000 E DF |
| Antimony | 530 UI DF/550 UI DF |
| Arsenic | 5800 E DF/6500 E DF |
| Barium | 130000 E DF/17000 DF |
| Beryllium | 150 UDF/330 DF |
| Cadmium | 250 DF/530 DF |
| Calcium | 180000000 E DF/45000000 E DF |
| Chromium Total | 10000 DF/5800 DF |
| Cobalt | 2100 DF/4900 DF |
| Copper | 12000 DF/5800 DF |
| Cyanide (total) | 100 U/200 |
| Iron | 14000000 E DF/8900000 E DF |
| Lead | 33000 DF/7400 E DF |
| Magnesium | 23000000 E DF/79000000 E DF |
| Manganese | 260000 E DF/420000 E DF |
| Mercury | 130 U/140 |
| Nickel | 14000 DF/5800 DF |
| Potassium | 540000 DF/910000 DF |
| Selenium | 280 UI DF/430 UI DF |
| Silver | 310 UDF/330 UDF |
| Sodium | 230000 DF/99000 DF |
| Thallium | 2100 UI DF/2200 UI DF |
| Vanadium | 15000 DF/8100 DF |
| Zinc | 17000 DF/53000 DF |

| D-3 | 7/23/96 % GM | 7/23/96 ug/kg GM |
|---|---|---|
| Aluminum | - | 1820000/2890000/6010000 |
| Antimony | - | 6000 U |
| Arsenic | - | 3000/4000/5000 |
| Barium | - | 20000 U/53200 |
| Beryllium | - | 500 U |
| Cadmium | - | 500 U |
| Calcium | - | 125000000/131000000/58300000 |
| Chromium Total | - | 11400/4800/4800 |
| Cobalt | - | 5000 U |
| Copper | - | 6100/8100/9200 |
| Cyanide (total) | - | 500 U/500 UJ |
| Iron | - | 10200000/5310000/7830000 |
| Lead | - | 2800/4700/6800 |
| Magnesium | - | 17300000/54800000/56700000 |
| Manganese | - | 217000/290000/362000 |
| Mercury | - | 100 U |
| Nickel | - | 10800/4800/8100 |
| Potassium | - | 500000 U/688000/643000 |
| Selenium | - | 500 U |
| Silver | - | 1000 U |
| Sodium | - | 500000 U |
| Thallium | - | 1000 U |
| Total Solids (Residue) | 85.5/85.6/90.6 | - |
| Vanadium | - | 12000/15700/6400 |
| Zinc | - | 12800/27700/28300 |

| SB-7 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 11000000 E DF/2300000 E DF |
| Antimony | 530 UDF/590 DF |
| Arsenic | 3900 E DF/4900 E DF |
| Barium | 130000 DF/440000 E DF |
| Beryllium | 150 UDF/390 DF |
| Cadmium | 280 DF/510 DF |
| Calcium | 220000000 E DF/95000000 E DF |
| Chromium Total | 12000 DF/17000 DF |
| Cobalt | 1900 DF/4700 DF |
| Copper | 20000 DF/21000 DF |
| Cyanide (total) | 100/100 U |
| Iron | 19000000 E DF/8500000 E DF |
| Lead | 36000 DF/46000 DF |
| Magnesium | 36000000 E DF/63000000 E DF |
| Manganese | 240000 E DF/360000 E DF |
| Mercury | 1100/170 U |
| Nickel | 17000 DF/22000 DF |
| Potassium | 2100000 E DF/670000 DF |
| Selenium | 420 UDF/440 UDF |
| Silver | 300 UDF/310 UDF |
| Sodium | 180000 DF/240000 DF |
| Thallium | 530 UDF/550 UDF |
| Vanadium | 27000 DF/8600 DF |
| Zinc | 140000 DF/90000 DF |

N
0 200 500ft

SOURCES: U.S.G.S. QUADRANGLE MAP;
WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000
AND JUNE 2001
NOVA CONSULTING INC.

| Nº | Revision | Date | Initial |
|---|---|---|---|

LEGEND

- LIMIT OF SITE
- BH4-99 BOREHOLE LOCATION
- MW-9 MONITORING WELL LOCATION

| SB-6 | 7/1/95 ug/kg GM |
|---|---|
| Aluminum | 6300000 E DF/6800000 E DF |
| Antimony | 500 UDF/520 UDF |
| Arsenic | 5100 E DF/7300 E DF |
| Barium | 230000 E DF/35000 DF |
| Beryllium | 230 DF/260 DF |
| Cadmium | 14000 DF/290 DF |
| Calcium | 130000000 E DF/34000000 E DF |
| Chromium Total | 12000 DF/140000 DF |
| Cobalt | 2800 DF/74000 DF |
| Copper | 15000 DF |
| Cyanide (total) | 100 U/200 |
| Iron | 13000000 E DF/6800000 E DF |
| Lead | 14000 DF/1600000 E DF |
| Magnesium | 42000000 E DF/81000000 E DF |
| Manganese | 190000 E DF/360000 E DF |
| Mercury | 380/660 |
| Nickel | 11000 DF/79000 DF |
| Potassium | 1000000 E DF/1400000 E DF |
| Selenium | 400 UDF/560 E DF |
| Silver | 290 UDF |
| Sodium | 230000 DF/250000 DF |
| Thallium | 500 UDF/520 UDF |
| Vanadium | 14000 DF/19000 DF |
| Zinc | 60000 DF/66000 DF |

SAMPLE LOCATION
SAMPLE DATE
RESULT UNIT
SAMPLED BY
CONCENTRATION
PARAMETER

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

| Status | Date | Initial |
|---|---|---|

GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

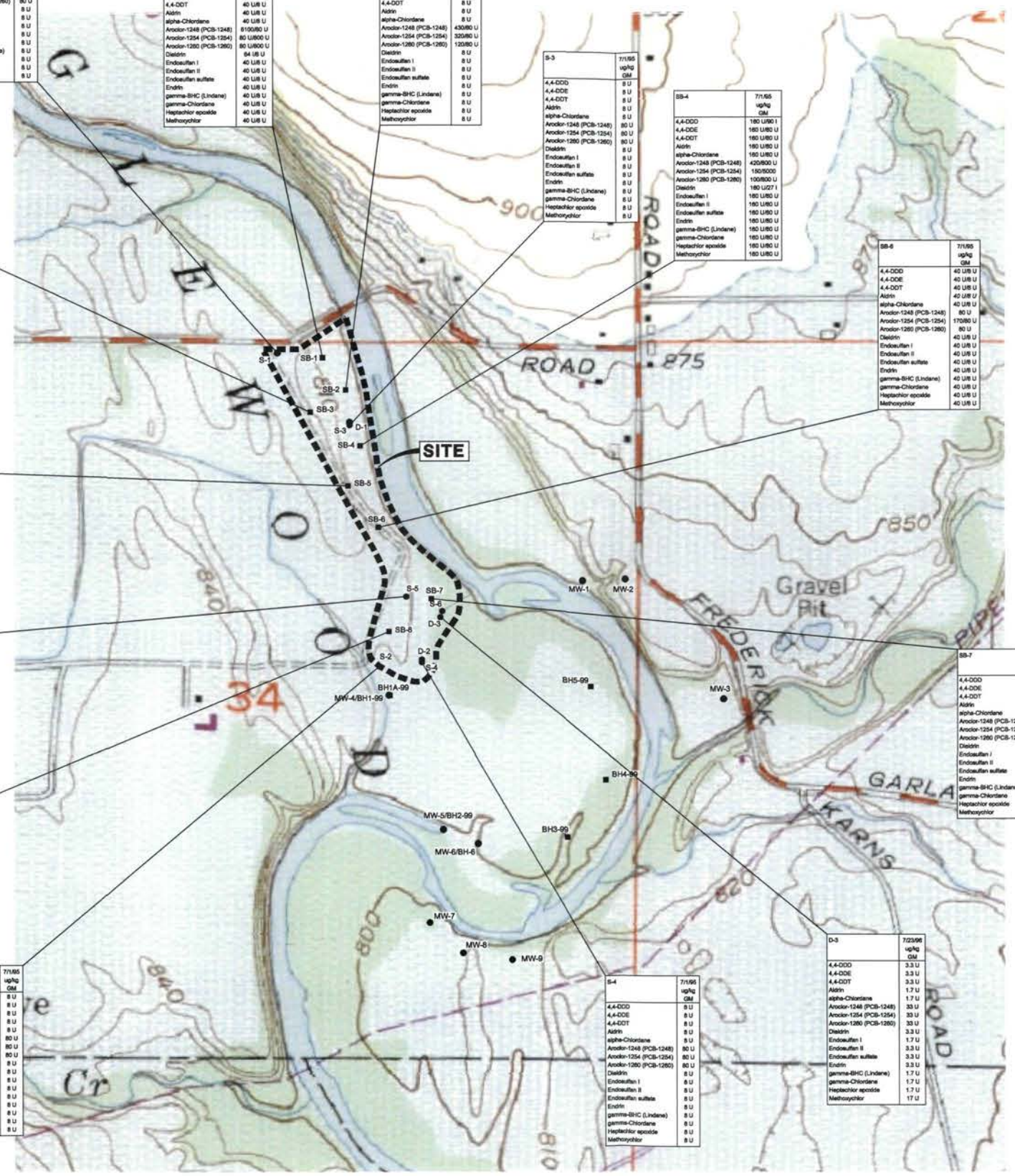
SOIL DATA SUMMARY
METALS

CRA CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: IKR | Reviewed By: MRT | Date: MAY 2006 | |
|---|---|---|---|
| Scale: 1"=500' | Project Nº: 07043-90 | Report Nº: 014 | Drawing Nº: figure E.3 |

07043-90(014)GN-WA016 MAY 31/2006




| S-1 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 8 U |
| 4,4-DDE | 8 U |
| 4,4-DDT | 8 U |
| Aldrin | 8 U |
| alpha-Chlordane | 8 U |
| Aroclor-1248 (PCB-1248) | 80 U |
| Aroclor-1254 (PCB-1254) | 80 U |
| Aroclor-1260 (PCB-1260) | 80 U |
| Dieldrin | 8 U |
| Endosulfan I | 8 U |
| Endosulfan II | 8 U |
| Endosulfan sulfate | 8 U |
| Endrin | 8 U |
| gamma-BHC (Lindane) | 8 U |
| gamma-Chlordane | 8 U |
| Heptachlor epoxide | 8 U |
| Methoxychlor | 8 U |

| SB-1 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 48 UB U |
| 4,4-DDE | 40 UB U |
| 4,4-DDT | 40 UB U |
| Aldrin | 40 UB U |
| alpha-Chlordane | 40 UB U |
| Aroclor-1248 (PCB-1248) | 8100/80 U |
| Aroclor-1254 (PCB-1254) | 80 U/800 U |
| Aroclor-1260 (PCB-1260) | 80 U/800 U |
| Dieldrin | 84 UB U |
| Endosulfan I | 40 UB U |
| Endosulfan II | 40 UB U |
| Endosulfan sulfate | 40 UB U |
| Endrin | 40 UB U |
| gamma-BHC (Lindane) | 40 UB U |
| gamma-Chlordane | 40 UB U |
| Heptachlor epoxide | 40 UB U |
| Methoxychlor | 40 UB U |

| SB-2 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 8 U |
| 4,4-DDE | 8 UB U |
| 4,4-DDT | 8 U |
| Aldrin | 8 U |
| alpha-Chlordane | 8 U |
| Aroclor-1248 (PCB-1248) | 430/80 U |
| Aroclor-1254 (PCB-1254) | 320/80 U |
| Aroclor-1260 (PCB-1260) | 120/80 U |
| Dieldrin | 8 U |
| Endosulfan I | 8 U |
| Endosulfan II | 8 U |
| Endosulfan sulfate | 8 U |
| Endrin | 8 U |
| gamma-BHC (Lindane) | 8 U |
| gamma-Chlordane | 8 U |
| Heptachlor epoxide | 8 U |
| Methoxychlor | 8 U |

| SB-3 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 40 UB U |
| 4,4-DDE | 40 UB U |
| 4,4-DDT | 40 UB U |
| Aldrin | 40 UB U |
| alpha-Chlordane | 40 UB U |
| Aroclor-1248 (PCB-1248) | 400 UB0 U |
| Aroclor-1254 (PCB-1254) | 1800/80 U |
| Aroclor-1260 (PCB-1260) | 400 UB0 U |
| Dieldrin | 80 UB U |
| Endosulfan I | 40 UB U |
| Endosulfan II | 40 UB U |
| Endosulfan sulfate | 40 UB U |
| Endrin | 40 UB U |
| gamma-BHC (Lindane) | 40 UB U |
| gamma-Chlordane | 40 UB U |
| Heptachlor epoxide | 40 UB U |
| Methoxychlor | 40 UB U |

| S-3 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 8 U |
| 4,4-DDE | 8 U |
| 4,4-DDT | 8 U |
| Aldrin | 8 U |
| alpha-Chlordane | 8 U |
| Aroclor-1248 (PCB-1248) | 80 U |
| Aroclor-1254 (PCB-1254) | 80 U |
| Aroclor-1260 (PCB-1260) | 80 U |
| Dieldrin | 8 U |
| Endosulfan I | 8 U |
| Endosulfan II | 8 U |
| Endosulfan sulfate | 8 U |
| Endrin | 8 U |
| gamma-BHC (Lindane) | 8 U |
| gamma-Chlordane | 8 U |
| Heptachlor epoxide | 8 U |
| Methoxychlor | 8 U |

| SB-4 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 160 UB0 U |
| 4,4-DDE | 160 UB0 U |
| 4,4-DDT | 160 UB0 U |
| Aldrin | 160 UB0 U |
| alpha-Chlordane | 160 UB0 U |
| Aroclor-1248 (PCB-1248) | 420/800 U |
| Aroclor-1254 (PCB-1254) | 130/5000 |
| Aroclor-1260 (PCB-1260) | 100/800 U |
| Dieldrin | 160 UD7 I |
| Endosulfan I | 160 UB0 U |
| Endosulfan II | 160 UB0 U |
| Endosulfan sulfate | 160 UB0 U |
| Endrin | 160 UB0 U |
| gamma-BHC (Lindane) | 160 UB0 U |
| gamma-Chlordane | 160 UB0 U |
| Heptachlor epoxide | 160 UB0 U |
| Methoxychlor | 160 UB0 U |

| SB-5 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 8 U |
| 4,4-DDE | 8 U |
| 4,4-DDT | 8 U |
| Aldrin | 8 U |
| alpha-Chlordane | 8 U |
| Aroclor-1248 (PCB-1248) | 80 U |
| Aroclor-1254 (PCB-1254) | 110/80 U |
| Aroclor-1260 (PCB-1260) | 80 U |
| Dieldrin | 8 U |
| Endosulfan I | 8 U |
| Endosulfan II | 8 U |
| Endosulfan sulfate | 8 U |
| Endrin | 8 U |
| gamma-BHC (Lindane) | 8 U |
| gamma-Chlordane | 8 U |
| Heptachlor epoxide | 8 U |
| Methoxychlor | 8 U |

| SB-6 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 40 UB U |
| 4,4-DDE | 40 UB U |
| 4,4-DDT | 40 UB U |
| Aldrin | 40 UB U |
| alpha-Chlordane | 40 UB U |
| Aroclor-1248 (PCB-1248) | 80 U |
| Aroclor-1254 (PCB-1254) | 170/80 U |
| Aroclor-1260 (PCB-1260) | 80 U |
| Dieldrin | 40 UB U |
| Endosulfan I | 40 UB U |
| Endosulfan II | 40 UB U |
| Endosulfan sulfate | 40 UB U |
| Endrin | 40 UB U |
| gamma-BHC (Lindane) | 40 UB U |
| gamma-Chlordane | 40 UB U |
| Heptachlor epoxide | 40 UB U |
| Methoxychlor | 40 UB U |

| S-5 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 8 U |
| 4,4-DDE | 8 U |
| 4,4-DDT | 8 U |
| Aldrin | 8 U |
| alpha-Chlordane | 8 U |
| Aroclor-1248 (PCB-1248) | 80 U |
| Aroclor-1254 (PCB-1254) | 80 U |
| Aroclor-1260 (PCB-1260) | 80 U |
| Dieldrin | 8 U |
| Endosulfan I | 8 U |
| Endosulfan II | 8 U |
| Endosulfan sulfate | 8 U |
| Endrin | 8 U |
| gamma-BHC (Lindane) | 8 U |
| gamma-Chlordane | 8 U |
| Heptachlor epoxide | 8 U |
| Methoxychlor | 8 U |

| SB-7 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 40 U |
| 4,4-DDE | 40 U |
| 4,4-DDT | 40 U |
| Aldrin | 40 U |
| alpha-Chlordane | 40 UB0 U |
| Aroclor-1248 (PCB-1248) | 400 UB0 U |
| Aroclor-1254 (PCB-1254) | 210/530 |
| Aroclor-1260 (PCB-1260) | 400 UB0 U |
| Dieldrin | 40 UK0 U |
| Endosulfan I | 40 U |
| Endosulfan II | 40 U |
| Endosulfan sulfate | 40 U |
| Endrin | 40 U |
| gamma-BHC (Lindane) | 40 U |
| gamma-Chlordane | 40 UB0 U |
| Heptachlor epoxide | 40 U |
| Methoxychlor | 40 U |

| SB-8 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 8 U |
| 4,4-DDE | 8 U |
| 4,4-DDT | 8 U |
| Aldrin | 8 U |
| alpha-Chlordane | 8 U |
| Aroclor-1248 (PCB-1248) | 80 U |
| Aroclor-1254 (PCB-1254) | 220/80 U |
| Aroclor-1260 (PCB-1260) | 80 U |
| Dieldrin | 13 UB U |
| Endosulfan I | 8 U |
| Endosulfan II | 8 U |
| Endosulfan sulfate | 8 U |
| Endrin | 8 U |
| gamma-BHC (Lindane) | 8 U |
| gamma-Chlordane | 8 U |
| Heptachlor epoxide | 8 U |
| Methoxychlor | 8 U |

| S-2 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 8 U |
| 4,4-DDE | 8 U |
| 4,4-DDT | 8 U |
| Aldrin | 8 U |
| alpha-Chlordane | 8 U |
| Aroclor-1248 (PCB-1248) | 80 U |
| Aroclor-1254 (PCB-1254) | 80 U |
| Aroclor-1260 (PCB-1260) | 80 U |
| Dieldrin | 8 U |
| Endosulfan I | 8 U |
| Endosulfan II | 8 U |
| Endosulfan sulfate | 8 U |
| Endrin | 8 U |
| gamma-BHC (Lindane) | 8 U |
| gamma-Chlordane | 8 U |
| Heptachlor epoxide | 8 U |
| Methoxychlor | 8 U |

| S-4 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 8 U |
| 4,4-DDE | 8 U |
| 4,4-DDT | 8 U |
| Aldrin | 8 U |
| alpha-Chlordane | 8 U |
| Aroclor-1248 (PCB-1248) | 80 U |
| Aroclor-1254 (PCB-1254) | 80 U |
| Aroclor-1260 (PCB-1260) | 80 U |
| Dieldrin | 8 U |
| Endosulfan I | 8 U |
| Endosulfan II | 8 U |
| Endosulfan sulfate | 8 U |
| Endrin | 8 U |
| gamma-BHC (Lindane) | 8 U |
| gamma-Chlordane | 8 U |
| Heptachlor epoxide | 8 U |
| Methoxychlor | 8 U |

| D-3 | 7/23/96 ug/kg GM |
|---|---|
| 4,4-DDD | 3.3 U |
| 4,4-DDE | 3.3 U |
| 4,4-DDT | 3.3 U |
| Aldrin | 1.7 U |
| alpha-Chlordane | 1.7 U |
| Aroclor-1248 (PCB-1248) | 33 U |
| Aroclor-1254 (PCB-1254) | 33 U |
| Aroclor-1260 (PCB-1260) | 33 U |
| Dieldrin | 3.3 U |
| Endosulfan I | 1.7 U |
| Endosulfan II | 3.3 U |
| Endosulfan sulfate | 3.3 U |
| Endrin | 3.3 U |
| gamma-BHC (Lindane) | 1.7 U |
| gamma-Chlordane | 1.7 U |
| Heptachlor epoxide | 1.7 U |
| Methoxychlor | 17 U |

SOURCES: U.S.G.S. QUADRANGLE MAP; WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000 AND JUNE 2001
NOVA CONSULTING INC.

| N° | Revision | Date | Initial |
|---|---|---|---|
| | | | |

LEGEND

- LIMIT OF SITE
- BH4-99 BOREHOLE LOCATION
- MW-9 MONITORING WELL LOCATION

SAMPLE LOCATION

| SB-6 | 7/1/95 ug/kg GM |
|---|---|
| 4,4-DDD | 40 UB U |
| 4,4-DDE | 40 UB U |
| 4,4-DDT | 40 UB U |
| Aldrin | 40 UB U |
| alpha-Chlordane | 40 UB U |
| Aroclor-1248 (PCB-1248) | 80 U |
| Aroclor-1254 (PCB-1254) | 170/80 U |
| Aroclor-1260 (PCB-1260) | 80 U |
| Dieldrin | 40 UB U |
| Endosulfan I | 40 UB U |
| Endosulfan II | 40 UB U |
| Endosulfan sulfate | 40 UB U |
| Endrin | 40 UB U |
| gamma-BHC (Lindane) | 40 UB U |
| gamma-Chlordane | 40 UB U |
| Heptachlor epoxide | 40 UB U |
| Methoxychlor | 40 UB U |

SAMPLE DATE
RESULT UNIT
SAMPLED BY
CONCENTRATION
PARAMETER

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

| Status | Date | Initial |
|---|---|---|
| | | |

GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

SOIL DATA SUMMARY
OTHER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: | Reviewed By: | Date: | |
|---|---|---|---|
| IKR | MRT | MAY 2006 | |
| Scale: 1"=500' | Project N°: 07043-90 | Report N°: 014 | Drawing N°: figure E.4 |

07043-90(014)GN-WA017 MAY 31/2006

# TABLE E.1

## ANALYTICAL RESULTS SUMMARY
## SOIL RESULTS
## GARLAND ROAD

| *Sample Location:* | | *D-3* | *D-3* | *D-3* | *MW-6 thru 9 Comp* | *S-1* | *S-1* | *S-1* | *S-2* | *S-2* | *S-3* | *S-4* | *S-4* | *S-5* | *S-5* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *S-MK-001* | *S-MK-002* | *S-MK-004* | *S-7043-061101-NZ-011* | *S-1* | *S-1* | *S-1D* | *S-2* | *S-2* | *S-3* | *S-4* | *S-4* | *S-5* | *S-5* |
| *Sample Date:* | | *7/23/1996* | *7/23/1996* | *7/23/1996* | *6/11/2001* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* |
| *Sample Depth:* | | *(0-1) ft BGS* | *(4-6) ft BGS* | *(10-12) ft BGS* | | *(0-1) ft BGS* | *(23-25) ft BGS* | *(0-1) ft BGS (Duplicate)* | *(0-1) ft BGS* | *(9-11) ft BGS* | *(21-23) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* | *(3-5) ft BGS* |
| *Parameters* | *Units* | | | | | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,1,2,2-Tetrachloroethane | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,1,2-Trichloroethane | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,1-Dichloroethane | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,1-Dichloroethene | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,2,4-Trichlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dibromo-3-chloropropane (DBCP) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dibromoethane (Ethylene Dibromide) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | ug/kg | - | - | - | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,2-Dichloroethane | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,2-Dichloroethene (total) | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichloropropane | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,3-Dichlorobenzene | ug/kg | - | - | - | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,4-Dichlorobenzene | ug/kg | - | - | - | - | 5 U | 5 U | 5 U | 5 U | 5 U | 4.7 J | 5 U | 5 U | 5 U | 5 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | 50 U | 50 U | 50 U | - | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Hexanone | ug/kg | 50 U | 50 U | 50 U | - | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/kg | 50 U | 50 U | 50 U | - | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Acetone | ug/kg | 50 U | 50 U | 46 J | - | 10 U | 462 DF | 10 U | 10 U | 170 DF | 2640 DF | 125000 DF | 14600 DF | 17000 DF | 10 U |
| Benzene | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Bromodichloromethane | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Bromoform | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Bromomethane (Methyl Bromide) | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Carbon disulfide | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Carbon tetrachloride | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Chlorobenzene | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Chloroethane | ug/kg | 10 U | 10 U | 10 U | - | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Chloroform (Trichloromethane) | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Chloromethane (Methyl Chloride) | ug/kg | 10 U | 10 U | 10 U | - | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| cis-1,2-Dichloroethene | ug/kg | - | - | - | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 3 J | 5 U | 5 U |
| cis-1,3-Dichloropropene | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Cyclohexane | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Dibromochloromethane | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Dichlorodifluoromethane (CFC-12) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ethylbenzene | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Isopropylbenzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| m&p-Xylene | ug/kg | - | - | - | - | 5 U | 5 U | 5 U | 5 U | 5 U | 7.9 | 5 U | 5 U | 5 U | 5 U |
| Methyl acetate | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Methyl cyclohexane | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Methyl Tert Butyl Ether | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Methylene chloride | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Naphthalene | ug/kg | - | - | - | - | 8.3 | 2.3 J | 15.7 | 5 U | 5 U | 10.6 | 5 U | 5 U | 4 J | 5 U |
| o-Xylene | ug/kg | - | - | - | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Styrene | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Tetrachloroethene | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Toluene | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 2.5 J | 13.8 | 5 U | 3 J | 5 U | 5 U | 2 J | 5 U | 5 U |
| trans-1,2-Dichloroethene | ug/kg | - | - | - | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| trans-1,3-Dichloropropene | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Trichloroethene | ug/kg | 5.0 U | 5.0 U | 2.1 J | - | 5 U | 5 U | 5 U | 5 U | 8.6 | 5 U | 6.0 | 145 DF | 21.2 | 15.1 |
| Trichlorofluoromethane (CFC-11) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Trifluorotrichloroethane (Freon 113) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vinyl acetate | ug/kg | - | - | - | - | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Vinyl chloride | ug/kg | 10 U | 10 U | 10 U | - | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Xylene (total) | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | - | - | - | - | - | - | - | - | - | - |

# TABLE E.1

## ANALYTICAL RESULTS SUMMARY
## SOIL RESULTS
## GARLAND ROAD

| *Sample Location:* | | *D-3* | *D-3* | *D-3* | *MW-6 thru 9 Comp* | *S-1* | *S-1* | *S-1* | *S-2* | *S-2* | *S-3* | *S-4* | *S-4* | *S-5* | *S-5* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *S-MK-001* | *S-MK-002* | *S-MK-004* | *S-7043-061101-NZ-011* | *S-1* | *S-1* | *S-1D* | *S-2* | *S-2* | *S-3* | *S-4* | *S-4* | *S-5* | *S-5* |
| *Sample Date:* | | *7/23/1996* | *7/23/1996* | *7/23/1996* | *6/11/2001* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1996* | *7/1/1995* | *7/1/1996* |
| *Sample Depth:* | | *(0-1) ft BGS* | *(4-6) ft BGS* | *(10-12) ft BGS* | | *(0-1) ft BGS* | *(23-25) ft BGS* | *(0-1) ft BGS (Duplicate)* | *(0-1) ft BGS* | *(9-11) ft BGS* | *(21-23) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* | *(3-5) ft BGS* |
| *Parameters* | *Units* | | | | | | | | | | | | | | |
| *Volatile Organic Compounds - Leachate* | | | | | | | | | | | | | | | |
| 1,1-Dichloroethene | ug/kg | - | - | - | 0.070 U | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichloroethane | ug/kg | - | - | - | 0.025 U | - | - | - | - | - | - | - | - | - | - |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | - | - | - | 0.050 U | - | - | - | - | - | - | - | - | - | - |
| Benzene | ug/kg | - | - | - | 0.025 U | - | - | - | - | - | - | - | - | - | - |
| Carbon tetrachloride | ug/kg | - | - | - | 0.025 U | - | - | - | - | - | - | - | - | - | - |
| Chlorobenzene | ug/kg | - | - | - | 0.025 U | - | - | - | - | - | - | - | - | - | - |
| Chloroform (Trichloromethane) | ug/kg | - | - | - | 0.025 U | - | - | - | - | - | - | - | - | - | - |
| Tetrachloroethene | ug/kg | - | - | - | 0.070 U | - | - | - | - | - | - | - | - | - | - |
| Trichloroethene | ug/kg | - | - | - | 0.050 U | - | - | - | - | - | - | - | - | - | - |
| Vinyl chloride | ug/kg | - | - | - | 0.050 U | - | - | - | - | - | - | - | - | - | - |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,2-Dichlorobenzene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,3-Dichlorobenzene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,4-Dichlorobenzene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4,5-Trichlorophenol | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4,6-Trichlorophenol | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4-Dichlorophenol | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4-Dimethylphenol | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4-Dinitrophenol | ug/kg | 1600 U | 1600 U | 1600 U | - | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U |
| 2,4-Dinitrotoluene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,6-Dinitrotoluene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Chloronaphthalene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Chlorophenol | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Methylnaphthalene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 140 J | 330 U | 330 U | 330 U | 330 U |
| 2-Methylphenol | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Nitroaniline | ug/kg | 1600 U | 1600 U | 1600 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Nitrophenol | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 660 U | 330 U | 660 U | 330 U | 330 U | 660 U | 660 U | 660 U | 660 U |
| 3&4-Methylphenol | ug/kg | - | - | - | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 3,3'-Dichlorobenzidine | ug/kg | 1600 U | 1600 U | 1600 U | - | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U |
| 3-Nitroaniline | ug/kg | 1600 U | 1600 U | 1600 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4,6-Dinitro-2-methylphenol | ug/kg | 1600 U | 1600 U | 1600 U | - | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U |
| 4-Bromophenyl phenyl ether | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Chloro-3-methylphenol | ug/kg | 330 U | 330 U | 330 U | - | 660 U | 330 U | 660 U | 330 U | 660 U | 660 U | 330 U | 330 U | 330 U | 330 U |
| 4-Chloroaniline | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Chlorophenyl phenyl ether | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Methylphenol | ug/kg | 330 U | 330 U | 330 U | - | - | - | - | - | - | - | - | - | - | - |
| 4-Nitroaniline | ug/kg | 1600 U | 1600 U | 1600 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Nitrophenol | ug/kg | 1600 U | 1600 U | 1600 U | - | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U |
| Acenaphthene | ug/kg | 330 U | 330 U | 330 U | | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 370 |
| Acenaphthylene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Acetophenone | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Anthracene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 910 |
| Atrazine | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Benzaldehyde | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Benzo(a)anthracene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 230 J | 2540 |
| Benzo(a)fluoranthene | ug/kg | - | - | - | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 170 J | 2230 |
| Benzo(a)pyrene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 200 J | 2190 |
| Benzo(b)fluoranthene | ug/kg | 330 U | 330 U | 330 U | - | - | - | - | - | - | - | - | - | - | - |

TABLE E.1

ANALYTICAL RESULTS SUMMARY
SOIL RESULTS
GARLAND ROAD

| *Sample Location:* | | *D-3* | *D-3* | *D-3* | *MW-6 thru 9 Comp* | *S-1* | *S-1* | *S-1* | *S-2* | *S-2* | *S-3* | *S-4* | *S-4* | *S-5* | *S-5* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *S-MK-001* | *S-MK-002* | *S-MK-004* | *S-7043-061101-NZ-011* | *S-1* | *S-1* | *S-1D* | *S-2* | *S-2* | *S-3* | *S-4* | *S-4* | *S-5* | *S-5* |
| *Sample Date:* | | *7/23/1996* | *7/23/1996* | *7/23/1996* | *6/11/2001* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* |
| *Sample Depth:* | | *(0-1) ft BGS* | *(4-6) ft BGS* | *(10-12) ft BGS* | | *(0-1) ft BGS* | *(23-25) ft BGS* | *(0-1) ft BGS (Duplicate)* | *(0-1) ft BGS* | *(9-11) ft BGS* | *(21-23) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* | *(3-5) ft BGS* |
| *Parameters* | *Units* | | | | | | | | | | | | | | |
| Benzo(g,h,i)perylene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 110 J | 1160 |
| Benzo(k)fluoranthene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 210 J | 2090 |
| Benzoic acid | ug/kg | - | - | - | - | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U |
| Benzyl Alcohol | ug/kg | - | - | - | - | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U |
| Biphenyl | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| bis(2-Chloroethyl)ether | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| bis(2-Ethylhexyl)phthalate | ug/kg | 230 J | 230 J | 230 J | - | 330 U | 50100 | 330 U | 330 U | 520 | 1660 | 330 U | 330 U | 310 J | 420 |
| Butyl benzylphthalate | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 2170 | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Caprolactam | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Carbazole | ug/kg | 330 U | 330 U | 330 U | - | - | - | - | - | - | - | - | - | - | - |
| Chrysene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 230 J | 2720 |
| Dibenz(a,h)anthracene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 560 |
| Dibenzofuran | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 280 J |
| Diethyl phthalate | ug/kg | 330 U | 330 U | 330 U | - | - | - | - | - | - | - | - | - | - | - |
| Dimethyl phthalate | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Di-n-butylphthalate | ug/kg | 330 U | 330 U | 330 U | - | 550 B | 860 B | 510 B | 340 B | 5020 B | 3010 B | 2740 B | 2840 B | 280 B J | 280 B |
| Di-n-octyl phthalate | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Fluoranthene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 490 | 6050 |
| Fluorene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 440 |
| Hexachlorobenzene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Hexachlorobutadiene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Hexachlorocyclopentadiene | ug/kg | 1600 U | 1600 U | 1600 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Hexachloroethane | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Indeno(1,2,3-cd)pyrene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 100 J | 1200 |
| Isophorone | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Naphthalene | ug/kg | 330 U | 330 U | 330 U | - | - | - | - | - | - | - | - | - | - | - |
| Nitrobenzene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| N-Nitrosodi-n-propylamine | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| N-Nitrosodiphenylamine | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Pentachlorophenol | ug/kg | 1600 U | 1600 U | 1600 U | - | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U |
| Phenanthrene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 300 J | 4620 |
| Phenol | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Pyrene | ug/kg | 330 U | 330 U | 330 U | - | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 450 | 5170 |
| *Semi-Volatile Organic Compounds - Leachate* | | | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/kg | - | - | - | 0.050 U | - | - | - | - | - | - | - | - | - | - |
| 2,4,5-TP (Silvex) | ug/kg | - | - | - | 0.10 U | - | - | - | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/kg | - | - | - | 0.050 U | - | - | - | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/kg | - | - | - | 0.050 U | - | - | - | - | - | - | - | - | - | - |
| 2,4-Dichlorophenoxyacetic acid (2,4-D) | ug/kg | - | - | - | 0.50 U | - | - | - | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/kg | - | - | - | 0.050 U | - | - | - | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/kg | - | - | - | 0.050 U | - | - | - | - | - | - | - | - | - | - |
| 3&4-Methylphenol | ug/kg | - | - | - | 0.10 U | - | - | - | - | - | - | - | - | - | - |
| Endrin | ug/kg | - | - | - | 0.00050 U | - | - | - | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/kg | - | - | - | 0.00050 U | - | - | - | - | - | - | - | - | - | - |
| Heptachlor | ug/kg | - | - | - | 0.00050 U | - | - | - | - | - | - | - | - | - | - |
| Heptachlor epoxide | ug/kg | - | - | - | 0.00050 U | - | - | - | - | - | - | - | - | - | - |
| Hexachlorobenzene | ug/kg | - | - | - | 0.050 U | - | - | - | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/kg | - | - | - | 0.050 U | - | - | - | - | - | - | - | - | - | - |
| Hexachloroethane | ug/kg | - | - | - | 0.050 U | - | - | - | - | - | - | - | - | - | - |
| Methoxychlor | ug/kg | - | - | - | 0.0010 U | - | - | - | - | - | - | - | - | - | - |
| Nitrobenzene | ug/kg | - | - | - | 0.050 U | - | - | - | - | - | - | - | - | - | - |
| Pentachlorophenol | ug/kg | - | - | - | 0.10 U | - | - | - | - | - | - | - | - | - | - |

# TABLE E1

## ANALYTICAL RESULTS SUMMARY
## SOIL RESULTS
## GARLAND ROAD

| *Sample Location:* | | *D-3* | *D-3* | *D-3* | *MW-6 thru 9 Comp* | *S-1* | *S-1* | *S-1* | *S-2* | *S-2* | *S-3* | *S-4* | *S-4* | *S-5* | *S-5* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *S-MK-001* | *S-MK-002* | *S-MK-004* | *S-7043-061101-NZ-011* | *S-1* | *S-1* | *S-1D* | *S-2* | *S-2* | *S-3* | *S-4* | *S-4* | *S-5* | *S-5* |
| *Sample Date:* | | *7/23/1996* | *7/23/1996* | *7/23/1996* | *6/11/2001* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* |
| *Sample Depth:* | | *(0-1) ft BGS* | *(4-6) ft BGS* | *(10-12) ft BGS* | | *(0-1) ft BGS* | *(23-25) ft BGS* | *(0-1) ft BGS (Duplicate)* | *(0-1) ft BGS* | *(9-11) ft BGS* | *(21-23) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* | *(5-6) ft BGS* |
| *Parameters* | *Units* | | | | | | | | | | | | | | |
| Pyridine | ug/kg | - | - | - | 0.10 U | - | - | - | - | - | - | - | - | - | - |
| Technical Chlordane | ug/kg | - | - | - | 0.0050 U | - | - | - | - | - | - | - | - | - | - |
| Toxaphene | ug/kg | - | - | - | 0.020 U | - | - | - | - | - | - | - | - | - | - |
| *Metals* | | | | | | | | | | | | | | | |
| Aluminum | ug/kg | 6010 | 2890 | 1820 | - | 7300 E DF | 310 E DF | 7200 E DF | 8700 E DF | 3800 E DF | 10000 E DF | 6800 E DF | 2400 E DF | 4200 E DF | 6800 E DF |
| Antimony | ug/kg | 6.0 U | 6.0 U | 6.0 U | - | 0.20 UI DF | 0.20 UI DF | 0.20 UI DF | 0.21 UI DF | 0.52 UI DF | 4.9 UI DF | 0.55 UI DF | 0.53 UI DF | 0.52 UI DF | 0.21 UI DF |
| Arsenic | ug/kg | 4.0 | 5.0 | 3.0 | - | 11 E DF | 0.66 E DF | 8.1 E DF | 7.8 DF | 4.8 E DF | 7.7 DF E | 5.8 E DF | 6.5 E DF | 6.7 E DF | 8.0 E DF |
| Barium | ug/kg | 53.2 | 20.0 U | 20.0 U | - | 41 DF | 4.1 UDF | 41 DF | 98 DF | 1700 E DF | 580 DF | 130 E DF | 17 DF | 110 E DF | 150 E DF |
| Beryllium | ug/kg | 0.50 U | 0.50 U | 0.50 U | - | 0.36 DF | 0.15 UDF | 0.30 DF | 0.42 DF | 0.18 DF | 0.40 DF | 0.33 DF | 0.15 UDF | 0.20 DF | 0.31 DF |
| Cadmium | ug/kg | 0.50 U | 0.50 U | 0.50 U | - | 0.50 DF | 0.15 UDF | 0.42 DF | 0.36 DF | 0.86 DF | 3.4 DF | 0.53 DF | 0.25 DF | 0.33 DF | 0.31 DF |
| Calcium | ug/kg | 58300 | 125000 | 131000 | - | 65000 E DF | 250000 E DF | 78000 E DF | 86000 E DF | 140000 E DF | 36000 E DF | 45000 E DF | 160000 E DF | 120000 E DF | 97000 E DF |
| Chromium Total | ug/kg | 11.4 | 4.6 | 4.8 | - | 9.1 DF | 0.83 DF | 8.7 DF | 11 DF | 6.5 DF | 17 DF | 10 DF | 5.8 DF | 6.1 DF | 11 DF |
| Cobalt | ug/kg | 5.0 U | 5.0 U | 5.0 U | - | 4.5 DF | 1.0 UDF | 4.2 DF | 5.5 DF | 2.4 DF | 6.4 DF | 4.9 DF | 2.1 DF | 2.4 DF | 4.4 DF |
| Copper | ug/kg | 8.1 | 9.2 | 6.1 | - | 15 DF | 0.76 DF | 16 DF | 18 DF | 8.1 DF | 24 DF | 12 DF | 5.8 DF | 11 DF | 19 DF |
| Cyanide (total) | ug/kg | - | - | - | - | 0.1 U | 0.1 U | 0.1 U | 0.1 | 0.2 | 0.1 | 0.2 | 0.1 U | 0.1 U | 0.1 U |
| Iron | ug/kg | 10200 | 7830 | 5310 | - | 15000 E DF | 1400 E DF | 16000 E DF | 18000 E DF | 8500 E DF | 27000 E DF | 14000 E DF | 6900 E DF | 8700 E DF | 16000 E DF |
| Lead | ug/kg | 6.8 | 4.7 | 2.8 | - | 15 DF | 2.2 E DF | 15 DF | 19 DF | 200 E DF | 450 E DF | 33 DF | 7.4 E DF | 32 DF | 37 DF |
| Magnesium | ug/kg | 17300 | 56700 | 54800 | - | 27000 E DF | 120000 E DF | 33000 E DF | 41000 E DF | 49000 E DF | 16000 E DF | 23000 E DF | 79000 E DF | 53000 E DF | 43000 E DF |
| Manganese | ug/kg | 290 | 362 | 217 | - | 320 E DF | 130 E DF | 340 E DF | 600 E DF | 290 E DF | 700 E DF | 420 E DF | 260 E DF | 230 E DF | 410 E DF |
| Mercury | ug/kg | 0.10 U | 0.10 U | 0.10 U | - | 0.13 U | 0.098 U | 0.13 U | 0.19 | 0.11 U | 0.24 | 0.13 U | 0.14 | 0.10 U | 0.21 |
| Nickel | ug/kg | 10.6 | 8.1 | 4.6 | - | 12 DF | 1.2 DF | 11 DF | 16 DF | 7.5 DF | 19 DF | 14 DF | 5.8 DF | 11 DF | 17 DF |
| Potassium | ug/kg | 843 | 688 | 500 U | - | 1100 DF | 110 DF | 1000 DF | 820 DF | 440 E DF | 1500 E DF | 910 DF | 540 DF | 700 DF | 650 DF |
| Selenium | ug/kg | 0.50 U | 0.50 U | 0.50 U | - | 0.50 UI DF | 0.50 UI DF | 0.51 UI DF | 0.36 DF | 0.52 E DF | 0.61 UI DF | 0.28 UI DF | 0.43 UI DF | 0.42 UI DF | 0.27 DF |
| Silver | ug/kg | 1.0 U | 1.0 U | 1.0 U | - | 0.30 UDF | 0.31 UDF | 0.30 UDF | 0.32 UDF | 0.37 DF | 0.34 UDF | 0.33 UDF | 0.31 UDF | 0.22 UDF | 0.31 UDF |
| Sodium | ug/kg | 500 U | 500 U | 500 U | - | 110 DF | 240 DF | 120 DF | 140 DF | 180 DF | 200 DF | 99 DF | 230 DF | 160 DF | 140 DF |
| Thallium | ug/kg | 1.0 U | 1.0 U | 1.0 U | - | 0.20 UI DF | 0.20 UI DF | 0.21 DF | 0.25 DF | 2.1 UI DF | 2.4 UI DF | 2.2 UI DF | 2.1 UI DF | 2.1 UI DF | 0.25 DF |
| Vanadium | ug/kg | 15.7 | 12.0 | 6.4 | - | 17 DF | 2.8 DF | 16 DF | 18 DF | 9.6 DF | 20 DF | 15 DF | 8.1 DF | 11 DF | 15 DF |
| Zinc | ug/kg | 27.7 | 28.3 | 12.8 | - | 77 DF | 3.1 DF | 77 DF | 51 DF | 31 DF | 140 DF | 53 DF | 17 DF | 42 DF | 52 DF |
| *Metals - Leachate* | | | | | | | | | | | | | | | |
| Arsenic | ug/kg | - | - | - | 0.50 U | - | - | - | - | - | - | - | - | - | - |
| Barium | ug/kg | - | - | - | 10.0 U | - | - | - | - | - | - | - | - | - | - |
| Cadmium | ug/kg | - | - | - | 0.10 U | - | - | - | - | - | - | - | - | - | - |
| Chromium Total | ug/kg | - | - | - | 0.50 U | - | - | - | - | - | - | - | - | - | - |
| Lead | ug/kg | - | - | - | 0.50 U | - | - | - | - | - | - | - | - | - | - |
| Mercury | ug/kg | - | - | - | 0.0020 U | - | - | - | - | - | - | - | - | - | - |
| pH Corrosivity | s.u. | - | - | - | 8.4 | - | - | - | - | - | - | - | - | - | - |
| Selenium | ug/kg | - | - | - | 0.25 U | - | - | - | - | - | - | - | - | - | - |
| Silver | ug/kg | - | - | - | 0.50 U | - | - | - | - | - | - | - | - | - | - |
| *PCBs* | | | | | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/kg | 33 U | 33 U | 33 U | - | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U |
| Aroclor-1221 (PCB-1221) | ug/kg | 33 U | 33 U | 33 U | - | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U |
| Aroclor-1232 (PCB-1232) | ug/kg | 33 U | 33 U | 33 U | - | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U |
| Aroclor-1242 (PCB-1242) | ug/kg | 33 U | 33 U | 33 U | - | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U |
| Aroclor-1248 (PCB-1248) | ug/kg | 33 U | 33 U | 33 U | - | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U |
| Aroclor-1254 (PCB-1254) | ug/kg | 33 U | 33 U | 33 U | - | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U |
| Aroclor-1260 (PCB-1260) | ug/kg | 33 U | 33 U | 33 U | - | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U |

# TABLE E.1

## ANALYTICAL RESULTS SUMMARY
## SOIL RESULTS
## GARLAND ROAD

| *Sample Location:* | | *D-3* | *D-3* | *D-3* | *MW-6 thru 9 Comp* | *S-1* | *S-1* | *S-1* | *S-2* | *S-2* | *S-3* | *S-4* | *S-4* | *S-5* | *S-5* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *S-MK-001* | *S-MK-002* | *S-MK-004* | *S-7043-061101-NZ-011* | *S-1* | *S-1* | *S-1D* | *S-2* | *S-2* | *S-3* | *S-4* | *S-4* | *S-5* | *S-5* |
| *Sample Date:* | | *7/23/1996* | *7/23/1996* | *7/23/1996* | *6/11/2001* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* |
| *Sample Depth:* | | *(0-1) ft BGS* | *(4-6) ft BGS* | *(10-12) ft BGS* | | *(0-1) ft BGS* | *(23-25) ft BGS* | *(0-1) ft BGS (Duplicate)* | *(0-1) ft BGS* | *(9-11) ft BGS* | *(21-23) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* | *(3-5) ft BGS* |
| *Parameters* | *Units* | | | | | | | | | | | | | | |
| *Pesticides* | | | | | | | | | | | | | | | |
| 4,4'-DDD | ug/kg | 3.3 U | 3.3 U | 3.3 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| 4,4'-DDE | ug/kg | 3.3 U | 3.3 U | 3.3 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| 4,4'-DDT | ug/kg | 3.3 U | 3.3 U | 3.3 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Aldrin | ug/kg | 1.7 U | 1.7 U | 1.7 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| alpha-BHC | ug/kg | 1.7 U | 1.7 U | 1.7 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| alpha-Chlordane | ug/kg | 1.7 U | 1.7 U | 1.7 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Aroclor-1016 (PCB-1016) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| beta-BHC | ug/kg | 1.7 U | 1.7 U | 1.7 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| delta-BHC | ug/kg | 1.7 U | 1.7 U | 1.7 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Dieldrin | ug/kg | 3.3 U | 3.3 U | 3.3 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Endosulfan I | ug/kg | 1.7 U | 1.7 U | 1.7 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Endosulfan II | ug/kg | 3.3 U | 3.3 U | 3.3 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Endosulfan sulfate | ug/kg | 3.3 U | 3.3 U | 3.3 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Endrin | ug/kg | 3.3 U | 3.3 U | 3.3 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Endrin aldehyde | ug/kg | 3.3 U | 3.3 U | 3.3 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Endrin ketone | ug/kg | 3.3 U | 3.3 U | 3.3 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| gamma-BHC (Lindane) | ug/kg | 1.7 U | 1.7 U | 1.7 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| gamma-Chlordane | ug/kg | 1.7 U | 1.7 U | 1.7 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Heptachlor | ug/kg | 1.7 U | 1.7 U | 1.7 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Heptachlor epoxide | ug/kg | 1.7 U | 1.7 U | 1.7 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Methoxychlor | ug/kg | 17 U | 17 U | 17 U | - | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U | 8 U |
| Toxaphene | ug/kg | 83 U | 83 U | 83 U | - | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U |
| *General Chemistry* | | | | | | | | | | | | | | | |
| Cyanide (total) | ug/kg | 0.50 UJ | 0.50 UJ | 0.50 U | - | - | - | - | - | - | - | - | - | - | - |
| Total Solids (Residue) | % | 85.5 | 85.6 | 90.6 | - | - | - | - | - | - | - | - | - | - | - |
| *General Chemistry - Leachate* | | | | | | | | | | | | | | | |
| Ignitability | deg F | - | - | - | >180 | - | - | - | - | - | - | - | - | - | - |
| Reactive Cyanide | ug/kg | - | - | - | 200 U | - | - | - | - | - | - | - | - | - | - |
| Reactive Sulfide | ug/kg | - | - | - | 200 U | - | - | - | - | - | - | - | - | - | - |

TABLE E.1

ANALYTICAL RESULTS SUMMARY
SOIL RESULTS
GARLAND ROAD

| *Sample Location:* | | *SB-1* | *SB-1* | *SB-2* | *SB-2* | *SB-3* | *SB-3* | *SB-4* | *SB-4* | *SB-5* | *SB-5* | *SB-6* | *SB-6* | *SB-7* | *SB-7* | *SB-8* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *SB-1* | *SB-1* | *SB-2* | *SB-2* | *SB-3* | *SB-3* | *SB-4* | *SB-4* | *SB-5* | *SB-5* | *SB-6* | *SB-6* | *SB-7* | *SB-7* | *SB-8* |
| *Sample Date:* | | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* |
| *Sample Depth:* | | *(0-1) ft BGS* | *(11-13) ft BGS* | *(0-1) ft BGS* | *(7-9) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* | *(3-5) ft BGS* | *(0-1) ft BGS* | *(13-15) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* |
| *Parameters* | *Units* | | | | | | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5.4 | 5 U |
| 1,1,2,2-Tetrachloroethane | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,1,2-Trichloroethane | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,1-Dichloroethane | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,1-Dichloroethene | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,2,4-Trichlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dibromo-3-chloropropane (DBCP) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dibromoethane (Ethylene Dibromide) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | ug/kg | 20 U | 14.7 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,2-Dichloroethane | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 6.5 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,2-Dichloroethene (total) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichloropropane | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,3-Dichlorobenzene | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,4-Dichlorobenzene | ug/kg | 20 U | 2.2 J | 5 U | 4.7 J | 5 U | 15.3 | 5 U | 5 U | 5 U | 60.2 | 5 U | 5.5 | 5 U | 5 U | 5 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | 40 U | 10 U | 10 U | 56.9 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Hexanone | ug/kg | 40 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/kg | 40 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Acetone | ug/kg | 190 | 175 | 10 U | 332 | 70.4 | 273 B | 57.1 | 81.5 B | 84.4 | 44.4 | 54.5 | 10 U | 10500 DF | 12600 B | 10 U |
| Benzene | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Bromodichloromethane | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Bromoform | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Bromomethane (Methyl Bromide) | ug/kg | 40 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Carbon disulfide | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Carbon tetrachloride | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Chlorobenzene | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 3.6 J | 5 U | 5 U | 5 U | 5 U | 5 U |
| Chloroethane | ug/kg | 40 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Chloroform (Trichloromethane) | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 2 J | 5 U |
| Chloromethane (Methyl Chloride) | ug/kg | 40 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| cis-1,2-Dichloroethene | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 1280 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 208 | 48.4 |
| cis-1,3-Dichloropropene | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Cyclohexane | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Dibromochloromethane | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Dichlorodifluoromethane (CFC-12) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ethylbenzene | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Isopropylbenzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| m&p-Xylene | ug/kg | 20 U | 8.3 | 5 U | 5 U | 5 U | 3.9 J | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Methyl acetate | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Methyl cyclohexane | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Methyl Tert Butyl Ether | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Methylene chloride | ug/kg | 40 | 5.1 | 4.4 J | 4.7 J | 8.8 | 12.4 B | 9.6 | 6.7 B | 5 U | 5 U | 5 U | 5 U | 5 U | 5.9 | 6.8 |
| Naphthalene | ug/kg | 20 U | 68.8 | 5 U | 93.1 | 5 U | 4.2 J | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| o-Xylene | ug/kg | 20 U | 5.6 | 5 U | 5 U | 5 U | 29.3 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Styrene | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Tetrachloroethene | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 25.8 | 5 U |
| Toluene | ug/kg | 20 U | 2.8 J | 5 U | 13 | 3.4 J | 9.3 | 5 U | 5 U | 5 U | 5.1 | 5 U | 5 U | 5 U | 7.6 | 2.9 J |
| trans-1,2-Dichloroethene | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 2 J | 5 U |
| trans-1,3-Dichloropropene | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Trichloroethene | ug/kg | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 22.8 | 5 U | 5 U | 5 U | 2.9 J | 5 U | 7.5 | 12300 | 51.0 |
| Trichlorofluoromethane (CFC-11) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Trifluorotrichloroethane (Freon 113) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vinyl acetate | ug/kg | 40 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Vinyl chloride | ug/kg | 20 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Xylene (total) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

# TABLE E.1

## ANALYTICAL RESULTS SUMMARY
## SOIL RESULTS
## GARLAND ROAD

| *Sample Location:* | | SB-1 | SB-1 | SB-2 | SB-2 | SB-3 | SB-3 | SB-4 | SB-4 | SB-5 | SB-5 | SB-6 | SB-6 | SB-7 | SB-7 | SB-8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | SB-1 | SB-1 | SB-2 | SB-2 | SB-3 | SB-3 | SB-4 | SB-4 | SB-5 | SB-5 | SB-6 | SB-6 | SB-7 | SB-7 | SB-8 |
| *Sample Date:* | | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 |
| *Sample Depth:* | | (0-1) ft BGS | (11-13) ft BGS | (0-1) ft BGS | (7-9) ft BGS | (0-1) ft BGS | (5-7) ft BGS | (0-1) ft BGS | (3-5) ft BGS | (0-1) ft BGS | (13-15) ft BGS | (0-1) ft BGS | (5-7) ft BGS | (0-1) ft BGS | (5-7) ft BGS | (0-1) ft BGS |
| *Parameters* | *Units* | | | | | | | | | | | | | | | |
| *Volatile Organic Compounds - Leachate* | | | | | | | | | | | | | | | | |
| 1,1-Dichloroethene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichloroethane | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Benzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Carbon tetrachloride | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Chlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Chloroform (Trichloromethane) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Tetrachloroethene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Trichloroethene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vinyl chloride | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,2-Dichlorobenzene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,3-Dichlorobenzene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,4-Dichlorobenzene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 580 | 330 U | 330 U | 330 U |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4,5-Trichlorophenol | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4,6-Trichlorophenol | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4-Dichlorophenol | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4-Dimethylphenol | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4-Dinitrophenol | ug/kg | 1600 U | 1600 U | 1600 U | 8000 U | 16000 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U |
| 2,4-Dinitrotoluene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,6-Dinitrotoluene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Chloronaphthalene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Chlorophenol | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Methylnaphthalene | ug/kg | 330 U | 330 U | 330 U | 27000 | 3300 U | 330 U | 200 J | 700 | 330 U | 330 U | 340 | 1250 | 330 U | 330 U | 330 U |
| 2-Methylphenol | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Nitroaniline | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Nitrophenol | ug/kg | 660 U | 660 U | 660 U | 3300 U | 6600 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U |
| 3&4-Methylphenol | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 470 | 330 U |
| 3,3'-Dichlorobenzidine | ug/kg | 660 U | 660 U | 660 U | 3300 U | 6600 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U |
| 3-Nitroaniline | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4,6-Dinitro-2-methylphenol | ug/kg | 1600 U | 1600 U | 1600 U | 8000 U | 16000 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U |
| 4-Bromophenyl phenyl ether | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Chloro-3-methylphenol | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Chloroaniline | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Chlorophenyl phenyl ether | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Methylphenol | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4-Nitroaniline | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Nitrophenol | ug/kg | 1600 U | 1600 U | 1600 U | 8000 U | 16000 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U |
| Acenaphthene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 280 J | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Acenaphthylene | ug/kg | 270 J | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Acetophenone | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Anthracene | ug/kg | 290 J | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 620 | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Atrazine | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Benzaldehyde | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Benzo(a)anthracene | ug/kg | 320 J | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 1460 | 330 U | 330 U | 330 U | 330 U | 160 J | 330 U |
| Benzo(a)fluoranthene | ug/kg | 420 | 330 U | 330 U | 1650 U | 3300 U | 420 | 330 U | 330 U | 1020 | 330 U | 330 U | 330 U | 330 U | 340 | 330 U |
| Benzo(a)pyrene | ug/kg | 280 J | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 1160 | 330 U | 330 U | 330 U | 330 U | 260 J | 330 U |
| Benzo(b)fluoranthene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

# TABLE E.1

## ANALYTICAL RESULTS SUMMARY
## SOIL RESULTS
## GARLAND ROAD

| *Sample Location:* | | *SB-1* | *SB-1* | *SB-2* | *SB-2* | *SB-3* | *SB-3* | *SB-4* | *SB-4* | *SB-5* | *SB-5* | *SB-6* | *SB-6* | *SB-7* | *SB-7* | *SB-8* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *SB-1* | *SB-1* | *SB-2* | *SB-2* | *SB-3* | *SB-3* | *SB-4* | *SB-4* | *SB-5* | *SB-5* | *SB-6* | *SB-6* | *SB-7* | *SB-7* | *SB-8* |
| *Sample Date:* | | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* |
| *Sample Depth.* | | *(0-1) ft BGS* | *(11-13) ft BGS* | *(0-1) ft BGS* | *(7-9) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* | *(3-5) ft BGS* | *(0-1) ft BGS* | *(13-15) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* |
| *Parameters* | *Units* | | | | | | | | | | | | | | | |
| Benzo(g,h,i)perylene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 570 | 330 U | 330 U | 330 U | 330 U | 190 J | 330 U |
| Benzo(k)fluoranthene | ug/kg | 440 | 330 U | 330 U | 1650 U | 3300 U | 440 | 330 U | 330 U | 1210 | 330 U | 330 U | 330 U | 330 U | 330 | 330 U |
| Benzoic acid | ug/kg | 4420 | 660 U | 660 U | 3300 U | 6600 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U |
| Benzyl Alcohol | ug/kg | 660 U | 660 U | 660 U | 3300 U | 6600 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U | 660 U |
| Biphenyl | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| bis(2-Chloroethyl)ether | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| bis(2-Ethylhexyl)phthalate | ug/kg | 1110 | 330 U | 330 U | 5710 | 14400 | 330 U | 3640 | 6920 | 380 | 330 U | 1650 | 2330 | 330 U | 820 | 18700 |
| Butyl benzylphthalate | ug/kg | 330 U | 330 U | 700 | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Caprolactam | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Carbazole | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Chrysene | ug/kg | 520 | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 1540 | 330 U | 330 U | 330 U | 330 U | 240 J | 330 U |
| Dibenz(a,h)anthracene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Dibenzofuran | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Diethyl phthalate | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Dimethyl phthalate | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Di-n-butylphthalate | ug/kg | 450 | 380 | 4140 B | 1650 U | 3300 U | 330 U | 4620 B | 1510 B | 330 U | 380 | 1250 B | 2620 B | 920 B | 990 B | 330 U |
| Di-n-octyl phthalate | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Fluoranthene | ug/kg | 880 | 330 U | 330 U | 3580 | 3300 U | 330 U | 330 U | 330 U | 3610 | 330 U | 330 U | 230 J | 330 U | 330 | 330 U |
| Fluorene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 280 J | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Hexachlorobenzene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Hexachlorobutadiene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Hexachlorocyclopentadiene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Hexachloroethane | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Indeno(1,2,3-cd)pyrene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 560 | 330 U | 330 U | 330 U | 330 U | 160 J | 330 U |
| Isophorone | ug/kg | 330 U | 330 U | 330 U | 1650 U | 9140 | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Naphthalene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nitrobenzene | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| N-Nitrosodi-n-propylamine | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| N-Nitrosodiphenylamine | ug/kg | 330 U | 330 U | 330 U | 5710 | 3300 U | 330 U | 330 U | 320 J | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Pentachlorophenol | ug/kg | 1600 U | 1600 U | 1600 U | 8000 U | 16000 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U | 1600 U |
| Phenanthrene | ug/kg | 760 | 330 U | 330 U | 4210 | 3300 U | 330 U | 330 U | 320 J | 2630 | 330 U | 330 U | 200 J | 330 U | 330 U | 330 U |
| Phenol | ug/kg | 330 U | 330 U | 330 U | 1650 U | 3300 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Pyrene | ug/kg | 1080 | 330 U | 330 U | 3380 | 3300 U | 330 U | 130 J | 330 U | 3330 | 330 U | 110 J | 330 U | 330 U | 570 | 330 U |
| *Semi-Volatile Organic Compounds - Leachate* | | | | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2,4,5-TP (Silvex) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2,4-Dichlorophenoxyacetic acid (2,4-D) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3&4-Methylphenol | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Endrin | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heptachlor | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heptachlor epoxide | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hexachlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hexachloroethane | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Methoxychlor | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nitrobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pentachlorophenol | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

# TABLE E.1

## ANALYTICAL RESULTS SUMMARY
## SOIL RESULTS
## GARLAND ROAD

| *Sample Location:* | | SB-1 | SB-1 | SB-2 | SB-2 | SB-3 | SB-3 | SB-4 | SB-4 | SB-5 | SB-5 | SB-6 | SB-6 | SB-7 | SB-7 | SB-8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | SB-1 | SB-1 | SB-2 | SB-2 | SB-3 | SB-3 | SB-4 | SB-4 | SB-5 | SB-5 | SB-6 | SB-6 | SB-7 | SB-7 | SB-8 |
| *Sample Date:* | | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 | 7/1/1995 |
| *Sample Depth:* | | (0-1) ft BGS | (11-13) ft BGS | (0-1) ft BGS | (7-9) ft BGS | (0-1) ft BGS | (5-7) ft BGS | (0-1) ft BGS | (3-5) ft BGS | (0-1) ft BGS | (13-15) ft BGS | (0-1) ft BGS | (5-7) ft BGS | (0-1) ft BGS | (5-7) ft BGS | (0-1) ft BGS |
| *Parameters* | *Units* | | | | | | | | | | | | | | | |
| Pyridine | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Technical Chlordane | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Toxaphene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Metals* | | | | | | | | | | | | | | | | |
| Aluminum | ug/kg | 3500 E DF | 9900 E DF | 14000 E DF | 9600 E DF | 5000 E DF | 2400 E DF | 8100 E DF | 12000 E DF | 5600 E DF | 2000 E DF | 6300 E DF | 6600 E DF | 11000 E DF | 2300 E DF | 5800 E DF |
| Antimony | ug/kg | 0.67 UDF | 0.58 UDF | 0.66 UDF | 0.70 UDF | 0.54 UDF | 0.50 UDF | 0.61 UDF | 0.70 UDF | 0.55 UDF | 0.54 UDF | 0.52 UDF | 0.50 UDF | 0.53 UDF | 0.59 DF | 0.53 UDF |
| Arsenic | ug/kg | 3.9 E DF | 7.8 E DF | 7.1 E DF | 8.8 E DF | 6.0 E DF | 5.6 E DF | 5.7 E DF | 6.5 E DF | 6.8 E DF | 7.4 E DF | 7.3 E DF | 5.1 E DF | 4.9 E DF | 3.9 E DF | 4.4 E DF |
| Barium | ug/kg | 2400 E DF | 100 DF | 270 E DF | 780 E DF | 1200 E DF | 13 DF | 1400 E DF | 200 E DF | 160 DF | 9.9 DF | 230 E DF | 35 DF | 130 DF | 440 E DF | 410 E DF |
| Beryllium | ug/kg | 0.24 DF | 0.48 DF | 0.67 DF | 0.55 DF | 0.23 DF | 0.16 DF | 0.27 DF | 0.56 DF | 0.24 DF | 0.16 UDF | 0.23 DF | 0.26 DF | 0.39 DF | 0.15 UDF | 0.19 DF |
| Cadmium | ug/kg | 2.8 DF | 0.38 DF | 0.78 DF | 1.2 DF | 3.6 DF | 0.22 DF | 2.4 DF | 3.3 DF | 0.44 DF | 0.19 DF | 14 DF | 0.29 DF | 0.51 DF | 0.28 DF | 1.3 DF |
| Calcium | ug/kg | 42000 E DF | 18000 E DF | 24000 E DF | 24000 E DF | 84000 E DF | 96000 E DF | 97000 E DF | 52000 E DF | 92000 E DF | 160000 E DF | 34000 E DF | 130000 E DF | 95000 E DF | 220000 E DF | 130000 E DF |
| Chromium Total | ug/kg | 79 DF | 13 DF | 25 DF | 200 DF | 20 DF | 4.3 DF | 54 DF | 26 DF | 9.0 DF | 4.2 DF | 12 DF | 14.0 DF | 17 DF | 12 DF | 11 DF |
| Cobalt | ug/kg | 11 DF | 7.4 DF | 7.9 DF | 34 DF | 2.8 DF | 3.0 DF | 7.8 DF | 7.3 DF | 3.8 DF | 2.2 DF | 2.8 DF | 74 DF | 4.7 DF | 1.9 DF | 3.5 DF |
| Copper | ug/kg | 70 DF | 13 DF | 29 DF | 530 E DF | 13 DF | 11 DF | 32 DF | 52 DF | 15 DF | 8.4 DF | 15 DF | 15 DF | 21 DF | 20 DF | 24 DF |
| Cyanide (total) | ug/kg | 0.5 | 0.1 | 0.4 | 0.3 | 12 | 0.1 U | 0.2 | 0.1 | 0.1 U | 0.1 U | 0.2 | 0.1 U | 0.1 U | 0.1 | 0.1 U |
| Iron | ug/kg | 29000 E DF | 21000 E DF | 29000 E DF | 56000 E DF | 11000 E DF | 9300 E DF | 18000 E DF | 49000 E DF | 13000 E DF | 7200 E DF | 8800 E DF | 13000 E DF | 19000 E DF | 8500 E DF | 10000 E DF |
| Lead | ug/kg | 1100 E DF | 8.1 DF | 97 DF | 520 E DF | 130 E DF | 6.1 DF | 830 E DF | 99 DF | 67 DF | 5.5 DF | 1600 E DF | 14 DF | 46 DF | 36 DF | 140 E DF |
| Magnesium | ug/kg | 50000 E DF | 11000 E DF | 13000 E DF | 19000 E DF | 36000 E DF | 30000 E DF | 60000 E DF | 20000 E DF | 36000 E DF | 66000 E DF | 42000 E DF | 61000 E DF | 36000 E DF | 63000 E DF | 62000 E DF |
| Manganese | ug/kg | 300 E DF | 1100 E DF | 490 E DF | 620 E DF | 370 E DF | 170 E DF | 380 E DF | 610 E DF | 350 E DF | 180 E DF | 190 E DF | 360 E DF | 360 E DF | 240 E DF | 240 E DF |
| Mercury | ug/kg | 0.18 U | 0.16 U | 0.14 U | 0.19 U | 0.59 | 0.23 U | 0.11 U | 0.17 U | 0.19 | 0.11 U | 0.66 | 0.38 | 0.17 U | 1.1 | 0.20 U |
| Nickel | ug/kg | 190 DF | 18 DF | 31 DF | 130 DF | 21 DF | 10 DF | 92 DF | 25 DF | 14 DF | 6.7 DF | 11 DF | 79 DF | 17 DF | 22 DF | 20 DF |
| Potassium | ug/kg | 500 DF | 980 DF | 2100 E DF | 1200 DF | 540 DF | 500 DF | 1000 DF | 1900 E DF | 560 DF | 430 DF | 1000 E DF | 1400 E DF | 2100 E DF | 670 DF | 790 DF |
| Selenium | ug/kg | 0.54 UDF | 0.46 UDF | 0.53 UDF | 0.56 UDF | 0.44 UDF | 0.40 UDF | 0.49 UDF | 0.56 UDF | 0.55 DF | 0.55 DF | 0.56 E DF | 0.40 UDF | 0.42 UDF | 0.44 UDF | 0.43 UDF |
| Silver | ug/kg | 0.40 UDF | 0.34 UDF | 0.37 UDF | 0.42 UDF | 0.33 UDF | 0.31 UDF | 0.38 UDF | 0.40 U | 0.34 UDF | 0.32 UDF | 0.29 UDF | 0.29 UDF | 0.30 UDF | 0.31 UDF | 0.32 UDF |
| Sodium | ug/kg | 110 DF | 140 DF | 130 DF | 160 DF | 160 DF | 180 DF | 190 DF | 230 DF | 170 DF | 240 DF | 230 DF | 250 DF | 180 DF | 240 DF | 210 DF |
| Thallium | ug/kg | 0.67 UDF | 0.58 UDF | 0.66 UDF | 0.70 UDF | 0.54 UDF | 0.50 UDF | 0.61 UDF | 0.70 UDF | 0.55 UDF | 0.54 UDF | 0.52 UDF | 0.50 UDF | 0.53 UDF | 0.55 UDF | 0.53 UDF |
| Vanadium | ug/kg | 7.3 DF | 24 DF | 27 DF | 19 DF | 13 DF | 11 DF | 21 DF | 24 DF | 12 DF | 7.7 DF | 14 DF | 19 DF | 27 DF | 6.6 DF | 16 DF |
| Zinc | ug/kg | 580 E DF | 40 DF | 120 DF | 310 E DF | 220 DF | 43 DF | 1000 E DF | 570 E DF | 48 DF | 22 DF | 66 DF | 60 DF | 90 DF | 140 DF | 65 DF |
| *Metals - Leachate* | | | | | | | | | | | | | | | | |
| Arsenic | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Barium | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cadmium | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Chromium Total | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Lead | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mercury | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| pH Corrosivity | s.u. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Selenium | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Silver | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *PCBs* | | | | | | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/kg | 800 U | 80 U | 80 U | 80 U | 400 U | 80 U | 800 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 400 U | 80 U |
| Aroclor-1221 (PCB-1221) | ug/kg | 800 U | 80 U | 80 U | 80 U | 400 U | 80 U | 800 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 400 U | 80 U |
| Aroclor-1232 (PCB-1232) | ug/kg | 800 U | 80 U | 80 U | 80 U | 400 U | 80 U | 800 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 400 U | 80 U |
| Aroclor-1242 (PCB-1242) | ug/kg | 800 U | 80 U | 80 U | 80 U | 400 U | 80 U | 800 U | 80 U | 80 U | 80 U | 80 U | 80 U | 80 U | 400 U | 80 U |
| Aroclor-1248 (PCB-1248) | ug/kg | 6100 | 80 U | 80 U | 430 | 400 U | 80 U | 800 U | 420 | 80 U | 80 U | 80 U | 80 U | 80 U | 400 U | 80 U |
| Aroclor-1254 (PCB-1254) | ug/kg | 800 U | 80 U | 80 U | 320 | 1600 | 80 U | 5000 | 150 | 110 | 80 U | 170 | 80 U | 210 | 550 | 220 |
| Aroclor-1260 (PCB-1260) | ug/kg | 800 U | 80 U | 80 U | 120 | 400 U | 80 U | 800 U | 100 | 80 U | 80 U | 80 U | 80 U | 80 U | 400 U | 80 U |

TABLE E.1

ANALYTICAL RESULTS SUMMARY
SOIL RESULTS
GARLAND ROAD

| *Sample Location:* | | *SB-1* | *SB-1* | *SB-2* | *SB-2* | *SB-3* | *SB-3* | *SB-4* | *SB-4* | *SB-5* | *SB-5* | *SB-6* | *SB-6* | *SB-7* | *SB-7* | *SB-8* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *SB-1* | *SB-1* | *SB-2* | *SB-2* | *SB-3* | *SB-3* | *SB-4* | *SB-4* | *SB-5* | *SB-5* | *SB-6* | *SB-6* | *SB-7* | *SB-7* | *SB-8* |
| *Sample Date:* | | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* | *7/1/1995* |
| *Sample Depth:* | | *(0-1) ft BGS* | *(11-13) ft BGS* | *(0-1) ft BGS* | *(7-9) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* | *(3-5) ft BGS* | *(0-1) ft BGS* | *(13-15) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* | *(5-7) ft BGS* | *(0-1) ft BGS* |
| *Parameters* | *Units* | | | | | | | | | | | | | | | |
| *Pesticides* | | | | | | | | | | | | | | | | |
| 4,4'-DDD | ug/kg | 48 I | 8 U | 8 U | 8 U | 40 U | 8 U | 90 I | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| 4,4'-DDE | ug/kg | 40 U | 8 U | 8 U | 8 I | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| 4,4'-DDT | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| Aldrin | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| alpha-BHC | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| alpha-Chlordane | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 80 U | 40 U | 8 U |
| Aroclor-1016 (PCB-1016) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| beta-BHC | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| delta-BHC | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| Dieldrin | ug/kg | 64 I | 8 U | 8 U | 8 U | 60 I | 8 U | 27 I | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 I | 13 I |
| Endosulfan I | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| Endosulfan II | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| Endosulfan sulfate | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| Endrin | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| Endrin aldehyde | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| Endrin ketone | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| gamma-BHC (Lindane) | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| gamma-Chlordane | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 80 U | 40 U | 8 U |
| Heptachlor | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| Heptachlor epoxide | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| Methoxychlor | ug/kg | 40 U | 8 U | 8 U | 8 U | 40 U | 8 U | 80 U | 160 U | 8 U | 8 U | 40 U | 8 U | 40 U | 40 U | 8 U |
| Toxaphene | ug/kg | 400 U | 80 U | 80 U | 80 U | 400 U | 80 U | 800 U | 1600 U | 80 U | 80 U | 400 U | 80 U | 400 U | 400 U | 80 U |
| *General Chemistry* | | | | | | | | | | | | | | | | |
| Cyanide (total) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total Solids (Residue) | % | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *General Chemistry - Leachate* | | | | | | | | | | | | | | | | |
| Ignitability | deg F | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Reactive Cyanide | ug/kg | - | - | - | - | - | - | - | - | | - | - | - | - | - | - |
| Reactive Sulfide | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

TABLE E.1

ANALYTICAL RESULTS SUMMARY
SOIL RESULTS
GARLAND ROAD

| *Sample Location:* | | SB-8 | SO-01 | SO-02 | SO-03 | SO-04 | SO-05 | SO-06 | SO-07 | SO-08 | SO-09 | SO-10 | SO-11 | SO-12 | SO-13 | SO-14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | SB-8 | SO-01 | SO-02 | SO-03 | SO-04 | SO-05 | SO-06 | SO-07 | SO-08 | SO-09 | SO-10 | SO-11 | SO-12 | SO-13 | SO-14 |
| *Sample Date:* | | 7/1/1995 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 |
| *Sample Depth:* | | (5-7) ft BGS | (12-) in | (12-20) in | (18-20) in | (12-20) in | (16-20) in | (18-23) in | (12-) in | (18-24) in | (12-20) in | (12-) in | (0-12) in | (0-12) in | (12-) in | (16-20) in |
| *Parameters* | *Units* | | | | | | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| 1,1,2,2-Tetrachloroethane | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 UJ | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| 1,1,2-Trichloroethane | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| 1,1-Dichloroethane | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| 1,1-Dichloroethene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| 1,2,4-Trichlorobenzene | ug/kg | - | 13 U | 13 U | 12 U | 11 U | 13 UJ | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| 1,2-Dibromo-3-chloropropane (DBCP) | ug/kg | - | 13 U | 13 U | 12 U | 11 U | 13 UJ | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| 1,2-Dibromoethane (Ethylene Dibromide) | ug/kg | - | 13 U | 13 U | 12 U | 11 U | 13 UJ | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| 1,2-Dichlorobenzene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 UJ | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| 1,2-Dichloroethane | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| 1,2-Dichloroethene (total) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichloropropane | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| 1,3-Dichlorobenzene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 UJ | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| 1,4-Dichlorobenzene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 UJ | 23 U | 25 U | 1 L | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | 10 U | 13 U | 13 UJ | 12 UJ | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| 2-Hexanone | ug/kg | 10 U | 13 UJ | 13 UJ | 12 UJ | 11 U | 13 UJ | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/kg | 10 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| Acetone | ug/kg | 353 | 13 U | 13 UJ | 12 UJ | 11 U | 13 U | 23 UJ | 25 UJ | 13 UJ | 32 UJ | 11 UJ | 13 UJ | 12 UJ | 14 UJ | 140 UJ |
| Benzene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Bromodichloromethane | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Bromoform | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Bromomethane (Methyl Bromide) | ug/kg | 10 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Carbon disulfide | ug/kg | 5 U | 13 U | 13 UJ | 12 UJ | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Carbon tetrachloride | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Chlorobenzene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 UJ | 23 U | 25 U | 7 L | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| Chloroethane | ug/kg | 10 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Chloroform (Trichloromethane) | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Chloromethane (Methyl Chloride) | ug/kg | 10 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| cis-1,2-Dichloroethene | ug/kg | 191 | 13 U | 13 U | 12 U | 11 U | 3 J | 23 U | 25 U | 13 UJ | 78 J | 11 U | 13 U | 12 U | 14 U | 140 U |
| cis-1,3-Dichloropropene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Cyclohexane | ug/kg | - | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Dibromochloromethane | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Dichlorodifluoromethane (CFC-12) | ug/kg | - | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Ethylbenzene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 UJ | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| Isopropylbenzene | ug/kg | - | 13 U | 13 U | 12 U | 11 U | 13 UJ | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| m&p-Xylene | ug/kg | 5 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Methyl acetate | ug/kg | - | 13 U | 13 U | 12 U | 11 U | 13 U | 23 UJ | 25 UJ | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Methyl cyclohexane | ug/kg | - | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Methyl Tert Butyl Ether | ug/kg | - | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Methylene chloride | ug/kg | 5 U | 13 U | 13 UJ | 12 UJ | 11 UJ | 13 UJ | 23 UJ | 25 UJ | 13 UJ | 32 UJ | 11 UJ | 13 UJ | 12 UJ | 14 UJ | 39 J |
| Naphthalene | ug/kg | 5 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| o-Xylene | ug/kg | 5 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Styrene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 UJ | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| Tetrachloroethene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 2 J | 23 U | 25 U | 13 UJ | 4 J | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| Toluene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 2 J | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |
| trans-1,2-Dichloroethene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| trans-1,3-Dichloropropene | ug/kg | 5 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Trichloroethene | ug/kg | 120 | 8 J | 3 J | 2 J | 30 | 1300 | 93 | 250 | 4 L | 1000 J | 11 U | 17 | 18 | 14 U | 5900 J |
| Trichlorofluoromethane (CFC-11) | ug/kg | - | 13 U | 13 U | 12 U | 5 J | 6 J | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Trifluorotrichloroethane (Freon 113) | ug/kg | - | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Vinyl acetate | ug/kg | 10 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vinyl chloride | ug/kg | 10 U | 13 U | 13 U | 12 U | 11 U | 13 U | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 U |
| Xylene (total) | ug/kg | - | 13 U | 13 U | 12 U | 11 U | 13 UJ | 23 U | 25 U | 13 UJ | 32 U | 11 U | 13 U | 12 U | 14 U | 140 UJ |

TABLE E1

ANALYTICAL RESULTS SUMMARY
SOIL RESULTS
GARLAND ROAD

| *Sample Location:* | | *SB-8* | *SO-01* | *SO-02* | *SO-03* | *SO-04* | *SO-05* | *SO-06* | *SO-07* | *SO-08* | *SO-09* | *SO-10* | *SO-11* | *SO-12* | *SO-13* | *SO-14* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *SB-8* | *SO-01* | *SO-02* | *SO-03* | *SO-04* | *SO-05* | *SO-06* | *SO-07* | *SO-08* | *SO-09* | *SO-10* | *SO-11* | *SO-12* | *SO-13* | *SO-14* |
| *Sample Date:* | | *7/1/1995* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth:* | | *(5-7) ft BGS* | *(12-) in* | *(12-20) in* | *(18-20) in* | *(12-20) in* | *(16-20) in* | *(18-23) in* | *(12-) in* | *(18-24) in* | *(12-20) in* | *(12-) in* | *(0-12) in* | *(0-12) in* | *(12-) in* | *(16-20) in* |
| *Parameters* | *Units* | | | | | | | | | | | | | | | |
| *Volatile Organic Compounds - Leachate* | | | | | | | | | | | | | | | | |
| 1,1-Dichloroethene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichloroethane | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Benzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Carbon tetrachloride | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Chlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Chloroform (Trichloromethane) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | | - | - | - |
| Tetrachloroethene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Trichloroethene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | | - | - | - |
| Vinyl chloride | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/kg | 330 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | ug/kg | 330 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,3-Dichlorobenzene | ug/kg | 330 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,4-Dichlorobenzene | ug/kg | 330 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 420 U | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 U | 440 U |
| 2,4,5-Trichlorophenol | ug/kg | 330 U | 1000 U | 1000 U | 980 U | 930 UJ | 1100 UJ | 960 U | 1000 U | 1100 U | 1300 UJ | 930 U | 1000 U | 1000 UJ | 1100 UJ | 1100 UJ |
| 2,4,6-Trichlorophenol | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 UJ | 420 UJ | 380 U | 410 U | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| 2,4-Dichlorophenol | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 UJ | 440 UJ |
| 2,4-Dimethylphenol | ug/kg | 330 U | 420 U | 410 U | 390 U | 26 J | 150 J | 34 J | 410 U | 24 J | 71 J | 370 U | 410 U | 410 U | 450 UJ | 150 J |
| 2,4-Dinitrophenol | ug/kg | 1600 U | 1000 UJ | 1000 U | 980 U | 930 UJ | 1100 UJ | 960 U | 1000 U | 1100 U | 1300 UJ | 930 U | 1000 U | 1000 UJ | 1100 UJ | 1100 UJ |
| 2,4-Dinitrotoluene | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 UJ | 420 UJ | 380 U | 410 U | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| 2,6-Dinitrotoluene | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 UJ | 420 UJ | 380 U | 410 U | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| 2-Chloronaphthalene | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 UJ | 420 UJ | 380 U | 410 U | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| 2-Chlorophenol | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 420 U | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 U | 440 U |
| 2-Methylnaphthalene | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 49 J | 42 J | 3300 | 420 U | 100 J | 370 U | 410 U | 410 U | 450 UJ | 53 J |
| 2-Methylphenol | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 100 J | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 U | 92 J |
| 2-Nitroaniline | ug/kg | 330 U | 1000 U | 1000 U | 980 U | 930 UJ | 1100 UJ | 960 U | 1000 U | 1100 U | 1300 UJ | 930 U | 1000 U | 1000 UJ | 1100 UJ | 1100 UJ |
| 2-Nitrophenol | ug/kg | 660 U | 420 U | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 UJ | 440 UJ |
| 3&4-Methylphenol | ug/kg | 330 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3,3'-Dichlorobenzidine | ug/kg | 660 U | 420 UJ | 410 U | 390 U | 370 UJ | 420 UJ | 380 UJ | 410 UJ | 420 UJ | 520 UJ | 370 U | 410 U | R | R | 440 UJ |
| 3-Nitroaniline | ug/kg | 330 U | 1000 U | 1000 U | 980 U | 930 UJ | 1100 UJ | 960 U | 1000 U | 1100 U | 1300 UJ | 930 U | 1000 U | 1000 UJ | 1100 UJ | 1100 UJ |
| 4,6-Dinitro-2-methylphenol | ug/kg | 1600 U | 1000 UJ | 1000 U | 980 U | 930 UJ | 1100 UJ | 960 U | 1000 UJ | 1100 U | 1300 UJ | 930 U | 1000 U | 1000 UJ | 1100 UJ | 1100 UJ |
| 4-Bromophenyl phenyl ether | ug/kg | 330 U | 420 UJ | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 UJ | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| 4-Chloro-3-methylphenol | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 UJ | 440 UJ |
| 4-Chloroaniline | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 UJ | 440 UJ |
| 4-Chlorophenyl phenyl ether | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 UJ | 420 UJ | 380 U | 410 U | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| 4-Methylphenol | ug/kg | - | 420 U | 410 U | 390 U | 55 J | 330 J | 63 J | 120 J | 70 J | 180 J | 370 U | 22 J | 34 J | 450 U | 270 J |
| 4-Nitroaniline | ug/kg | 330 U | 1000 U | 1000 U | 980 U | 930 UJ | 1100 UJ | 960 U | 1000 U | 1100 U | 1300 UJ | 930 U | 1000 U | 1000 UJ | 1100 UJ | 1100 UJ |
| 4-Nitrophenol | ug/kg | 1600 U | 1000 U | 1000 U | 980 U | 930 UJ | 1100 UJ | 960 U | 1000 U | 1100 U | 1300 UJ | 35 J | 1000 U | 1000 UJ | 1100 UJ | 1100 UJ |
| Acenaphthene | ug/kg | 330 U | 420 U | 410 U | 56 J | 370 UJ | 420 UJ | 380 U | 95 J | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| Acenaphthylene | ug/kg | 330 U | 420 U | 34 J | 27 J | 370 UJ | 420 UJ | 380 U | 100 J | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| Acetophenone | ug/kg | - | 420 U | 410 U | 390 U | 370 U | 31 J | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 U | 440 U |
| Anthracene | ug/kg | 330 U | 33 J | 32 J | 280 J | 370 UJ | 420 UJ | 380 U | 30 J | 420 U | 520 UJ | 370 U | 21 J | 410 UJ | 450 UJ | 440 UJ |
| Atrazine | ug/kg | - | 420 UJ | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 UJ | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| Benzaldehyde | ug/kg | - | 40 J | 56 J | 160 J | 53 J | 120 J | 180 J | 220 J | 360 J | 850 | 21 J | 24 J | 23 J | 510 | 250 J |
| Benzo(a)anthracene | ug/kg | 330 U | 91 J | 80 J | 1300 J | 76 J | 38 J | 30 J | 28 J | 30 J | 36 J | 32 J | 60 J | 62 J | 63 J | 45 J |
| Benzo(a)fluoranthene | ug/kg | 330 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Benzo(a)pyrene | ug/kg | 330 U | 110 J | 120 J | 1200 J | 97 J | 42 J | 42 J | 29 J | 37 J | 55 J | 38 J | 58 J | 62 J | 79 J | 41 J |
| Benzo(b)fluoranthene | ug/kg | - | 120 J | 140 J | 1200 J | 84 J | 61 J | 47 J | 38 J | 52 J | 70 J | 42 J | 62 J | 52 J | 80 J | 57 J |

# TABLE E.1

## ANALYTICAL RESULTS SUMMARY
## SOIL RESULTS
## GARLAND ROAD

| *Sample Location:* | | *SB-8* | *SO-01* | *SO-02* | *SO-03* | *SO-04* | *SO-05* | *SO-06* | *SO-07* | *SO-08* | *SO-09* | *SO-10* | *SO-11* | *SO-12* | *SO-13* | *SO-14* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *SB-8* | *SO-01* | *SO-02* | *SO-03* | *SO-04* | *SO-05* | *SO-06* | *SO-07* | *SO-08* | *SO-09* | *SO-10* | *SO-11* | *SO-12* | *SO-13* | *SO-14* |
| *Sample Date:* | | *7/1/1995* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth:* | | *(5-7) ft BGS* | *(12-) in* | *(12-20) in* | *(18-20) in* | *(12-20) in* | *(16-20) in* | *(18-23) in* | *(12-) in* | *(18-24) in* | *(12-20) in* | *(12-) in* | *(0-12) in* | *(0-12) in* | *(12-) in* | *(16-20) in* |
| *Parameters* | *Units* | | | | | | | | | | | | | | | |
| Benzo(g,h,i)perylene | ug/kg | 330 U | 53 J | 100 J | 850 J | 83 J | 82 J | 60 J | 41 J | 52 J | 95 J | 28 J | 37 J | 55 J | 78 J | 110 J |
| Benzo(k)fluoranthene | ug/kg | 330 U | 100 J | 110 J | 1200 J | 86 J | 36 J | 38 J | 29 J | 34 J | 55 J | 39 J | 48 J | 60 J | 80 J | 51 J |
| Benzoic acid | ug/kg | 660 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Benzyl Alcohol | ug/kg | 660 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Biphenyl | ug/kg | - | 420 U | 410 U | 390 U | 370 UJ | 30 J | 380 U | 390 J | 420 U | 26 J | 370 U | 410 U | 410 UJ | 450 UJ | 32 J |
| bis(2-Chloroethoxy)methane | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 UJ | 440 UJ |
| bis(2-Chloroethyl)ether | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 420 U | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 U | 440 U |
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 U | 420 UJ | 410 UJ | 720 UJ | 370 UJ | 420 UJ | 1300 UJ | 3500 J | 420 UJ | 680 UJ | 890 U | 410 UJ | 410 UJ | 450 UJ | 440 UJ |
| Butyl benzylphthalate | ug/kg | 330 U | 420 UJ | 410 U | 110 J | 370 UJ | 110 J | 380 UJ | 28000 J | 420 UJ | 710 J | U | 410 U | R | R | 440 UJ |
| Caprolactam | ug/kg | - | 420 U | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 UJ | 440 UJ |
| Carbazole | ug/kg | - | 420 UJ | 410 U | 59 J | 370 UJ | 420 UJ | 380 U | 410 UJ | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| Chrysene | ug/kg | 330 U | 120 J | 110 J | 1700 J | 120 J | 92 J | 64 J | 67 J | 61 J | 89 J | 50 J | 75 J | 78 J | 100 J | 100 J |
| Dibenz(a,h)anthracene | ug/kg | 330 U | 420 UJ | 49 J | 400 J | 370 UJ | 420 UJ | 28 J | 410 UJ | 420 UJ | 520 UJ | 370 U | 410 U | R | R | 440 UJ |
| Dibenzofuran | ug/kg | 330 U | 420 U | 410 U | 23 J | 370 UJ | 420 UJ | 380 U | 130 J | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| Diethyl phthalate | ug/kg | - | 420 U | 410 U | 390 U | 370 UJ | 420 UJ | 380 U | 410 U | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| Dimethyl phthalate | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 UJ | 420 UJ | 380 U | 410 U | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| Di-n-butylphthalate | ug/kg | 330 U | 26 J | 30 J | 41 J | 32 J | 32 J | 30 J | 900 J | 43 J | 120 J | 19 J | 23 J | 410 UJ | 28 J | 47 J |
| Di-n-octyl phthalate | ug/kg | 330 U | 420 UJ | 410 UJ | 390 UJ | 370 UJ | 420 UJ | 380 UJ | 410 UJ | 420 UJ | 520 UJ | 370 U | 410 U | R | R | 440 UJ |
| Fluoranthene | ug/kg | 330 U | 210 J | 93 J | 1700 | 150 J | 420 UJ | 380 U | 410 UJ | 420 U | 520 UJ | 80 J | 130 J | 100 J | 120 J | 440 UJ |
| Fluorene | ug/kg | 330 U | 420 U | 410 U | 56 J | 370 UJ | 420 UJ | 380 U | 340 J | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| Hexachlorobenzene | ug/kg | 330 U | 420 UJ | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 UJ | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| Hexachlorobutadiene | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 UJ | 440 UJ |
| Hexachlorocyclopentadiene | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 UJ | 420 UJ | 380 U | 410 U | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| Hexachloroethane | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 420 U | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 U | 440 U |
| Indeno(1,2,3-cd)pyrene | ug/kg | 330 U | 110 J | 100 J | 860 J | 100 J | 33 J | 61 J | 31 J | 40 J | 57 J | 33 J | 42 J | 50 J | 84 J | 42 J |
| Isophorone | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 UJ | 440 UJ |
| Naphthalene | ug/kg | - | 420 U | 410 U | 390 U | 370 U | 22 J | 380 U | 370 J | 420 U | 32 J | 370 U | 410 U | 410 U | 450 UJ | 27 J |
| Nitrobenzene | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 UJ | 440 UJ |
| N-Nitrosodi-n-propylamine | ug/kg | 330 U | 420 U | 410 U | 390 U | 370 U | 420 U | 380 U | 410 U | 420 U | 520 U | 370 U | 410 U | 410 U | 450 U | 440 U |
| N-Nitrosodiphenylamine | ug/kg | 330 U | 420 UJ | 410 U | 390 U | 370 U | 420 UJ | 380 U | 410 UJ | 420 U | 520 UJ | 370 U | 410 U | 410 UJ | 450 UJ | 440 UJ |
| Pentachlorophenol | ug/kg | 1600 U | 1000 UJ | 32 J | 980 U | 930 U | 1100 UJ | 960 U | 1000 UJ | 1100 U | 1300 UJ | 930 U | 1000 U | 1000 UJ | 1100 UJ | 1100 UJ |
| Phenanthrene | ug/kg | 330 U | 150 J | 35 J | 790 | 55 J | 58 J | 37 J | 200 J | 34 J | 48 J | 47 J | 100 J | 99 J | 81 J | 54 J |
| Phenol | ug/kg | 330 U | 420 U | 410 U | 390 U | 89 J | 480 | 380 U | 690 | 420 U | 520 U | 370 U | 410 U | 410 U | 450 U | 330 J |
| Pyrene | ug/kg | 330 U | 210 J | 140 J | 2600 J | 120 J | 420 UJ | 80 J | 110 J | 91 J | 94 J | 74 J | 140 J | 180 J | 190 J | 120 J |
| *Semi-Volatile Organic Compounds - Leachate* | | | | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2,4,5-TP (Silvex) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2,4-Dichlorophenoxyacetic acid (2,4-D) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3&4-Methylphenol | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Endrin | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heptachlor | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heptachlor epoxide | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hexachlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hexachloroethane | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Methoxychlor | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nitrobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pentachlorophenol | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

# TABLE E1

## ANALYTICAL RESULTS SUMMARY
## SOIL RESULTS
## GARLAND ROAD

| *Sample Location:* | | *SB-8* | *SO-01* | *SO-02* | *SO-03* | *SO-04* | *SO-05* | *SO-06* | *SO-07* | *SO-08* | *SO-09* | *SO-10* | *SO-11* | *SO-12* | *SO-13* | *SO-14* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *SB-8* | *SO-01* | *SO-02* | *SO-03* | *SO-04* | *SO-05* | *SO-06* | *SO-07* | *SO-08* | *SO-09* | *SO-10* | *SO-11* | *SO-12* | *SO-13* | *SO-14* |
| *Sample Date:* | | *7/1/1995* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth:* | | *(5-7) ft BGS* | *(12-) in* | *(12-20) in* | *(18-20) in* | *(12-20) in* | *(16-20) in* | *(18-23) in* | *(12-) in* | *(18-24) in* | *(12-24) in* | *(12-) in* | *(0-12) in* | *(0-12) in* | *(12-) in* | *(16-20) in* |
| *Parameters* | *Units* | | | | | | | | | | | | | | | |
| Pyridine | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Technical Chlordane | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Toxaphene | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Metals* | | | | | | | | | | | | | | | | |
| Aluminum | ug/kg | 3500 E DF | 5740 | 5810 | 5250 | 2570 | 4890 | 3450 | 3410 | 6200 | 4670 | 6680 | 8480 | 6180 | 6720 | 4500 |
| Antimony | ug/kg | 0.49 DF | 1.5 | 14.9 U | 2.3 | 1.8 | 4.1 | 2.1 | 3 | 1.7 | 2.1 | 13.6 U | 2.8 | 2.9 | 2 | 4.1 |
| Arsenic | ug/kg | 3.3 E DF | 4.7 | 6.1 | 7 | 5.9 | 8.7 | 8.1 | 5.5 | 6 | 7.1 | 8.4 | 11.3 | 6.6 | 5.9 | 6.8 |
| Barium | ug/kg | 190 E DF | 102 | 170 | 197 | 1500 | 3650 | 1000 | 1610 | 1610 | 2780 | 222 | 1260 | 1320 | 117 | 4670 |
| Beryllium | ug/kg | 0.15 UDF | 0.54 | 0.56 | 0.48 | 0.28 | 0.45 | 0.33 | 0.34 | 0.58 | 0.5 | 0.56 | 0.66 | 0.59 | 0.62 | 0.49 |
| Cadmium | ug/kg | 0.30 DF | 1.2 U | 1.2 U | 1.2 U | 1.1 U | 1.4 U | 1.2 U | 2.4 | 1.3 U | 0.54 | 0.63 | 1.2 U | 1.3 U | 1.4 | 1.3 U |
| Calcium | ug/kg | 150000 E DF | 35600 | 25000 | 43300 | 79600 | 16700 | 60700 | 30700 | 28600 | 47800 | 37600 | 22200 | 46300 | 35200 | 10600 |
| Chromium Total | ug/kg | 12 DF | 8.9 | 8.7 | 9.6 | 25.8 | 68.6 | 23.4 | 24.3 | 25.2 | 40.4 | 12.9 | 23.2 | 19.8 | 10.7 | 70.7 |
| Cobalt | ug/kg | 3.1 DF | 6.4 | 8.2 | 6.1 | 7.3 | 17.2 | 6.8 | 7.1 | 9.9 | 12.4 | 7.5 | 10.6 | 8.5 | 7.2 | 17.5 |
| Copper | ug/kg | 23 DF | 12.7 | 9.9 | 13.8 | 38.1 | 158 | 28.8 | 29.3 | 46.8 | 45 | 24.7 | 23.5 | 20.8 | 17.8 | 238 |
| Cyanide (total) | ug/kg | 0.1 | 1.2 U | 1.2 U | 1.2 U | 1.1 U | 1.4 U | 1.2 U | 1.3 U | 1.3 U | 1.6 U | 1.1 U | 1.2 U | 1.3 U | 1.4 | 1.3 U |
| Iron | ug/kg | 10000 E DF | 11200 | 10800 | 11000 | 7910 | 30600 | 10600 | 8640 | 15400 | 17900 | 16500 | 17500 | 11200 | 12900 | 11900 |
| Lead | ug/kg | 97 DF | 20.7 | 27.5 | 44.7 | 635 | 1480 | 364 | 597 | 405 | 825 | 96.1 | 115 | 116 | 23 | 1890 |
| Magnesium | ug/kg | 57000 E DF | 16400 | 11900 | 22200 | 37400 | 34100 | 35700 | 20100 | 20800 | 40100 | 18700 | 14400 | 28400 | 11900 | 37200 |
| Manganese | ug/kg | 320 E DF | 494 | 990 | 475 | 303 | 730 | 348 | 290 | 642 | 492 | 534 | 573 | 547 | 500 | 552 |
| Mercury | ug/kg | 0.20 U | 1.3 J | 0.35 | 0.31 | 0.14 | 0.22 | 5.4 | 4 | 0.49 | 0.87 | 0.14 J | 0.090 J | 0.11 J | 0.12 | 0.24 J |
| Nickel | ug/kg | 15 DF | 13.4 | 12.6 | 12.9 | 74 | 189 | 55 | 66 | 65.3 | 130 | 20.5 | 57.2 | 47.4 | 16.2 | 206 |
| Potassium | ug/kg | 560 DF | 1270 J | 890 | 846 J | 659 J | 878 J | 568 J | 556 J | 1240 | 1080 J | 1210 J | 834 J | 716 J | 1270 | 856 J |
| Selenium | ug/kg | 0.47 DF | 8.6 U | 8.7 U | 8.4 U | 7.8 U | 9.5 U | 8.4 U | 9.0 U | 9.3 U | 11.3 U | 7.9 U | 8.6 U | 8.9 U | 9.6 | 9.4 U |
| Silver | ug/kg | 0.30 UDF | 2.4 UJ | 2.5 UJ | 2.4 UJ | 2.2 UJ | 2.7 UJ | 2.4 UJ | 2.6 UJ | 2.7 UJ | 3.2 UJ | 2.3 UJ | 2.4 UJ | 0.27 J | 2.8 | 2.7 UJ |
| Sodium | ug/kg | 230 DF | 1220 U | 1240 U | 1200 U | 1110 U | 1350 U | 1200 U | 1290 U | 1330 U | 109 J | 1130 U | 1220 U | 1270 U | 1380 | 1350 U |
| Thallium | ug/kg | 0.49 UDF | 6.1 U | 6.2 U | 6.0 U | 5.6 U | 6.8 U | 6.0 U | 6.4 U | 6.7 U | 8.0 U | 5.7 U | 6.1 U | 6.3 U | 6.9 | 6.7 U |
| Vanadium | ug/kg | 9.1 DF | 14.7 | 15.7 | 14.4 | 8.4 | 16.9 | 11.3 | 10.4 | 17.7 | 12.9 | 20.6 | 25.6 | 18.1 | 15.5 | 15.1 |
| Zinc | ug/kg | 79 DF | 65.9 | 35.1 | 55.1 | 133 | 289 | 128 | 140 | 161 | 275 | 125 | 93.5 | 83.1 | 66 | 387 |
| *Metals - Leachate* | | | | | | | | | | | | | | | | |
| Arsenic | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Barium | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cadmium | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Chromium Total | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Lead | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mercury | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| pH Corrosivity | s.u. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Selenium | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Silver | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *PCBs* | | | | | | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/kg | 80 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/kg | 80 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/kg | 80 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/kg | 80 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/kg | 80 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/kg | 80 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/kg | 80 U | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

# TABLE E.1

## ANALYTICAL RESULTS SUMMARY
## SOIL RESULTS
## GARLAND ROAD

| *Sample Location:* | | *SB-8* | *SO-01* | *SO-02* | *SO-03* | *SO-04* | *SO-05* | *SO-06* | *SO-07* | *SO-08* | *SO-09* | *SO-10* | *SO-11* | *SO-12* | *SO-13* | *SO-14* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *SB-8* | *SO-01* | *SO-02* | *SO-03* | *SO-04* | *SO-05* | *SO-06* | *SO-07* | *SO-08* | *SO-09* | *SO-10* | *SO-11* | *SO-12* | *SO-13* | *SO-14* |
| *Sample Date:* | | *7/1/1995* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth:* | | *(5-7) ft BGS* | *(12-) in* | *(12-20) in* | *(18-20) in* | *(12-20) in* | *(16-20) in* | *(18-23) in* | *(12-) in* | *(18-24) in* | *(12-20) in* | *(12-) in* | *(0-12) in* | *(0-12) in* | *(12-) in* | *(16-20) in* |
| *Parameters* | *Units* | | | | | | | | | | | | | | | |
| *Pesticides* | | | | | | | | | | | | | | | | |
| 4,4'-DDD | ug/kg | 8 U | 2.1 J | 4.1 U | 3.9 U | 1.7 J | 6.7 | 0.71 J | 4.1 UJ | 2.0 J | 4.9 J | 3.7 U | 1.1 J | 0.82 J | 4.6 UJ | 9.5 |
| 4,4'-DDE | ug/kg | 8 U | 2.7 J | 4.1 U | 5.6 | 13 J | 22 J | 3.2 J | 1.8 J | 6.1 J | 19 J | 3.1 J | 5.6 | 2.3 J | 2.7 J | 24 |
| 4,4'-DDT | ug/kg | 8 U | 3.1 J | 3.8 J | 19 J | 24 J | 52 J | 8.4 J | 4.9 J | 15 J | 56 J | 6.4 | 11 | 8 | 1.8 J | 39 |
| Aldrin | ug/kg | 8 U | 2.2 U | 2.1 U | 2.0 U | 1.4 J | 7.2 | 2.0 U | 2.1 UJ | 0.99 J | 2.8 | 0.17 J | 1.6 J | 2.1 U | 2.3 U | 5.9 |
| alpha-BHC | ug/kg | 8 U | 2.2 U | 2.1 U | 2.0 U | 1.9 U | 2.2 UJ | 2.0 U | 2.1 UJ | 2.2 UJ | 2.7 UJ | 1.9 U | 2.1 U | 2.1 UJ | 2.3 UJ | 2.3 UJ |
| alpha-Chlordane | ug/kg | 8 U | 1.3 J | 2.1 U | 2.0 U | 1.9 U | 2.2 UJ | 2.0 U | 2.1 UJ | 1.3 J | 5.4 J | 1.9 U | 1.2 J | 1.3 J | 2.3 U | 9.3 |
| Aroclor-1016 (PCB-1016) | ug/kg | - | 42 U | 41 U | 39 U | 37 U | 42 U | 38 U | 41 UJ | 43 U | 52 U | 37 U | 41 U | 41 U | 46 U | 44 U |
| Aroclor-1221 (PCB-1221) | ug/kg | - | 86 U | 83 U | 79 U | 76 U | 86 U | 78 U | 83 UJ | 87 U | 110 U | 75 U | 83 U | 82 U | 92 U | 90 U |
| Aroclor-1232 (PCB-1232) | ug/kg | - | 42 U | 41 U | 39 U | 37 U | 42 U | 38 U | 41 UJ | 43 U | 52 U | 37 U | 41 U | 41 U | 46 U | 44 U |
| Aroclor-1242 (PCB-1242) | ug/kg | - | 42 U | 41 U | 39 U | 37 U | 42 U | 38 U | 41 UJ | 43 U | 52 U | 37 U | 41 U | 41 U | 46 U | 44 U |
| Aroclor-1248 (PCB-1248) | ug/kg | - | 42 U | 41 U | 39 U | 37 U | 42 U | 38 U | 41 UJ | 43 U | 52 U | 37 U | 41 U | 41 U | 46 U | 44 U |
| Aroclor-1254 (PCB-1254) | ug/kg | - | 42 U | 41 U | 120 | 220 | 490 | 71 | 35 | 100 | 510 | 51 | 92 | 52 | 46 U | 500 |
| Aroclor-1260 (PCB-1260) | ug/kg | - | 42 U | 41 U | 39 U | 37 U | 42 U | 38 U | 41 UJ | 43 U | 52 U | 37 U | 41 U | 41 U | 46 U | 44 U |
| beta-BHC | ug/kg | 8 U | 2.2 U | 2.1 UJ | 2.0 UJ | 1.9 UJ | 2.2 UJ | 2.0 UJ | 2.1 UJ | 2.2 UJ | 2.7 UJ | 1.9 U | 2.1 U | 2.1 UJ | 2.3 UJ | 2.3 UJ |
| delta-BHC | ug/kg | 8 U | 2.2 U | 2.1 U | 2.0 U | 1.9 U | 2.2 U | 2.0 U | 2.1 UJ | 2.2 UJ | 2.7 U | 1.9 U | 2.1 U | 2.1 U | 2.3 U | 2.3 UJ |
| Dieldrin | ug/kg | 8 U | 2.7 J | 1.0 J | 3.8 J | 7.6 J | 13 | 2.0 J | 0.90 J | 4.6 | 17 | 1.4 J | 2.9 J | 1.8 J | 1.1 J | 17 |
| Endosulfan I | ug/kg | 8 U | 2.2 U | 2.1 U | 2.0 U | 1.9 U | 4.6 J | 2.0 U | 2.1 UJ | 2.2 UJ | 2.7 UJ | 1.9 U | 2.1 U | 2.1 U | 2.3 U | 11 |
| Endosulfan II | ug/kg | 8 U | 4.2 U | 4.1 U | 3.9 U | 12 J | 20 | 3.8 U | 4.1 UJ | 9.2 | 23 | 1.9 J | 2.7 J | 4.1 U | 4.6 UJ | 4.4 U |
| Endosulfan sulfate | ug/kg | 8 U | 4.2 U | 4.1 U | 3.9 U | 3.7 U | 4.2 U | 1.7 J | 4.1 UJ | 4.3 U | 5.2 U | 3.7 U | 4.1 U | 35 | 1.3 J | 12 |
| Endrin | ug/kg | 8 U | 3.5 J | 4.1 U | 1.0 J | 3.7 U | 4.2 U | 3.8 U | 4.1 UJ | 4.3 U | 5.2 U | 3.7 U | R | 4.1 U | 4.6 UJ | 4.4 U |
| Endrin aldehyde | ug/kg | 8 U | 4.2 U | 4.1 U | 3.9 U | 3.7 U | 4.2 U | 3.8 U | 4.1 UJ | 4.3 U | 5.2 U | 3.7 U | 4.1 U | 4.1 U | 4.6 U | 4.4 U |
| Endrin ketone | ug/kg | 8 U | 4.2 U | 4.1 UJ | 3.9 UJ | 3.7 UJ | 4.2 UJ | 3.8 UJ | 4.1 UJ | 4.3 UJ | 5.2 UJ | 3.7 U | 0.62 UNJ | 4.1 U | 4.6 U | 4.4 U |
| gamma-BHC (Lindane) | ug/kg | 8 U | 2.2 U | 2.1 UJ | 2.0 UJ | 1.9 UJ | 2.2 UJ | 2.0 UJ | 2.1 UJ | 2.2 UJ | 2.7 UJ | 1.9 U | 2.1 U | 2.1 UJ | 2.3 UJ | 0.48 J |
| gamma-Chlordane | ug/kg | 8 U | 2.2 U | 2.1 U | 4.8 | 1.9 U | 2.2 UJ | 2.0 U | 2.1 UJ | 2.1 J | 2.7 UJ | 1.7 J | 3.5 | 1.3 J | 2.3 U | 2.3 U |
| Heptachlor | ug/kg | 8 U | 2.6 U | 2.1 U | 0.95 UJ | 0.62 UJ | 2.2 U | 0.41 UJ | 0.57 UJ | 2.2 U | 2.7 U | 0.98 UJ | 0.74 UJ | 1.2 UJ | 0.83 UJ | 1.5 UJ |
| Heptachlor epoxide | ug/kg | 8 U | 2.2 U | 2.1 U | 2.0 U | 1.9 U | 2.2 U | 2.0 U | 2.1 UJ | 2.2 U | 2.7 U | 1.9 U | 2.1 U | 2.1 U | 2.3 U | 1.3 J |
| Methoxychlor | ug/kg | 8 U | 2.3 UJ | 21 UJ | 20 UJ | 26 J | 22 UJ | 20 UJ | 21 UJ | 22 UJ | 27 UJ | 19 U | 21 U | 21 U | 23 U | 28 |
| Toxaphene | ug/kg | 80 U | 220 U | 210 U | 200 U | 190 U | 220 U | 200 U | 210 UJ | 220 U | 270 U | 190 U | 210 U | 210 U | 230 U | 230 U |
| *General Chemistry* | | | | | | | | | | | | | | | | |
| Cyanide (total) | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total Solids (Residue) | % | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *General Chemistry - Leachate* | | | | | | | | | | | | | | | | |
| Ignitability | deg F | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Reactive Cyanide | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Reactive Sulfide | ug/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

TABLE E.2

SUMMARY OF DETECTIONS - CONTAINER AND SOIL SAMPLE RESULTS
OEPA COLLECTED SAMPLES - JULY 1992
GARLAND ROAD LANDFILL SITE

| | Sample Number | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Parameters* | *DRM001 (µg/L)* | *DRM002 (µg/L)* | *DRM003 (µg/kg)* | *DRM004 (µg/kg)* | *S001 (µg/kg)* | *S002 (µg/kg)* | *S003 (µg/kg)* | *S004 (µg/kg)* |
| *Volatile Organics* | | | | | | | | |
| Acetone | < 50 | 32J | < 5,000,000 | NA | < 5,000 | 44J | < 10,000 | NA |
| Benzene | < 5 | 16 | < 500,000 | NA | < 500 | < 5 | < 1,000 | NA |
| Carbon disulfide | < 5 | < 5 | < 500,000 | NA | < 500 | 16 | < 1,000 | NA |
| Carbon tetrachloride | < 5 | < 5 | 1,400,000 | NA | 500 | 2J | < 1,000 | NA |
| Chloroform | < 5 | < 5 | < 500,000 | NA | 200J | < 5 | 1,600 | NA |
| 1,1-dichloroethene | 11 | < 5 | < 500,000 | NA | < 500 | < 5 | < 1,000 | NA |
| trans-1,2-dichloroethene | 14 | < 5 | < 500,000 | NA | < 500 | < 5 | < 1,000 | NA |
| Ethylbenzene | < 5 | < 5 | 2,700,000 | NA | 2,900 | 4J | 37,000 | NA |
| Methylene Chloride | 2J | 20 | < 500,000 | NA | 200J | 32 | < 1,000 | NA |
| Toluene | < 5 | 3J | 3,300,000 | NA | 5,800 | 33 | 48,000 | NA |
| 1,1,1-trichloroethane | 70 | < 5 | < 500,000 | NA | < 500 | < 5 | < 1,000 | NA |
| Trichloroethene | 930 | 51 | < 500,000 | NA | 1,100 | < 5 | < 1,000 | NA |
| Trichlorofluoromethane | < 5 | < 5 | < 500,000 | NA | 200J | 16 | < 1,000 | NA |
| Vinyl Chloride | 1,400 | < 10 | < 1,000,000 | NA | < 1,000 | < 10 | < 2,000 | NA |
| Xylenes (total) | < 5 | < 5 | 17,000,000 | NA | 36,000 | 24 | 380,000 | NA |
| cis-1-2-dichloroethene | 7,300 | NA | NA | NA | NA | NA | NA | NA |
| *Semi-Volatile Organics* | | | | | | | | |
| 2,4-Dinitrophenol | < 25,000 | < 62,500 | 693,000J | NA | < 330,000 | < 16,500 | < 165,000 | < 1,650 |
| Acenaphthene | < 5,000 | < 12,500 | 594,000J | NA | 138,600 | < 3,300 | 33,000 | < 330 |
| Acenaphthylene | < 5,000 | < 12,500 | 495,000J | NA | 151,800 | < 3,300 | 23,100J | < 330 |
| bis (2-chloroethoxy) methane | < 5,000 | < 12,500 | 396,000J | NA | < 66,000 | < 3,300 | < 33,000 | < 330 |
| Dibenzofuran | < 5,000 | < 12,500 | 1,089,000 | NA | < 66,000 | < 3,300 | 49,500 | < 330 |
| 2,4-dinitrotoluene | < 5,000 | < 12,500 | 1,089,000 | NA | 310,200 | < 3,300 | < 33,000 | < 330 |
| 2,6-dinitrotoluene | < 5,000 | < 12,500 | < 990,000 | NA | 66,000 | < 3,300 | < 33,000 | < 330 |
| Fluorene | < 5,000 | < 12,500 | 1,386,000 | NA | 5,214,000 | < 3,300 | 122,100 | < 330 |
| 2-methylnaphthalene | 50,000 | 3,750 J | 38,412,000 | NA | 4,389,000 | < 3,300 | 924,000 | < 330 |
| Naphthalene | < 5,000 | < 12,500 | 20,196,000 | NA | 1,537,800 | < 3,300 | 211,200 | < 330 |
| Phenanthrene | 1,000J | < 12,500 | < 990,000 | NA | 52,800J | < 3,300 | < 33,000 | < 330 |
| *Pesticides* | | | | | | | | |
| alpha BHC | < 0.05 | < 0.05 | 780 | NA | < 160 | < 160 | 25J | < 8.0 |
| delta BHC | < 0.05 | < 0.05 | < 240.0 | NA | < 160.0 | < 160.0 | 62J | < 1.2J |
| Heptachlor | < 0.05 | 0.14 | < 240.0 | NA | 97J | < 160.0 | 72J | < 8.0 |
| Aldrin | < 0.05 | < 0.05 | < 240.0 | NA | 520 | < 160.0 | 80 | < 8.0 |
| Heptachlor epoxide | < 0.05 | < 0.05 | 84J | NA | < 160.0 | < 160.0 | < 80.0 | < 8.0 |
| 4,4'-DDE | < 0.10 | 0.23 | < 480.0 | NA | < 320.0 | < 320.0 | 20J | < 16.0 |
| Endrin | < 0.10 | < 0.10 | < 480.0 | NA | < 320.0 | 240J | < 160.0 | < 16.0 |
| 4,4'-DDD | < 0.10 | 0.08J | < 480.0 | NA | < 320.0 | 1,000 | < 160.0 | < 16.0 |

Notes:

J - The associated numerical value is an estimated quantity.
NA - Not Analyzed.

TABLE E.2

SUMMARY OF DETECTIONS - CONTAINER AND SOIL SAMPLE RESULTS
OEPA COLLECTED SAMPLES - JULY 1992
GARLAND ROAD LANDFILL SITE

| | *Sample Number* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Parameters* | *DRM001* (*µg/L*) | *DRM002* (*µg/L*) | *DRM003* (*µg/kg*) | *DRM004* (*µg/kg*) | *S001* (*µg/kg*) | *S002* (*µg/kg*) | *S003* (*µg/kg*) | *S004* (*µg/kg*) |
| *Pesticides Continued* | | | | | | | | |
| Endrin ketone | 0.3 | < 0.10 | < 480.0 | NA | < 320.0 | 220J | < 160.0 | < 16.0 |
| Methoxychlor (Mariate) | < 0.50 | < 0.50 | < 2,400.0 | NA | < 1,600.0 | 450J | < 800.0 | < 80.0 |
| gamma Chlordane | 0.2J | < 0.50 | 300J | NA | < 1,600.0 | < 1,600.0 | < 800.0 | < 80.0 |
| *PCBs* | | | | | | | | |
| Aroclor 1242 | < 0.50 | < 0.50 | < 2,400.0 | NA | < 1,600.0 | < 1,600.0 | 1,300.0 | < 80.0 |
| *Metals* | (*mg/L*) | (*mg/L*) | (*mg/kg*) | (*mg/kg*) | (*mg/kg*) | (*mg/kg*) | (*mg/kg*) | (*mg/kg*) |
| Aluminum | 247 | 8.00 | < 20.0 | NA | 3,310 | 3,930 | 8,680 | 11,200 |
| Antimony | 0.144 | 0.191 | 465 | NA | < 10.0 | < 10.0 | < 10.0 | < 10.0 |
| Arsenic | < 0.005 | 0.044 | < 10.0 | NA | < 10.0 | < 10.0 | < 10.0 | < 10.0 |
| Barium | 4.77 | 1.90 | 7.80 | NA | 4,920 | 1,010 | 190 | 108 |
| Beryllium | 0.018 | < 0.005 | < 1.00 | NA | < 1.00 | < 1.00 | < 1.00 | < 1.00 |
| Cadmium | 0.171 | 0.412 | < 1.00 | NA | < 1.00 | < 1.00 | < 1.00 | < 1.00 |
| Calcium | 403 | 29.4 | < 100 | NA | 2,500 | 40,300 | 19,000 | 21,100 |
| Magnesium | 125 | 3.24 | < 100 | NA | 44,600 | 29,000 | 11,100 | 8,620 |
| Chromium | 0.372 | 0.317 | < 2.00 | NA | 107 | 35.8 | 42.70 | 16.1 |
| Cobalt | 0.21 | < 0.010 | < 2.00 | NA | 17.10 | 6.84 | 6.72 | 6.98 |
| Copper | 12.3 | 1.17 | 3.32 | NA | 91.1 | 154 | 27.4 | 22.6 |
| Iron | 1,010 | 54.4 | 839 | NA | 9,200 | 9,260 | 15,400 | 20,100 |
| Lead | 400 | 6.42 | < 10.0 | NA | 1,180 | 312 | 239 | 23.8 |
| Mercury | 0.104 | 5.740 | < 0.100 | NA | < 0.100 | < 0.100 | < 0.100 | < 0.100 |
| Manganese | 11.3 | 1.22 | 5.50 | NA | 350 | 231 | 260 | 469 |
| Nickel | 0.915 | 0.141 | 3.82 | NA | 228 | 88.6 | 23.8 | 19.5 |
| Potassium | 40.55 | 15.5 | < 100 | NA | 332 | 466 | 911 | 1,480 |
| Sodium | 42.9 | 110 | < 100 | NA | < 100 | 132 | < 100 | < 100 |
| Vanadium | 0.451 | < 0.010 | < 2.00 | NA | 9.10 | 15.0 | 18.3 | 18.9 |
| Zinc | 6.76 | 3.01 | 31.2 | NA | 392 | 213 | 89.4 | 83.7 |
| *TCLP Metals* | (*µg/L*) | (*µg/L*) | (*µg/L*) | (*µg/L*) | (*µg/L*) | (*µg/L*) | (*µg/L*) | (*µg/L*) |
| Barium | NA | NA | NA | 650 | NA | NA | NA | NA |
| Mercury | NA | NA | NA | 8 | NA | NA | NA | NA |

Notes:

J - The associated numerical value is an estimated quantity.
NA - Not Analyzed.

TABLE E.3

SUMMARY OF DETECTIONS - CONTAINER AND SOIL SAMPLE RESULTS
TAT COLLECTED SAMPLES - MARCH 1993
GARLAND ROAD LANDFILL SITE

| *Parameters* | *Sample Number* | | | | |
|---|---|---|---|---|---|
| | *A* | *B* | *C* | *D* | *E* |
| | *Drum* | *Soil* | *Soil* | *Soil* | *Drum* |
| *Total Analyses* | | | | | |
| *Volatile Organics (values in µg/kg)* | | | | | |
| 1,1,2,2-tetrachloroethane | 1,100 | 900 | < 2.5 | < 2.5 | NS |
| *PCBs (values in mg/kg)* | | | | | |
| Aroclor 1254 | 1.2 | < 0.12 | < 0.12 | < 0.12 | NS |
| *TCLP Analyses* | | | | | |
| *TCLP Metals (values in mg/L)* | | | | | |
| Arsenic | 0.086 | 0.075 | 0.076 | 0.060 | NS |
| Barium | 1.12 | 1.12 | 1.01 | 1.01 | NS |
| Lead | 4.05 | 1.45 | < 0.100 J | < 0.100 J | NS |
| Selenium | 0.017 | 0.015 | 0.014 | 0.021 | NS |
| Silver | < 0.020 J | < 0.020 J | 0.036 | < 0.020 J | NS |
| Asbestos | NS | NS | NS | NS | ND |

Notes:

J - The associated numerical value is an estimated quantity
R - The sample results were rejected by U.S. EPA based on QA/QC review.
ND - Not Detected.
NS - Not Sampled.

TABLE E.3

SUMMARY OF DETECTIONS - CONTAINER AND SOIL SAMPLE RESULTS
TAT COLLECTED SAMPLES - MARCH 1993
GARLAND ROAD LANDFILL SITE

| *Parameters* | *Sample Number* | | | | | | |
|---|---|---|---|---|---|---|---|
| | *F Soil* | *G Drum* | *H Soil* | *I Soil* | *J Drum (Top)* | *J Drum (Bottom)* | *K Soil* |
| **Total Analyses** | | | | | | | |
| *PCBs (values in ppm)* | | | | | | | |
| Aroclor 1254 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | 34.4 | 0.037 | < 1.0 |
| ***TCLP Analyses*** | | | | | | | |
| *Pesticides/Herbicides (values in mg/L)* | | | | | | | |
| Chlordane | < 0.001 | < 10 | 0.003 | < 0.001 | < 100 | < 1.0 | < 0.001 |
| Endrin | < 0.001 | < 10 | 0.006 | < 0.001 | < 100 | < 1.0 | < 0.001 |
| 2,4-D | < 0.001 | < 10 | 0.375 | 0.375 | < 100 | < 1.0 | < 0.001 |
| *Metals (values in mg/L)* | | | | | | | |
| Barium | 0.56 | < 0.05 | < 1.99 | 1.14 | < 0.10 | 0.59 | 0.98 |
| Lead | 43.3 | 120 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | 0.17 |
| *Volatile Organic Compounds (values in mg/L)* | | | | | | | |
| Chloroform | < 0.001 | < 10 | < 0.001 | < 0.001 | < 10 | < 1.0 | 0.001 |
| Methyl ethyl ketone | < 0.001 | 478 | < 0.001 | < 0.001 | 732 | < 1.0 | < 0.001 |
| Tetrachloroethylene | < 0.001 | < 10 | < 0.001 | < 0.001 | < 10 | < 1.0 | 0.001 |
| Trichloroethylene | 0.003 | < 10 | < 0.001 | < 0.001 | < 10 | < 1.0 | 0.001 |
| *Semi-Volatile Organics (values in mg/L)* | | | | | | | |
| m-cresol, p-cresol | < 0.01 | < 10 | < 0.01 | < 0.01 | 275 | 132 | < 0.01 |
| Cresol (total) | < 0.01 | < 10 | < 0.01 | < 0.01 | 275 | 132 | < 0.01 |

TABLE E.4

SUMMARY OF DETECTIONS - SOIL SAMPLE RESULTS
FIT COLLECTED SAMPLES - APRIL 1993
GARLAND ROAD LANDFILL SITE

| *Parameters* | *Soil SS-01 (µg/kg)* | *Soil SS-02 (µg/kg)* | *Soil SS-03 (µg/kg)* | *Soil SS-04 (µg/kg)* | *Background Soil SS-05 (µg/kg)* | *Background Soil SS-06 (µg/kg)* |
|---|---|---|---|---|---|---|
| *Volatile Organics* | | | | | | |
| 1,2-dichloroethene (total) | 220 | < 10 | 7 J | < 10 | < 10 | < 10 |
| 4-Methyl-2-Pentanone | < 10 | 5,200 | < 10 | < 10 | < 10 | < 10 |
| Carbon disulfide | NA | NA | NA | NA | NA | NA |
| Ethylbenzene | < 10 | 640 J | < 10 | < 10 | < 10 | < 10 |
| Methylene Chloride | NA | NA | NA | NA | NA | NA |
| Phenol | 24,000 | < 330 | < 330 | < 330 | < 330 | < 330 |
| Toluene | < 10 | 850 J | 81 | < 10 | < 10 | < 10 |
| Trichloroethene | 950 | 18,000 | 16 J | < 10 | < 10 | < 10 |
| Xylenes (total) | < 10 | 4,100 | < 10 | < 10 | < 10 | < 10 |
| *Semi-Volatile Organics* | | | | | | |
| 2-methylnaphthalene | < 330 | 49,000 J | 3,400,000 | 150 J | 120 J | < 330 |
| Acenaphthene | < 330 | < 330 | 110,000 J | < 330 | < 330 | < 330 |
| Acenaphthylene | < 330 | < 330 | 37,000 J | < 330 | < 330 | < 330 |
| benzo (a) anthracene | NA | NA | NA | NA | NA | NA |
| benzo (a) pyrene | < 330 | < 330 | < 330 | 38 J | < 330 | < 330 |
| benzo (b) fluoranthene | < 330 | < 330 | < 330 | 54 J | < 330 | < 330 |
| benzo (g,h,i) perylene | < 330 | < 330 | < 330 | 25 J | < 330 | < 330 |
| benzo (k) fluoranthene | < 330 | < 330 | < 330 | 22 J | < 330 | < 330 |
| bis (2-ethylhexyl) phthalate | NA | NA | NA | NA | NA | NA |
| Chrysene | < 330 | < 330 | < 330 | 54 J | < 330 | < 330 |
| di-n-butyl phthalate | NA | NA | NA | NA | NA | NA |
| Dibenzofuran | < 330 | < 330 | 92,000 J | < 330 | < 330 | < 330 |
| Diethylphthalate | < 330 | < 330 | < 330 | 54 J | < 330 | < 330 |
| Fluoranthene | < 330 | < 330 | < 330 | 120 J | < 330 | < 330 |
| Fluorene | < 330 | 7,700 J | 97,000 J | < 330 | < 330 | < 330 |
| Indeno (1,2,3-cd) pyrene | < 330 | < 330 | < 330 | 35 J | < 330 | < 330 |
| *Semi-Volatile Organics, continued* | | | | | | |
| n-nitrosodiphenylamine | < 330 | < 330 | 100,000 J | < 330 | < 330 | < 330 |
| Naphthalene | < 330 | 6,800 J | 150,000 J | < 330 | < 330 | < 330 |
| Phenanthrene | < 330 | < 330 | 25,000 J | 56 J | < 330 | < 330 |
| Pyrene | < 330 | < 330 | < 330 | 94 J | < 330 | < 330 |
| *Pesticides* | | | | | | |
| 4,4'-DDD | < 3.3 | < 3.3 | < 3.3 | < 3.3 | < 3.3 | 8.5 J |
| 4,4'-DDE | 17 P | < 3.3 | 6.0 JP | 1.0 JP | < 3.3 | < 3.3 |
| 4,4'-DDT | 62 P | < 3.3 | 6.2 JP | 2.1 JP | < 3.3 | < 3.3 |
| alpha Chlordane | 16 | 7,700 X | < 1.7 | 0.49 J | < 1.7 | 11 |
| delta-BHC | < 1.7 | < 1.7 | 3.7 JP | < 1.7 | < 1.7 | < 1.7 |
| Dieldrin | < 3.3 | < 3.3 | < 3.3 | < 3.3 | < 3.3 | 150 |
| Endosulfan I | 17 P | < 1.7 | 11 P | < 1.7 | < 1.7 | < 1.7 |
| Endosulfan II | < 3.3 | < 3.3 | 12 JP | < 3.3 | < 3.3 | < 3.3 |
| Endrin | 28 P | 8,900 PX | 8.0 JP | < 3.3 | < 3.3 | < 3.3 |
| gamma Chlordane | < 1.7 | < 1.7 | 5.8 JP | < 1.7 | < 1.7 | 16 |
| Heptachlor epoxide | < 1.7 | < 1.7 | < 1.7 | 0.47 JP | < 1.7 | 29 |
| Methoxychlor (Mariate) | 14 JP | < 17.0 | 88 JP | < 17.0 | < 17.0 | < 17.0 |

TABLE E.4

SUMMARY OF DETECTIONS - SOIL SAMPLE RESULTS
FIT COLLECTED SAMPLES - APRIL 1993
GARLAND ROAD LANDFILL SITE

| *Parameters* | *Soil SS-01 (µg/kg)* | *Soil SS-02 (µg/kg)* | *Soil SS-03 (µg/kg)* | *Soil SS-04 (µg/kg)* | *Background Soil SS-05 (µg/kg)* | *Background Soil SS-06 (µg/kg)* |
|---|---|---|---|---|---|---|
| *PCBs* | | | | | | |
| Aroclor 1248 | 140 P | < 33.0 | 350 PX | < 33.0 | < 33.0 | < 33.0 |
| Aroclor 1254 | 680 C | 340,000 C | 1,000 X | < 33.0 | < 33.0 | < 33.0 |
| *Metals* | | | | | | |
| Aluminum | 2,790 | 3,260 | 3,520 | 12,800 | 13,000 | 11,300 |
| Antimony | 16.1 B | < 12 | < 12 | < 12 | < 12 | < 12 |
| Arsenic | 2.5 BWJ | 2.9 B | 4.3 JW | 8.4 | 1.09 S | 15.6 + |
| Barium | 4,260 | 14,500 | 13,000 | 83.5 | 72.5 | 80.2 |
| *Metals, continued* | | | | | | |
| Beryllium | < 1 | < 1 | < 1 | < 1 | 0.77 B | 0.74 B |
| Cadmium | 7.7 | 3.5 | 2.2 | 7.1 | 2.8 | 2.0 |
| Calcium | 15,100 | 7,450 | 3,510 | 59,900 | 1,850 | 3,260 |
| Chromium | 166 | 177 | 174 | 34.3 | 15.5 | 14.4 |
| Cobalt | 35.2 | 29.0 | 25.0 | 16.3 | 10.3 B | 9.4 B |
| Copper | 40.8 JN | 45.5 JN | 89 JN | 26.2 JN | < 5 | < 5 |
| Iron | 15,900 | 17,700 | 22,400 | 46,600 | 19,200 | 18,200 |
| Lead | 13,800 | 3,030 | 2,240 | 96.2 | 35.3 | 29.8 |
| Magnesium | 124,000 | 105,000 | 88,000 | 28,200 | 2,270 | 2,200 |
| Manganese | 330 | 316 | 308 | 658 | 745 | 820 |
| Mercury | 14.2 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Nickel | 636 | 462 | 354 | 22.2 | 17.4 | 17.1 |
| Potassium | 289 B | 217 B | 175 B | 1,450 | 977 B | 844 B |
| Silver | < 2 | < 2 | < 2 | 3.7 | < 2 | 2.4 |
| Sodium | 173 B | 148 B | 145 B | 508 B | < 1,000 | 133 B |
| Vanadium | 8.1 B | 9.9 B | 10.0 B | 29.6 | 33.2 | 28.4 |
| Zinc | 173 EJ | 493 EJ | 584 EJ | 3,800 EJ | 76.2 EJ | 63.2 EJ |

Notes:

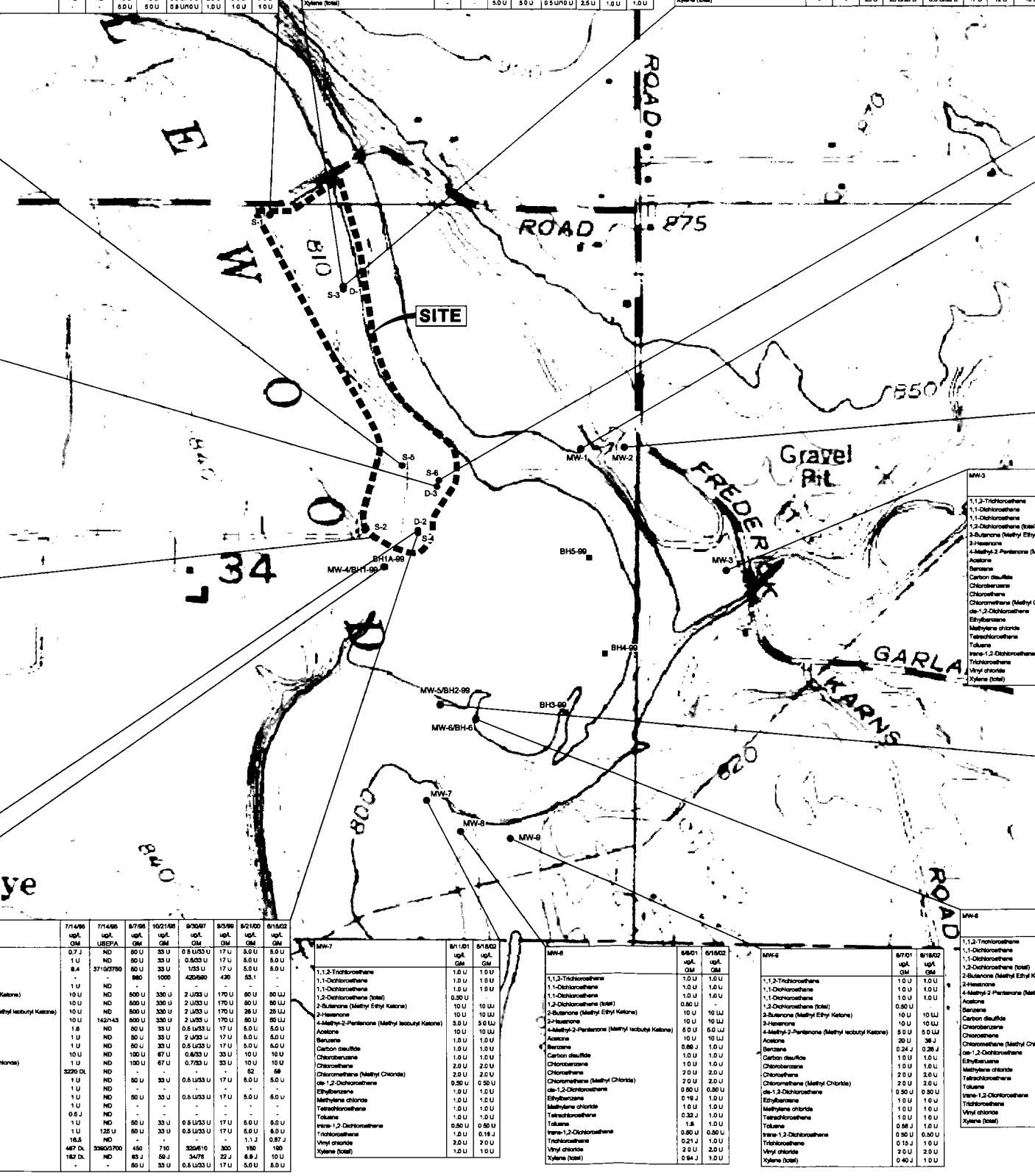
J - Value is estimated (also indicates a compound that is detected below the Contract Required Quantitation Limit (CRQL) or Contract Required Detection Limit (CRDL)).
U - Compound was detected in an associated laboratory blank.
P - Variance between GC columns was greater than 25 percent in pesticide or Aroclor (PCB) analyses. The lower value is reported.
C - Identity of pesticide/PCB compound was confirmed by GC/MS.
X - Result cannot be confirmed by CLP protocols - compound may or may not be present.
B - Value is below the CRDL (adjusted for percent moisture and/or dilution by the laboratory).
E - Value is estimated due to matrix interferences.
N - Matrix spike percent recovery values were outside of control limits.
W - Furnace AA post - digestion spike recovery values were outside of control limits.
S - Analyte concentration was determined by method of Standard Additions (MSA).
+ - Correlation coefficient for MSA was less than 0.995
NA - Not Analyzed

F

# APPENDIX F

## GROUNDWATER SAMPLE ANALYTICAL RESULTS


Figure F.1 - Groundwater Data Summary - VOCs
Figure F.2 - Groundwater Data Summary - SVOCs
Figure F.3 - Groundwater Data Summary - Metals
Figure F.4 - Groundwater Data Summary - Other
Table F.1 - Groundwater Analytical Results Summary (Database)
Table F.2 - Summary of Detections - Groundwater Sample Results (TAT - July 1993)




| S-1 | 7/20/95 ug/L GM | 7/20/95 ug/L USEPA | 8/7/96 ug/L GM | 10/22/96 ug/L GM | 9/30/97 ug/L GM | 9/1/99 ug/L GM | 8/21/00 ug/L GM | 6/17/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|
| 1,1,2-Trichloroethane | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethane (total) | - | - | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 0.50 U | - |
| 1,4-Dichlorobenzene | 1 U | ND | - | - | - | - | - | - |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U | ND | 50 U | 50 U | 10 U/2 U | 10 U | 10 U | 10 U |
| 2-Hexanone | 10 U | ND | 50 U | 50 U | 10 U/2 U | 10 U | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 10 U | ND | 50 U | 50 U | 10 U/2 U | 10 U | 5.0 U | 5.0 U |
| Acetone | 10 U | 5 U | 50 U | 50 U | 10 U/2 U | 10 U | 10 U | 10 U |
| Benzene | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| Carbon disulfide | 1 U | ND | 5.0 U | 5.0 U | 10 U/2 U | 1.0 U | 1.0 U | 1.0 U |
| Chlorobenzene | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| Chloroethane | 10 U | ND | 10 U | 10 U | 0.5 U/10 U | 2.0 U | 2.0 U | 2.0 U |
| Chloromethane (Methyl Chloride) | 1 U | ND | 10 U | 10 U | 0.5 U/10 U | 2.0 U | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | 4.1 | ND | - | - | - | - | 0.11 J | 0.50 U |
| Ethylbenzene | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| m&p-Xylene | 1 U | ND | - | - | - | - | - | - |
| Methylene chloride | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| Naphthalene | 1 U | ND | - | - | - | - | - | - |
| o-Xylene | 1 U | ND | - | - | - | - | - | - |
| Tetrachloroethene | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| Toluene | 1 U | 5 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| trans-1,2-Dichloroethene | 1 U | ND | - | - | - | 0.50 U | 0.50 U | 0.50 U |
| Trichloroethene | 64.9 | 64.2 | 11 | 8.8 | 3 J/4 | 1.2 | 7.0 | 7.0 |
| Vinyl chloride | 1 U | ND | 10 U | 10 U | 0.5 U/10 U | 2.0 U | 2.0 U | 2.0 U |
| Xylene (total) | - | - | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |

| S-3 | 7/20/95 ug/L GM | 7/20/95 ug/L USEPA | 8/7/96 ug/L GM | 10/22/96 ug/L GM | 9/30/97 ug/L GM | 9/1/99 ug/L GM | 8/22/00 ug/L GM | 6/17/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|
| 1,1,2-Trichloroethane | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 2.5 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | 1.1 | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 2.5 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 2.5 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethane (total) | - | - | 43 | 2.2 J | 0.5 U/10 U | 6.3 | 0.277 | - |
| 1,4-Dichlorobenzene | 1.8 | ND | - | - | - | - | - | - |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U | ND | 50 U | 50 U | 10 U/2 U | 25 U | 10 U | 10 U |
| 2-Hexanone | 10 U | ND | 50 U | 50 U | 10 U/2 U | 25 U | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 10 U | ND | 50 U | 50 U | 10 U/2 U | 25 U | 5.0 U | 5.0 U |
| Acetone | 10 U | 5.88 | 31 J | 50 U | 2 U/32 | 25 U | 10 U | 10 U |
| Benzene | 5 | 6.08 | 3.3 J | 5.2 | 3 J/4 | 4.5 | 5.4 | 4.3 |
| Carbon disulfide | 15.7 | ND | 5.0 U | 5.0 U | 10 U/2 U | 2.5 U | 1.0 U | 1.0 U |
| Chlorobenzene | 1.2 | ND | 5.0 U | 5.0 U | 10 U/2 | 3 | 5.8 | 7.1 |
| Chloroethane | 10 U | ND | 10 U | 10 U | 0.5/10 U | 5.0 U | 2.0 U | 0.33 J |
| Chloromethane (Methyl Chloride) | 1 U | ND | 10 U | 10 U | 0.5 U/10 U | 5.0 U | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | 1 | ND | - | - | - | - | 0.18 J | 0.8 |
| Ethylbenzene | 1 U | ND | 5.0 U | 5.0 U | 0.5/10 U | 2.5 U | 1.0 U | 1.0 U |
| m&p-Xylene | 0.7 J | ND | - | - | - | - | - | - |
| Methylene chloride | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 2.5 U | 0.14 J | 1.0 U |
| Naphthalene | 1.1 | ND | - | - | - | - | - | - |
| o-Xylene | 1 U | ND | - | - | - | - | - | - |
| Tetrachloroethene | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 2.5 U | 1.0 U | 1.0 U |
| Toluene | 1 U | ND | 5.0 U | 5.0 U | 0.5/10 U | 2.5 U | 1.0 U | 0.29 J |
| trans-1,2-Dichloroethene | 1 U | ND | - | - | - | - | 0.097 J | 0.25 J |
| Trichloroethene | 2.8 | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 3.7 | 1.0 U | 0.49 J |
| Vinyl chloride | 0.6 J | ND | 120 | 2.9 J | 0.5 U/10 U | 5.0 U | 0.51 J | 27 |
| Xylene (total) | - | - | 5.0 U | 5.0 U | 0.5 U/10 U | 2.5 U | 1.0 U | 1.0 U |

| D-1 | 7/13/95 ug/L GM | 7/13/95 ug/L USEPA | 8/8/96 ug/L GM | 10/22/96 ug/L GM | 9/30/97 ug/L GM | 9/1/99 ug/L GM | 8/22/00 ug/L GM | 6/17/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|
| 1,1,2-Trichloroethane | 1 U | ND | 25 U | 25 U/33 U | 0.5 U/33 U | 17 U | 12 U | 10 U |
| 1,1-Dichloroethane | 1 U | ND | 25 U | 25 U/33 U | 0.5 U/33 U | 17 U | 12 U | 10 U |
| 1,1-Dichloroethene | 1 U | 588 | 25 U | 25 U/33 U | 0.5 U/33 U | 17 U | 12 U | 10 U |
| 1,2-Dichloroethane (total) | - | - | 790 | 660/840 | 500/560/630 | 340 | 300 | - |
| 1,4-Dichlorobenzene | 1 U | ND | - | - | - | - | - | - |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U | ND | 250 U | 250 U/330 U | 2 U/33 U | 170 U | 120 U | 100 U |
| 2-Hexanone | 10 U | ND | 250 U | 250 U/330 U | 2 U/33 U | 170 U | 120 U | 100 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 10 U | ND | 250 U | 250 U/330 U | 2 U/33 U | 170 U | 62 U | 50 U |
| Acetone | 10 U | 25 U | 250 U | 250 U/330 U | 2 U/33 U | 170 U | 120 U | 100 U |
| Benzene | 1 U | ND | 25 U | 25 U/33 U | 0.5 U/33 U | 17 U | 12 U | 1.7 J/10 U |
| Carbon disulfide | 1 U | ND | 25 U | 25 U/33 U | 2 U/33 U | 17 U | 12 U | 10 U |
| Chlorobenzene | 1 U | ND | 25 U | 25 U/33 U | 0.5 U/33 U | 17 U | 12 U | 10 U |
| Chloroethane | 10 U | ND | 50 U | 50 U/67 U | 0.5 U/33 U | 33 U | 25 U | 25 U |
| Chloromethane (Methyl Chloride) | 1 U | ND | 50 U | 50 U/67 U | 0.8/33 U | 33 U | 25 U | 20 U |
| cis-1,2-Dichloroethene | 502 DL | ND | - | - | - | - | 300 | 330/350 |
| Ethylbenzene | 1 U | ND | 25 U | 25 U/33 U | 0.5 U/33 U | 17 U | 12 U | 10 U |
| m&p-Xylene | 1 U | ND | - | - | - | - | - | - |
| Methylene chloride | 1 U | ND | 25 U | 25 U/33 U | 0.5 U/33 U | 17 U | 12 U | 10 U |
| Naphthalene | 1 U | ND | - | - | - | - | - | - |
| o-Xylene | 1 U | ND | - | - | - | - | - | - |
| Tetrachloroethene | 1 U | ND | 25 U | 25 U/33 U | 0.5 U/33 U | 17 U | 12 U | 10 U |
| Toluene | 1 U | 25 U | 25 U | 25 U/33 U | 0.5 U/33 U | 17 U | 12 U | 10 U |
| trans-1,2-Dichloroethene | 2.3 | ND | - | - | - | - | 6.0 J | 1.7 J/0.5 J |
| Trichloroethene | 286 DL | 138 | 200 | 160/220 | 140/180/240 | 98 | 120 | 110/130 |
| Vinyl chloride | 1 U | ND | 50 U | 50 U/67 U | 0.5 U/33 U | 33 U | 25 U | 20 U |
| Xylene (total) | - | - | 25 U | 25 U/33 U | 0.5 U/33 U | 17 U | 12 U | 10 U |

| S-5 | 8/8/96 ug/L GM | 9/12/96 ug/L GM | 10/21/96 ug/L GM | 9/29/97 ug/L GM | 9/2/99 ug/L GM | 8/21/00 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|---|---|---|---|---|
| 1,1,2-Trichloroethane | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.7 U |
| 1,1-Dichloroethane | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.7 U |
| 1,1-Dichloroethene | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.7 U |
| 1,2-Dichloroethane (total) | 5.2 | 3.0 J/5.8 J | 2.1 J | 2/2 J | 14 | 3.8 | - |
| 2-Butanone (Methyl Ethyl Ketone) | 50 U | 50 U | 50 U | 10 U/2 U | 17 U | 10 U | 17 U |
| 2-Hexanone | 50 U | 50 U | 50 U | 10 U/2 U | 17 U | 10 U | 17 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 50 U | 50 U | 50 U | 10 U/2 U | 17 U | 5.0 U | 8.4 U |
| Acetone | 50 U | 50 U | 50 U | 10 U/2 U | 17 U | 10 U | 17 U |
| Benzene | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.7 U | 1.0 U | 1.7 U |
| Carbon disulfide | 5.0 U | 5.0 U | 5.0 U | 10 U/2 U | 1.7 U | 1.0 U | 1.7 U |
| Chlorobenzene | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.7 U | 1.0 U | 1.7 U |
| Chloroethane | 10 U | 10 U | 10 U | 0.5 U/10 U | 3.3 U | 2.0 U | 3.3 U |
| Chloromethane (Methyl Chloride) | 10 U | 10 U | 10 U | 0.7/10 U | 3.3 U | 2.0 U | 3.3 U |
| cis-1,2-Dichloroethene | - | - | - | - | - | 3.8 | 4.0 |
| Ethylbenzene | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.7 U | 1.0 U | 1.7 U |
| Methylene chloride | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.7 U | 1.0 U | 1.7 U |
| Tetrachloroethene | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 0.38 J | 0.36 J | 1.7 U |
| Toluene | 5.0 U | 5.0 U | 5.0 U | 0.5/10 U | 1.7 U | 1.0 U | 1.7 U |
| trans-1,2-Dichloroethene | - | - | - | - | - | 0.50 U | 0.84 U |
| Trichloroethene | 23 | 25/27 | 24 | 20/24 | 54 | 62 | 60 |
| Vinyl chloride | 10 U | 10 U | 10 U | 0.5 U/10 U | 3.3 U | 2.0 U | 3.3 U |
| Xylene (total) | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.7 U | 1.0 U | 1.7 U |

| MW-1 | 8/22/00 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|
| 1,1,2-Trichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | 1.0 U | 1.0 U |
| 1,2-Dichloroethane (total) | 0.50 U | - |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U | 10 U |
| 2-Hexanone | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 5.0 U | 5.0 U |
| Acetone | 10 U | 10 U |
| Benzene | 1.0 U | 1.0 U |
| Carbon disulfide | 1.0 U | 1.0 U |
| Chlorobenzene | 1.0 U | 1.0 U |
| Chloroethane | 2.0 U | 2.0 U |
| Chloromethane (Methyl Chloride) | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | 0.50 U | 0.50 U |
| Ethylbenzene | 1.0 U | 1.0 U |
| Methylene chloride | 1.0 U | 1.0 U |
| Tetrachloroethene | 1.0 U | 1.0 U |
| Toluene | 1.0 U | 1.0 U |
| trans-1,2-Dichloroethene | 0.50 U | 0.50 U |
| Trichloroethene | 1.0 U | 1.0 U |
| Vinyl chloride | 2.0 U | 2.0 U |
| Xylene (total) | 1.0 U | 1.0 U |

| MW-2 | 8/22/00 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|
| 1,1,2-Trichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | 1.0 U | 1.0 U |
| 1,2-Dichloroethane (total) | 0.50 U | - |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U | 10 U |
| 2-Hexanone | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 5.0 U | 5.0 U |
| Acetone | 10 U | 10 U |
| Benzene | 1.0 U | 1.0 U |
| Carbon disulfide | 1.0 U | 1.0 U |
| Chlorobenzene | 1.0 U | 1.0 U |
| Chloroethane | 2.0 U | 2.0 U |
| Chloromethane (Methyl Chloride) | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | 0.50 U | 0.50 U |
| Ethylbenzene | 1.0 U | 1.0 U |
| Methylene chloride | 1.0 U | 1.0 U |
| Tetrachloroethene | 1.0 U | 1.0 U |
| Toluene | 1.0 U | 1.0 U |
| trans-1,2-Dichloroethene | 0.50 U | 0.50 U |
| Trichloroethene | 1.0 U | 1.0 U |
| Vinyl chloride | 2.0 U | 2.0 U |
| Xylene (total) | 1.0 U | 1.0 U |

| MW-3 | 8/23/00 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|
| 1,1,2-Trichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | 1.0 U | 1.0 U |
| 1,2-Dichloroethane (total) | 0.50 U | - |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U | 10 U |
| 2-Hexanone | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 5.0 U | 5.0 U |
| Acetone | 10 U | 10 U |
| Benzene | 1.0 U | 1.0 U |
| Carbon disulfide | 0.14 J | 1.0 U |
| Chlorobenzene | 1.0 U | 1.0 U |
| Chloroethane | 2.0 U | 2.0 U |
| Chloromethane (Methyl Chloride) | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | 0.50 U | 0.50 U |
| Ethylbenzene | 1.0 U | 1.0 U |
| Methylene chloride | 1.0 U | 1.0 U |
| Tetrachloroethene | 1.0 U | 1.0 U |
| Toluene | 1.0 U | 1.0 U |
| trans-1,2-Dichloroethene | 0.50 U | 0.50 U |
| Trichloroethene | 1.0 U | 1.0 U |
| Vinyl chloride | 2.0 U | 2.0 U |
| Xylene (total) | 1.0 U | 1.0 U |

| D-2 | 7/14/95 ug/L GM | 7/14/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM | 9/3/99 ug/L GM | 8/21/00 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|
| 1,1,2-Trichloroethane | 0.5 J/1 U | ND | 50 U | 50 U | 0.5 U/33 U | 25 U | 7.1 U | 5.0 U |
| 1,1-Dichloroethane | 1 U | ND | 50 U | 50 U | 0.5 U/33 U | 25 U | 7.1 U | 5.0 U |
| 1,1-Dichloroethene | 4.1/4.3 | 2020 | 50 U | 50 U | 1/33 U | 25 U | 7.1 U | 5.0 U |
| 1,2-Dichloroethane (total) | - | - | 350 | 1100 | 480/573 E | 430 | 64 J/86.8 | - |
| 1,4-Dichlorobenzene | 1 U | ND | - | - | - | - | - | - |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U | ND | 500 U | 500 U | 2 U/33 U | 250 U | 71 U | 50 U |
| 2-Hexanone | 0.8 J/10 U | ND | 500 U | 500 U | 2 U/33 U | 250 U | 71 U | 50 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 10 U | ND | 500 U | 500 U | 2 U/33 U | 250 U | 36 U | 35 U |
| Acetone | 10 U | 250 U | 500 U | 500 U | 2 U/33 U | 250 U | 71 U | 50 U |
| Benzene | 1 1 | ND | 50 U | 50 U | 0.5 U/33 U | 25 U | 7.1 U | 5.0 U |
| Carbon disulfide | 1 U | ND | 50 U | 50 U | 2 U/33 U | 25 U | 7.1 U | 5.0 U |
| Chlorobenzene | 1 U | ND | 50 U | 50 U | 0.5 U/33 U | 25 U | 7.1 U | 5.0 U |
| Chloroethane | 10 U | ND | 100 U | 100 U | 0.5 U/33 U | 50 U | 14 U | 10 U |
| Chloromethane (Methyl Chloride) | 1 U | ND | 100 U | 100 U | 1/33 U | 50 U | 14 U | 10 U |
| cis-1,2-Dichloroethene | 1440 DL/2080 DL | ND | - | - | - | - | 63/85 | 54 |
| Ethylbenzene | 1 U | ND | 50 U | 50 U | 0.5 U/33 U | 25 U | 7.1 U | 5.0 U |
| m&p-Xylene | 1 U | ND | - | - | - | - | - | - |
| Methylene chloride | 0.7 J/0.8 J | ND | 50 U | 50 U | 0.5 U/33 U | 25 U | 7.1 U | 5.0 U |
| Naphthalene | 1 U | ND | - | - | - | - | - | - |
| o-Xylene | 2.4/2.5 | ND | - | - | - | - | - | - |
| Tetrachloroethene | 0.5 J/0.6 J | ND | 50 U | 50 U | 0.5 U/33 U | 25 U | 7.1 U | 5.0 U |
| Toluene | 1 U | 250 U | 50 U | 50 U | 0.5 U/33 U | 25 U | 7.1 U | 5.0 U |
| trans-1,2-Dichloroethene | 8.5/8.8 | ND | - | - | - | - | 1.5 J/1.8 J | 0.85 J |
| Trichloroethene | 6100 DL/6730 DL | 5120 | 500 | 1200 | 410/564 E | 360 | 210/220 | 170 |
| Vinyl chloride | 44 8/47.6 | ND | 100 U | 100 U | 33 U/8 | 50 U | 14 U | 10 U |
| Xylene (total) | - | - | 50 U | 50 U | 0.5 U/33 U | 25 U | 7.1 U | 5.0 U |

| D-3 | 8/8/96 ug/L GM | 9/12/96 ug/L GM | 10/21/96 ug/L GM | 9/29/97 ug/L GM | 9/2/99 ug/L GM | 8/21/00 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|---|---|---|---|---|
| 1,1,2-Trichloroethane | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 3.3 U |
| 1,1-Dichloroethane | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 3.3 U |
| 1,1-Dichloroethene | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 3.3 U |
| 1,2-Dichloroethane (total) | 4.8 J/5.0 | 7.5 | 7.2 | 6.2/7.6 | 13 | 6.33 | - |
| 2-Butanone (Methyl Ethyl Ketone) | 50 U | 50 U | 50 U | 10 U/2 U | 10 U | 10 U | 33 U |
| 2-Hexanone | 50 U | 50 U | 50 U | 10 U/2 U | 10 U | 10 U | 33 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 50 U | 50 U | 50 U | 10 U/2 U | 10 U | 5.0 U | 17 U |
| Acetone | 50 U | 50 U | 50 U | 10 U/2 U | 10 U | 10 U | 33 U |
| Benzene | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 3.3 U |
| Carbon disulfide | 5.0 U | 5.0 U | 5.0 U | 10 U/2 U | 1.0 U | 1.0 U | 3.3 U |
| Chlorobenzene | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 3.3 U |
| Chloroethane | 10 U | 10 U | 10 U | 0.5 U/10 U | 2.0 U | 2.0 U | 6.7 U |
| Chloromethane (Methyl Chloride) | 10 U | 10 U | 10 U | 0.5/10 U | 2.0 U | 2.0 U | 6.7 U |
| cis-1,2-Dichloroethene | - | - | - | - | - | 6.2 | 11 |
| Ethylbenzene | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 3.3 U |
| Methylene chloride | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 3.3 U |
| Tetrachloroethene | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 0.45 J | 0.49 J | 3.3 U |
| Toluene | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 3.3 U |
| trans-1,2-Dichloroethene | - | - | - | - | - | 0.13 J | 1.7 U |
| Trichloroethene | 29/30 | 29 | 34 | 28/33 | 31 | 32 | 120 |
| Vinyl chloride | 10 U | 10 U | 10 U | 0.5 U/10 U | 2.0 U | 2.0 U | 6.7 U |
| Xylene (total) | 5.0 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 3.3 U |

| S-2 | 7/13/95 ug/L GM | 7/13/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM | 9/3/99 ug/L GM | 8/23/00 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|
| 1,1,2-Trichloroethane | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | 1 U | 5.8 | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethane (total) | - | - | 5.0 U | 5.0 U | 0.5 U/10 U | 0.11 | - | - |
| 1,4-Dichlorobenzene | 1 U | ND | - | - | - | - | - | - |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U | ND | 50 U | 50 U | 10 U/2 U | 10 U | 10 U | 10 UJ |
| 2-Hexanone | 10 U | ND | 50 U | 50 U | 10 U/2 U | 10 U | 10 U | 10 UJ |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 10 U | ND | 50 U | 50 U | 10 U/2 U | 5.0 U | 5.0 U | 5.0 UJ |
| Acetone | 10 U | 5 U | 50 U | 50 U | 10 U/2 U | 10 U | 10 U | 10 UJ |
| Benzene | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| Carbon disulfide | 1 U | ND | 5.0 U | 5.0 U | 10 U/2 U | 1.0 U | 1.0 U | 1.0 U |
| Chlorobenzene | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| Chloroethane | 10 U | ND | 10 U | 10 U | 0.5 U/10 U | 2.0 U | 2.0 U | 2.0 U |
| Chloromethane (Methyl Chloride) | 1 U | ND | 10 U | 10 U | 0.5/10 U | 2.0 U | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | 4.1 | ND | - | - | - | - | 0.11 J | 0.50 U |
| Ethylbenzene | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| m&p-Xylene | 1 U | ND | - | - | - | - | - | - |
| Methylene chloride | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| Naphthalene | 1 U | ND | - | - | - | - | - | - |
| o-Xylene | 1 U | ND | - | - | - | - | - | - |
| Tetrachloroethene | 1 U | ND | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| Toluene | 1 U | 5 U | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |
| trans-1,2-Dichloroethene | 1 U | ND | - | - | - | 0.50 U | 0.50 U | 0.50 U |
| Trichloroethene | 64.9 | 64.2 | 11 | 8.8 | 3 J/4 | 1.2 | 7.0 | 7.0 |
| Vinyl chloride | 1 U | ND | 10 U | 10 U | 0.5 U/10 U | 2.0 U | 2.0 U | 2.0 U |
| Xylene (total) | - | - | 5.0 U | 5.0 U | 0.5 U/10 U | 1.0 U | 1.0 U | 1.0 U |

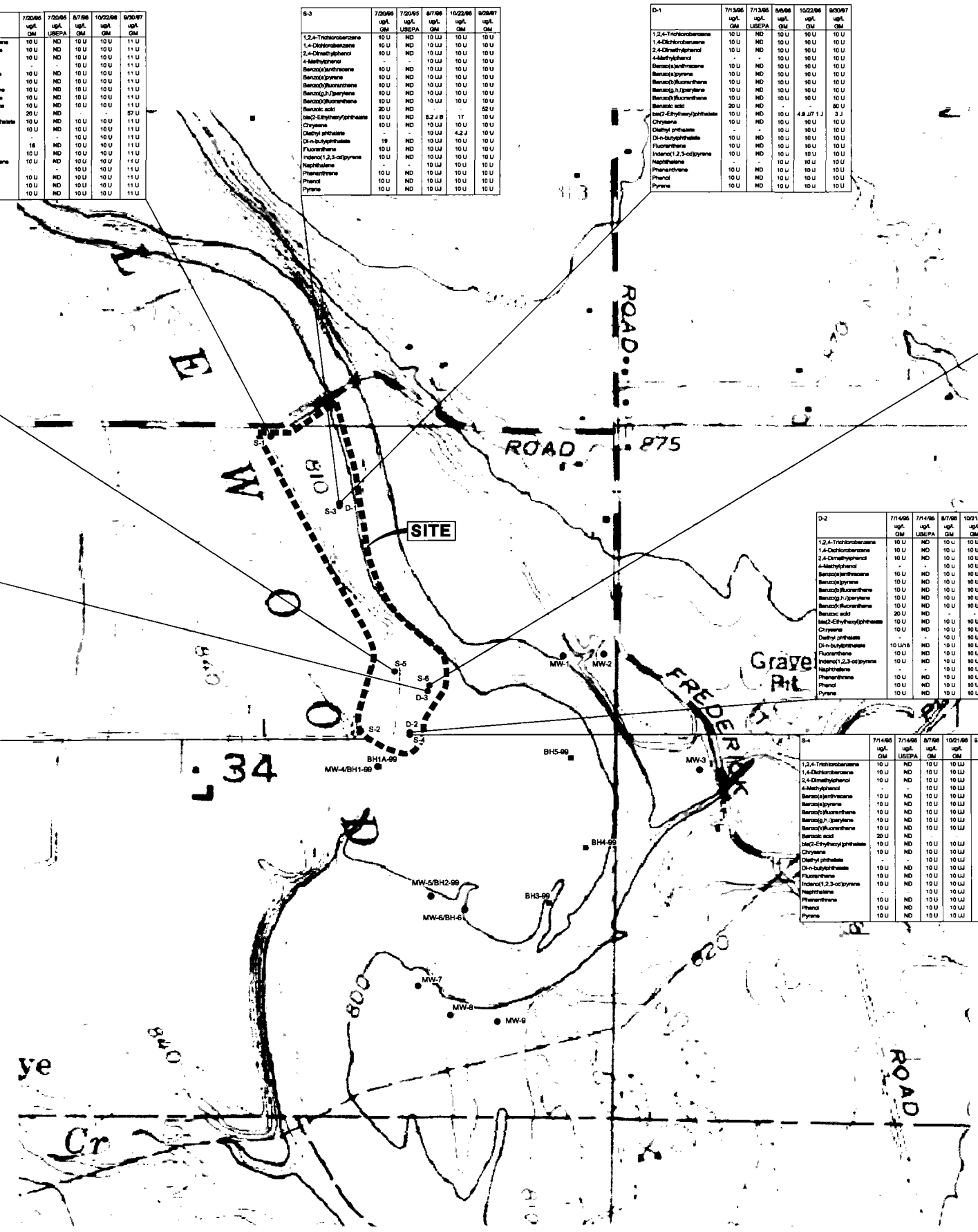
| MW-4 | 8/22/00 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|
| 1,1,2-Trichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | 1.0 U | 1.0 U |
| 1,2-Dichloroethane (total) | 0.50 U | - |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U | 10 U |
| 2-Hexanone | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 5.0 U | 5.0 U |
| Acetone | 10 U | 10 U |
| Benzene | 1.0 U | 1.0 U |
| Carbon disulfide | 1.0 U | 1.0 U |
| Chlorobenzene | 1.0 U | 1.0 U |
| Chloroethane | 2.0 U | 2.0 U |
| Chloromethane (Methyl Chloride) | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | 0.50 U | 0.50 U |
| Ethylbenzene | 1.0 U | 1.0 U |
| Methylene chloride | 1.0 U | 1.0 U |
| Tetrachloroethene | 1.0 U | 1.0 U |
| Toluene | 0.86 J | 1.0 U |
| trans-1,2-Dichloroethene | 0.50 U | 0.50 U |
| Trichloroethene | 1.0 U | 1.0 U |
| Vinyl chloride | 2.0 U | 2.0 U |
| Xylene (total) | 1.0 U | 1.0 U |

| MW-5 | 8/23/00 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|
| 1,1,2-Trichloroethane | 3.3 U | 1.0 U |
| 1,1-Dichloroethane | 3.3 U | 1.0 U |
| 1,1-Dichloroethene | 3.3 U | 1.0 U |
| 1,2-Dichloroethane (total) | 103.9 | - |
| 2-Butanone (Methyl Ethyl Ketone) | 33 U | 10 U |
| 2-Hexanone | 33 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 17 U | 5.0 U |
| Acetone | 33 U | 10 U |
| Benzene | 3.3 U | 1.0 U |
| Carbon disulfide | 3.3 U | 1.0 U |
| Chlorobenzene | 3.3 U | 1.0 U |
| Chloroethane | 6.7 U | 2.0 U |
| Chloromethane (Methyl Chloride) | 6.7 U | 2.0 U |
| cis-1,2-Dichloroethene | 98 | 10 |
| Ethylbenzene | 3.3 U | 1.0 U |
| Methylene chloride | 3.3 U | 1.0 U |
| Tetrachloroethene | 3.3 U | 1.0 U |
| Toluene | 0.36 J | 1.0 U |
| trans-1,2-Dichloroethene | 7.9 | 1.7 |
| Trichloroethene | 6.5 | 0.98 J |
| Vinyl chloride | 6.7 U | 2.0 U |
| Xylene (total) | 3.3 U | 1.0 U |

| MW-6 | 6/6/01 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|
| 1,1,2-Trichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | 1.0 U | 1.0 U |
| 1,2-Dichloroethane (total) | 8.85 | - |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U | 10 U |
| 2-Hexanone | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 5.0 U | 5.0 U |
| Acetone | 10 U | 10 U |
| Benzene | 0.20 J | 1.0 U |
| Carbon disulfide | 1.0 U | 1.0 U |
| Chlorobenzene | 1.0 U | 1.0 U |
| Chloroethane | 2.0 U | 2.0 U |
| Chloromethane (Methyl Chloride) | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | 8.5 | 7.0 |
| Ethylbenzene | 1.0 U | 1.0 U |
| Methylene chloride | 1.0 U | 1.0 U |
| Tetrachloroethene | 1.0 U | 1.0 U |
| Toluene | 1.0 U | 1.0 U |
| trans-1,2-Dichloroethene | 0.26 J | 0.29 J |
| Trichloroethene | 8.5 | 12 |
| Vinyl chloride | 2.0 U | 2.0 U |
| Xylene (total) | 1.0 U | 1.0 U |

| MW-7 | 5/1/01 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|
| 1,1,2-Trichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | 1.0 U | 1.0 U |
| 1,2-Dichloroethane (total) | 0.50 U | - |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U | 10 U |
| 2-Hexanone | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 5.0 U | 5.0 U |
| Acetone | 10 U | 10 U |
| Benzene | 1.0 U | 1.0 U |
| Carbon disulfide | 1.0 U | 1.0 U |
| Chlorobenzene | 1.0 U | 1.0 U |
| Chloroethane | 2.0 U | 2.0 U |
| Chloromethane (Methyl Chloride) | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | 0.50 U | 0.50 U |
| Ethylbenzene | 1.0 U | 1.0 U |
| Methylene chloride | 1.0 U | 1.0 U |
| Tetrachloroethene | 1.0 U | 1.0 U |
| Toluene | 1.0 U | 1.0 U |
| trans-1,2-Dichloroethene | 0.50 U | 0.50 U |
| Trichloroethene | 1.0 U | 1.0 U |
| Vinyl chloride | 2.0 U | 2.0 U |
| Xylene (total) | 1.0 U | 1.0 U |

| MW-8 | 6/6/01 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|
| 1,1,2-Trichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | 1.0 U | 1.0 U |
| 1,2-Dichloroethane (total) | 0.50 U | - |
| 2-Butanone (Methyl Ethyl Ketone) | 10 U | 10 U |
| 2-Hexanone | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl isobutyl Ketone) | 5.0 U | 5.0 U |
| Acetone | 10 U | 10 U |
| Benzene | 0.88 J | 1.0 U |
| Carbon disulfide | 1.0 U | 1.0 U |
| Chlorobenzene | 1.0 U | 1.0 U |
| Chloroethane | 2.0 U | 2.0 U |
| Chlo




| S-1 | 7/20/95 ug/L GM | 7/20/95 ug/L USEPA | 8/7/96 ug/L GM | 10/22/96 ug/L GM | 9/30/97 ug/L GM |
|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 10 U | ND | 10 U | 10 U | 11 U |
| 1,4-Dichlorobenzene | 10 U | ND | 10 U | 10 U | 11 U |
| 2,4-Dimethylphenol | 10 U | ND | 10 U | 10 U | 11 U |
| 4-Methylphenol | - | - | 10 U | 10 U | 11 U |
| Benzo(a)anthracene | 10 U | ND | 10 U | 10 U | 11 U |
| Benzo(a)pyrene | 10 U | ND | 10 U | 10 U | 11 U |
| Benzo(b)fluoranthene | 10 U | ND | 10 U | 10 U | 11 U |
| Benzo(g,h,i)perylene | 10 U | ND | 10 U | 10 U | 11 U |
| Benzo(k)fluoranthene | 10 U | ND | 10 U | 10 U | 11 U |
| Benzoic acid | 20 U | ND | - | - | 57 U |
| bis(2-Ethylhexyl)phthalate | 10 U | ND | 10 U | 10 U | 11 U |
| Chrysene | 10 U | ND | 10 U | 10 U | 11 U |
| Diethyl phthalate | - | - | 10 U | 10 U | 11 U |
| Di-n-butylphthalate | 18 | ND | 10 U | 10 U | 11 U |
| Fluoranthene | 10 U | ND | 10 U | 10 U | 11 U |
| Indeno(1,2,3-cd)pyrene | 10 U | ND | 10 U | 10 U | 11 U |
| Naphthalene | - | - | 10 U | 10 U | 11 U |
| Phenanthrene | 10 U | ND | 10 U | 10 U | 11 U |
| Phenol | 10 U | ND | 10 U | 10 U | 11 U |
| Pyrene | 10 U | ND | 10 U | 10 U | 11 U |

| S-3 | 7/20/95 ug/L GM | 7/20/95 ug/L USEPA | 8/7/96 ug/L GM | 10/22/96 ug/L GM | 9/30/97 ug/L GM |
|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 10 U | ND | 10 UJ | 10 U | 10 U |
| 1,4-Dichlorobenzene | 10 U | ND | 10 UJ | 10 U | 10 U |
| 2,4-Dimethylphenol | 10 U | ND | 10 UJ | 10 U | 10 U |
| 4-Methylphenol | - | - | 10 UJ | 10 U | 10 U |
| Benzo(a)anthracene | 10 U | ND | 10 UJ | 10 U | 10 U |
| Benzo(a)pyrene | 10 U | ND | 10 UJ | 10 U | 10 U |
| Benzo(b)fluoranthene | 10 U | ND | 10 UJ | 10 U | 10 U |
| Benzo(g,h,i)perylene | 10 U | ND | 10 UJ | 10 U | 10 U |
| Benzo(k)fluoranthene | 10 U | ND | 10 UJ | 10 U | 10 U |
| Benzoic acid | 20 U | ND | - | - | 52 U |
| bis(2-Ethylhexyl)phthalate | 10 U | ND | 10 UJ | 8.2 J B | 17 |
| Chrysene | 10 U | ND | 10 UJ | 10 U | 10 U |
| Diethyl phthalate | - | - | 10 UJ | 4.2 J | 10 U |
| Di-n-butylphthalate | 18 | ND | 10 UJ | 10 U | 10 U |
| Fluoranthene | 10 U | ND | 10 UJ | 10 U | 10 U |
| Indeno(1,2,3-cd)pyrene | 10 U | ND | 10 UJ | 10 U | 10 U |
| Naphthalene | - | - | 10 UJ | 10 U | 10 U |
| Phenanthrene | 10 U | ND | 10 UJ | 10 U | 10 U |
| Phenol | 10 U | ND | 10 UJ | 10 U | 10 U |
| Pyrene | 10 U | ND | 10 UJ | 10 U | 10 U |

| D-1 | 7/13/95 ug/L GM | 7/13/95 ug/L USEPA | 8/6/96 ug/L GM | 10/22/96 ug/L GM | 9/30/97 ug/L GM |
|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 10 U | ND | 10 U | 10 U | 10 U |
| 1,4-Dichlorobenzene | 10 U | ND | 10 U | 10 U | 10 U |
| 2,4-Dimethylphenol | 10 U | ND | 10 U | 10 U | 10 U |
| 4-Methylphenol | - | - | 10 U | 10 U | 10 U |
| Benzo(a)anthracene | 10 U | ND | 10 U | 10 U | 10 U |
| Benzo(a)pyrene | 10 U | ND | 10 U | 10 U | 10 U |
| Benzo(b)fluoranthene | 10 U | ND | 10 U | 10 U | 10 U |
| Benzo(g,h,i)perylene | 10 U | ND | 10 U | 10 U | 10 U |
| Benzo(k)fluoranthene | 10 U | ND | 10 U | 10 U | 10 U |
| Benzoic acid | 20 U | ND | - | - | 50 U |
| bis(2-Ethylhexyl)phthalate | 10 U | ND | 10 U | 4.8 J/7.1 J | 3 J |
| Chrysene | 10 U | ND | 10 U | 10 U | 10 U |
| Diethyl phthalate | - | - | 10 U | 10 U | 10 U |
| Di-n-butylphthalate | 10 U | ND | 10 U | 10 U | 10 U |
| Fluoranthene | 10 U | ND | 10 U | 10 U | 10 U |
| Indeno(1,2,3-cd)pyrene | 10 U | ND | 10 U | 10 U | 10 U |
| Naphthalene | - | - | 10 U | 10 U | 10 U |
| Phenanthrene | 10 U | ND | 10 U | 10 U | 10 U |
| Phenol | 10 U | ND | 10 U | 10 U | 10 U |
| Pyrene | 10 U | ND | 10 U | 10 U | 10 U |

| S-6 | 8/6/96 ug/L GM | 9/12/96 ug/L GM | 10/21/96 ug/L GM | 9/29/97 ug/L GM |
|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 10 U | 10 U | 10 U | 10 U |
| 1,4-Dichlorobenzene | 10 U | 10 U | 10 U | 10 U |
| 2,4-Dimethylphenol | 10 U | 10 U | 10 U | 10 U |
| 4-Methylphenol | 10 U | 10 U | 10 U | 10 U |
| Benzo(a)anthracene | 10 U | 10 U | 10 U | 10 U |
| Benzo(a)pyrene | 10 U | 10 U | 10 U | 10 U |
| Benzo(b)fluoranthene | 10 U | 10 U | 10 U | 10 U |
| Benzo(g,h,i)perylene | 10 U | 10 U | 10 U | 10 U |
| Benzo(k)fluoranthene | 10 U | 10 U | 10 U | 10 U |
| Benzoic acid | - | - | - | 51 U |
| bis(2-Ethylhexyl)phthalate | 10 U | 10 U | 10 U | 2 J |
| Chrysene | 10 U | 10 U | 10 U | 10 U |
| Diethyl phthalate | 10 U | 10 U | 10 U | 10 U |
| Di-n-butylphthalate | 10 U | 10 U | 10 U | 10 U |
| Fluoranthene | 10 U | 10 U | 10 U | 10 U |
| Indeno(1,2,3-cd)pyrene | 10 U | 10 U | 10 U | 10 U |
| Naphthalene | 10 U | 10 U | 10 U | 10 U |
| Phenanthrene | 10 U | 10 U | 10 U | 10 U |
| Phenol | 10 U | 10 U | 10 U | 10 U |
| Pyrene | 10 U | 10 U | 10 U | 10 U |

| B-5 | 7/14/95 ug/L GM | 7/14/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM |
|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 12 | ND | 10 U | 10 UJ | 11 U |
| 1,4-Dichlorobenzene | 10 U | ND | 10 U | 10 UJ | 11 U |
| 2,4-Dimethylphenol | 4.4 J | ND | 4.8 J | 10 UJ | 11 U |
| 4-Methylphenol | - | - | 19 | 10 UJ | 11 U |
| Benzo(a)anthracene | 8.6 J | ND | 10 U | 10 UJ | 11 U |
| Benzo(a)pyrene | 8.3 J | ND | 10 U | 10 UJ | 11 U |
| Benzo(b)fluoranthene | 7.9 J | ND | 10 U | 10 UJ | 11 U |
| Benzo(g,h,i)perylene | 5 J | ND | 10 U | 10 UJ | 11 U |
| Benzo(k)fluoranthene | 7.5 J | ND | 10 U | 10 UJ | 11 U |
| Benzoic acid | 51 | ND | - | - | 56 U |
| bis(2-Ethylhexyl)phthalate | 10 U | ND | 10 U | 10 UJ | 6 J |
| Chrysene | 8.8 J | ND | 10 U | 10 UJ | 11 U |
| Diethyl phthalate | - | - | 10 U | 10 UJ | 11 U |
| Di-n-butylphthalate | 10 U | ND | 10 U | 10 UJ | 11 U |
| Fluoranthene | 21 | ND | 10 U | 10 UJ | 11 U |
| Indeno(1,2,3-cd)pyrene | 4.7 J | ND | 10 U | 10 UJ | 11 U |
| Naphthalene | - | - | 10 U | 10 UJ | 11 U |
| Phenanthrene | 15 | ND | 10 U | 10 UJ | 11 U |
| Phenol | 78 | 11 | 3.2 J | 10 UJ | 11 U |
| Pyrene | 19 | ND | 10 U | 10 UJ | 11 U |

| D-3 | 8/6/96 ug/L GM | 9/12/96 ug/L GM | 10/21/96 ug/L GM | 9/29/97 ug/L GM |
|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 10 U | 10 U | 10 UJ | 11 U |
| 1,4-Dichlorobenzene | 10 U | 10 U | 10 UJ | 11 U |
| 2,4-Dimethylphenol | 10 U | 10 U | 10 UJ | 11 U |
| 4-Methylphenol | 10 U | 10 U | 10 UJ | 11 U |
| Benzo(a)anthracene | 10 U | 10 U | 10 UJ | 11 U |
| Benzo(a)pyrene | 10 U | 10 U | 10 UJ | 11 U |
| Benzo(b)fluoranthene | 10 U | 10 U | 10 UJ | 11 U |
| Benzo(g,h,i)perylene | 10 U | 10 U | 10 UJ | 11 U |
| Benzo(k)fluoranthene | 10 U | 10 U | 10 UJ | 11 U |
| Benzoic acid | - | - | - | 54 UR6 U |
| bis(2-Ethylhexyl)phthalate | 10 U | 10 U | 10 UJ | 3.09 J |
| Chrysene | 10 U | 10 U | 10 UJ | 11 U |
| Diethyl phthalate | 10 U | 10 U | 10 UJ | 11 U |
| Di-n-butylphthalate | 10 U | 10 U | 10 UJ | 11 U |
| Fluoranthene | 10 U | 10 U | 10 UJ | 11 U |
| Indeno(1,2,3-cd)pyrene | 10 U | 10 U | 10 UJ | 11 U |
| Naphthalene | 10 U | 10 U | 10 UJ | 11 U |
| Phenanthrene | 10 U | 10 U | 10 UJ | 11 U |
| Phenol | 10 U | 10 U | 10 UJ | 11 U |
| Pyrene | 10 U | 10 U | 10 UJ | 11 U |

| B-2 | 7/13/95 ug/L GM | 7/13/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM |
|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 10 U | ND | 10 U | 10 UJ | 11 U |
| 1,4-Dichlorobenzene | 10 U | ND | 10 U | 10 UJ | 11 U |
| 2,4-Dimethylphenol | 10 U | ND | 10 U | 10 UJ | 11 U |
| 4-Methylphenol | - | - | 10 U | 10 UJ | 11 U |
| Benzo(a)anthracene | 10 U | ND | 10 U | 10 UJ | 11 U |
| Benzo(a)pyrene | 10 U | ND | 10 U | 10 UJ | 11 U |
| Benzo(b)fluoranthene | 10 U | ND | 10 U | 10 UJ | 11 U |
| Benzo(g,h,i)perylene | 10 U | ND | 10 U | 10 UJ | 11 U |
| Benzo(k)fluoranthene | 10 U | ND | 10 U | 10 UJ | 11 U |
| Benzoic acid | 20 U | ND | - | - | 54 U |
| bis(2-Ethylhexyl)phthalate | 10 U | ND | 10 U | 10 UJ | 11 U |
| Chrysene | 10 U | ND | 10 U | 10 UJ | 11 U |
| Diethyl phthalate | - | - | 10 U | 10 UJ | 11 U |
| Di-n-butylphthalate | 36 | ND | 10 U | 10 UJ | 11 U |
| Fluoranthene | 10 U | ND | 10 U | 10 UJ | 11 U |
| Indeno(1,2,3-cd)pyrene | 10 U | ND | 10 U | 10 UJ | 11 U |
| Naphthalene | - | - | 10 U | 10 UJ | 11 U |
| Phenanthrene | 10 U | ND | 10 U | 10 UJ | 11 U |
| Phenol | 10 U | ND | 10 U | 10 UJ | 11 U |
| Pyrene | 10 U | ND | 10 U | 10 UJ | 11 U |

| D-2 | 7/14/95 ug/L GM | 7/14/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM |
|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 10 U | ND | 10 U | 10 UJ | 10 U |
| 1,4-Dichlorobenzene | 10 U | ND | 10 U | 10 UJ | 10 U |
| 2,4-Dimethylphenol | 10 U | ND | 10 U | 10 UJ | 10 U |
| 4-Methylphenol | - | - | 10 U | 10 UJ | 10 U |
| Benzo(a)anthracene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(a)pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(b)fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(g,h,i)perylene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(k)fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzoic acid | 20 U | ND | - | - | 50 U |
| bis(2-Ethylhexyl)phthalate | 10 U | ND | 10 U | 10 UJ | 1 J |
| Chrysene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Diethyl phthalate | - | - | 10 U | 10 UJ | 10 U |
| Di-n-butylphthalate | 10 UJ/5 | ND | 10 U | 10 UJ | 10 U |
| Fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Indeno(1,2,3-cd)pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Naphthalene | - | - | 10 U | 10 UJ | 10 U |
| Phenanthrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Phenol | 10 U | ND | 10 U | 10 UJ | 10 U |
| Pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |

| S-4 | 7/14/95 ug/L GM | 7/14/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM |
|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 10 U | ND | 10 U | 10 UJ | 10 U |
| 1,4-Dichlorobenzene | 10 U | ND | 10 U | 10 UJ | 10 U |
| 2,4-Dimethylphenol | 10 U | ND | 10 U | 10 UJ | 10 U |
| 4-Methylphenol | - | - | 10 U | 10 UJ | 10 U |
| Benzo(a)anthracene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(a)pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(b)fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(g,h,i)perylene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(k)fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzoic acid | 20 U | ND | - | - | 62 U |
| bis(2-Ethylhexyl)phthalate | 10 U | ND | 10 U | 10 UJ | 10 U |
| Chrysene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Diethyl phthalate | - | - | 10 U | 10 UJ | 10 U |
| Di-n-butylphthalate | 10 U | ND | 10 U | 10 UJ | 10 U |
| Fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Indeno(1,2,3-cd)pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Naphthalene | - | - | 10 U | 10 UJ | 10 U |
| Phenanthrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Phenol | 10 U | ND | 10 U | 10 UJ | 10 U |
| Pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |

| D-2 | 7/14/95 ug/L GM | 7/14/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM |
|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 10 U | ND | 10 U | 10 UJ | 10 U |
| 1,4-Dichlorobenzene | 10 U | ND | 10 U | 10 UJ | 10 U |
| 2,4-Dimethylphenol | 10 U | ND | 10 U | 10 UJ | 10 U |
| 4-Methylphenol | - | - | 10 U | 10 UJ | 10 U |
| Benzo(a)anthracene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(a)pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(b)fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(g,h,i)perylene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(k)fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzoic acid | 20 U | ND | - | - | 50 U |
| bis(2-Ethylhexyl)phthalate | 10 U | ND | 10 U | 10 UJ | 1 J |
| Chrysene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Diethyl phthalate | - | - | 10 U | 10 UJ | 10 U |
| Di-n-butylphthalate | 10 UJ/5 | ND | 10 U | 10 UJ | 10 U |
| Fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Indeno(1,2,3-cd)pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Naphthalene | - | - | 10 U | 10 UJ | 10 U |
| Phenanthrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Phenol | 10 U | ND | 10 U | 10 UJ | 10 U |
| Pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |

| S-4 | 7/14/95 ug/L GM | 7/14/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM |
|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 10 U | ND | 10 U | 10 UJ | 10 U |
| 1,4-Dichlorobenzene | 10 U | ND | 10 U | 10 UJ | 10 U |
| 2,4-Dimethylphenol | 10 U | ND | 10 U | 10 UJ | 10 U |
| 4-Methylphenol | - | - | 10 U | 10 UJ | 10 U |
| Benzo(a)anthracene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(a)pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(b)fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(g,h,i)perylene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(k)fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzoic acid | 20 U | ND | - | - | 62 U |
| bis(2-Ethylhexyl)phthalate | 10 U | ND | 10 U | 10 UJ | 10 U |
| Chrysene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Diethyl phthalate | - | - | 10 U | 10 UJ | 10 U |
| Di-n-butylphthalate | 10 U | ND | 10 U | 10 UJ | 10 U |
| Fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Indeno(1,2,3-cd)pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Naphthalene | - | - | 10 U | 10 UJ | 10 U |
| Phenanthrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Phenol | 10 U | ND | 10 U | 10 UJ | 10 U |
| Pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |

SOURCES: U.S.G.S. QUADRANGLE MAP:
WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000
AND JUNE 2001
NOVA CONSULTING INC.

| N° | Revision | Date | Initial |
|---|---|---|---|
| | | | |

LEGEND

- LIMIT OF SITE
- BH4-99 BOREHOLE LOCATION
- MW-9 MONITORING WELL LOCATION

| D-2 | 7/14/95 ug/L GM | 7/14/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM |
|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | 10 U | ND | 10 U | 10 UJ | 10 U |
| 1,4-Dichlorobenzene | 10 U | ND | 10 U | 10 UJ | 10 U |
| 2,4-Dimethylphenol | 10 U | ND | 10 U | 10 UJ | 10 U |
| 4-Methylphenol | - | - | 10 U | 10 UJ | 10 U |
| Benzo(a)anthracene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(a)pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(b)fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(g,h,i)perylene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzo(k)fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Benzoic acid | 20 U | ND | - | - | 51 U |
| bis(2-Ethylhexyl)phthalate | 10 U | ND | 10 U | 10 UJ | 2 J |
| Chrysene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Diethyl phthalate | 10 U | ND | 10 U | 10 UJ | 10 U |
| Di-n-butylphthalate | 10 U | ND | 10 U | 10 UJ | 10 U |
| Fluoranthene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Indeno(1,2,3-cd)pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Naphthalene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Phenanthrene | 10 U | ND | 10 U | 10 UJ | 10 U |
| Phenol | 10 U | ND | 10 U | 10 UJ | 10 U |
| Pyrene | 10 U | ND | 10 U | 10 UJ | 10 U |

SAMPLE LOCATION
SAMPLE DATE
RESULT UNIT
SAMPLED BY
CONCENTRATION
PARAMETER

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL ADJUST SCALE ACCORDINGLY

Approved

DRAWING STATUS

| Status | Date | Initial |
|---|---|---|
| | | |

GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

GROUNDWATER DATA SUMMARY
OF SVOC's

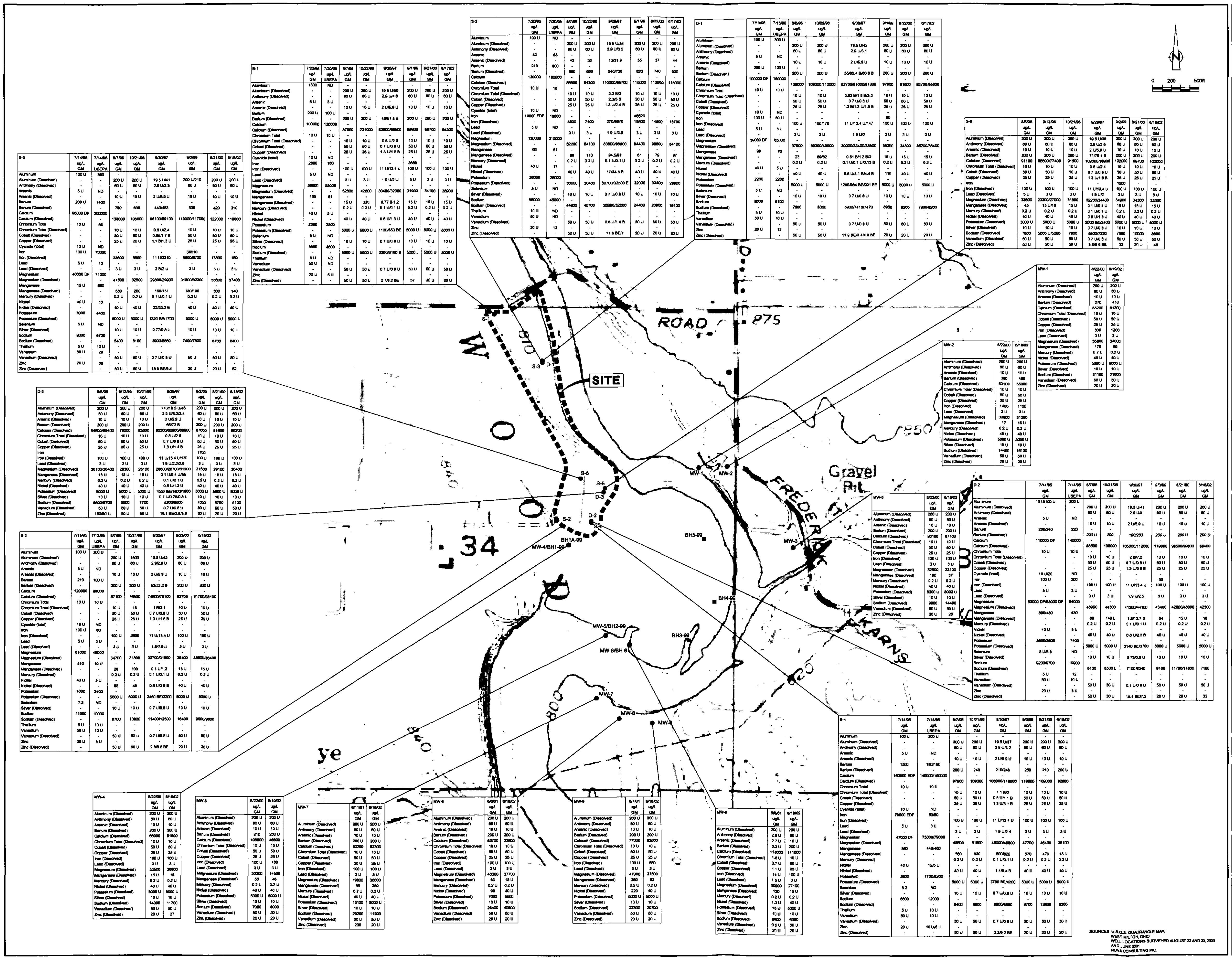
CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: | Reviewed By: | Date |
|---|---|---|
| IKR | MRT | MAY 2006 |

| Scale: | Project N°: | Report N°: | Drawing N° |
|---|---|---|---|
| 1"=500' | 07043-90 | 014 | figure F.2 |

07043-90(014)GN-WA003 MAY 30/2006




| MW-4 | 8/22/00 ug/L GM | 6/19/02 ug/L GM |
|---|---|---|
| Aluminum (Dissolved) | 200 U | 200 U |
| Antimony (Dissolved) | 60 U | 60 U |
| Arsenic (Dissolved) | 10 U | 10 U |
| Barium (Dissolved) | 200 U | 200 U |
| Calcium (Dissolved) | 68000 | 81800 |
| Chromium Total (Dissolved) | 10 U | 10 U |
| Cobalt (Dissolved) | 50 U | 50 U |
| Copper (Dissolved) | 25 U | 25 U |
| Iron (Dissolved) | 100 U | 100 U |
| Lead (Dissolved) | 3 U | 3 U |
| Magnesium (Dissolved) | 33500 | 36600 |
| Manganese (Dissolved) | 15 U | 18 |
| Mercury (Dissolved) | 0.2 U | 0.2 U |
| Nickel (Dissolved) | 40 U | 40 U |
| Potassium (Dissolved) | 5000 U | 5000 U |
| Silver (Dissolved) | 10 U | 10 U |
| Sodium (Dissolved) | 14300 | 11700 |
| Vanadium (Dissolved) | 50 U | 50 U |
| Zinc (Dissolved) | 20 U | 27 |

| MW-5 | 8/22/00 ug/L GM | 6/19/02 ug/L GM |
|---|---|---|
| Aluminum (Dissolved) | 200 U | 200 U |
| Antimony (Dissolved) | 60 U | 60 U |
| Arsenic (Dissolved) | 10 U | 10 U |
| Barium (Dissolved) | 210 | 200 U |
| Calcium (Dissolved) | 108000 | 48600 |
| Chromium Total (Dissolved) | 10 U | 10 U |
| Cobalt (Dissolved) | 50 U | 50 U |
| Copper (Dissolved) | 25 U | 25 U |
| Iron (Dissolved) | 100 U | 180 |
| Lead (Dissolved) | 3 U | 3 U |
| Magnesium (Dissolved) | 30300 | 14500 |
| Manganese (Dissolved) | 63 | 48 |
| Mercury (Dissolved) | 0.2 U | 0.2 U |
| Nickel (Dissolved) | 40 U | 40 U |
| Potassium (Dissolved) | 5000 U | 5000 U |
| Silver (Dissolved) | 10 U | 10 U |
| Sodium (Dissolved) | 7000 | 8000 |
| Vanadium (Dissolved) | 50 U | 50 U |
| Zinc (Dissolved) | 20 U | 20 U |

| MW-7 | 6/11/01 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|
| Aluminum (Dissolved) | 200 U | 200 U |
| Antimony (Dissolved) | 60 U | 60 U |
| Arsenic (Dissolved) | 10 U | 10 U |
| Barium (Dissolved) | 200 U | 200 U |
| Calcium (Dissolved) | 52200 | 82300 |
| Chromium Total (Dissolved) | 10 U | 10 U |
| Cobalt (Dissolved) | 50 U | 50 U |
| Copper (Dissolved) | 25 U | 25 U |
| Iron (Dissolved) | 100 U | 100 U |
| Lead (Dissolved) | 3 U | 3 U |
| Magnesium (Dissolved) | 18600 | 30000 |
| Manganese (Dissolved) | 56 | 280 |
| Mercury (Dissolved) | 0.2 U | 0.2 U |
| Nickel (Dissolved) | 40 U | 40 U |
| Potassium (Dissolved) | 13100 | 5000 U |
| Silver (Dissolved) | 10 U | 10 U |
| Sodium (Dissolved) | 29200 | 11900 |
| Vanadium (Dissolved) | 50 U | 50 U |
| Zinc (Dissolved) | 230 | 20 U |

| MW-8 | 6/6/01 ug/L GM | 6/15/02 ug/L GM |
|---|---|---|
| Aluminum (Dissolved) | 200 U | 200 U |
| Antimony (Dissolved) | 60 U | 60 U |
| Arsenic (Dissolved) | 10 U | 10 U |
| Barium (Dissolved) | 200 U | 200 U |
| Calcium (Dissolved) | 63700 | 23600 |
| Chromium Total (Dissolved) | 10 U | 10 U |
| Cobalt (Dissolved) | 50 U | 50 U |
| Copper (Dissolved) | 25 U | 25 U |
| Iron (Dissolved) | 100 U | 100 U |
| Lead (Dissolved) | 3 U | 3 U |
| Magnesium (Dissolved) | 43300 | 37700 |
| Manganese (Dissolved) | 63 | 15 U |
| Mercury (Dissolved) | 0.2 U | 0.2 U |
| Nickel (Dissolved) | 98 | 40 U |
| Potassium (Dissolved) | 7000 | 6600 |
| Silver (Dissolved) | 10 U | 10 U |
| Sodium (Dissolved) | 28400 | 40600 |
| Vanadium (Dissolved) | 50 U | 50 U |
| Zinc (Dissolved) | 20 U | 20 U |

| MW-9 | 6/7/01 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|
| Aluminum (Dissolved) | 200 U | 200 U |
| Antimony (Dissolved) | 60 U | 60 U |
| Arsenic (Dissolved) | 10 U | 10 U |
| Barium (Dissolved) | 200 U | 200 U |
| Calcium (Dissolved) | 77000 | 63500 |
| Chromium Total (Dissolved) | 10 U | 10 U |
| Cobalt (Dissolved) | 50 U | 50 U |
| Copper (Dissolved) | 25 U | 25 U |
| Iron (Dissolved) | 100 U | 660 |
| Lead (Dissolved) | 3 U | 3 U |
| Magnesium (Dissolved) | 47000 | 37800 |
| Manganese (Dissolved) | 280 | 82 |
| Mercury (Dissolved) | 0.2 U | 0.2 U |
| Nickel (Dissolved) | 40 U | 40 U |
| Potassium (Dissolved) | 5000 U | 5000 U |
| Silver (Dissolved) | 10 U | 10 U |
| Sodium (Dissolved) | 22300 | 20700 |
| Vanadium (Dissolved) | 50 U | 50 U |
| Zinc (Dissolved) | 20 U | 20 U |

| MW-6 | 6/6/01 ug/L GM | 6/19/02 ug/L GM |
|---|---|---|
| Aluminum (Dissolved) | 200 U | 200 U |
| Antimony (Dissolved) | 2.6 U | 60 U |
| Arsenic (Dissolved) | 2.7 U | 10 U |
| Barium (Dissolved) | 0.3 U | 200 U |
| Calcium (Dissolved) | 113000 | 111000 |
| Chromium Total (Dissolved) | 1.6 U | 10 U |
| Cobalt (Dissolved) | 0.7 U | 50 U |
| Copper (Dissolved) | 1.1 U | 25 U |
| Iron (Dissolved) | 14 U | 100 U |
| Lead (Dissolved) | 1.6 U | 3 U |
| Magnesium (Dissolved) | 30900 | 27100 |
| Manganese (Dissolved) | 120 | 15 U |
| Mercury (Dissolved) | 0.2 U | 0.2 U |
| Nickel (Dissolved) | 1.3 U | 40 U |
| Potassium (Dissolved) | 16 U | 5000 U |
| Silver (Dissolved) | 10 U | 10 U |
| Sodium (Dissolved) | 8600 | 6300 |
| Vanadium (Dissolved) | 0.5 U | 50 U |
| Zinc (Dissolved) | 20 U | 20 U |

| MW-3 | 8/23/00 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|
| Aluminum (Dissolved) | 200 U | 200 U |
| Antimony (Dissolved) | 60 U | 60 U |
| Arsenic (Dissolved) | 10 U | 10 U |
| Barium (Dissolved) | 200 U | 200 U |
| Calcium (Dissolved) | 90100 | 87100 |
| Chromium Total (Dissolved) | 10 U | 10 U |
| Cobalt (Dissolved) | 50 U | 50 U |
| Copper (Dissolved) | 25 U | 25 U |
| Iron (Dissolved) | 100 U | 100 U |
| Lead (Dissolved) | 3 U | 3 U |
| Magnesium (Dissolved) | 32500 | 33100 |
| Manganese (Dissolved) | 180 | 37 |
| Mercury (Dissolved) | 0.2 U | 0.2 U |
| Nickel (Dissolved) | 40 U | 40 U |
| Potassium (Dissolved) | 5000 U | 5000 U |
| Silver (Dissolved) | 10 U | 10 U |
| Sodium (Dissolved) | 9900 | 14400 |
| Vanadium (Dissolved) | 50 U | 50 U |
| Zinc (Dissolved) | 20 U | 26 |

| MW-2 | 8/22/00 ug/L GM | 6/18/02 ug/L GM |
|---|---|---|
| Aluminum (Dissolved) | 200 U | 200 U |
| Antimony (Dissolved) | 60 U | 60 U |
| Arsenic (Dissolved) | 10 U | 10 U |
| Barium (Dissolved) | 390 | 480 |
| Calcium (Dissolved) | 63100 | 56000 |
| Chromium Total (Dissolved) | 10 U | 10 U |
| Cobalt (Dissolved) | 50 U | 50 U |
| Copper (Dissolved) | 25 U | 25 U |
| Iron (Dissolved) | 1400 | 1100 |
| Lead (Dissolved) | 3 U | 3 U |
| Magnesium (Dissolved) | 30800 | 31200 |
| Manganese (Dissolved) | 17 | 15 U |
| Mercury (Dissolved) | 0.2 U | 0.2 U |
| Nickel (Dissolved) | 40 U | 40 U |
| Potassium (Dissolved) | 5000 U | 5000 U |
| Silver (Dissolved) | 10 U | 10 U |
| Sodium (Dissolved) | 14400 | 16100 |
| Vanadium (Dissolved) | 50 U | 50 U |
| Zinc (Dissolved) | 20 U | 20 U |

| MW-1 | 8/22/00 ug/L GM | 6/19/02 ug/L GM |
|---|---|---|
| Aluminum (Dissolved) | 200 U | 200 U |
| Antimony (Dissolved) | 60 U | 60 U |
| Arsenic (Dissolved) | 10 U | 10 U |
| Barium (Dissolved) | 270 | 410 |
| Calcium (Dissolved) | 56200 | 61300 |
| Chromium Total (Dissolved) | 10 U | 10 U |
| Cobalt (Dissolved) | 50 U | 50 U |
| Copper (Dissolved) | 25 U | 25 U |
| Iron (Dissolved) | 300 | 1200 |
| Lead (Dissolved) | 3 U | 3 U |
| Magnesium (Dissolved) | 35800 | 34000 |
| Manganese (Dissolved) | 170 | 68 |
| Mercury (Dissolved) | 0.2 U | 0.2 U |
| Nickel (Dissolved) | 40 U | 40 U |
| Potassium (Dissolved) | 5000 U | 5000 U |
| Silver (Dissolved) | 10 U | 10 U |
| Sodium (Dissolved) | 31100 | 21600 |
| Vanadium (Dissolved) | 50 U | 50 U |
| Zinc (Dissolved) | 20 U | 20 U |

LEGEND

LIMIT OF SITE
BH4-99 BOREHOLE LOCATION
MW-9 MONITORING WELL LOCATION

SAMPLE LOCATION — SAMPLE DATE — RESULT UNIT — SAMPLED BY — CONCENTRATION — PARAMETER

| Nº | Revision | Date | Initial |
|---|---|---|---|

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

| Status | Date | Initial |
|---|---|---|

# GARLAND ROAD LANDFILL SITE
# MIAMI COUNTY, OHIO

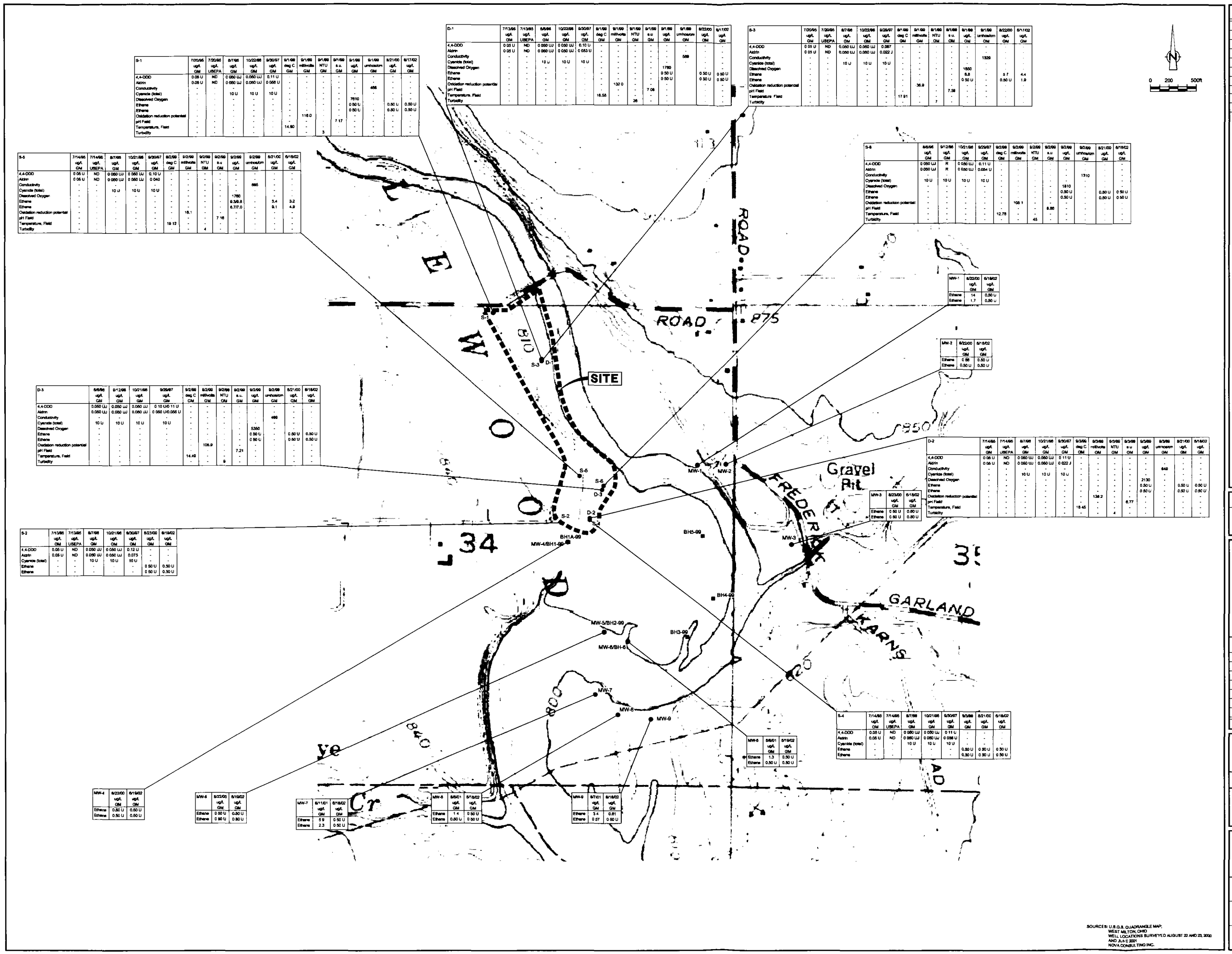
## GROUNDWATER DATA SUMMARY OF METALS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: IKR | Reviewed By: MRT | Date: MAY 2006 | |
|---|---|---|---|
| Scale: 1"=500' | Project Nº: 07043-90 | Report Nº: 014 | Drawing Nº: figure F.3 |

07043-90(014)GN-WA004 MAY 30/2006




| S-1 | 7/05/95 ug/L GM | 7/20/95 ug/L USEPA | 8/7/96 ug/L GM | 10/22/96 ug/L GM | 9/30/97 ug/L GM | 9/1/99 deg C GM | 9/1/99 millivolts GM | 9/1/99 NTU GM | 9/1/99 s.u. GM | 9/1/99 ug/L GM | 9/1/99 umhos/cm GM | 8/21/00 ug/L GM | 5/17/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,4-DDD | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.050 UJ | - | - | - | - | - | - | - | - |
| Aldrin | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.053 UJ | - | - | - | - | - | - | - | - |
| Conductivity | - | - | - | - | - | - | - | - | - | - | 466 | - | - |
| Cyanide (total) | - | - | 10 U | 10 U | 10 U | - | - | - | - | - | - | - | - |
| Dissolved Oxygen | - | - | - | - | - | - | - | 7610 | - | - | - | - | - |
| Ethene | - | - | - | - | - | - | - | 0.50 U | - | 0.50 U | 0.50 U | - | - |
| Ethane | - | - | - | - | - | - | - | 0.50 U | - | 0.50 U | 0.50 U | - | - |
| Oxidation reduction potential | - | - | - | - | - | - | 118.0 | - | - | - | - | - | - |
| pH Field | - | - | - | - | - | - | 7.17 | - | - | - | - | - | - |
| Temperature, Field | - | - | - | - | - | 14.90 | - | - | - | - | - | - | - |
| Turbidity | - | - | - | - | - | 3 | - | - | - | - | - | - | - |

| D-1 | 7/13/95 ug/L GM | 7/13/95 ug/L USEPA | 8/8/96 ug/L GM | 10/22/96 ug/L GM | 9/30/97 ug/L GM | 9/1/99 deg C GM | 9/1/99 millivolts GM | 9/1/99 NTU GM | 9/1/99 s.u. GM | 9/1/99 ug/L GM | 9/1/99 umhos/cm GM | 8/22/00 ug/L GM | 5/17/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,4-DDD | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.10 U | - | - | - | - | - | - | - | - |
| Aldrin | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.053 U | - | - | - | - | - | - | - | - |
| Conductivity | - | - | - | - | - | - | - | - | - | - | 589 | - | - |
| Cyanide (total) | - | - | 10 U | 10 U | 10 U | - | - | - | - | - | - | - | - |
| Dissolved Oxygen | - | - | - | - | - | - | - | - | - | 1780 | - | - | - |
| Ethene | - | - | - | - | - | - | - | - | - | 0.50 U | - | 0.50 U | 0.50 U |
| Ethane | - | - | - | - | - | - | - | - | - | 0.50 U | - | 0.50 U | 0.50 U |
| Oxidation reduction potential | - | - | - | - | - | - | 132.0 | - | - | - | - | - | - |
| pH Field | - | - | - | - | - | - | - | - | 7.08 | - | - | - | - |
| Temperature, Field | - | - | - | - | - | 16.56 | - | - | - | - | - | - | - |
| Turbidity | - | - | - | - | - | - | - | 26 | - | - | - | - | - |

| S-3 | 7/20/95 ug/L GM | 7/20/95 ug/L USEPA | 8/7/96 ug/L GM | 10/22/96 ug/L GM | 9/29/97 ug/L GM | 9/1/99 deg C GM | 9/1/99 millivolts GM | 9/1/99 NTU GM | 9/1/99 s.u. GM | 9/1/99 ug/L GM | 9/1/99 umhos/cm GM | 8/22/00 ug/L GM | 5/17/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,4-DDD | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.067 | - | - | - | - | - | - | - | - |
| Aldrin | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.022 J | - | - | - | - | - | - | - | - |
| Conductivity | - | - | - | - | - | - | - | - | - | - | 1329 | - | - |
| Cyanide (total) | - | - | 10 U | 10 U | 10 U | - | - | - | - | - | - | - | - |
| Dissolved Oxygen | - | - | - | - | - | - | - | - | - | 1550 | - | - | - |
| Ethene | - | - | - | - | - | - | - | - | - | 8.8 | - | 5.7 | 4.4 |
| Ethane | - | - | - | - | - | - | - | - | - | 0.50 U | - | 0.50 U | 1.9 |
| Oxidation reduction potential | - | - | - | - | - | - | 36.9 | - | - | - | - | - | - |
| pH Field | - | - | - | - | - | - | - | - | 7.58 | - | - | - | - |
| Temperature, Field | - | - | - | - | - | 17.91 | - | - | - | - | - | - | - |
| Turbidity | - | - | - | - | - | - | - | 7 | - | - | - | - | - |

| S-5 | 7/14/95 ug/L GM | 7/14/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM | 8/2/99 deg C GM | 9/2/99 millivolts GM | 9/2/99 NTU GM | 9/2/99 s.u. GM | 9/2/99 ug/L GM | 9/2/99 umhos/cm GM | 8/21/00 ug/L GM | 5/15/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,4-DDD | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.10 U | - | - | - | - | - | - | - | - |
| Aldrin | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.040 | - | - | - | - | - | - | - | - |
| Conductivity | - | - | - | - | - | - | - | - | - | - | 885 | - | - |
| Cyanide (total) | - | - | 10 U | 10 U | 10 U | - | - | - | - | - | - | - | - |
| Dissolved Oxygen | - | - | - | - | - | - | - | - | - | 1780 | - | - | - |
| Ethene | - | - | - | - | - | - | - | - | - | 6,345.8 | - | 3.4 | 3.2 |
| Ethane | - | - | - | - | - | - | - | - | - | 6,777.0 | - | 9.1 | 4.9 |
| Oxidation reduction potential | - | - | - | - | - | - | 18.1 | - | - | - | - | - | - |
| pH Field | - | - | - | - | - | - | - | - | 7.16 | - | - | - | - |
| Temperature, Field | - | - | - | - | - | 19.12 | - | - | - | - | - | - | - |
| Turbidity | - | - | - | - | - | - | - | 4 | - | - | - | - | - |

| S-6 | 8/8/96 ug/L GM | 9/12/96 ug/L GM | 10/21/96 ug/L GM | 9/29/97 ug/L GM | 9/2/99 deg C GM | 9/2/99 millivolts GM | 9/2/99 NTU GM | 9/2/99 s.u. GM | 9/2/99 ug/L GM | 9/2/99 umhos/cm GM | 8/21/00 ug/L GM | 5/15/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,4-DDD | 0.050 UJ | R | 0.050 UJ | 0.11 U | - | - | - | - | - | - | - | - |
| Aldrin | 0.050 UJ | R | 0.050 UJ | 0.054 U | - | - | - | - | - | - | - | - |
| Conductivity | - | - | - | - | - | - | - | - | - | 1310 | - | - |
| Cyanide (total) | 10 U | 10 U | 10 U | 10 U | - | - | - | - | - | - | - | - |
| Dissolved Oxygen | - | - | - | - | - | - | - | - | 1810 | - | - | - |
| Ethene | - | - | - | - | - | - | - | - | 0.50 U | - | 0.50 U | 0.50 U |
| Ethane | - | - | - | - | - | - | - | - | 0.50 U | - | 0.50 U | 0.50 U |
| Oxidation reduction potential | - | - | - | - | - | - | 105.1 | - | - | - | - | - |
| pH Field | - | - | - | - | - | - | - | - | 6.86 | - | - | - |
| Temperature, Field | - | - | - | - | - | 12.78 | - | - | - | - | - | - |
| Turbidity | - | - | - | - | - | - | - | 45 | - | - | - | - |

| MW-1 | 8/23/00 ug/L GM | 5/18/02 ug/L GM |
|---|---|---|
| Ethene | 14 | 0.50 U |
| Ethane | 1.7 | 0.50 U |

| MW-2 | 8/22/00 ug/L GM | 5/15/02 ug/L GM |
|---|---|---|
| Ethene | 0.88 | 0.50 U |
| Ethane | 0.50 U | 0.50 U |

| D-3 | 8/8/96 ug/L GM | 9/12/96 ug/L GM | 10/21/96 ug/L GM | 9/29/97 ug/L GM | 9/2/99 deg C GM | 9/2/99 millivolts GM | 9/2/99 NTU GM | 9/2/99 s.u. GM | 9/2/99 ug/L GM | 9/2/99 umhos/cm GM | 8/21/00 ug/L GM | 5/18/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,4-DDD | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U/0.11 U | - | - | - | - | - | - | - | - |
| Aldrin | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 U/0.055 U | - | - | - | - | - | - | - | - |
| Conductivity | - | - | - | - | - | - | - | - | - | 490 | - | - |
| Cyanide (total) | 10 U | 10 U | 10 U | 10 U | - | - | - | - | - | - | - | - |
| Dissolved Oxygen | - | - | - | - | - | - | - | - | 5360 | - | - | - |
| Ethene | - | - | - | - | - | - | - | - | 0.50 U | - | 0.50 U | 0.50 U |
| Ethane | - | - | - | - | - | - | - | - | 0.50 U | - | 0.50 U | 0.50 U |
| Oxidation reduction potential | - | - | - | - | - | - | 105.9 | - | - | - | - | - |
| pH Field | - | - | - | - | - | - | - | 7.21 | - | - | - | - |
| Temperature, Field | - | - | - | - | - | 14.40 | - | - | - | - | - | - |
| Turbidity | - | - | - | - | - | - | - | 9 | - | - | - | - |

| D-2 | 7/14/95 ug/L GM | 7/14/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM | 9/3/99 deg C GM | 9/3/99 millivolts GM | 9/3/99 NTU GM | 9/3/99 s.u. GM | 9/3/99 ug/L GM | 9/3/99 umhos/cm GM | 8/21/00 ug/L GM | 5/18/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,4-DDD | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | - | - | - | - |
| Aldrin | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.022 J | - | - | - | - | - | - | - | - |
| Conductivity | - | - | 10 U | 10 U | 10 U | - | - | - | - | 648 | - | - | - |
| Cyanide (total) | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Dissolved Oxygen | - | - | - | - | - | - | - | - | 2130 | - | - | - | - |
| Ethene | - | - | - | - | - | - | - | - | 0.50 U | - | 0.50 U | 0.50 U | 0.50 U |
| Ethane | - | - | - | - | - | - | - | - | 0.50 U | - | 0.50 U | 0.50 U | 0.50 U |
| Oxidation reduction potential | - | - | - | - | - | - | 138.2 | - | - | - | - | - | - |
| pH Field | - | - | - | - | - | - | - | 6.77 | - | - | - | - | - |
| Temperature, Field | - | - | - | - | - | 18.45 | - | - | - | - | - | - | - |
| Turbidity | - | - | - | - | - | - | - | 4 | - | - | - | - | - |

| MW-3 | 8/23/00 ug/L GM | 5/18/02 ug/L GM |
|---|---|---|
| Ethene | 0.50 U | 0.50 U |
| Ethane | 0.50 U | 0.50 U |

| S-2 | 7/13/95 ug/L GM | 7/13/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM | 8/23/00 ug/L GM | 5/18/02 ug/L GM |
|---|---|---|---|---|---|---|---|
| 4,4-DDD | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.12 U | - | - |
| Aldrin | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.075 | - | - |
| Cyanide (total) | - | - | 10 U | 10 U | 10 U | - | - |
| Ethene | - | - | - | - | - | 0.50 U | 0.50 U |
| Ethane | - | - | - | - | - | 0.50 U | 0.50 U |

| S-4 | 7/14/95 ug/L GM | 7/14/95 ug/L USEPA | 8/7/96 ug/L GM | 10/21/96 ug/L GM | 9/30/97 ug/L GM | 9/3/99 ug/L GM | 8/21/00 ug/L GM | 5/18/02 ug/L GM |
|---|---|---|---|---|---|---|---|---|
| 4,4-DDD | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - |
| Aldrin | 0.05 U | ND | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - |
| Cyanide (total) | - | - | 10 U | 10 U | 10 U | - | - | - |
| Ethene | - | - | - | - | - | 0.50 U | 0.50 U | 0.50 U |
| Ethane | - | - | - | - | - | 0.50 U | 0.50 U | 0.50 U |

| MW-4 | 8/22/00 ug/L GM | 5/18/02 ug/L GM |
|---|---|---|
| Ethene | 0.50 U | 0.50 U |
| Ethane | 0.50 U | 0.50 U |

| MW-5 | 8/23/00 ug/L GM | 5/18/02 ug/L GM |
|---|---|---|
| Ethene | 0.50 U | 0.50 U |
| Ethane | 0.50 U | 0.50 U |

| MW-6 | 8/8/01 ug/L GM | 5/19/02 ug/L GM |
|---|---|---|
| Ethene | 1.3 | 0.50 U |
| Ethane | 0.50 U | 0.50 U |

| MW-7 | 8/11/01 ug/L GM | 5/18/02 ug/L GM |
|---|---|---|
| Ethene | 5.9 | 0.50 U |
| Ethane | 2.3 | 0.50 U |

| MW-8 | 8/8/01 ug/L GM | 5/18/02 ug/L GM |
|---|---|---|
| Ethene | 1.4 | 0.50 U |
| Ethane | 0.50 U | 0.50 U |

| MW-9 | 8/7/01 ug/L GM | 5/18/02 ug/L GM |
|---|---|---|
| Ethene | 3.4 | 0.81 |
| Ethane | 0.57 | 0.50 U |

SOURCES: U.S.G.S. QUADRANGLE MAP, WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2002 AND JULY 2001
NOVA CONSULTING INC.

| Nº | Revision | Date | Initial |
|---|---|---|---|
| | | | |

LEGEND

- LIMIT OF SITE
- BH4-99 BOREHOLE LOCATION
- MW-9 MONITORING WELL LOCATION

| MW-1 | 8/22/00 ug/L GM | 5/18/02 ug/L GM |
|---|---|---|
| Ethene | 14 | 0.50 U |
| Ethane | 1.7 | 0.50 U |

- SAMPLE LOCATION
- SAMPLE DATE
- RESULT UNIT
- SAMPLED BY
- CONCENTRATION
- PARAMETER

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY

Approved

DRAWING STATUS

| Status | Date | Initial |
|---|---|---|
| | | |

GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

GROUNDWATER DATA SUMMARY OF OTHER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: | Reviewed By: | Date: | |
|---|---|---|---|
| IKR | MRT | MAY 2006 | |
| Scale: 1"=500' | Project Nº: 07043-90 | Report Nº: 014 | Drawing Nº: figure F.4 |

07043-90(014)GN-WA005 MAY 30/2006

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *BH1A-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH3-99* |
|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-083199-TJ-002* | *GW-7043-090199-TJ-005* | *GW-7043-090199-TJ-006* | *GW-7043-090199-TJ-007* | *GW-7043-090199-TJ-008* | *GW-7043-090299-TJ-009* | *GW-7043-090299-TJ-010* | *GW-7043-090799-TJ-011* |
| *Sample Date:* | | *8/31/1999* | *9/1/1999* | *9/1/1999* | *9/1/1999* | *9/1/1999* | *9/2/1999* | *9/2/1999* | *9/7/1999* |
| | | | | | | | | *(Duplicate)* | |
| *Parameters* | *Units* | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| 1,1,2-Trichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| 1,1-Dichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| 1,1-Dichloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| 1,2-Dichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| 1,2-Dichloroethene (total) | ug/L | 1.0 U | 23 | 41 | 31 | 48 | 42 | 41 | 1.0 U |
| 1,2-Dichloropropane | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 10 U | 10 U | 10 U | 20 U | 12 U | 17 U | 17 U | 10 U |
| 2-Hexanone | ug/L | 10 U | 10 U | 10 U | 20 U | 12 U | 17 U | 17 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 10 U | 10 U | 10 U | 20 U | 12 U | 17 U | 17 U | 10 U |
| Acetone | ug/L | 10 U | 10 U | 10 U | 20 U | 12 U | 17 U | 17 U | 10 U |
| Benzene | ug/L | 1.4 J | 0.50 J | 0.52 J | 0.44 J | 0.66 J | 0.35 J | 0.34 J | 0.47 J |
| Bromodichloromethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| Bromoform | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| Bromomethane (Methyl Bromide) | ug/L | 2.0 U | 2.0 U | 2.0 U | 4.0 U | 2.5 U | 3.3 U | 3.3 U | 2.0 U |
| Carbon disulfide | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| Carbon tetrachloride | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| Chlorobenzene | ug/L | 1.0 UJ | 1.0 UJ | 1.0 UJ | 2.0 UJ | 1.2 UJ | 1.7 UJ | 1.7 U | 1.0 U |
| Chloroethane | ug/L | 2.0 U | 2.0 U | 2.0 U | 4.0 U | 2.5 U | 3.3 U | 3.3 U | 2.0 U |
| Chloroform (Trichloromethane) | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| Chloromethane (Methyl Chloride) | ug/L | 2.0 U | 2.0 U | 2.0 U | 4.0 U | 2.5 U | 3.3 U | 3.3 U | 2.0 U |
| cis-1,2-Dichloroethene | ug/L | - | - | - | - | - | - | - | - |
| cis-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| Dibromochloromethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| Ethylbenzene | ug/L | 0.53 J | 1.0 UJ | 1.0 UJ | 2.0 UJ | 1.2 UJ | 1.7 UJ | 1.7 U | 0.15 J |
| Methylene chloride | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| Styrene | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| Tetrachloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| Toluene | ug/L | 2.1 UJ | 1.0 UJ | 1.0 U | 1.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| trans-1,2-Dichloroethene | ug/L | - | - | - | - | - | - | - | - |
| trans-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 1.0 U | 2.0 U | 1.2 U | 1.7 U | 1.7 U | 1.0 U |
| Trichloroethene | ug/L | 1.0 U | 15 | 22 | 15 | 23 | 18 | 17 | 1.0 U |
| Vinyl chloride | ug/L | 2.0 U | 2.0 U | 2.0 U | 4.0 U | 2.5 U | 3.3 U | 3.3 U | 2.0 U |
| Xylene (total) | ug/L | 0.94 J | 1.0 UJ | 1.0 UJ | 2.0 UJ | 1.2 UJ | 1.7 UJ | 1.7 U | 1.0 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | ug/L | - | - | - | - | - | - | - | - |
| 1,3-Dichlorobenzene | ug/L | - | - | - | - | - | - | - | - |
| 1,4-Dichlorobenzene | ug/L | - | - | - | - | - | - | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/L | - | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/L | - | - | - | - | - | - | - | - |
| 2,4-Dichlorophenol | ug/L | - | - | - | - | - | - | - | - |
| 2,4-Dimethylphenol | ug/L | - | - | - | - | - | - | - | - |
| 2,4-Dinitrophenol | ug/L | - | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/L | - | - | - | - | - | - | - | - |
| 2,6-Dinitrotoluene | ug/L | - | - | - | - | - | - | - | - |
| 2-Chloronaphthalene | ug/L | - | - | - | - | - | - | - | - |
| 2-Chlorophenol | ug/L | - | - | - | - | - | - | - | - |
| 2-Methylnaphthalene | ug/L | - | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/L | - | - | - | - | - | - | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *BH1A-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH3-99* |
|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-083199-TJ-002* | *GW-7043-090199-TJ-005* | *GW-7043-090199-TJ-006* | *GW-7043-090199-TJ-007* | *GW-7043-090199-TJ-008* | *GW-7043-090299-TJ-009* | *GW-7043-090299-TJ-010* | *GW-7043-090799-TJ-011* |
| *Sample Date:* | | *8/31/1999* | *9/1/1999* | *9/1/1999* | *9/1/1999* | *9/1/1999* | *9/2/1999* | *9/2/1999* | *9/7/1999* |
| | | | | | | | | *(Duplicate)* | |
| *Parameters* | *Units* | | | | | | | | |
| 2-Nitroaniline | ug/L | - | - | - | - | - | - | - | - |
| 2-Nitrophenol | ug/L | - | - | - | - | - | - | - | - |
| 3,3'-Dichlorobenzidine | ug/L | - | - | - | - | - | - | - | - |
| 3-Nitroaniline | ug/L | - | - | - | - | - | - | - | - |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | - | - | - | - | - | - |
| 4-Bromophenyl phenyl ether | ug/L | - | - | - | - | - | - | - | - |
| 4-Chloro-3-methylphenol | ug/L | - | - | - | - | - | - | - | - |
| 4-Chloroaniline | ug/L | - | - | - | - | - | - | - | - |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | - | - | - | - | - | - |
| 4-Methylphenol | ug/L | - | - | - | - | - | - | - | - |
| 4-Nitroaniline | ug/L | - | - | - | - | - | - | - | - |
| 4-Nitrophenol | ug/L | - | - | - | - | - | - | - | - |
| Acenaphthene | ug/L | - | - | - | - | - | - | - | - |
| Acenaphthylene | ug/L | - | - | - | - | - | - | - | - |
| Anthracene | ug/L | - | - | - | - | - | - | - | - |
| Benzo(a)anthracene | ug/L | - | - | - | - | - | - | - | - |
| Benzo(a)pyrene | ug/L | - | - | - | - | - | - | - | - |
| Benzo(b)fluoranthene | ug/L | - | - | - | - | - | - | - | - |
| Benzo(g,h,i)perylene | ug/L | - | - | - | - | - | - | - | - |
| Benzo(k)fluoranthene | ug/L | - | - | - | - | - | - | - | - |
| Benzoic acid | ug/L | - | - | - | - | - | - | - | - |
| Benzyl Alcohol | ug/L | - | - | - | - | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | - | - | - | - | - | - |
| bis(2-Chloroethyl)ether | ug/L | - | - | - | - | - | - | - | - |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | - | - | - | - | - | - |
| Butyl benzylphthalate | ug/L | - | - | - | - | - | - | - | - |
| Carbazole | ug/L | - | - | | - | - | - | - | - |
| Chrysene | ug/L | - | - | - | - | - | - | - | - |
| Dibenz(a,h)anthracene | ug/L | - | - | - | - | - | - | - | - |
| Dibenzofuran | ug/L | - | - | - | - | - | - | - | - |
| Diethyl phthalate | ug/L | - | - | - | - | - | - | - | - |
| Dimethyl phthalate | ug/L | - | - | - | - | - | - | - | - |
| Di-n-butylphthalate | ug/L | - | - | - | - | - | - | - | - |
| Di-n-octyl phthalate | ug/L | - | - | - | - | - | - | - | - |
| Fluoranthene | ug/L | - | - | - | - | - | - | - | - |
| Fluorene | ug/L | - | - | | - | - | - | - | - |
| Hexachlorobenzene | ug/L | - | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/L | - | - | - | - | - | - | - | - |
| Hexachlorocyclopentadiene | ug/L | - | - | | - | - | - | - | - |
| Hexachloroethane | ug/L | - | - | - | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | - | - | - | - | - | - |
| Isophorone | ug/L | - | - | - | - | - | - | - | - |
| Naphthalene | ug/L | - | - | - | - | - | - | - | - |
| Nitrobenzene | ug/L | - | - | - | - | - | - | - | - |
| N-Nitrosodi-n-propylamine | ug/L | - | - | - | - | - | - | - | - |
| N-Nitrosodiphenylamine | ug/L | - | - | | - | - | - | - | - |
| Pentachlorophenol | ug/L | - | - | | - | - | - | - | - |
| Phenanthrene | ug/L | - | - | - | - | - | - | - | - |
| Phenol | ug/L | - | - | - | - | - | - | - | - |
| Pyrene | ug/L | - | - | - | - | - | - | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *BH1A-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH3-99* |
|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-083199-TJ-002* | *GW-7043-090199-TJ-005* | *GW-7043-090199-TJ-006* | *GW-7043-090199-TJ-007* | *GW-7043-090199-TJ-008* | *GW-7043-090299-TJ-009* | *GW-7043-090299-TJ-010* | *GW-7043-090799-TJ-011* |
| *Sample Date:* | | *8/31/1999* | *9/1/1999* | *9/1/1999* | *9/1/1999* | *9/1/1999* | *9/2/1999* | *9/2/1999* | *9/7/1999* |
| | | | | | | | | *(Duplicate)* | |
| *Parameters* | *Units* | | | | | | | | |
| *Metals* | | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 26.0 | 0.20 U | 80.9 | 88.0 | 81.0 | 3.0 | 11.2 | 77.3 |
| Antimony (Dissolved) | ug/L | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.013 | 0.010 U | 0.11 | 0.18 | 0.23 | 0.010 U | 0.018 | 0.12 |
| Barium (Dissolved) | ug/L | 0.21 | 0.20 U | 0.96 | 0.98 | 1.1 | 0.21 | 0.29 | 0.90 |
| Beryllium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 224 | 102 | 745 | 868 | 1150 | 129 | 191 | 929 |
| Chromium Total (Dissolved) | ug/L | 0.032 | 0.010 U | 0.14 | 0.17 | 0.19 | 0.010 U | 0.010 U | 0.010 U |
| Cobalt (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.064 | 0.068 | 0.081 | 0.050 U | 0.050 U | 0.057 |
| Copper (Dissolved) | ug/L | 0.026 | 0.025 U | 0.30 | 0.43 | 0.53 | 0.025 U | 0.051 | 0.24 |
| Iron | ug/L | - | - | - | - | - | - | - | - |
| Iron (Dissolved) | ug/L | 33.9 | 0.10 U | 175 | 226 | 275 | 10.5 | 32.5 | 191 |
| Lead (Dissolved) | ug/L | 0.016 | 0.0030 U | 0.13 | 0.19 | 0.24 | 0.0058 | 0.021 | 0.12 |
| Magnesium (Dissolved) | ug/L | 67.5 | 27.9 | 226 | 283 | 369 | 45.2 | 65.3 | 311 |
| Manganese (Dissolved) | ug/L | 0.84 | 0.12 | 2.8 | 3.5 | 4.7 | 0.81 | 1.1 | 4.7 |
| Mercury (Dissolved) | ug/L | 0.00020 U | 0.00020 U | 0.00029 | 0.00037 | 0.00040 | 0.00020 U | 0.00020 U | 0.00037 |
| Nickel (Dissolved) | ug/L | 0.040 U | 0.040 U | 0.20 | 0.20 | 0.24 | 0.040 U | 0.084 | 0.23 |
| Potassium (Dissolved) | ug/L | 15.7 | 5.0 U | 21.1 | 25.3 | 25.0 | 5.0 U | 6.4 | 22.7 |
| Selenium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0097 | 0.069 | 0.043 | 0.0050 U | 0.0072 | 0.0050 U |
| Silver (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 19.6 | 8.6 | 16.2 | 14.3 | 17.0 | 8.1 | 11.7 | 28.2 |
| Thallium (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Vanadium (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.18 | 0.22 | 0.22 | 0.050 U | 0.050 U | 0.18 |
| Zinc (Dissolved) | ug/L | 0.11 | 0.020 U | 0.89 | 1.0 | 1.3 | 0.054 U | 0.16 | 0.75 |
| *PCBs* | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | - | - | - | - | - | - |
| *Gas* | | | | | | | | | |
| Ethane | ug/L | 2.4 | 7.8 | 13 | 12 | 16 | 7.2 | 7.7 | 8.6 |
| Ethene | ug/L | 0.50 U | 0.62 | 1.7 | 1.7 | 1.7 | 0.72 | 0.76 | 0.52 |
| *Pesticides* | | | | | | | | | |
| 4,4'-DDD | ug/L | - | - | - | - | - | - | - | - |
| 4,4'-DDE | ug/L | - | - | - | - | - | - | - | - |
| 4,4'-DDT | ug/L | - | - | - | - | - | - | - | - |
| Aldrin | ug/L | - | - | - | - | - | - | - | - |
| alpha-BHC | ug/L | - | - | - | - | - | - | - | - |
| alpha-Chlordane | ug/L | - | - | - | - | - | - | - | - |
| beta-BHC | ug/L | - | - | - | - | - | - | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *BH1A-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH2-99* | *BH3-99* |
|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-083199-TJ-002* | *GW-7043-090199-TJ-005* | *GW-7043-090199-TJ-006* | *GW-7043-090199-TJ-007* | *GW-7043-090199-TJ-008* | *GW-7043-090299-TJ-009* | *GW-7043-090299-TJ-010* | *GW-7043-090799-TJ-011* |
| *Sample Date:* | | *8/31/1999* | *9/1/1999* | *9/1/1999* | *9/1/1999* | *9/1/1999* | *9/2/1999* | *9/2/1999* | *9/7/1999* |
| | | | | | | | | *(Duplicate)* | |
| *Parameters* | *Units* | | | | | | | | |
| delta-BHC | ug/L | - | - | - | - | - | - | - | - |
| Dieldrin | ug/L | - | - | - | - | - | - | - | - |
| Endosulfan I | ug/L | - | - | - | - | - | - | - | - |
| Endosulfan II | ug/L | - | - | - | - | - | - | - | - |
| Endosulfan sulfate | ug/L | - | - | - | - | - | - | - | - |
| Endrin | ug/L | - | - | - | - | - | - | - | - |
| Endrin aldehyde | ug/L | - | - | - | - | - | - | - | - |
| Endrin ketone | ug/L | - | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/L | - | - | - | - | - | - | - | - |
| gamma-Chlordane | ug/L | - | - | - | - | - | - | - | - |
| Heptachlor | ug/L | - | - | - | - | - | - | - | - |
| Heptachlor epoxide | ug/L | - | - | - | - | - | - | - | - |
| Methoxychlor | ug/L | - | - | - | - | - | - | - | - |
| Toxaphene | ug/L | - | - | - | - | - | - | - | - |
| *General Chemistry* | | | | | | | | | |
| Cyanide (total) | ug/L | - | - | - | - | - | - | - | - |
| *Field Parameters* | | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | - | - | - | - | - |
| Dissolved Oxygen | ug/L | - | - | - | - | - | - | - | - |
| Oxidation reduction potential | millivolts | - | - | - | - | - | - | - | - |
| pH Field | s.u. | - | - | - | - | - | - | - | - |
| Temperature, Field | deg C | - | - | - | - | - | - | - | - |
| Turbidity | NTU | - | - | - | - | - | - | - | - |

*Notes:*
U - Not detected at or above associated value.
J - Estimated concentration.
UJ - Estimated reporting detection limit
R - Rejected.

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *BH3-99* | *BH3-99* | *BH4-99* | *BH4-99* | *BH4-99* | *BH5-99* | *BH5-99* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-090799-TJ-012* | *GW-7043-090799-TJ-013* | *GW-7043-090799-TJ-014* | *GW-7043-090799-TJ-015* | *GW-7043-090799-TJ-017* | *GW-7043-090999-BBT-018* | *GW-7043-090999-BBT-019* |
| *Sample Date:* | | *9/7/1999* | *9/7/1999* | *9/7/1999* | *9/7/1999* | *9/7/1999* | *9/9/1999* | *9/9/1999* |
| *Parameters* | *Units* | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1,2-Trichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethene (total) | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloropropane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Hexanone | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Acetone | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Benzene | ug/L | 1.0 J | 0.37 J | 0.35 J | 0.61 J | 0.76 J | 0.25 J | 1.0 U |
| Bromodichloromethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromoform | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromomethane (Methyl Bromide) | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Carbon disulfide | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Carbon tetrachloride | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chlorobenzene | ug/L | 1.0 UJ | 1.0 UJ | 1.0 UJ | 1.0 U | 1.0 U | 1.0 UJ | 1.0 U |
| Chloroethane | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Chloroform (Trichloromethane) | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chloromethane (Methyl Chloride) | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | ug/L | - | - | - | - | - | - | - |
| cis-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Dibromochloromethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Ethylbenzene | ug/L | 0.33 J | 1.0 UJ | 1.0 UJ | 1.0 U | 1.0 U | 1.0 UJ | 1.0 U |
| Methylene chloride | ug/L | 1.0 U | 1.0 U | 2.8 U | 3.5 U | 3.8 U | 6.6 U | 5.6 U |
| Styrene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Tetrachloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Toluene | ug/L | 1.9 UJ | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| trans-1,2-Dichloroethene | ug/L | - | - | - | - | - | - | - |
| trans-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Trichloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Vinyl chloride | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Xylene (total) | ug/L | 0.66 J | 1.0 UJ | 1.0 UJ | 1.0 U | 1.0 U | 1.0 UJ | 1.0 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,3-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,4-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dimethylphenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dinitrophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/L | - | - | - | - | - | - | - |
| 2,6-Dinitrotoluene | ug/L | - | - | - | - | - | - | - |
| 2-Chloronaphthalene | ug/L | - | - | - | - | - | - | - |
| 2-Chlorophenol | ug/L | - | - | - | - | - | - | - |
| 2-Methylnaphthalene | ug/L | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/L | - | - | - | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *BH3-99* | *BH3-99* | *BH4-99* | *BH4-99* | *BH4-99* | *BH5-99* | *BH5-99* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-090799-TJ-012* | *GW-7043-090799-TJ-013* | *GW-7043-090799-TJ-014* | *GW-7043-090799-TJ-015* | *GW-7043-090799-TJ-017* | *GW-7043-090899-BBT-018* | *GW-7043-090999-BBT-019* |
| *Sample Date:* | | *9/7/1999* | *9/7/1999* | *9/7/1999* | *9/7/1999* | *9/7/1999* | *9/8/1999* | *9/9/1999* |
| *Parameters* | *Units* | | | | | | | |
| 2-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 2-Nitrophenol | ug/L | - | - | - | - | - | - | - |
| 3,3'-Dichlorobenzidine | ug/L | - | - | - | - | - | - | - |
| 3-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Bromophenyl phenyl ether | ug/L | - | - | - | - | - | - | - |
| 4-Chloro-3-methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Chloroaniline | ug/L | - | - | - | - | - | - | - |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | - | - | - | - | - |
| 4-Methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 4-Nitrophenol | ug/L | - | - | - | - | - | - | - |
| Acenaphthene | ug/L | - | - | - | - | - | - | - |
| Acenaphthylene | ug/L | - | - | - | - | - | - | - |
| Anthracene | ug/L | - | - | - | - | - | - | - |
| Benzo(a)anthracene | ug/L | - | - | - | - | - | - | - |
| Benzo(a)pyrene | ug/L | - | - | - | - | - | - | - |
| Benzo(b)fluoranthene | ug/L | - | - | - | - | - | - | - |
| Benzo(g,h,i)perylene | ug/L | - | - | - | - | - | - | - |
| Benzo(k)fluoranthene | ug/L | - | - | - | - | - | - | - |
| Benzoic acid | ug/L | - | - | - | - | - | - | - |
| Benzyl Alcohol | ug/L | - | - | - | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | - | - | - | - | - |
| bis(2-Chloroethyl)ether | ug/L | - | - | - | - | - | - | - |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | - | - | - | - | - |
| Butyl benzylphthalate | ug/L | - | - | - | - | - | - | - |
| Carbazole | ug/L | - | - | - | - | - | - | - |
| Chrysene | ug/L | - | - | - | - | - | - | - |
| Dibenz(a,h)anthracene | ug/L | - | - | - | - | - | - | - |
| Dibenzofuran | ug/L | - | - | - | - | - | - | - |
| Diethyl phthalate | ug/L | - | - | - | - | - | - | - |
| Dimethyl phthalate | ug/L | - | - | - | - | - | - | - |
| Di-n-butylphthalate | ug/L | - | - | - | - | - | - | - |
| Di-n-octyl phthalate | ug/L | - | - | - | - | - | - | - |
| Fluoranthene | ug/L | - | - | - | - | - | - | - |
| Fluorene | ug/L | - | - | - | - | - | - | - |
| Hexachlorobenzene | ug/L | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/L | - | - | - | - | - | - | - |
| Hexachlorocyclopentadiene | ug/L | - | - | - | - | - | - | - |
| Hexachloroethane | ug/L | - | - | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | - | - | - | - | - |
| Isophorone | ug/L | - | - | - | - | - | - | - |
| Naphthalene | ug/L | - | - | - | - | - | - | - |
| Nitrobenzene | ug/L | - | - | - | - | - | - | - |
| N-Nitrosodi-n-propylamine | ug/L | - | - | - | - | - | - | - |
| N-Nitrosodiphenylamine | ug/L | - | - | - | - | - | - | - |
| Pentachlorophenol | ug/L | - | - | - | - | - | - | - |
| Phenanthrene | ug/L | - | - | - | - | - | - | - |
| Phenol | ug/L | - | - | - | - | - | - | - |
| Pyrene | ug/L | - | - | - | - | - | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *BH3-99* | *BH3-99* | *BH4-99* | *BH4-99* | *BH4-99* | *BH5-99* | *BH5-99* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-090799-TJ-012* | *GW-7043-090799-TJ-013* | *GW-7043-090799-TJ-014* | *GW-7043-090799-TJ-015* | *GW-7043-090799-TJ-017* | *GW-7043-090999-BBT-018* | *GW-7043-090999-BBT-019* |
| *Sample Date:* | | *9/7/1999* | *9/7/1999* | *9/7/1999* | *9/7/1999* | *9/7/1999* | *9/9/1999* | *9/9/1999* |
| *Parameters* | *Units* | | | | | | | |
| *Metals* | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 137 J | 1.4 | - | - | - | 1.6 J | 26.4 J |
| Antimony (Dissolved) | ug/L | 0.060 U | 0.060 U | - | - | - | 0.060 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.010 | 0.010 U | - | - | - | 0.010 U | 0.043 |
| Barium (Dissolved) | ug/L | 4.3 | 4.2 | - | - | - | 0.20 U | 0.50 |
| Beryllium (Dissolved) | ug/L | 0.0095 | 0.0050 U | - | - | - | 0.0050 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.015 | 0.0059 | - | - | - | 0.0050 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 8350 | 7610 | - | - | - | 143 | 258 |
| Chromium Total (Dissolved) | ug/L | 0.34 J | 0.010 U | - | - | - | 0.010 U | 0.043 |
| Cobalt (Dissolved) | ug/L | 0.21 J | 0.050 U | - | - | - | 0.050 U | 0.050 U |
| Copper (Dissolved) | ug/L | 1.3 J | 0.025 | - | - | - | 0.025 U | 0.093 |
| Iron | ug/L | - | - | - | - | - | - | - |
| Iron (Dissolved) | ug/L | 197 J | 1.0 | - | - | - | 4.8 | 57.2 |
| Lead (Dissolved) | ug/L | 0.61 J | 0.0030 U | - | - | - | 0.0030 U | 0.062 |
| Magnesium (Dissolved) | ug/L | 3250 | 2630 | - | - | - | 31.5 | 79.9 |
| Manganese (Dissolved) | ug/L | 17.0 J | 13.5 | - | - | - | 0.10 | 1.1 |
| Mercury (Dissolved) | ug/L | 0.0021 | 0.00096 | - | - | - | 0.00020 UJ | 0.00020 UJ |
| Nickel (Dissolved) | ug/L | 0.69 J | 0.040 U | - | - | - | 0.040 U | 0.071 |
| Potassium (Dissolved) | ug/L | 27.0 | 19.3 | - | - | - | 5.0 U | 5.0 U |
| Selenium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | - | - | - | 0.0050 U | 0.0064 |
| Silver (Dissolved) | ug/L | 0.010 U | 0.010 U | - | - | - | 0.010 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 39.2 J | 25.8 | - | - | - | 12.3 | 10.6 |
| Thallium (Dissolved) | ug/L | 0.010 U | 0.010 U | - | - | - | 0.010 U | 0.010 U |
| Vanadium (Dissolved) | ug/L | 0.050 U | 0.050 U | - | - | - | 0.050 U | 0.058 |
| Zinc (Dissolved) | ug/L | 2.4 J | 0.072 | - | - | - | 0.020 U | 0.28 |
| *PCBs* | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | - | - | - | - | - |
| *Gas* | | | | | | | | |
| Ethane | ug/L | 13 | 15 | 5.8 | 18 | 28 | 6.0 | 7.9 |
| Ethene | ug/L | 1.0 | 3.3 | 0.50 U | 3.0 | 4.6 | 0.50 U | 0.50 U |
| *Pesticides* | | | | | | | | |
| 4,4'-DDD | ug/L | - | - | - | - | - | - | - |
| 4,4'-DDE | ug/L | - | - | - | - | - | - | - |
| 4,4'-DDT | ug/L | - | - | - | - | - | - | - |
| Aldrin | ug/L | - | - | - | - | - | - | - |
| alpha-BHC | ug/L | - | - | - | - | - | - | - |
| alpha-Chlordane | ug/L | - | - | - | - | - | - | - |
| beta-BHC | ug/L | - | - | - | - | - | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *BH3-99* | *BH3-99* | *BH4-99* | *BH4-99* | *BH4-99* | *BH5-99* | *BH5-99* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-090799-TJ-012* | *GW-7043-090799-TJ-013* | *GW-7043-090799-TJ-014* | *GW-7043-090799-TJ-015* | *GW-7043-090799-TJ-017* | *GW-7043-090999-BBT-018* | *GW-7043-090999-BBT-019* |
| *Sample Date:* | | *9/7/1999* | *9/7/1999* | *9/7/1999* | *9/7/1999* | *9/7/1999* | *9/9/1999* | *9/9/1999* |
| *Parameters* | *Units* | | | | | | | |
| delta-BHC | ug/L | - | - | - | - | - | - | - |
| Dieldrin | ug/L | - | - | - | - | - | - | - |
| Endosulfan I | ug/L | - | - | - | - | - | - | - |
| Endosulfan II | ug/L | - | - | - | - | - | - | - |
| Endosulfan sulfate | ug/L | - | - | - | - | - | - | - |
| Endrin | ug/L | - | - | - | - | - | - | - |
| Endrin aldehyde | ug/L | - | - | - | - | - | - | - |
| Endrin ketone | ug/L | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/L | - | - | - | - | - | - | - |
| gamma-Chlordane | ug/L | - | - | - | - | - | - | - |
| Heptachlor | ug/L | - | - | - | - | - | - | - |
| Heptachlor epoxide | ug/L | - | - | - | - | - | - | - |
| Methoxychlor | ug/L | - | - | - | - | - | - | - |
| Toxaphene | ug/L | - | - | - | - | - | - | - |
| *General Chemistry* | | | | | | | | |
| Cyanide (total) | ug/L | - | - | - | - | - | - | - |
| *Field Parameters* | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | - | - | - | - |
| Dissolved Oxygen | ug/L | - | - | - | - | - | - | - |
| Oxidation reduction potential | millivolts | - | - | - | - | - | - | - |
| pH Field | s.u. | - | - | - | - | - | - | - |
| Temperature, Field | deg C | - | - | - | - | - | - | - |
| Turbidity | NTU | - | - | - | - | - | - | - |

*Notes:*
U - Not detected at or above associated value
J - Estimated concentration.
UJ - Estimated reporting detection limit.
R - Rejected.

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *BH5-99* | *BH6-00* | *BH6-00* | *BH6-00* | *BH6-00* | *D-1* | *D-1* | *D-1* | *D-1* | *D-1* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-090999-BBT-020* | *GW-7043-081700-CA-031* | *GW-7043-081700-CA-032* | *GW-7043-081700-CA-033* | *GW-7043-081700-CA-034* | *W-MT-028* | *W-DF-009* | *W-DF-010* | *006(EPA)* | *D193097(GM)* |
| *Sample Date:* | | *9/9/1999* | *8/17/2000* | *8/17/2000* | *8/17/2000* | *8/17/2000* | *8/8/1996* | *10/22/1996* | *10/22/1996* | *9/30/1997* | *9/30/1997* |
| | | | | | | | | *(Duplicate)* | | | *(Duplicate)* |
| *Parameters* | *Units* | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 1.0 U | 0.11 J | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| 1,1,2-Trichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| 1,1-Dichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| 1,1-Dichloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| 1,2-Dichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| 1,2-Dichloroethene (total) | ug/L | 1.0 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 780 | 840 | 660 | 850 | 500 |
| 1,2-Dichloropropane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 10 U | 10 U | 10 U | 1.3 J | 1.5 J | 250 U | 250 U | 330 U | 2 U | 33 U |
| 2-Hexanone | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 250 U | 250 U | 330 U | 2 U | 33 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 10 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 250 U | 250 U | 330 U | 2 U | 33 U |
| Acetone | ug/L | 11 U | 1.4 J | 3.2 J | 4.4 J | 4.8 J | 250 U | 250 U | 330 U | 2 U | 33 U |
| Benzene | ug/L | 0.20 J | 0.23 J | 0.43 J | 0.67 J | 0.74 J | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Bromodichloromethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Bromoform | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Bromomethane (Methyl Bromide) | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Carbon disulfide | ug/L | 1.0 U | 0.11 J | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 2 U | 33 U |
| Carbon tetrachloride | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Chlorobenzene | ug/L | 1.0 UJ | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Chloroethane | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 50 U | 50 U | 67 U | 0.5 U | 33 U |
| Chloroform (Trichloromethane) | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Chloromethane (Methyl Chloride) | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 50 U | 50 U | 67 U | 0.9 | 33 U |
| cis-1,2-Dichloroethene | ug/L | - | 0.50 U | 0.50 U | 0.50 U | 0.50 U | - | - | - | - | - |
| cis-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Dibromochloromethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Ethylbenzene | ug/L | 1.0 UJ | 1.0 U | 0.064 J | 0.090 J | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Methylene chloride | ug/L | 12 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Styrene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Tetrachloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Toluene | ug/L | 1.0 UJ | 0.40 J | 0.41 J | 0.70 J | 0.82 J | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| trans-1,2-Dichloroethene | ug/L | - | 0.50 U | 0.50 U | 0.50 U | 0.50 U | - | - | - | - | - |
| trans-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| Trichloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 200 | 220 | 160 | 240 | 140 |
| Vinyl chloride | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 50 U | 50 U | 67 U | 0.5 U | 33 U |
| Xylene (total) | ug/L | 1.0 UJ | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 25 U | 25 U | 33 U | 0.5 U | 33 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 1,2-Dichlorobenzene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 1,3-Dichlorobenzene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 1,4-Dichlorobenzene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 2,4,5-Trichlorophenol | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 50 U | - |
| 2,4,6-Trichlorophenol | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 2,4-Dichlorophenol | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 2,4-Dimethylphenol | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 2,4-Dinitrophenol | ug/L | - | - | - | - | - | 50 U | 50 U | 50 U | 50 U | - |
| 2,4-Dinitrotoluene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 2,6-Dinitrotoluene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 2-Chloronaphthalene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 2-Chlorophenol | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 2-Methylnaphthalene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 2-Methylphenol | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *BH5-99* | *BH6-00* | *BH6-00* | *BH6-00* | *BH6-00* | *D-1* | *D-1* | *D-1* | *D-1* | *D-1* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-090999-BBT-020* | *GW-7043-081700-CA-031* | *GW-7043-081700-CA-032* | *GW-7043-081700-CA-033* | *GW-7043-081700-CA-034* | *W-MT-028* | *W-DF-009* | *W-DF-010* | *005(EPA)* | *D193097(GM)* |
| *Sample Date:* | | *9/9/1999* | *8/17/2000* | *8/17/2000* | *8/17/2000* | *8/17/2000* | *8/8/1996* | *10/22/1996* | *10/22/1996* | *9/30/1997* | *9/30/1997* |
| | | | | | | | | *(Duplicate)* | | | *(Duplicate)* |
| *Parameters* | *Units* | | | | | | | | | | |
| 2-Nitroaniline | ug/L | - | - | - | - | - | 50 U | 50 U | 50 U | 50 U | - |
| 2-Nitrophenol | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 3,3'-Dichlorobenzidine | ug/L | - | - | - | - | - | 50 U | 50 U | 50 U | 20 U | - |
| 3-Nitroaniline | ug/L | - | - | - | - | - | 50 U | 50 U | 50 U | 50 U | - |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | - | - | - | 50 U | 50 U | 50 U | 50 U | - |
| 4-Bromophenyl phenyl ether | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 4-Chloro-3-methylphenol | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 20 U | - |
| 4-Chloroaniline | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 20 U | - |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 4-Methylphenol | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| 4-Nitroaniline | ug/L | - | - | - | - | - | 50 U | 50 U | 50 U | 50 U | - |
| 4-Nitrophenol | ug/L | - | - | - | - | - | 50 U | 50 U | 50 U | 50 U | - |
| Acenaphthene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Acenaphthylene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Anthracene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Benzo(a)anthracene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Benzo(a)pyrene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Benzo(b)fluoranthene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Benzo(g,h,i)perylene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Benzo(k)fluoranthene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Benzoic acid | ug/L | - | - | - | - | - | - | - | - | 50 U | - |
| Benzyl Alcohol | ug/L | - | - | - | - | - | - | - | - | 10 U | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| bis(2-Chloroethyl)ether | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | - | - | - | 10 U | 7.1 J | 4.9 J | 3 J | - |
| Butyl benzylphthalate | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Carbazole | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | - | - |
| Chrysene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Dibenz(a,h)anthracene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Dibenzofuran | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Diethyl phthalate | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Dimethyl phthalate | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Di-n-butylphthalate | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Di-n-octyl phthalate | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Fluoranthene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Fluorene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Hexachlorobenzene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Hexachlorobutadiene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Hexachlorocyclopentadiene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Hexachloroethane | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Isophorone | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Naphthalene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Nitrobenzene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| N-Nitrosodi-n-propylamine | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| N-Nitrosodiphenylamine | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Pentachlorophenol | ug/L | - | - | - | - | - | 50 U | 50 U | 50 U | 50 U | - |
| Phenanthrene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Phenol | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |
| Pyrene | ug/L | - | - | - | - | - | 10 U | 10 U | 10 U | 10 U | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *BH5-99* | *BH6-00* | *BH6-00* | *BH6-00* | *BH6-00* | *D-1* | *D-1* | *D-1* | *D-1* | *D-1* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-090999-BBT-020* | *GW-7043-081700-CA-031* | *GW-7043-081700-CA-032* | *GW-7043-081700-CA-033* | *GW-7043-081700-CA-034* | *W-MT-028* | *W-DF-009* | *W-DF-010* | *005(EPA)* | *D195097(GM)* |
| *Sample Date:* | | *9/9/1999* | *8/17/2000* | *8/17/2000* | *8/17/2000* | *8/17/2000* | *8/8/1996* | *10/22/1996* | *10/22/1996* | *9/30/1997* | *9/30/1997* |
| | | | | | | | | *(Duplicate)* | | | *(Duplicate)* |
| *Parameters* | *Units* | | | | | | | | | | |
| *Metals* | | | | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 127 J | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.042 | 0.0195 U |
| Antimony (Dissolved) | ug/L | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.0031 | 0.0029 U |
| Arsenic (Dissolved) | ug/L | 0.16 | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0020 U | 0.0059 U |
| Barium (Dissolved) | ug/L | 1.6 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.055 | 0.0606 B |
| Beryllium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.0001 U |
| Cadmium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.0003 U |
| Calcium (Dissolved) | ug/L | 1410 | 110 | 91.7 | 86.2 | 81.5 | 108 | 112 | 109 | 82.7 | 91.3 |
| Chromium Total (Dissolved) | ug/L | 0.27 | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0032 | 0.00092 B |
| Cobalt (Dissolved) | ug/L | 0.12 | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U | 0.0007 U |
| Copper (Dissolved) | ug/L | 0.34 | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.0013 U | 0.0015 B |
| Iron | ug/L | - | - | - | - | - | - | - | - | - | - |
| Iron (Dissolved) | ug/L | 282 | 0.10 U | 0.10 U | 0.10 U | 0.10 U | 0.10 U | 0.17 | 0.15 | 0.011 U | 0.0134 U |
| Lead (Dissolved) | ug/L | 0.21 | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0020 | 0.0019 U |
| Magnesium (Dissolved) | ug/L | 445 | 27.1 | 32.7 | 36.1 | 35.6 | 37.9 | 40.0 | 39.3 | 30.0 | 33.5 |
| Manganese (Dissolved) | ug/L | 5.4 | 0.078 | 0.16 | 0.19 | 0.21 | 0.023 | 0.082 | 0.069 | 0.0020 | 0.00051 B |
| Mercury (Dissolved) | ug/L | 0.00043 J | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00010 U | 0.00013 B |
| Nickel (Dissolved) | ug/L | 0.31 | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.00060 U | 0.0041 B |
| Potassium (Dissolved) | ug/L | 16.6 | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 1.2 | 0.991 BE |
| Selenium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0020 U | 0.0044 U |
| Silver (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.00070 U | 0.0008 U |
| Sodium (Dissolved) | ug/L | 18.2 | 12.7 | 15.0 | 15.1 | 14.0 | 7.6 | 8.3 | 8.3 | 5.9 | 7.47 |
| Thallium (Dissolved) | ug/L | 0.013 | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0019 U | 0.005 U |
| Vanadium (Dissolved) | ug/L | 0.27 | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U | 0.0007 U |
| Zinc (Dissolved) | ug/L | 1.1 | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.050 U | 0.050 U | 0.050 U | 0.0034 | 0.0049 BE |
| *PCBs* | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.53 U | - |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.53 U | - |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.53 U | - |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.53 U | - |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.53 U | - |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.53 U | - |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.53 U | - |
| *Gas* | | | | | | | | | | | |
| Ethane | ug/L | 14 | 3.5 | 18 | 22 | 24 | - | - | - | - | - |
| Ethene | ug/L | 3.3 | 0.50 U | 2.0 | 3.4 | 3.7 | - | - | - | - | - |
| *Pesticides* | | | | | | | | | | | |
| 4,4'-DDD | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | - |
| 4,4'-DDE | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | - |
| 4,4'-DDT | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | - |
| Aldrin | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.053 U | - |
| alpha-BHC | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.053 U | - |
| alpha-Chlordane | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.053 U | - |
| beta-BHC | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.053 U | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *BH5-99* | *BH6-00* | *BH6-00* | *BH6-00* | *BH6-00* | *D-1* | *D-1* | *D-1* | *D-1* | *D-1* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-090999-RBT-020* | *GW-7043-081700-CA-031* | *GW-7043-081700-CA-032* | *GW-7043-081700-CA-033* | *GW-7043-081700-CA-034* | *W-MT-028* | *W-DF-009* | *W-DF-010* | *006(EPA)* | *D193097(GM)* |
| Sample Date: | | *9/9/1999* | *8/17/2000* | *8/17/2000* | *8/17/2000* | *8/17/2000* | *8/8/1996* | *10/22/1996* | *10/22/1996* | *9/30/1997* | *9/30/1997* |
| | | | | | | | | *(Duplicate)* | | | *(Duplicate)* |
| *Parameters* | *Units* | | | | | | | | | | |
| delta-BHC | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.053 U | - |
| Dieldrin | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | - |
| Endosulfan I | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.053 U | - |
| Endosulfan II | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | - |
| Endosulfan sulfate | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | - |
| Endrin | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | - |
| Endrin aldehyde | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | - |
| Endrin ketone | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | - |
| gamma-BHC (Lindane) | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.053 U | - |
| gamma-Chlordane | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.053 U | - |
| Heptachlor | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.053 U | - |
| Heptachlor epoxide | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.053 U | - |
| Methoxychlor | ug/L | - | - | - | - | - | 0.25 UJ | 0.25 UJ | 0.25 UJ | 0.53 U | - |
| Toxaphene | ug/L | - | - | - | - | - | 2.0 UJ | 2.0 UJ | 2.0 UJ | 1.0 U | - |
| *General Chemistry* | | | | | | | | | | | |
| Cyanide (total) | ug/L | - | - | - | - | - | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| *Field Parameters* | | | | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | - | - | - | - | - | - | - |
| Dissolved Oxygen | ug/L | - | - | - | - | - | - | - | - | - | - |
| Oxidation reduction potential | millivolts | - | - | - | - | - | - | - | - | - | - |
| pH Field | s.u. | - | - | - | - | - | - | - | - | - | - |
| Temperature, Field | deg C | - | - | - | - | - | - | - | - | - | - |
| Turbidity | NTU | - | - | - | - | - | - | - | - | - | - |

Notes:
U - Not detected at or above associated value.
J - Estimated concentration.
UJ - Estimated reporting detection limit.
R - Rejected.

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *D-1* | *D-1* | *D-1* | *D-1* | *D-1* | *D-2* | *D-2* | *D-2* | *D-2* | *D-2* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *D193097(GM)* | *GW-7043-090199-RSH-101* | *GW-7043-RW-082200-09* | *GW-7043-061702-BW-002* | *GW-7043-061702-BW-003* | *W-MT-021* | *W-DF-001* | *007(EPA)* | *D293097(GM)* | *GW-7043-090399-RSH-108* |
| *Sample Date:* | | *9/30/1997* | *9/1/1999* | *8/22/2000* | *6/17/2002* | *6/17/2002* | *8/7/1996* | *10/21/1996* | *9/30/1997* | *9/30/1997* | *9/3/1999* |
| | | | | | | *(Duplicate)* | | | | | |
| *Parameters* | *Units* | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| 1,1,2-Trichloroethane | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| 1,1-Dichloroethane | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| 1,1-Dichloroethene | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 1 | 33 U | 25 U |
| 1,2-Dichloroethane | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| 1,2-Dichloroethene (total) | ug/L | 560 | 340 | 355 | - | - | 350 | 1100 | 573 E | 480 | 430 |
| 1,2-Dichloropropane | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 33 U | 170 U | 120 U | 100 U | 100 U | 500 U | 500 U | 2 U | 33 U | 250 U |
| 2-Hexanone | ug/L | 33 U | 170 U | 120 U | 100 U | 100 U | 500 U | 500 U | 2 U | 33 U | 250 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 33 U | 170 U | 62 U | 50 U | 50 U | 500 U | 500 U | 2 U | 33 U | 250 U |
| Acetone | ug/L | 33 U | 170 U | 120 U | 100 U | 100 U | 500 U | 500 U | 2 U | 33 U | 250 U |
| Benzene | ug/L | 33 U | 17 U | 12 U | 1.7 J | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Bromodichloromethane | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Bromoform | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Bromomethane (Methyl Bromide) | ug/L | 33 U | 33 U | 25 U | 20 U | 20 U | 50 U | 50 U | 0.5 U | 33 U | 50 U |
| Carbon disulfide | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 2 U | 33 U | 25 U |
| Carbon tetrachloride | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Chlorobenzene | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Chloroethane | ug/L | 33 U | 33 U | 25 U | 20 U | 20 U | 100 U | 100 U | 0.5 U | 33 U | 50 U |
| Chloroform (Trichloromethane) | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Chloromethane (Methyl Chloride) | ug/L | 33 U | 33 U | 25 U | 20 U | 20 U | 100 U | 100 U | 1 | 33 U | 50 U |
| cis-1,2-Dichloroethene | ug/L | - | - | 350 | 330 | 350 | - | - | - | - | - |
| cis-1,3-Dichloropropene | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Dibromochloromethane | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Ethylbenzene | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Methylene chloride | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Styrene | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Tetrachloroethene | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Toluene | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| trans-1,2-Dichloroethene | ug/L | - | - | 5.0 J | 1.7 J | 2.5 J | - | - | - | - | - |
| trans-1,3-Dichloropropene | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| Trichloroethene | ug/L | 150 | 98 | 120 | 110 | 130 | 500 | 1200 | 504 E | 410 | 360 |
| Vinyl chloride | ug/L | 33 U | 33 U | 25 U | 20 U | 20 U | 100 U | 100 U | 8 | 33 U | 50 U |
| Xylene (total) | ug/L | 33 U | 17 U | 12 U | 10 U | 10 U | 50 U | 50 U | 0.5 U | 33 U | 25 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 1,2-Dichlorobenzene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 1,3-Dichlorobenzene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 1,4-Dichlorobenzene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 2,4,5-Trichlorophenol | ug/L | - | - | - | - | - | 10 U | 10 UJ | 50 U | - | - |
| 2,4,6-Trichlorophenol | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 2,4-Dichlorophenol | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 2,4-Dimethylphenol | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 2,4-Dinitrophenol | ug/L | - | - | - | - | - | 50 U | 50 UJ | 50 U | - | - |
| 2,4-Dinitrotoluene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 2,6-Dinitrotoluene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 2-Chloronaphthalene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 2-Chlorophenol | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 2-Methylnaphthalene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 2-Methylphenol | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *D-1* | *D-1* | *D-1* | *D-1* | *D-1* | *D-2* | *D-2* | *D-2* | *D-2* | *D-2* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *D193097(GM)* | *GW-7043-090199-RSH-101* | *GW-7043-RW-082200-09* | *GW-7043-061702-BW-002* | *GW-7043-061702-BW-003* | *W-MT-021* | *W-DF-001* | *007(EPA)* | *D293097(GM)* | *GW-7043-090399-RSH-108* |
| *Sample Date:* | | *9/30/1997* | *9/1/1999* | *8/22/2000* | *6/17/2002* | *6/17/2002* | *8/7/1996* | *10/21/1996* | *9/30/1997* | *9/30/1997* | *9/3/1999* |
| | | | | | | *(Duplicate)* | | | | | |
| *Parameters* | *Units* | | | | | | | | | | |
| 2-Nitroaniline | ug/L | - | - | - | - | - | 50 U | 50 UJ | 50 U | - | - |
| 2-Nitrophenol | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 3,3'-Dichlorobenzidine | ug/L | - | - | - | - | - | 50 U | 50 UJ | 20 U | - | - |
| 3-Nitroaniline | ug/L | - | - | - | - | - | 50 U | 50 UJ | 50 U | - | - |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | - | - | - | 50 U | 50 UJ | 50 U | - | - |
| 4-Bromophenyl phenyl ether | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 4-Chloro-3-methylphenol | ug/L | - | - | - | - | - | 10 U | 10 UJ | 20 U | - | - |
| 4-Chloroaniline | ug/L | - | - | - | - | - | 10 U | 10 UJ | 20 U | - | - |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 4-Methylphenol | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| 4-Nitroaniline | ug/L | - | - | - | - | - | 50 U | 50 UJ | 50 U | - | - |
| 4-Nitrophenol | ug/L | - | - | - | - | - | 50 U | 50 UJ | 50 U | - | - |
| Acenaphthene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Acenaphthylene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Anthracene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Benzo(a)anthracene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Benzo(a)pyrene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Benzo(b)fluoranthene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Benzo(g,h,i)perylene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Benzo(k)fluoranthene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Benzoic acid | ug/L | - | - | - | - | - | - | - | 50 U | - | - |
| Benzyl Alcohol | ug/L | - | - | - | - | - | - | - | 10 U | - | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| bis(2-Chloroethyl)ether | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | - | - | - | 10 U | 10 UJ | 1 J | - | - |
| Butyl benzylphthalate | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Carbazole | ug/L | - | - | - | - | - | 10 U | 10 UJ | - | - | - |
| Chrysene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Dibenz(a,h)anthracene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Dibenzofuran | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Diethyl phthalate | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Dimethyl phthalate | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Di-n-butylphthalate | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Di-n-octyl phthalate | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Fluoranthene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | | - |
| Fluorene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Hexachlorobenzene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Hexachlorobutadiene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Hexachlorocyclopentadiene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Hexachloroethane | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Isophorone | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Naphthalene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Nitrobenzene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| N-Nitrosodi-n-propylamine | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| N-Nitrosodiphenylamine | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Pentachlorophenol | ug/L | - | - | - | - | - | 50 U | 50 UJ | 50 U | - | - |
| Phenanthrene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Phenol | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |
| Pyrene | ug/L | - | - | - | - | - | 10 U | 10 UJ | 10 U | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *D-1* | *D-1* | *D-1* | *D-1* | *D-1* | *D-2* | *D-2* | *D-2* | *D-2* | *D-2* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *D193097(GM)* | *GW-7043-090199-RSH-101* | *GW-7043-RW-082200-09* | *GW-7043-061702-BW-002* | *GW-7043-061702-BW-003* | *W-MT-021* | *W-DF-001* | *007(EPA)* | *D293097(GM)* | *GW-7043-090399-RSH-108* |
| *Sample Date:* | | *9/30/1997* | *9/1/1999* | *8/22/2000* | *6/17/2002* | *6/17/2002* | *8/7/1996* | *10/21/1996* | *9/30/1997* | *9/30/1997* | *9/3/1999* |
| | | | | | | *(Duplicate)* | | | | | |
| *Parameters* | *Units* | | | | | | | | | | |
| *Metals* | | | | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 0.0195 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.041 | 0.0195 U | 0.20 U |
| Antimony (Dissolved) | ug/L | 0.0029 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.0040 | 0.0029 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.0059 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0020 U | 0.0059 U | 0.010 U |
| Barium (Dissolved) | ug/L | 0.0604 B | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 | 0.19 | 0.203 | 0.20 U |
| Beryllium (Dissolved) | ug/L | 0.0001 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.0001 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.0003 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.0003 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 91 | 97.8 | 91.6 | 92.7 | 95.8 | 88.5 | 108 | 105 | 112 | 119 |
| Chromium Total (Dissolved) | ug/L | 0.0019 B | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0072 | 0.002 B | 0.010 U |
| Cobalt (Dissolved) | ug/L | 0.0007 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U | 0.0007 U | 0.050 U |
| Copper (Dissolved) | ug/L | 0.0012 B | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.0013 U | 0.0039 B | 0.025 U |
| Iron | ug/L | - | 0.05 | - | - | - | - | - | - | - | 0.05 |
| Iron (Dissolved) | ug/L | 0.147 | 0.10 U | 0.10 U | 0.10 U | 0.10 U | 0.10 U | 0.10 U | 0.011 U | 0.0134 U | 0.10 U |
| Lead (Dissolved) | ug/L | 0.0019 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0025 | 0.0019 U | 0.0030 U |
| Magnesium (Dissolved) | ug/L | 33.4 | 35.3 | 34.3 | 35.2 | 36.4 | 43.9 | 44.5 | 41.2 | 44.1 | 43.4 |
| Manganese (Dissolved) | ug/L | 0.0012 B | 0.015 U | 0.015 U | 0.015 U | 0.015 U | 0.088 | 0.14 L | 0.0018 | 0.0137 B | 0.064 |
| Mercury (Dissolved) | ug/L | 0.0001 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00010 U | 0.0001 U | 0.00020 U |
| Nickel (Dissolved) | ug/L | 0.0044 B | 0.11 | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.00060 U | 0.0023 B | 0.040 U |
| Potassium (Dissolved) | ug/L | 0.984 BE | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 3.7 | 3.14 BE | 5.0 U |
| Selenium (Dissolved) | ug/L | 0.0044 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0020 U | 0.0044 U | 0.0050 U |
| Silver (Dissolved) | ug/L | 0.0008 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.00073 | 0.0008 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 7.41 | 6.9 | 6.2 | 7.9 | 8.2 | 6.1 | 8.5 L | 7.1 | 8.34 | 9.1 |
| Thallium (Dissolved) | ug/L | 0.005 U | 0.010 U | 0.010 U | 0.011 U | 0.011 U | 0.010 U | 0.010 U | 0.0019 U | 0.005 U | 0.010 U |
| Vanadium (Dissolved) | ug/L | 0.0007 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U | 0.0007 U | 0.050 U |
| Zinc (Dissolved) | ug/L | 0.0119 BE | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.050 U | 0.050 U | 0.0072 | 0.0154 BE | 0.020 U |
| *PCBs* | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.55 U | - | - |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.55 U | - | - |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.55 U | - | - |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.55 U | - | - |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.55 U | - | - |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.55 U | - | - |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.55 U | - | - |
| *Gas* | | | | | | | | | | | |
| Ethane | ug/L | - | 0.50 U | 0.50 U | 0.50 U | 0.50 U | - | - | - | - | 0.50 U |
| Ethene | ug/L | - | 0.50 U | 0.50 U | 0.50 U | 0.50 U | - | - | - | - | 0.50 U |
| *Pesticides* | | | | | | | | | | | |
| 4,4'-DDD | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| 4,4'-DDE | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| 4,4'-DDT | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| Aldrin | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.022 J | - | - |
| alpha-BHC | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.055 U | - | - |
| alpha-Chlordane | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.055 U | - | - |
| beta-BHC | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.055 U | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *D-1* | *D-1* | *D-1* | *D-1* | *D-1* | *D-2* | *D-2* | *D-2* | *D-2* | *D-2* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *D193097(GM)* | *GW-7043-090199-RSH-101* | *GW-7043-RW-082200-09* | *GW-7043-061702-BW-002* | *GW-7043-061702-BW-003* | *W-MT-021* | *W-DF-001* | *007(EPA)* | *D293097(GM)* | *GW-7043-090399-RSH-108* |
| *Sample Date:* | | *9/30/1997* | *9/1/1999* | *8/22/2000* | *6/17/2002* | *6/17/2002* | *8/7/1996* | *10/21/1996* | *9/30/1997* | *9/30/1997* | *9/3/1999* |
| | | | | | | *(Duplicate)* | | | | | |
| *Parameters* | *Units* | | | | | | | | | | |
| delta-BHC | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.055 U | - | - |
| Dieldrin | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| Endosulfan I | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.055 U | - | - |
| Endosulfan II | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| Endosulfan sulfate | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| Endrin | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| Endrin aldehyde | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| Endrin ketone | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| gamma-BHC (Lindane) | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.055 U | - | - |
| gamma-Chlordane | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.055 U | - | - |
| Heptachlor | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.055 U | - | - |
| Heptachlor epoxide | ug/L | - | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.055 U | - | - |
| Methoxychlor | ug/L | - | - | - | - | - | 0.25 UJ | 0.25 UJ | 0.55 U | - | - |
| Toxaphene | ug/L | - | - | - | - | - | 2.0 UJ | 2.0 UJ | 1.1 U | - | - |
| *General Chemistry* | | | | | | | | | | | |
| Cyanide (total) | ug/L | 0.010 U | - | - | - | - | 0.010 U | 0.010 U | 0.010 U | 0.010 U | - |
| *Field Parameters* | | | | | | | | | | | |
| Conductivity | umhos/cm | - | 589 | - | - | - | - | - | - | - | 649 |
| Dissolved Oxygen | ug/L | - | 1.78 | - | - | - | - | - | - | - | 2.13 |
| Oxidation reduction potential | millivolts | - | 132.0 | - | - | - | - | - | - | - | 138.2 |
| pH Field | s.u. | - | 7.08 | - | - | - | - | - | - | - | 6.77 |
| Temperature, Field | deg C | - | 16.58 | - | - | - | - | - | - | - | 16.45 |
| Turbidity | NTU | - | 26 | - | - | - | - | - | - | - | 4 |

*Notes:*
U - Not detected at or above associated value.
J - Estimated concentration.
UJ - Estimated reporting detection limit.
R - Rejected.

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *D-2* | *D-2* | *D-2* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-RW-082100-02* | *GW-7043-RW-082100-03* | *GW-7043-061802-BW-011* | *W-MT-012* | *W-MT-013* | *W-MK-030* | *W-DF-005* | *008(EPA)* | *011(EPA)* | *D392997(GM)* | *GW-7043-090299-RSH-106* |
| *Sample Date:* | | *8/21/2000* | *8/21/2000* | *6/18/2002* | *8/6/1996* | *8/6/1996* | *9/12/1996* | *10/21/1996* | *9/29/1997* | *9/29/1997* | *9/29/1997* | *9/2/1999* |
| | | | *(Duplicate)* | | | *(Duplicate)* | | | | *(Duplicate)* | | |
| *Parameters* | *Units* | | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| 1,1,2-Trichloroethane | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| 1,1-Dichloroethane | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| 1,1-Dichloroethene | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| 1,2-Dichloroethane | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| 1,2-Dichloroethene (total) | ug/L | 64.5 | 66.8 | - | 5.0 | 4.6 J | 7.5 | 7.2 | 8 | 7 | 6 J | 13 |
| 1,2-Dichloropropane | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 71 U | 71 U | 50 UJ | 50 U | 50 U | 50 U | 50 U | 2 U | 2 U | 10 U | 10 U |
| 2-Hexanone | ug/L | 71 U | 71 U | 50 UJ | 50 U | 50 U | 50 U | 50 U | 2 U | 2 U | 10 U | 10 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 36 U | 36 U | 25 UJ | 50 U | 50 U | 50 U | 50 U | 2 U | 2 U | 10 U | 10 U |
| Acetone | ug/L | 71 U | 71 U | 50 UJ | 50 U | 50 U | 50 U | 50 U | 2 U | 2 U | 10 U | 10 U |
| Benzene | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| Bromodichloromethane | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| Bromoform | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| Bromomethane (Methyl Bromide) | ug/L | 14 U | 14 U | 10 UJ | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 2.0 U |
| Carbon disulfide | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 2 U | 2 U | 10 U | 1.0 U |
| Carbon tetrachloride | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| Chlorobenzene | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| Chloroethane | ug/L | 14 U | 14 U | 10 U | 10 U | 10 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 2.0 U |
| Chloroform (Trichloromethane) | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| Chloromethane (Methyl Chloride) | ug/L | 14 U | 14 U | 10 U | 10 U | 10 U | 10 U | 10 U | 1 | 0.5 | 10 U | 2.0 U |
| cis-1,2-Dichloroethene | ug/L | 63 | 65 | 54 | - | - | - | - | - | - | - | - |
| cis-1,3-Dichloropropene | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| Dibromochloromethane | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| Ethylbenzene | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| Methylene chloride | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| Styrene | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| Tetrachloroethene | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 0.45 J |
| Toluene | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| trans-1,2-Dichloroethene | ug/L | 1.5 J | 1.8 J | 0.85 J | - | - | - | - | - | - | - | - |
| trans-1,3-Dichloropropene | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| Trichloroethene | ug/L | 210 | 220 | 170 | 30 | 29 | 29 | 34 | 33 | 33 | 28 | 31 |
| Vinyl chloride | ug/L | 14 U | 14 U | 10 U | 10 U | 10 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 2.0 U |
| Xylene (total) | ug/L | 7.1 U | 7.1 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U | 0.5 U | 10 U | 1.0 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 1,2-Dichlorobenzene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 1,3-Dichlorobenzene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 1,4-Dichlorobenzene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 2,4,5-Trichlorophenol | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 56 U | 54 U | - | - |
| 2,4,6-Trichlorophenol | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 2,4-Dichlorophenol | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 2,4-Dimethylphenol | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 2,4-Dinitrophenol | ug/L | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 56 U | 54 U | - | - |
| 2,4-Dinitrotoluene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 2,6-Dinitrotoluene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 2-Chloronaphthalene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 2-Chlorophenol | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 2-Methylnaphthalene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 2-Methylphenol | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *D-2* | *D-2* | *D-2* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-RW-082100-02* | *GW-7043-RW-082100-03* | *GW-7043-061802-BW-011* | *W-MT-012* | *W-MT-013* | *W-MK-030* | *W-DF-005* | *008(EPA)* | *011(EPA)* | *D392997(GM)* | *GW-7043-090299-RSH-106* |
| *Sample Date:* | | *8/21/2000* | *8/21/2000* | *6/18/2002* | *8/6/1996* | *8/6/1996* | *9/12/1996* | *10/21/1996* | *9/29/1997* | *9/29/1997* | *9/29/1997* | *9/2/1999* |
| | | | *(Duplicate)* | | | *(Duplicate)* | | | | *(Duplicate)* | | |
| *Parameters* | *Units* | | | | | | | | | | | |
| 2-Nitroaniline | ug/L | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 56 U | 54 U | - | - |
| 2-Nitrophenol | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 3,3'-Dichlorobenzidine | ug/L | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 22 U | 22 U | - | - |
| 3-Nitroaniline | ug/L | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 56 U | 54 U | - | - |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 56 U | 54 U | - | - |
| 4-Bromophenyl phenyl ether | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 4-Chloro-3-methylphenol | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 22 U | 22 U | - | - |
| 4-Chloroaniline | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 22 U | 22 U | - | - |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 4-Methylphenol | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| 4-Nitroaniline | ug/L | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 56 U | 54 U | - | - |
| 4-Nitrophenol | ug/L | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 56 U | 54 U | - | - |
| Acenaphthene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Acenaphthylene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Anthracene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Benzo(a)anthracene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Benzo(a)pyrene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Benzo(b)fluoranthene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Benzo(g,h,i)perylene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Benzo(k)fluoranthene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Benzoic acid | ug/L | - | - | - | - | - | - | - | 56 U | 54 U | - | - |
| Benzyl Alcohol | ug/L | - | - | - | - | - | - | - | 11 U | 11 U | - | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| bis(2-Chloroethyl)ether | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 9 J | 5 J | - | - |
| Butyl benzylphthalate | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Carbazole | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | - | - | - | - |
| Chrysene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Dibenz(a,h)anthracene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Dibenzofuran | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Diethyl phthalate | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Dimethyl phthalate | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Di-n-butylphthalate | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Di-n-octyl phthalate | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Fluoranthene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Fluorene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Hexachlorobenzene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Hexachlorobutadiene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Hexachlorocyclopentadiene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Hexachloroethane | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Isophorone | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Naphthalene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Nitrobenzene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| N-Nitrosodi-n-propylamine | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| N-Nitrosodiphenylamine | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Pentachlorophenol | ug/L | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 56 U | 54 U | - | - |
| Phenanthrene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Phenol | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |
| Pyrene | ug/L | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 11 U | 11 U | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *D-2* | *D-2* | *D-2* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-RW-082100-02* | *GW-7043-RW-082100-03* | *GW-7043-061802-BW-011* | *W-MT-012* | *W-MT-013* | *W-MK-030* | *W-DF-005* | *008(EPA)* | *011(EPA)* | *D392997(GM)* | *GW-7043-090299-RSH-106* |
| *Sample Date:* | | *8/21/2000* | *8/21/2000* | *6/18/2002* | *8/6/1996* | *8/6/1996* | *9/12/1996* | *10/21/1996* | *9/29/1997* | *9/29/1997* | *9/29/1997* | *9/2/1999* |
| | | | *(Duplicate)* | | | *(Duplicate)* | | | | *(Duplicate)* | | |
| *Parameters* | *Units* | | | | | | | | | | | |
| *Metals* | | | | | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.043 | 0.11 | 0.0195 U | 0.20 U |
| Antimony (Dissolved) | ug/L | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.0034 | 0.0032 | 0.0029 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0020 U | 0.0020 U | 0.0059 U | 0.010 U |
| Barium (Dissolved) | ug/L | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.065 | 0.065 | 0.073 B | 0.20 U |
| Beryllium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.00030 U | 0.0001 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.00030 U | 0.0003 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 99.6 | 98.5 | 88.4 | 84.6 | 85.4 | 79.0 | 83.8 | 80.3 | 80.8 | 86.9 | 87.0 |
| Chromium Total (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0026 | 0.0026 | 0.0008 U | 0.010 U |
| Cobalt (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U | 0.00080 U | 0.0007 U | 0.050 U |
| Copper (Dissolved) | ug/L | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.0013 U | 0.0013 U | 0.0014 B | 0.025 U |
| Iron | ug/L | - | - | - | - | - | - | - | - | - | - | 1.70 |
| Iron (Dissolved) | ug/L | 0.10 U | 0.10 U | 0.10 U | 0.10 U | 0.10 U | 0.10 U | 0.10 U | 0.011 U | 0.17 | 0.0134 U | 0.10 U |
| Lead (Dissolved) | ug/L | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0022 | 0.0026 | 0.0019 U | 0.0030 U |
| Magnesium (Dissolved) | ug/L | 43.0 | 42.6 | 42.3 | 30.4 | 30.1 | 26.3 | 28.1 | 28.6 | 28.7 | 31.2 | 31.5 |
| Manganese (Dissolved) | ug/L | 0.015 U | 0.015 U | 0.016 | 0.015 U | 0.015 U | 0.015 U | 0.015 U | 0.00040 U | 0.035 | 0.0001 U | 0.015 U |
| Mercury (Dissolved) | ug/L | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00010 U | 0.00010 U | 0.0001 U | 0.00020 U |
| Nickel (Dissolved) | ug/L | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.00060 U | 0.00060 U | 0.0013 U | 0.040 U |
| Potassium (Dissolved) | ug/L | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 1.8 | 1.9 | 1.56 BE | 5.0 U |
| Selenium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0020 U | 0.0020 U | 0.0044 U | 0.0050 U |
| Silver (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.00076 | 0.00070 U | 0.0008 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 11.8 | 11.7 | 7.1 | 6.7 | 6.5 | 5.5 | 7.7 | 5.2 | 5.2 | 6.5 | 7.0 |
| Thallium (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0019 U | 0.0019 U | 0.005 U | 0.010 U |
| Vanadium (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U | 0.00080 U | 0.0007 U | 0.050 U |
| Zinc (Dissolved) | ug/L | 0.020 U | 0.020 U | 0.035 | 0.18 | 0.050 U | 0.050 U | 0.050 U | 0.0026 | 0.0039 | 0.0191 BE | 0.020 U |
| *PCBs* | | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.50 U | 0.55 U | - | - |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.50 U | 0.55 U | - | - |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.50 U | 0.55 U | - | - |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.50 U | 0.55 U | - | - |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.50 U | 0.55 U | - | - |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.50 U | 0.55 U | - | - |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | - | 1.0 UJ | 1.0 UJ | 1.0 UJ | 1.0 UJ | 0.50 U | 0.55 U | - | - |
| *Gas* | | | | | | | | | | | | |
| Ethane | ug/L | 0.50 U | 0.50 U | 0.50 U | - | - | - | - | - | - | - | 0.50 U |
| Ethene | ug/L | 0.50 U | 0.50 U | 0.50 U | - | - | - | - | - | - | - | 0.50 U |
| *Pesticides* | | | | | | | | | | | | |
| 4,4'-DDD | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | 0.11 U | - | - |
| 4,4'-DDE | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | 0.11 U | - | - |
| 4,4'-DDT | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | R | 0.050 UJ | 0.10 U | 0.11 U | - | - |
| Aldrin | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 U | 0.055 U | - | - |
| alpha-BHC | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 U | 0.055 U | - | - |
| alpha-Chlordane | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 U | 0.055 U | - | - |
| beta-BHC | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 U | 0.055 U | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *D-2* | *D-2* | *D-2* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* | *D-3* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-RW-082100-02* | *GW-7043-RW-082100-03* | *GW-7043-061802-BW-011* | *W-MT-012* | *W-MT-013* | *W-MK-030* | *W-DF-005* | *008(EPA)* | *011(EPA)* | *D392997(GM)* | *GW-7043-090299-RSH-106* |
| Sample Date: | | 8/21/2000 | 8/21/2000 | 6/18/2002 | 8/6/1996 | 8/6/1996 | 9/12/1996 | 10/21/1996 | 9/29/1997 | 9/29/1997 | 9/29/1997 | 9/2/1999 |
| | | | *(Duplicate)* | | | *(Duplicate)* | | | | *(Duplicate)* | | |
| *Parameters* | *Units* | | | | | | | | | | | |
| delta-BHC | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 U | 0.055 U | - | - |
| Dieldrin | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | 0.11 U | - | - |
| Endosulfan I | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 U | 0.055 U | - | - |
| Endosulfan II | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | 0.11 U | - | - |
| Endosulfan sulfate | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | 0.11 U | - | - |
| Endrin | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | 0.11 U | - | - |
| Endrin aldehyde | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | 0.11 U | - | - |
| Endrin ketone | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.10 U | 0.11 U | - | - |
| gamma-BHC (Lindane) | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | R | 0.050 UJ | 0.050 U | 0.055 U | - | - |
| gamma-Chlordane | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 U | 0.055 U | - | - |
| Heptachlor | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 U | 0.055 U | - | - |
| Heptachlor epoxide | ug/L | - | - | - | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 UJ | 0.050 U | 0.055 U | - | - |
| Methoxychlor | ug/L | - | - | - | 0.25 UJ | 0.25 UJ | 0.25 UJ | 0.25 UJ | 0.50 U | 0.55 U | - | - |
| Toxaphene | ug/L | - | - | - | 2.0 UJ | 2.0 UJ | 2.0 UJ | 2.0 UJ | 1.0 U | 1.1 U | - | - |
| *General Chemistry* | | | | | | | | | | | | |
| Cyanide (total) | ug/L | - | - | - | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | - |
| *Field Parameters* | | | | | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | - | - | - | - | - | - | - | 499 |
| Dissolved Oxygen | ug/L | - | - | - | - | - | - | - | - | - | - | 5.35 |
| Oxidation reduction potential | millivolts | - | - | - | - | - | - | - | - | - | - | 105.9 |
| pH Field | s.u. | - | - | - | - | - | - | - | - | - | - | 7.21 |
| Temperature, Field | deg C | - | - | - | - | - | - | - | - | - | - | 14.49 |
| Turbidity | NTU | - | - | - | - | - | - | - | - | - | - | 9 |

*Notes:*
U - Not detected at or above associated value.
J - Estimated concentration
UJ - Estimated reporting detection limit
R - Rejected

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *D-3* | *D-3* | *MW-1* | *MW-1* | *MW-1* | *MW-1* | *MW-2* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-RW-082100-05* | *GW-7043-061802-BW-013* | *GW-7043-081600-CA-029* | *GW-7043-081600-CA-030* | *GW-7043-RW-082200-10* | *GW-7043-061902-BW-022* | *GW-7043-081000-BW-023* |
| *Sample Date:* | | *8/21/2000* | *6/18/2002* | *8/16/2000* | *8/16/2000* | *8/22/2000* | *6/19/2002* | *8/10/2000* |
| *Parameters* | *Units* | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.8 |
| 1,1,2,2-Tetrachloroethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1,2-Trichloroethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethene (total) | ug/L | 6.33 | - | 0.50 U | 0.50 U | 0.50 U | - | 0.50 U |
| 1,2-Dichloropropane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 10 U | 33 UJ | 10 U | 1.3 J | 10 U | 10 UJ | 7.8 J |
| 2-Hexanone | ug/L | 10 U | 33 UJ | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 5.0 U | 17 UJ | 5.0 U | 5.0 U | 5.0 U | 5.0 UJ | 5.0 U |
| Acetone | ug/L | 10 U | 33 UJ | 7.2 J | 9.2 J | 10 U | 10 UJ | 10 |
| Benzene | ug/L | 1.0 U | 3.3 U | 0.31 J | 0.19 J | 1.0 U | 1.0 U | 1.0 U |
| Bromodichloromethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromoform | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromomethane (Methyl Bromide) | ug/L | 2.0 U | 6.7 UJ | 2.0 U | 2.0 U | 2.0 U | 2.0 UJ | 2.0 U |
| Carbon disulfide | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Carbon tetrachloride | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chlorobenzene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 0.23 J |
| Chloroethane | ug/L | 2.0 U | 6.7 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Chloroform (Trichloromethane) | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chloromethane (Methyl Chloride) | ug/L | 2.0 U | 6.7 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | ug/L | 6.2 | 11 | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| cis-1,3-Dichloropropene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Dibromochloromethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Ethylbenzene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Methylene chloride | ug/L | 1.0 U | 3.3 U | 1.3 U | 1.8 U | 1.0 U | 1.0 U | 1.0 U |
| Styrene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Tetrachloroethene | ug/L | 0.43 J | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Toluene | ug/L | 1.0 U | 3.3 U | 0.32 J | 1.0 U | 0.99 J | 1.0 U | 0.29 J |
| trans-1,2-Dichloroethene | ug/L | 0.13 J | 1.7 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| trans-1,3-Dichloropropene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Trichloroethene | ug/L | 32 | 120 | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Vinyl chloride | ug/L | 2.0 U | 6.7 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Xylene (total) | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,3-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,4-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dimethylphenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dinitrophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/L | - | - | - | - | - | - | - |
| 2,6-Dinitrotoluene | ug/L | - | - | - | - | - | - | - |
| 2-Chloronaphthalene | ug/L | - | - | - | - | - | - | - |
| 2-Chlorophenol | ug/L | - | - | - | - | - | - | - |
| 2-Methylnaphthalene | ug/L | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/L | - | - | - | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *D-3* | *D-3* | *MW-1* | *MW-1* | *MW-1* | *MW-1* | *MW-2* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-RW-082100-05* | *GW-7043-061802-BW-013* | *GW-7043-081600-CA-029* | *GW-7043-081600-CA-030* | *GW-7043-RW-082200-10* | *GW-7043-061902-BW-022* | *GW-7043-081000-BW-023* |
| *Sample Date:* | | *8/21/2000* | *6/18/2002* | *8/16/2000* | *8/16/2000* | *8/22/2000* | *6/18/2002* | *8/10/2000* |
| *Parameters* | Units | | | | | | | |
| 2-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 2-Nitrophenol | ug/L | - | - | - | - | - | - | - |
| 3,3'-Dichlorobenzidine | ug/L | - | - | - | - | - | - | - |
| 3-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Bromophenyl phenyl ether | ug/L | - | - | - | - | - | - | - |
| 4-Chloro-3-methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Chloroaniline | ug/L | - | - | - | - | - | - | - |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | - | - | - | - | - |
| 4-Methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 4-Nitrophenol | ug/L | - | - | - | - | - | - | - |
| Acenaphthene | ug/L | - | - | - | - | - | - | - |
| Acenaphthylene | ug/L | - | - | - | - | - | - | - |
| Anthracene | ug/L | - | - | - | - | - | - | - |
| Benzo(a)anthracene | ug/L | - | - | - | - | - | - | - |
| Benzo(a)pyrene | ug/L | - | - | - | - | - | - | - |
| Benzo(b)fluoranthene | ug/L | - | - | - | - | - | - | - |
| Benzo(g,h,i)perylene | ug/L | - | - | - | - | - | - | - |
| Benzo(k)fluoranthene | ug/L | - | - | - | - | - | - | - |
| Benzoic acid | ug/L | - | - | - | - | - | - | - |
| Benzyl Alcohol | ug/L | - | - | - | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | - | - | - | - | - |
| bis(2-Chloroethyl)ether | ug/L | - | - | - | - | - | - | - |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | - | - | - | - | - |
| Butyl benzylphthalate | ug/L | - | - | - | - | - | - | - |
| Carbazole | ug/L | - | - | - | - | - | - | - |
| Chrysene | ug/L | - | - | - | - | - | - | - |
| Dibenz(a,h)anthracene | ug/L | - | - | - | - | - | - | - |
| Dibenzofuran | ug/L | - | - | - | - | - | - | - |
| Diethyl phthalate | ug/L | - | - | - | - | - | - | - |
| Dimethyl phthalate | ug/L | - | - | - | - | - | - | - |
| Di-n-butylphthalate | ug/L | - | - | - | - | - | - | - |
| Di-n-octyl phthalate | ug/L | - | - | - | - | - | - | - |
| Fluoranthene | ug/L | - | - | - | - | - | - | - |
| Fluorene | ug/L | - | - | - | - | - | - | - |
| Hexachlorobenzene | ug/L | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/L | - | - | - | - | - | - | - |
| Hexachlorocyclopentadiene | ug/L | - | - | - | - | - | - | - |
| Hexachloroethane | ug/L | - | - | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | - | - | - | - | - |
| Isophorone | ug/L | - | - | - | - | - | - | - |
| Naphthalene | ug/L | - | - | - | - | - | - | - |
| Nitrobenzene | ug/L | - | - | - | - | - | - | - |
| N-Nitrosodi-n-propylamine | ug/L | - | - | - | - | - | - | - |
| N-Nitrosodiphenylamine | ug/L | - | - | - | - | - | - | - |
| Pentachlorophenol | ug/L | - | - | - | - | - | - | - |
| Phenanthrene | ug/L | - | - | - | - | - | - | - |
| Phenol | ug/L | - | - | - | - | - | - | - |
| Pyrene | ug/L | - | - | - | - | - | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *D-3* | *D-3* | *MW-1* | *MW-1* | *MW-1* | *MW-1* | *MW-2* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-RW-082100-05* | *GW-7043-061802-BW-013* | *GW-7043-081600-CA-029* | *GW-7043-081600-CA-030* | *GW-7043-RW-082200-10* | *GW-7043-061902-BW-022* | *GW-7043-081000-BW-023* |
| *Sample Date:* | | *8/21/2000* | *6/18/2002* | *8/16/2000* | *8/16/2000* | *8/22/2000* | *6/19/2002* | *8/10/2000* |
| *Parameters* | *Units* | | | | | | | |
| *Metals* | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Antimony (Dissolved) | ug/L | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Barium (Dissolved) | ug/L | 0.20 U | 0.20 U | 0.20 U | 0.22 | 0.27 | 0.41 | 0.20 |
| Beryllium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 81.6 | 86.2 | 62.7 | 53.0 | 55.2 | 61.3 | 46.6 |
| Chromium Total (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Cobalt (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U |
| Copper (Dissolved) | ug/L | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U |
| Iron | ug/L | - | - | - | - | - | - | - |
| Iron (Dissolved) | ug/L | 0.10 U | 0.10 U | 0.10 U | 0.10 | 0.30 | 1.2 | 0.10 U |
| Lead (Dissolved) | ug/L | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U |
| Magnesium (Dissolved) | ug/L | 29.1 | 30.4 | 27.8 | 31.4 | 35.8 | 34.0 | 27.5 |
| Manganese (Dissolved) | ug/L | 0.015 U | 0.015 U | 0.30 | 0.28 | 0.17 | 0.069 | 0.11 |
| Mercury (Dissolved) | ug/L | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U |
| Nickel (Dissolved) | ug/L | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U |
| Potassium (Dissolved) | ug/L | 5.0 U | 5.0 U | 5.0 U | 6.1 | 5.0 U | 5.0 U | 5.0 U |
| Selenium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Silver (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 8.7 | 5.1 | 21.5 | 23.9 | 31.1 | 21.6 | 17.1 |
| Thallium (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Vanadium (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U |
| Zinc (Dissolved) | ug/L | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U |
| *PCBs* | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | - | - | - | - | - |
| *Gas* | | | | | | | | |
| Ethane | ug/L | 0.50 U | 0.50 U | 9.1 | 13 | 14 | 0.50 U | 4.8 |
| Ethene | ug/L | 0.50 U | 0.50 U | 1.1 | 3.7 | 1.7 | 0.50 U | 0.78 |
| *Pesticides* | | | | | | | | |
| 4,4'-DDD | ug/L | - | - | - | - | - | - | - |
| 4,4'-DDE | ug/L | - | - | - | - | - | - | - |
| 4,4'-DDT | ug/L | - | - | - | - | - | - | - |
| Aldrin | ug/L | - | - | - | - | - | - | - |
| alpha-BHC | ug/L | - | - | - | - | - | - | - |
| alpha-Chlordane | ug/L | - | - | - | - | - | - | - |
| beta-BHC | ug/L | - | - | - | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *D-3* | *D-3* | *MW-1* | *MW-1* | *MW-1* | *MW-1* | *MW-2* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-RW-082100-05* | *GW-7043-061802-BW-013* | *GW-7043-081600-CA-029* | *GW-7043-081600-CA-030* | *GW-7043-RW-082200-10* | *GW-7043-061902-BW-022* | *GW-7043-081000-BW-023* |
| *Sample Date:* | | *8/21/2000* | *6/18/2002* | *8/16/2000* | *8/16/2000* | *8/22/2000* | *6/19/2002* | *8/10/2000* |
| *Parameters* | *Units* | | | | | | | |
| delta-BHC | ug/L | - | - | - | - | - | - | - |
| Dieldrin | ug/L | - | - | - | - | - | - | - |
| Endosulfan I | ug/L | - | - | - | - | - | - | - |
| Endosulfan II | ug/L | - | - | - | - | - | - | - |
| Endosulfan sulfate | ug/L | - | - | - | - | - | - | - |
| Endrin | ug/L | - | - | - | - | - | - | - |
| Endrin aldehyde | ug/L | - | - | - | - | - | - | - |
| Endrin ketone | ug/L | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/L | - | - | - | - | - | - | - |
| gamma-Chlordane | ug/L | - | - | - | - | - | - | - |
| Heptachlor | ug/L | - | - | - | - | - | - | - |
| Heptachlor epoxide | ug/L | - | - | - | - | - | - | - |
| Methoxychlor | ug/L | - | - | - | - | - | - | - |
| Toxaphene | ug/L | - | - | - | - | - | - | - |
| *General Chemistry* | | | | | | | | |
| Cyanide (total) | ug/L | - | - | - | - | - | - | - |
| *Field Parameters* | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | - | - | - | - |
| Dissolved Oxygen | ug/L | - | - | - | - | - | - | - |
| Oxidation reduction potential | millivolts | - | - | - | - | - | - | - |
| pH Field | s.u. | - | - | - | - | - | - | - |
| Temperature, Field | deg C | - | - | - | - | - | - | - |
| Turbidity | NTU | - | - | - | - | - | - | - |

*Notes:*
U - Not detected at or above associated value.
J - Estimated concentration.
UJ - Estimated reporting detection limit.
R - Rejected.

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *MW-2* | *MW-2* | *MW-2* | *MW-2* | *MW-2* | *MW-2* | *MW-2* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-081000-BW-024* | *GW-7043-081000-BW-025* | *GW-7043-081000-BW-026* | *GW-7043-081000-BW-027* | *GW-7043-081000-BW-028* | *GW-7043-RW-082200-11* | *GW-7043-061802-BW-008* |
| *Sample Date:* | | *8/10/2000* | *8/10/2000* | *8/10/2000* | *8/10/2000* | *8/10/2000* | *8/22/2000* | *6/18/2002* |
| | | | *(Duplicate)* | | | | | |
| *Parameters* | *Units* | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 0.77 J | 0.68 J | 0.31 J | 1.0 U | 0.13 J | 1.0 U | 1.0 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1,2-Trichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethene (total) | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | - |
| 1,2-Dichloropropane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ |
| 2-Hexanone | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 UJ |
| Acetone | ug/L | 4.1 J | 10 U | 3.8 J | 3.9 J | 7.4 J | 10 U | 10 UJ |
| Benzene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromodichloromethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromoform | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromomethane (Methyl Bromide) | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 UJ |
| Carbon disulfide | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Carbon tetrachloride | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chlorobenzene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chloroethane | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Chloroform (Trichloromethane) | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chloromethane (Methyl Chloride) | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| cis-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Dibromochloromethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Ethylbenzene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Methylene chloride | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Styrene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Tetrachloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Toluene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| trans-1,2-Dichloroethene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| trans-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Trichloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Vinyl chloride | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Xylene (total) | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,3-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,4-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dimethylphenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dinitrophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/L | - | - | - | - | - | - | - |
| 2,6-Dinitrotoluene | ug/L | - | - | - | - | - | - | - |
| 2-Chloronaphthalene | ug/L | - | - | - | - | - | - | - |
| 2-Chlorophenol | ug/L | - | - | - | - | - | - | - |
| 2-Methylnaphthalene | ug/L | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/L | - | - | - | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *MW-2* | *MW-2* | *MW-2* | *MW-2* | *MW-2* | *MW-2* | *MW-2* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-081000-BW-024* | *GW-7043-081000-BW-025* | *GW-7043-081000-BW-026* | *GW-7043-081000-BW-027* | *GW-7043-081000-BW-028* | *GW-7043-RW-082200-11* | *GW-7043-061802-BW-068* |
| *Sample Date:* | | *8/10/2000* | *8/10/2000* | *8/10/2000* | *8/10/2000* | *8/10/2000* | *8/22/2000* | *6/18/2002* |
| | | | *(Duplicate)* | | | | | |
| *Parameters* | *Units* | | | | | | | |
| 2-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 2-Nitrophenol | ug/L | - | - | - | - | - | - | - |
| 3,3'-Dichlorobenzidine | ug/L | - | - | - | - | - | - | - |
| 3-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Bromophenyl phenyl ether | ug/L | - | - | - | - | - | - | - |
| 4-Chloro-3-methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Chloroaniline | ug/L | - | - | - | - | - | - | - |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | - | - | - | - | - |
| 4-Methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 4-Nitrophenol | ug/L | - | - | - | - | - | - | - |
| Acenaphthene | ug/L | - | - | - | - | - | - | - |
| Acenaphthylene | ug/L | - | - | - | - | - | - | - |
| Anthracene | ug/L | - | - | - | - | - | - | - |
| Benzo(a)anthracene | ug/L | - | - | - | - | - | - | - |
| Benzo(a)pyrene | ug/L | - | - | - | - | - | - | - |
| Benzo(b)fluoranthene | ug/L | - | - | - | - | - | - | - |
| Benzo(g,h,i)perylene | ug/L | - | - | - | - | - | - | - |
| Benzo(k)fluoranthene | ug/L | - | - | - | - | - | - | - |
| Benzoic acid | ug/L | - | - | - | - | - | - | - |
| Benzyl Alcohol | ug/L | - | - | - | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | - | - | - | - | - |
| bis(2-Chloroethyl)ether | ug/L | - | - | - | - | - | - | - |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | - | - | - | - | - |
| Butyl benzylphthalate | ug/L | - | - | - | - | - | - | - |
| Carbazole | ug/L | - | - | - | - | - | - | - |
| Chrysene | ug/L | - | - | - | - | - | - | - |
| Dibenz(a,h)anthracene | ug/L | - | - | - | - | - | - | - |
| Dibenzofuran | ug/L | - | - | - | - | - | - | - |
| Diethyl phthalate | ug/L | - | - | - | - | - | - | - |
| Dimethyl phthalate | ug/L | - | - | - | - | - | - | - |
| Di-n-butylphthalate | ug/L | - | - | - | - | - | - | - |
| Di-n-octyl phthalate | ug/L | - | - | - | - | - | - | - |
| Fluoranthene | ug/L | - | - | - | - | - | - | - |
| Fluorene | ug/L | - | - | - | - | - | - | - |
| Hexachlorobenzene | ug/L | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/L | - | - | - | - | - | - | - |
| Hexachlorocyclopentadiene | ug/L | - | - | - | - | - | - | - |
| Hexachloroethane | ug/L | - | - | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | - | - | - | - | - |
| Isophorone | ug/L | - | - | - | - | - | - | - |
| Naphthalene | ug/L | - | - | - | - | - | - | - |
| Nitrobenzene | ug/L | - | - | - | - | - | - | - |
| N-Nitrosodi-n-propylamine | ug/L | - | - | - | - | - | - | - |
| N-Nitrosodiphenylamine | ug/L | - | - | - | - | - | - | - |
| Pentachlorophenol | ug/L | - | - | - | - | - | - | - |
| Phenanthrene | ug/L | - | - | - | - | - | - | - |
| Phenol | ug/L | - | - | - | - | - | - | - |
| Pyrene | ug/L | - | - | - | - | - | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *MW-2* | *MW-2* | *MW-2* | *MW-2* | *MW-2* | *MW-2* | *MW-2* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-081000-BW-024* | *GW-7043-081000-BW-025* | *GW-7043-081000-BW-026* | *GW-7043-081000-BW-027* | *GW-7043-081000-BW-028* | *GW-7043-RW-082200-11* | *GW-7043-061802-BW-008* |
| *Sample Date:* | | *8/10/2000* | *8/10/2000* | *8/10/2000* | *8/10/2000* | *8/10/2000* | *8/22/2000* | *6/18/2002* |
| | | | *(Duplicate)* | | | | | |
| *Parameters* | *Units* | | | | | | | |
| *Metals* | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 0.34 | 0.20 U | 0.20 U | 0.22 | 0.20 U | 0.20 U | 0.20 U |
| Antimony (Dissolved) | ug/L | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Barium (Dissolved) | ug/L | 0.34 | 0.34 | 0.21 | 0.20 U | 0.20 U | 0.39 | 0.48 |
| Beryllium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 43.0 | 36.4 | 22.5 | 16.9 | 17.4 | 63.1 | 55.0 |
| Chromium Total (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Cobalt (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U |
| Copper (Dissolved) | ug/L | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U |
| Iron | ug/L | - | - | - | - | - | - | - |
| Iron (Dissolved) | ug/L | 0.64 | 0.10 U | 0.10 U | 0.28 | 0.10 U | 1.4 | 1.1 |
| Lead (Dissolved) | ug/L | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U |
| Magnesium (Dissolved) | ug/L | 30.0 | 28.5 | 23.3 | 13.5 | 16.3 | 30.8 | 31.2 |
| Manganese (Dissolved) | ug/L | 0.062 | 0.050 | 0.015 U | 0.015 U | 0.015 U | 0.017 | 0.015 U |
| Mercury (Dissolved) | ug/L | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U |
| Nickel (Dissolved) | ug/L | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U |
| Potassium (Dissolved) | ug/L | 5.0 U | 5.0 U | 5.0 | 5.4 | 6.7 | 5.0 U | 5.0 U |
| Selenium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Silver (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 16.6 | 16.5 | 18.8 | 17.9 | 20.3 | 14.4 | 16.1 |
| Thallium (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Vanadium (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U |
| Zinc (Dissolved) | ug/L | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U |
| *PCBs* | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | - | - | - | - | - |
| *Gas* | | | | | | | | |
| Ethane | ug/L | 6.6 | 6.3 | 11 | 15 | 13 | 0.86 | 0.50 U |
| Ethene | ug/L | 0.72 | 0.66 | 0.79 | 0.94 | 1.2 | 0.50 U | 0.50 U |
| *Pesticides* | | | | | | | | |
| 4,4'-DDD | ug/L | - | - | - | - | - | - | - |
| 4,4'-DDE | ug/L | - | - | - | - | - | - | - |
| 4,4'-DDT | ug/L | - | - | - | - | - | - | - |
| Aldrin | ug/L | - | - | - | - | - | - | - |
| alpha-BHC | ug/L | - | - | - | - | - | - | - |
| alpha-Chlordane | ug/L | - | - | - | - | - | - | - |
| beta-BHC | ug/L | - | - | - | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | MW-2 | MW-2 | MW-2 | MW-2 | MW-2 | MW-2 | MW-2 |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | GW-7043-081000-BW-024 | GW-7043-081000-BW-025 | GW-7043-081000-BW-026 | GW-7043-081000-BW-027 | GW-7043-081000-BW-028 | GW-7043-RW-082200-11 | GW-7043-061802-BW-008 |
| *Sample Date:* | | 8/10/2000 | 8/10/2000 (Duplicate) | 8/10/2000 | 8/10/2000 | 8/10/2000 | 8/22/2000 | 6/18/2002 |
| *Parameters* | *Units* | | | | | | | |
| delta-BHC | ug/L | - | - | - | - | - | - | - |
| Dieldrin | ug/L | - | - | - | - | - | - | - |
| Endosulfan I | ug/L | - | - | - | - | - | - | - |
| Endosulfan II | ug/L | - | - | - | - | - | - | - |
| Endosulfan sulfate | ug/L | - | - | - | - | - | - | - |
| Endrin | ug/L | - | - | - | - | - | - | - |
| Endrin aldehyde | ug/L | - | - | | - | - | - | - |
| Endrin ketone | ug/L | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/L | - | - | - | - | - | - | - |
| gamma-Chlordane | ug/L | - | - | - | - | - | - | - |
| Heptachlor | ug/L | - | - | - | - | - | - | - |
| Heptachlor epoxide | ug/L | - | - | - | - | - | - | - |
| Methoxychlor | ug/L | - | - | - | - | - | - | - |
| Toxaphene | ug/L | - | - | - | - | - | - | - |
| *General Chemistry* | | | | | | | | |
| Cyanide (total) | ug/L | - | - | - | - | - | - | - |
| *Field Parameters* | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | - | - | - | - |
| Dissolved Oxygen | ug/L | - | - | - | - | - | - | - |
| Oxidation reduction potential | millivolts | - | - | - | - | - | - | - |
| pH Field | s.u. | - | - | - | - | - | - | - |
| Temperature, Field | deg C | - | - | - | - | - | - | - |
| Turbidity | NTU | - | - | - | - | - | - | - |

*Notes:*
U - Not detected at or above associated value.
J - Estimated concentration.
UJ - Estimated reporting detection limit.
R - Rejected.

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *MW-3* | *MW-3* | *MW-3* | *MW-3* | *MW-3* | *MW-3* | *MW-4* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-080800-BW-018* | *GW-7043-080800-BW-019* | *GW-7043-080900-BW-020* | *GW-7043-080900-BW-021* | *GW-7043-RW-082300-15* | *GW-7043-061802-BW-009* | *GW-7043-RW-082200-13* |
| *Sample Date:* | | *8/8/2000* | *8/8/2000* | *8/9/2000* | *8/9/2000* | *8/23/2000* | *6/18/2002* | *8/22/2000* |
| *Parameters* | *Units* | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 12 | 0.90 J | 0.79 J | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1,2-Trichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | ug/L | 0.63 J | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethene (total) | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | - | 0.50 U |
| 1,2-Dichloropropane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 0.78 J | 0.95 J | 3.2 J | 10 U | 10 U | 10 UJ | 10 U |
| 2-Hexanone | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 UJ | 5.0 U |
| Acetone | ug/L | 2.4 J | 3.2 J | 12 U | 10 U | 10 U | 10 UJ | 10 U |
| Benzene | ug/L | 0.50 J | 0.31 J | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromodichloromethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromoform | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromomethane (Methyl Bromide) | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 UJ | 2.0 U |
| Carbon disulfide | ug/L | 0.16 J | 1.0 U | 1.0 U | 1.0 U | 0.14 J | 1.0 U | 1.0 U |
| Carbon tetrachloride | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chlorobenzene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chloroethane | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Chloroform (Trichloromethane) | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chloromethane (Methyl Chloride) | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| cis-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Dibromochloromethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Ethylbenzene | ug/L | 0.21 J | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Methylene chloride | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Styrene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Tetrachloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Toluene | ug/L | 1.4 | 0.26 J | 1.4 | 1.0 U | 1.0 U | 1.0 U | 0.89 J |
| trans-1,2-Dichloroethene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| trans-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Trichloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Vinyl chloride | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Xylene (total) | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,3-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,4-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dimethylphenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dinitrophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/L | - | - | - | - | - | - | - |
| 2,6-Dinitrotoluene | ug/L | - | - | - | - | - | - | - |
| 2-Chloronaphthalene | ug/L | - | - | - | - | - | - | - |
| 2-Chlorophenol | ug/L | - | - | - | - | - | - | - |
| 2-Methylnaphthalene | ug/L | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/L | - | - | - | - | - | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *MW-3* | *MW-3* | *MW-3* | *MW-3* | *MW-3* | *MW-3* | *MW-4* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-080800-BW-018* | *GW-7043-080800-BW-019* | *GW-7043-080900-BW-020* | *GW-7043-080900-BW-021* | *GW-7043-RW-082300-15* | *GW-7043-061802-BW-009* | *GW-7043-RW-082200-13* |
| *Sample Date:* | | *8/8/2000* | *8/8/2000* | *8/9/2000* | *8/9/2000* | *8/23/2000* | *6/18/2002* | *8/22/2000* |
| *Parameters* | *Units* | | | | | | | |
| 2-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 2-Nitrophenol | ug/L | - | - | - | - | - | - | - |
| 3,3'-Dichlorobenzidine | ug/L | - | - | - | - | - | - | - |
| 3-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Bromophenyl phenyl ether | ug/L | - | - | - | - | - | - | - |
| 4-Chloro-3-methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Chloroaniline | ug/L | - | - | - | - | - | - | - |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | - | - | - | - | - |
| 4-Methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 4-Nitrophenol | ug/L | - | - | - | - | - | - | - |
| Acenaphthene | ug/L | - | - | - | - | - | - | - |
| Acenaphthylene | ug/L | - | - | - | - | - | - | - |
| Anthracene | ug/L | - | - | - | - | - | - | - |
| Benzo(a)anthracene | ug/L | - | - | - | - | - | - | - |
| Benzo(a)pyrene | ug/L | - | - | - | - | - | - | - |
| Benzo(b)fluoranthene | ug/L | - | - | - | - | - | - | - |
| Benzo(g,h,i)perylene | ug/L | - | - | - | - | - | - | - |
| Benzo(k)fluoranthene | ug/L | - | - | - | - | - | - | - |
| Benzoic acid | ug/L | - | - | - | - | - | - | - |
| Benzyl Alcohol | ug/L | - | - | - | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | - | - | - | - | - |
| bis(2-Chloroethyl)ether | ug/L | - | - | - | - | - | - | - |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | - | - | - | - | - |
| Butyl benzylphthalate | ug/L | - | - | - | - | - | - | - |
| Carbazole | ug/L | - | - | - | - | - | - | - |
| Chrysene | ug/L | - | - | - | - | - | - | - |
| Dibenz(a,h)anthracene | ug/L | - | - | - | - | - | - | - |
| Dibenzofuran | ug/L | - | - | - | - | - | - | - |
| Diethyl phthalate | ug/L | - | - | - | - | - | - | - |
| Dimethyl phthalate | ug/L | - | - | - | - | - | - | - |
| Di-n-butylphthalate | ug/L | - | - | - | - | - | - | - |
| Di-n-octyl phthalate | ug/L | - | - | - | - | - | - | - |
| Fluoranthene | ug/L | - | - | - | - | - | - | - |
| Fluorene | ug/L | - | - | - | - | - | - | - |
| Hexachlorobenzene | ug/L | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/L | - | - | - | - | - | - | - |
| Hexachlorocyclopentadiene | ug/L | - | - | - | - | - | - | - |
| Hexachloroethane | ug/L | - | - | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | - | - | - | - | - |
| Isophorone | ug/L | - | - | - | - | - | - | - |
| Naphthalene | ug/L | - | - | - | - | - | - | - |
| Nitrobenzene | ug/L | - | - | - | - | - | - | - |
| N-Nitrosodi-n-propylamine | ug/L | - | - | - | - | - | - | - |
| N-Nitrosodiphenylamine | ug/L | - | - | - | - | - | - | - |
| Pentachlorophenol | ug/L | - | - | - | | - | - | - |
| Phenanthrene | ug/L | - | - | - | - | - | - | - |
| Phenol | ug/L | - | - | - | - | - | - | - |
| Pyrene | ug/L | - | - | - | - | - | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *MW-3* | *MW-3* | *MW-3* | *MW-3* | *MW-3* | *MW-3* | *MW-4* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-080800-BW-018* | *GW-7043-080800-BW-019* | *GW-7043-080900-BW-020* | *GW-7043-080900-BW-021* | *GW-7043-RW-082300-15* | *GW-7043-061802-BW-009* | *GW-7043-RW-082200-13* |
| *Sample Date:* | | *8/8/2000* | *8/8/2000* | *8/9/2000* | *8/9/2000* | *8/23/2000* | *6/18/2002* | *8/22/2000* |
| *Parameters* | *Units* | | | | | | | |
| *Metals* | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Antimony (Dissolved) | ug/L | 0.060 U | 0.060 U | 0.0026 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.0027 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Barium (Dissolved) | ug/L | 0.20 U | 0.20 U | 0.20 | 0.21 | 0.20 U | 0.20 U | 0.20 U |
| Beryllium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.00030 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.00020 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 82.2 | 57.2 | 62.0 | 64.6 | 90.1 | 87.1 | 66.0 |
| Chromium Total (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.0016 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Cobalt (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.00070 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U |
| Copper (Dissolved) | ug/L | 0.025 U | 0.025 U | 0.0011 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U |
| Iron | ug/L | - | - | - | - | - | - | - |
| Iron (Dissolved) | ug/L | 0.10 U | 0.32 | 0.014 U | 0.10 U | 0.10 U | 0.10 U | 0.10 U |
| Lead (Dissolved) | ug/L | 0.0030 U | 0.0030 U | 0.0015 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U |
| Magnesium (Dissolved) | ug/L | 35.5 | 28.7 | 35.5 | 38.0 | 32.5 | 33.1 | 33.5 |
| Manganese (Dissolved) | ug/L | 0.14 | 0.35 | 0.27 | 0.26 | 0.19 | 0.037 | 0.015 U |
| Mercury (Dissolved) | ug/L | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U |
| Nickel (Dissolved) | ug/L | 0.040 U | 0.040 U | 0.0013 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U |
| Potassium (Dissolved) | ug/L | 5.0 U | 8.0 | 8.7 | 8.7 | 5.0 U | 5.0 U | 5.0 U |
| Selenium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0036 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Silver (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 16.1 | 17.3 | 12.4 | 13.2 | 9.9 | 14.4 | 14.3 |
| Thallium (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.0071 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Vanadium (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.00050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U |
| Zinc (Dissolved) | ug/L | 0.020 U | 0.020 U | 0.0017 U | 0.020 U | 0.020 U | 0.026 | 0.020 U |
| *PCBs* | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | - | - | - | - | - |
| *Gas* | | | | | | | | |
| Ethane | ug/L | 5.4 | 14 | 9.5 | 11 | 0.50 U | 0.50 U | 0.50 U |
| Ethene | ug/L | 0.50 U | 2.7 | 2.1 | 2.0 | 0.50 U | 0.50 U | 0.50 U |
| *Pesticides* | | | | | | | | |
| 4,4'-DDD | ug/L | - | - | - | - | - | - | - |
| 4,4'-DDE | ug/L | - | - | - | - | - | - | - |
| 4,4'-DDT | ug/L | - | - | - | - | - | - | - |
| Aldrin | ug/L | - | - | - | - | - | - | - |
| alpha-BHC | ug/L | - | - | - | - | - | - | - |
| alpha-Chlordane | ug/L | - | - | - | - | - | - | - |
| beta-BHC | ug/L | - | - | - | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | MW-3 | MW-3 | MW-3 | MW-3 | MW-3 | MW-3 | MW-4 |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | GW-7043-080800-BW-018 | GW-7043-080800-BW-019 | GW-7043-080900-BW-020 | GW-7043-080900-BW-021 | GW-7043-RW-062300-15 | GW-7043-061802-BW-009 | GW-7043-RW-082200-13 |
| *Sample Date:* | | 8/8/2000 | 8/8/2000 | 8/9/2000 | 8/9/2000 | 8/23/2000 | 6/18/2002 | 8/22/2000 |
| *Parameters* | *Units* | | | | | | | |
| delta-BHC | ug/L | - | - | - | - | - | - | - |
| Dieldrin | ug/L | - | - | - | - | - | - | - |
| Endosulfan I | ug/L | - | - | - | - | - | - | - |
| Endosulfan II | ug/L | - | - | - | - | - | - | - |
| Endosulfan sulfate | ug/L | - | - | - | - | - | - | - |
| Endrin | ug/L | - | - | - | - | - | - | - |
| Endrin aldehyde | ug/L | - | - | - | - | - | - | - |
| Endrin ketone | ug/L | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/L | - | - | - | - | - | - | - |
| gamma-Chlordane | ug/L | - | - | - | - | - | - | - |
| Heptachlor | ug/L | - | - | - | - | - | - | - |
| Heptachlor epoxide | ug/L | - | - | - | - | - | - | - |
| Methoxychlor | ug/L | - | - | - | - | - | - | - |
| Toxaphene | ug/L | - | - | - | - | - | - | - |
| *General Chemistry* | | | | | | | | |
| Cyanide (total) | ug/L | - | - | - | - | - | - | - |
| *Field Parameters* | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | - | - | - | - |
| Dissolved Oxygen | ug/L | - | - | - | - | - | - | - |
| Oxidation reduction potential | millivolts | - | - | - | - | - | - | - |
| pH Field | s.u. | - | - | - | - | - | - | - |
| Temperature, Field | deg C | - | - | - | - | - | - | - |
| Turbidity | NTU | - | - | - | - | - | - | - |

*Notes:*
U - Not detected at or above associated value.
J - Estimated concentration.
UJ - Estimated reporting detection limit.
R - Rejected.

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *MW-4* | *MW-5* | *MW-5* | *MW-6* | *MW-6* | *MW-7* | *MW-7* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-061902-BW-019* | *GW-7043-RW-082200-12* | *GW-7043-061902-BW-020* | *GW-7043-060801-NZ-008* | *GW-7043-061902-BW-021* | *GW-7043-061101-NZ-010* | *GW-7043-061802-BW-007* |
| *Sample Date:* | | *6/19/2002* | *8/22/2000* | *6/19/2002* | *6/8/2001* | *6/19/2002* | *6/11/2001* | *6/18/2002* |
| *Parameters* | *Units* | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1,2-Trichloroethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethene (total) | ug/L | - | 103.9 | - | 8.85 | - | 0.50 U | - |
| 1,2-Dichloropropane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 10 UJ | 33 U | 10 UJ | 10 U | 10 UJ | 10 U | 10 UJ |
| 2-Hexanone | ug/L | 10 UJ | 33 U | 10 UJ | 10 U | 10 UJ | 10 U | 10 UJ |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 5.0 UJ | 17 U | 5.0 UJ | 5.0 U | 5.0 UJ | 5.0 U | 5.0 UJ |
| Acetone | ug/L | 10 UJ | 33 U | 10 UJ | 10 U | 10 UJ | 10 U | 10 UJ |
| Benzene | ug/L | 1.0 U | 3.3 U | 1.0 U | 0.20 J | 1.0 U | 1.0 U | 1.0 U |
| Bromodichloromethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromoform | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromomethane (Methyl Bromide) | ug/L | 2.0 UJ | 6.7 U | 2.0 UJ | 2.0 U | 2.0 UJ | 2.0 U | 2.0 UJ |
| Carbon disulfide | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Carbon tetrachloride | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chlorobenzene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chloroethane | ug/L | 2.0 U | 6.7 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Chloroform (Trichloromethane) | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chloromethane (Methyl Chloride) | ug/L | 2.0 U | 6.7 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | ug/L | 0.50 U | 96 | 10 | 8.5 | 7.0 | 0.50 U | 0.50 U |
| cis-1,3-Dichloropropene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Dibromochloromethane | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Ethylbenzene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Methylene chloride | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Styrene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Tetrachloroethene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Toluene | ug/L | 1.0 U | 0.35 J | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| trans-1,2-Dichloroethene | ug/L | 0.50 U | 7.9 | 1.7 | 0.35 J | 0.29 J | 0.50 U | 0.50 U |
| trans-1,3-Dichloropropene | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Trichloroethene | ug/L | 0.33 J | 6.5 | 0.58 J | 6.5 | 12 | 1.0 U | 0.19 J |
| Vinyl chloride | ug/L | 2.0 U | 6.7 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Xylene (total) | ug/L | 1.0 U | 3.3 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,3-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,4-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dimethylphenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dinitrophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/L | - | - | - | - | - | - | - |
| 2,6-Dinitrotoluene | ug/L | - | - | - | - | - | - | - |
| 2-Chloronaphthalene | ug/L | - | - | - | - | - | - | - |
| 2-Chlorophenol | ug/L | - | - | - | - | - | - | - |
| 2-Methylnaphthalene | ug/L | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/L | - | - | - | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *MW-4* | *MW-5* | *MW-5* | *MW-6* | *MW-6* | *MW-7* | *MW-7* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-061902-BW-019* | *GW-7043-RW-082200-12* | *GW-7043-061902-BW-020* | *GW-7043-060801-NZ-008* | *GW-7043-061902-BW-021* | *GW-7043-061101-NZ-010* | *GW-7043-061802-BW-007* |
| *Sample Date:* | | *6/19/2002* | *8/22/2000* | *6/19/2002* | *6/8/2001* | *6/19/2002* | *6/11/2001* | *6/18/2002* |
| *Parameters* | *Units* | | | | | | | |
| 2-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 2-Nitrophenol | ug/L | - | - | - | - | - | - | - |
| 3,3'-Dichlorobenzidine | ug/L | - | - | - | - | - | - | - |
| 3-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Bromophenyl phenyl ether | ug/L | - | - | - | - | - | - | - |
| 4-Chloro-3-methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Chloroaniline | ug/L | - | - | - | - | - | - | - |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | - | - | - | - | - |
| 4-Methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 4-Nitrophenol | ug/L | - | - | - | - | - | - | - |
| Acenaphthene | ug/L | - | - | - | - | - | - | - |
| Acenaphthylene | ug/L | - | - | - | - | - | - | - |
| Anthracene | ug/L | - | - | - | - | - | - | - |
| Benzo(a)anthracene | ug/L | - | - | - | - | - | - | - |
| Benzo(a)pyrene | ug/L | - | - | - | - | - | - | - |
| Benzo(b)fluoranthene | ug/L | - | - | - | - | - | - | - |
| Benzo(g,h,i)perylene | ug/L | - | - | - | - | - | - | - |
| Benzo(k)fluoranthene | ug/L | - | - | - | - | - | - | - |
| Benzoic acid | ug/L | - | - | - | - | - | - | - |
| Benzyl Alcohol | ug/L | - | - | - | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | - | - | - | - | - |
| bis(2-Chloroethyl)ether | ug/L | - | - | - | - | - | - | - |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | - | - | - | - | - |
| Butyl benzylphthalate | ug/L | - | - | - | - | - | - | - |
| Carbazole | ug/L | - | - | - | - | - | - | - |
| Chrysene | ug/L | - | - | - | - | - | - | - |
| Dibenz(a,h)anthracene | ug/L | - | - | - | - | - | - | - |
| Dibenzofuran | ug/L | - | - | - | - | - | - | - |
| Diethyl phthalate | ug/L | - | - | - | - | - | - | - |
| Dimethyl phthalate | ug/L | - | - | - | - | - | - | - |
| Di-n-butylphthalate | ug/L | - | - | - | - | - | - | - |
| Di-n-octyl phthalate | ug/L | - | - | - | - | - | - | - |
| Fluoranthene | ug/L | - | - | - | - | - | - | - |
| Fluorene | ug/L | - | - | - | - | - | - | - |
| Hexachlorobenzene | ug/L | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/L | - | - | - | - | - | - | - |
| Hexachlorocyclopentadiene | ug/L | - | - | - | - | - | - | - |
| Hexachloroethane | ug/L | - | - | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | - | - | - | - | - |
| Isophorone | ug/L | - | - | - | - | - | - | - |
| Naphthalene | ug/L | - | - | - | - | - | - | - |
| Nitrobenzene | ug/L | - | - | - | - | - | - | - |
| N-Nitrosodi-n-propylamine | ug/L | - | - | - | - | - | - | - |
| N-Nitrosodiphenylamine | ug/L | - | - | - | - | - | - | - |
| Pentachlorophenol | ug/L | - | - | - | - | - | - | - |
| Phenanthrene | ug/L | - | - | - | - | - | - | - |
| Phenol | ug/L | - | - | - | - | - | - | - |
| Pyrene | ug/L | - | - | - | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *MW-4* | *MW-5* | *MW-5* | *MW-6* | *MW-6* | *MW-7* | *MW-7* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-061902-BW-019* | *GW-7043-RW-082200-12* | *GW-7043-061902-BW-020* | *GW-7043-060801-NZ-008* | *GW-7043-061902-BW-021* | *GW-7043-061101-NZ-010* | *GW-7043-061802-BW-007* |
| *Sample Date:* | | *6/19/2002* | *8/22/2000* | *6/19/2002* | *6/8/2001* | *6/19/2002* | *6/11/2001* | *6/18/2002* |
| *Parameters* | *Units* | | | | | | | |
| *Metals* | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Antimony (Dissolved) | ug/L | 0.060 U | 0.060 U | 0.060 U | 0.0026 U | 0.060 U | 0.060 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.0027 U | 0.010 U | 0.010 U | 0.010 U |
| Barium (Dissolved) | ug/L | 0.20 U | 0.21 | 0.20 U | 0.00030 U | 0.20 U | 0.20 U | 0.20 U |
| Beryllium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.00020 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 81.8 | 106 | 46.6 | 113 | 111 | 52.2 | 82.3 |
| Chromium Total (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.0016 U | 0.010 U | 0.010 U | 0.010 U |
| Cobalt (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.00070 U | 0.050 U | 0.050 U | 0.050 U |
| Copper (Dissolved) | ug/L | 0.025 U | 0.025 U | 0.025 U | 0.0011 U | 0.025 U | 0.025 U | 0.025 U |
| Iron | ug/L | - | - | - | - | - | - | - |
| Iron (Dissolved) | ug/L | 0.10 U | 0.10 U | 0.18 | 0.014 U | 0.10 U | 0.10 U | 0.10 U |
| Lead (Dissolved) | ug/L | 0.0030 U | 0.0030 U | 0.0030 U | 0.0015 U | 0.0030 U | 0.0030 U | 0.0030 U |
| Magnesium (Dissolved) | ug/L | 36.6 | 30.3 | 14.5 | 30.9 | 27.1 | 19.8 | 36.0 |
| Manganese (Dissolved) | ug/L | 0.018 | 0.053 | 0.046 | 0.12 | 0.015 U | 0.055 | 0.26 |
| Mercury (Dissolved) | ug/L | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U |
| Nickel (Dissolved) | ug/L | 0.040 U | 0.040 U | 0.040 U | 0.0013 U | 0.040 U | 0.040 U | 0.040 U |
| Potassium (Dissolved) | ug/L | 5.0 U | 5.0 U | 5.0 U | 0.016 U | 5.0 U | 13.1 | 5.0 U |
| Selenium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0036 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Silver (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 11.7 | 7.0 | 8.0 | 8.6 | 6.3 | 29.2 | 11.9 |
| Thallium (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.0071 U | 0.010 U | 0.010 U | 0.010 U |
| Vanadium (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.00050 U | 0.050 U | 0.050 U | 0.050 U |
| Zinc (Dissolved) | ug/L | 0.027 | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.23 | 0.020 U |
| *PCBs* | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | - | - | - | - | - |
| *Gas* | | | | | | | | |
| Ethane | ug/L | 0.50 U | 0.50 U | 0.50 U | 1.3 | 0.50 U | 5.9 | 0.50 U |
| Ethene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 2.3 | 0.50 U |
| *Pesticides* | | | | | | | | |
| 4,4'-DDD | ug/L | - | - | - | - | - | - | - |
| 4,4'-DDE | ug/L | - | - | - | - | - | - | - |
| 4,4'-DDT | ug/L | - | - | - | - | - | - | - |
| Aldrin | ug/L | - | - | - | - | - | - | - |
| alpha-BHC | ug/L | - | - | - | - | - | - | - |
| alpha-Chlordane | ug/L | - | - | - | - | - | - | - |
| beta-BHC | ug/L | - | - | - | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *MW-4* | *MW-5* | *MW-5* | *MW-6* | *MW-6* | *MW-7* | *MW-7* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-061902-BW-019* | *GW-7043-RW-082200-12* | *GW-7043-061902-BW-020* | *GW-7043-060801-NZ-008* | *GW-7043-061902-BW-021* | *GW-7043-061101-NZ-010* | *GW-7043-061802-BW-007* |
| *Sample Date:* | | *6/19/2002* | *8/22/2000* | *6/19/2002* | *6/8/2001* | *6/19/2002* | *6/11/2001* | *6/18/2002* |
| *Parameters* | Units | | | | | | | |
| delta BHC | ug/L | - | - | - | - | - | - | - |
| Dieldrin | ug/L | - | - | - | - | - | - | - |
| Endosulfan I | ug/L | - | - | - | - | - | - | - |
| Endosulfan II | ug/L | - | - | - | - | - | - | - |
| Endosulfan sulfate | ug/L | - | - | - | - | - | - | - |
| Endrin | ug/L | - | - | - | - | - | - | - |
| Endrin aldehyde | ug/L | - | - | - | - | - | - | - |
| Endrin ketone | ug/L | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/L | - | - | - | - | - | - | - |
| gamma-Chlordane | ug/L | - | - | - | - | - | - | - |
| Heptachlor | ug/L | - | - | - | - | - | - | - |
| Heptachlor epoxide | ug/L | - | - | - | - | - | - | - |
| Methoxychlor | ug/L | - | - | - | - | - | - | - |
| Toxaphene | ug/L | - | - | - | - | - | - | - |
| *General Chemistry* | | | | | | | | |
| Cyanide (total) | ug/L | - | - | - | - | - | - | - |
| *Field Parameters* | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | - | - | - | - |
| Dissolved Oxygen | ug/L | - | - | - | - | - | - | - |
| Oxidation reduction potential | millivolts | - | - | - | - | - | - | - |
| pH Field | s.u. | - | - | - | - | - | - | - |
| Temperature, Field | deg C | - | - | - | - | - | - | - |
| Turbidity | NTU | - | - | - | - | - | - | - |

*Notes:*
U - Not detected at or above associated value.
J - Estimated concentration.
UJ - Estimated reporting detection limit
R - Rejected.

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *MW-8* | *MW-8* | *MW-8* | *MW-8* | *MW-8* | *MW-8* | *MW-9* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-053101-CA-003* | *GW-7043-053101-CA-004* | *GW-7043-053101-CA-005* | *GW-7043-053101-CA-006* | *GW-7043-060801-NZ-009* | *GW-7043-061802-BW-006* | *GW-7043-063001-CA-001* |
| *Sample Date:* | | *5/31/2001* | *5/31/2001* | *5/31/2001* | *5/31/2001* | *6/8/2001* | *6/18/2002* | *5/30/2001* |
| | | | | *(Duplicate)* | | | | |
| *Parameters* | *Units* | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1,2-Trichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2-Dichloroethene (total) | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | - | 0.50 U |
| 1,2-Dichloropropane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 0.53 J |
| 2-Hexanone | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 UJ | 5.0 U |
| Acetone | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Benzene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 0.89 J | 1.0 U | 1.0 U |
| Bromodichloromethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromoform | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromomethane (Methyl Bromide) | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 UJ | 2.0 U |
| Carbon disulfide | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Carbon tetrachloride | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chlorobenzene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chloroethane | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Chloroform (Trichloromethane) | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Chloromethane (Methyl Chloride) | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| cis-1,2-Dichloroethene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| cis-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Dibromochloromethane | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Ethylbenzene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 0.19 J | 1.0 U | 1.0 U |
| Methylene chloride | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Styrene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Tetrachloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 0.32 J | 1.0 U | 1.0 U |
| Toluene | ug/L | 1.0 U | 0.18 J | 0.18 J | 1.0 U | 1.8 | 1.0 U | 1.0 U |
| trans-1,2-Dichloroethene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| trans-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Trichloroethene | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 0.21 J | 1.0 U | 1.0 U |
| Vinyl chloride | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Xylene (total) | ug/L | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 0.94 J | 1.0 U | 1.0 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,3-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 1,4-Dichlorobenzene | ug/L | - | - | - | - | - | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dichlorophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dimethylphenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dinitrophenol | ug/L | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/L | - | - | - | - | - | - | - |
| 2,6-Dinitrotoluene | ug/L | - | - | - | - | - | - | - |
| 2-Chloronaphthalene | ug/L | - | - | - | - | - | - | - |
| 2-Chlorophenol | ug/L | - | - | - | - | - | - | - |
| 2-Methylnaphthalene | ug/L | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/L | - | - | - | - | - | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *MW-8* | *MW-8* | *MW-8* | *MW-8* | *MW-8* | *MW-8* | *MW-9* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-053101-CA-003* | *GW-7043-053101-CA-004* | *GW-7043-053101-CA-005* | *GW-7043-053101-CA-006* | *GW-7043-060801-NZ-009* | *GW-7043-061802-BW-006* | *GW-7043-053001-CA-001* |
| *Sample Date:* | | *5/31/2001* | *5/31/2001* | *5/31/2001* | *5/31/2001* | *6/8/2001* | *6/18/2002* | *5/30/2001* |
| | | | | *(Duplicate)* | | | | |
| *Parameters* | *Units* | | | | | | | |
| 2-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 2-Nitrophenol | ug/L | - | - | - | - | - | - | - |
| 3,3'-Dichlorobenzidine | ug/L | - | - | - | - | - | - | - |
| 3-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Bromophenyl phenyl ether | ug/L | - | - | - | - | - | - | - |
| 4-Chloro-3-methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Chloroaniline | ug/L | - | - | - | - | - | - | - |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | - | - | - | - | - |
| 4-Methylphenol | ug/L | - | - | - | - | - | - | - |
| 4-Nitroaniline | ug/L | - | - | - | - | - | - | - |
| 4-Nitrophenol | ug/L | - | - | - | - | - | - | - |
| Acenaphthene | ug/L | - | - | - | - | - | - | - |
| Acenaphthylene | ug/L | - | - | - | - | - | - | - |
| Anthracene | ug/L | - | - | - | - | - | - | - |
| Benzo(a)anthracene | ug/L | - | - | - | - | - | - | - |
| Benzo(a)pyrene | ug/L | - | - | - | - | - | - | - |
| Benzo(b)fluoranthene | ug/L | - | - | - | - | - | - | - |
| Benzo(g,h,i)perylene | ug/L | - | - | - | - | - | - | - |
| Benzo(k)fluoranthene | ug/L | - | - | - | - | - | - | - |
| Benzoic acid | ug/L | - | - | - | - | - | - | - |
| Benzyl Alcohol | ug/L | - | - | - | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | - | - | - | - | - |
| bis(2-Chloroethyl)ether | ug/L | - | - | - | - | - | - | - |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | - | - | - | - | - |
| Butyl benzylphthalate | ug/L | - | - | - | - | - | - | - |
| Carbazole | ug/L | - | - | - | - | - | - | - |
| Chrysene | ug/L | - | - | - | - | - | - | - |
| Dibenz(a,h)anthracene | ug/L | - | - | - | - | - | - | - |
| Dibenzofuran | ug/L | - | - | - | - | - | - | - |
| Diethyl phthalate | ug/L | - | - | - | - | - | - | - |
| Dimethyl phthalate | ug/L | - | - | - | - | - | - | - |
| Di-n-butylphthalate | ug/L | - | - | - | - | - | - | - |
| Di-n-octyl phthalate | ug/L | - | - | - | - | - | - | - |
| Fluoranthene | ug/L | - | - | - | - | - | - | - |
| Fluorene | ug/L | - | - | - | - | - | - | - |
| Hexachlorobenzene | ug/L | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/L | - | - | - | - | - | - | - |
| Hexachlorocyclopentadiene | ug/L | - | - | - | - | - | - | - |
| Hexachloroethane | ug/L | - | - | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | - | - | - | - | - |
| Isophorone | ug/L | - | - | - | - | - | - | - |
| Naphthalene | ug/L | - | - | - | - | - | - | - |
| Nitrobenzene | ug/L | - | - | - | - | - | - | - |
| N-Nitrosodi-n-propylamine | ug/L | - | - | - | - | - | - | - |
| N-Nitrosodiphenylamine | ug/L | - | - | - | - | - | - | - |
| Pentachlorophenol | ug/L | - | - | - | - | - | - | - |
| Phenanthrene | ug/L | - | - | - | - | - | - | - |
| Phenol | ug/L | - | - | - | - | - | - | - |
| Pyrene | ug/L | - | - | - | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *MW-8* | *MW-8* | *MW-8* | *MW-8* | *MW-8* | *MW-8* | *MW-9* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-053101-CA-003* | *GW-7043-053101-CA-004* | *GW-7043-053101-CA-005* | *GW-7043-053101-CA-006* | *GW-7043-060801-NZ-009* | *GW-7043-061802-BW-006* | *GW-7043-053001-CA-001* |
| *Sample Date:* | | *5/31/2001* | *5/31/2001* | *5/31/2001* | *5/31/2001* | *6/8/2001* | *6/18/2002* | *5/30/2001* |
| | | | | *(Duplicate)* | | | | |
| *Parameters* | *Units* | | | | | | | |
| *Metals* | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Antimony (Dissolved) | ug/L | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Barium (Dissolved) | ug/L | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Beryllium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 66.1 | 60.2 | 57.8 | 49.4 | 53.7 | 23.8 | 112 J |
| Chromium Total (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Cobalt (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U |
| Copper (Dissolved) | ug/L | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U |
| Iron | ug/L | - | - | - | - | - | - | - |
| Iron (Dissolved) | ug/L | 0.10 U | 0.14 | 0.10 U | 0.10 U | 0.10 U | 0.10 U | 0.10 U |
| Lead (Dissolved) | ug/L | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U |
| Magnesium (Dissolved) | ug/L | 52.0 | 57.3 | 54.1 | 49.6 | 43.3 | 37.7 | 51.0 |
| Manganese (Dissolved) | ug/L | 0.37 | 0.31 | 0.32 | 0.14 | 0.053 | 0.015 U | 0.67 |
| Mercury (Dissolved) | ug/L | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U |
| Nickel (Dissolved) | ug/L | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.099 | 0.040 U | 0.040 U |
| Potassium (Dissolved) | ug/L | 10 | 10.0 | 9.2 | 8.7 | 7.0 | 5.5 | 5.0 U |
| Selenium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Silver (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 25.1 | 28.9 | 27.3 | 27.0 | 26.4 | 40.9 | 10.2 |
| Thallium (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Vanadium (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U |
| Zinc (Dissolved) | ug/L | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U |
| *PCBs* | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | - | - | - | - | - |
| *Gas* | | | | | | | | |
| Ethane | ug/L | 18 | 23 | 27 | 22 | 1.4 | 0.50 U | 3.5 |
| Ethene | ug/L | 2.6 | 3.5 | 3.8 | 3.8 | 0.50 U | 0.50 U | 0.75 |
| *Pesticides* | | | | | | | | |
| 4,4'-DDD | ug/L | - | - | - | - | - | - | - |
| 4,4'-DDE | ug/L | - | - | - | - | - | - | - |
| 4,4'-DDT | ug/L | - | - | - | - | - | - | - |
| Aldrin | ug/L | - | - | - | - | - | - | - |
| alpha-BHC | ug/L | - | - | - | - | - | - | - |
| alpha-Chlordane | ug/L | - | - | - | - | - | - | - |
| beta-BHC | ug/L | - | - | - | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *MW-8* | *MW-8* | *MW-8* | *MW-8* | *MW-8* | *MW-8* | *MW-9* |
|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-053101-CA-003* | *GW-7043-053101-CA-004* | *GW-7043-053101-CA-005* | *GW-7043-053101-CA-006* | *GW-7043-060801-NZ-009* | *GW-7043-061802-BW-006* | *GW-7043-063001-CA-001* |
| *Sample Date:* | | *5/31/2001* | *5/31/2001* | *5/31/2001* | *5/31/2001* | *6/8/2001* | *6/18/2002* | *5/30/2001* |
| | | | | *(Duplicate)* | | | | |
| *Parameters* | *Units* | | | | | | | |
| delta-BHC | ug/L | - | - | - | - | - | - | - |
| Dieldrin | ug/L | - | - | - | - | - | - | - |
| Endosulfan I | ug/L | - | - | - | - | - | - | - |
| Endosulfan II | ug/L | - | - | - | - | - | - | - |
| Endosulfan sulfate | ug/L | - | - | - | - | - | - | - |
| Endrin | ug/L | - | - | - | - | - | - | - |
| Endrin aldehyde | ug/L | - | - | - | - | - | - | - |
| Endrin ketone | ug/L | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/L | - | - | - | - | - | - | - |
| gamma-Chlordane | ug/L | - | - | - | - | - | - | - |
| Heptachlor | ug/L | - | - | - | - | - | - | - |
| Heptachlor epoxide | ug/L | - | - | - | - | - | - | - |
| Methoxychlor | ug/L | - | - | - | - | - | - | |
| Toxaphene | ug/L | - | - | - | - | - | - | - |
| *General Chemistry* | | | | | | | | |
| Cyanide (total) | ug/L | - | - | - | - | - | - | - |
| *Field Parameters* | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | - | - | - | |
| Dissolved Oxygen | ug/L | - | - | - | - | - | - | - |
| Oxidation reduction potential | millivolts | - | - | - | - | - | - | - |
| pH Field | s.u. | - | - | - | - | - | - | - |
| Temperature, Field | deg C | - | - | - | - | - | - | - |
| Turbidity | NTU | - | - | - | - | - | - | - |

*Notes:*
U - Not detected at or above associated value.
J - Estimated concentration.
UJ - Estimated reporting detection limit.
R - Rejected.

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *MW-9* | *MW-9* | *S-1* | *S-1* | *S-1* | *S-1* | *S-1* | *S-1* | *S-1* | *S-2* | *S-2* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-060701-NZ-006* | *GW-7043-061802-BW-005* | *W-MT-024* | *W-DF-007* | *001(EPA)* | *S193097(GM)* | *GW-7043-090199-RSH-100* | *GW-7043-RW-082100-01* | *GW-7043-061702-BW-001* | *W-MT-025* | *W-DF-003* |
| *Sample Date:* | | *6/7/2001* | *6/18/2002* | *8/7/1996* | *10/22/1996* | *9/30/1997* | *9/30/1997* | *9/1/1999* | *8/21/2000* | *6/17/2002* | *8/7/1996* | *10/21/1996* |
| *Parameters* | *Units* | | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| 1,1,2-Trichloroethane | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| 1,1-Dichloroethane | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| 1,1-Dichloroethene | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| 1,2-Dichloroethane | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| 1,2-Dichloroethene (total) | ug/L | 0.50 U | - | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 0.50 U | - | 5.0 U | 5.0 U |
| 1,2-Dichloropropane | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 10 U | 10 UJ | 50 U | 50 U | 2 U | 10 U | 10 U | 10 U | 10 U | 50 U | 50 U |
| 2-Hexanone | ug/L | 10 U | 10 UJ | 50 U | 50 U | 2 U | 10 U | 10 U | 10 U | 10 U | 50 U | 50 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 5.0 U | 5.0 UJ | 50 U | 50 U | 2 U | 10 U | 10 U | 5.0 U | 5.0 U | 50 U | 50 U |
| Acetone | ug/L | 20 U | 36 J | 50 U | 50 U | 2 U | 10 U | 10 U | 10 U | 10 U | 50 U | 50 U |
| Benzene | ug/L | 0.24 J | 0.26 J | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Bromodichloromethane | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Bromoform | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Bromomethane (Methyl Bromide) | ug/L | 2.0 U | 2.0 UJ | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.0 U | 2.0 U | 2.0 U | 5.0 U | 5.0 U |
| Carbon disulfide | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 2 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Carbon tetrachloride | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Chlorobenzene | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Chloroethane | ug/L | 2.0 U | 2.0 U | 10 U | 10 U | 0.5 U | 10 U | 2.0 U | 2.0 U | 2.0 U | 10 U | 10 U |
| Chloroform (Trichloromethane) | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Chloromethane (Methyl Chloride) | ug/L | 2.0 U | 2.0 U | 10 U | 10 U | 0.5 U | 10 U | 2.0 U | 2.0 U | 2.0 U | 10 U | 10 U |
| cis-1,2-Dichloroethene | ug/L | 0.50 U | 0.50 U | - | - | - | - | - | 0.50 U | 0.50 U | - | - |
| cis-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Dibromochloromethane | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Ethylbenzene | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Methylene chloride | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Styrene | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Tetrachloroethene | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Toluene | ug/L | 0.58 J | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| trans-1,2-Dichloroethene | ug/L | 0.50 U | 0.50 U | - | - | - | - | - | 0.50 U | 0.50 U | - | - |
| trans-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| Trichloroethene | ug/L | 0.15 J | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 11 | 8.8 |
| Vinyl chloride | ug/L | 2.0 U | 2.0 U | 10 U | 10 U | 0.5 U | 10 U | 2.0 U | 2.0 U | 2.0 U | 10 U | 10 U |
| Xylene (total) | ug/L | 0.40 J | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 1,2-Dichlorobenzene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 1,3-Dichlorobenzene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 1,4-Dichlorobenzene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 2,4,5-Trichlorophenol | ug/L | - | - | 10 U | 10 U | 57 U | - | - | - | - | 10 U | 10 UJ |
| 2,4,6-Trichlorophenol | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 2,4-Dichlorophenol | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 2,4-Dimethylphenol | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 2,4-Dinitrophenol | ug/L | - | - | 50 U | 50 U | 57 U | - | - | - | - | 50 U | 50 UJ |
| 2,4-Dinitrotoluene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 2,6-Dinitrotoluene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 2-Chloronaphthalene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 2-Chlorophenol | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 2-Methylnaphthalene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 2-Methylphenol | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *MW-9* | *MW-9* | *S-1* | *S-1* | *S-1* | *S-1* | *S-1* | *S-1* | *S-1* | *S-2* | *S-2* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-060701-NZ-006* | *GW-7043-061802-BW-005* | *W-MT-024* | *W-DF-007* | *001(EPA)* | *S193097(GM)* | *GW-7043-090199-RSH-100* | *GW-7043-RW-082100-01* | *GW-7043-061702-BW-001* | *W-MT-025* | *W-DF-003* |
| *Sample Date:* | | *6/7/2001* | *6/18/2002* | *8/7/1996* | *10/22/1996* | *9/30/1997* | *9/30/1997* | *9/1/1999* | *8/21/2000* | *6/17/2002* | *8/7/1996* | *10/21/1996* |
| *Parameters* | *Units* | | | | | | | | | | | |
| 2-Nitroaniline | ug/L | - | - | 50 U | 50 U | 57 U | - | - | - | - | 50 U | 50 UJ |
| 2-Nitrophenol | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 3,3'-Dichlorobenzidine | ug/L | - | - | 50 U | 50 U | 23 U | - | - | - | - | 50 U | 50 UJ |
| 3-Nitroaniline | ug/L | - | - | 50 U | 50 U | 57 U | - | - | - | - | 50 U | 50 UJ |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | 50 U | 50 U | 57 U | - | - | - | - | 50 U | 50 UJ |
| 4-Bromophenyl phenyl ether | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 4-Chloro-3-methylphenol | ug/L | - | - | 10 U | 10 U | 23 U | - | - | - | - | 10 U | 10 UJ |
| 4-Chloroaniline | ug/L | - | - | 10 U | 10 U | 23 U | - | - | - | - | 10 U | 10 UJ |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 4-Methylphenol | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| 4-Nitroaniline | ug/L | - | - | 50 U | 50 U | 57 U | - | - | - | - | 50 U | 50 UJ |
| 4-Nitrophenol | ug/L | - | - | 50 U | 50 U | 57 U | - | - | - | - | 50 U | 50 UJ |
| Acenaphthene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Acenaphthylene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Anthracene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Benzo(a)anthracene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Benzo(a)pyrene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Benzo(b)fluoranthene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Benzo(g,h,i)perylene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Benzo(k)fluoranthene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Benzoic acid | ug/L | - | - | - | - | 57 U | - | - | - | - | - | - |
| Benzyl Alcohol | ug/L | - | - | - | - | 11 U | - | - | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| bis(2-Chloroethyl)ether | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Butyl benzylphthalate | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Carbazole | ug/L | - | - | 10 U | 10 U | - | - | - | - | - | 10 U | 10 UJ |
| Chrysene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Dibenz(a,h)anthracene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Dibenzofuran | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Diethyl phthalate | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Dimethyl phthalate | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Di-n-butylphthalate | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Di-n-octyl phthalate | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Fluoranthene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Fluorene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Hexachlorobenzene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Hexachlorobutadiene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Hexachlorocyclopentadiene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Hexachloroethane | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Isophorone | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Naphthalene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Nitrobenzene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| N-Nitrosodi-n-propylamine | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| N-Nitrosodiphenylamine | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Pentachlorophenol | ug/L | - | - | 50 U | 50 U | 57 U | - | - | - | - | 50 U | 50 UJ |
| Phenanthrene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Phenol | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |
| Pyrene | ug/L | - | - | 10 U | 10 U | 11 U | - | - | - | - | 10 U | 10 UJ |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *MW-9* | *MW-9* | *S-1* | *S-1* | *S-1* | *S-1* | *S-1* | *S-1* | *S-1* | *S-2* | *S-2* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-060701-NZ-006* | *GW-7043-061802-BW-005* | *W-MT-024* | *W-DF-007* | *001(EPA)* | *S193097(GM)* | *GW-7043-090199-RSH-100* | *GW-7043-RW-082100-01* | *GW-7043-061702-BW-001* | *W-MT-025* | *W-DF-003* |
| *Sample Date:* | | *6/7/2001* | *6/18/2002* | *8/7/1996* | *10/22/1996* | *9/30/1997* | *9/30/1997* | *9/1/1999* | *8/21/2000* | *6/17/2002* | *8/7/1996* | *10/21/1996* |
| *Parameters* | *Units* | | | | | | | | | | | |
| *Metals* | | | | | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.059 | 0.0195 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 1.5 |
| Antimony (Dissolved) | ug/L | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.0046 | 0.0029 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0020 U | 0.0059 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Barium (Dissolved) | ug/L | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.048 | 0.0518 B | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Beryllium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.0001 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.0003 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 77.0 | 63.5 | 87.0 | 231 | 82.9 | 86.5 | 88.9 | 88.7 | 94.3 | 87.1 | 76.8 |
| Chromium Total (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0029 | 0.0008 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.016 |
| Cobalt (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U | 0.0007 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U |
| Copper (Dissolved) | ug/L | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.0013 U | 0.0015 B | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U |
| Iron | ug/L | - | - | - | - | - | - | 3.65 | - | - | - | - |
| Iron (Dissolved) | ug/L | 0.10 U | 0.68 | 0.10 U | 0.10 U | 0.011 U | 0.0134 U | 0.10 U | 0.10 U | 0.10 U | 0.10 U | 2.6 |
| Lead (Dissolved) | ug/L | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0020 U | 0.0019 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U |
| Magnesium (Dissolved) | ug/L | 47.0 | 27.8 | 32.6 | 42.8 | 30.4 | 32.3 | 31.9 | 34.1 | 35.9 | 34.7 | 31.5 |
| Manganese (Dissolved) | ug/L | 0.28 | 0.082 | 0.015 U | 0.32 | 0.0012 | 0.00077 B | 0.015 U | 0.015 U | 0.015 U | 0.028 | 0.10 |
| Mercury (Dissolved) | ug/L | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00010 U | 0.0001 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U |
| Nickel (Dissolved) | ug/L | 0.22 | 0.040 U | 0.040 U | 0.040 U | 0.00060 U | 0.0013 U | 0.040 U | 0.040 U | 0.040 U | 0.065 | 0.049 |
| Potassium (Dissolved) | ug/L | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 1.1 | 0.853 BE | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U |
| Selenium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0020 U | 0.0044 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Silver (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.00070 U | 0.0008 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 22.3 | 20.7 | 5.0 U | 5.0 U | 2.3 | 3.1 B | 5.2 J | 5.0 U | 5.0 U | 6.7 | 13.9 |
| Thallium (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0019 U | 0.005 U | 0.010 U | 0.010 U | 0.01 U | 0.010 U | 0.010 U |
| Vanadium (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U | 0.0007 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U |
| Zinc (Dissolved) | ug/L | 0.020 U | 0.020 U | 0.050 U | 0.050 U | 0.0027 | 0.0082 BE | 0.037 | 0.020 U | 0.020 U | 0.050 U | 0.050 U |
| *PCBs* | | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| *Gas* | | | | | | | | | | | | |
| Ethane | ug/L | 3.4 | 0.61 | - | - | - | - | 0.50 U | 0.50 U | 0.50 U | - | - |
| Ethene | ug/L | 0.57 | 0.50 U | - | - | - | - | 0.50 U | 0.50 U | 0.50 U | - | - |
| *Pesticides* | | | | | | | | | | | | |
| 4,4'-DDD | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| 4,4'-DDE | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| 4,4'-DDT | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Aldrin | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| alpha-BHC | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| alpha-Chlordane | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| beta-BHC | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *MW-9* | *MW-9* | *S-1* | *S-1* | *S-1* | *S-1* | *S-1* | *S-1* | *S-1* | *S-2* | *S-2* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-060701-NZ-006* | *GW-7043-061802-BW-005* | *W-MT-024* | *W-DF-007* | *001(EPA)* | *S193097(GM)* | *GW-7043-090199-RSH-100* | *GW-7043-RW-082100-01* | *GW-7043-061702-BW-001* | *W-MT-025* | *W-DF-003* |
| *Sample Date:* | | *6/7/2001* | *6/18/2002* | *8/7/1996* | *10/22/1996* | *9/30/1997* | *9/30/1997* | *9/1/1999* | *8/21/2000* | *6/17/2002* | *8/7/1996* | *10/21/1996* |
| *Parameters* | *Units* | | | | | | | | | | | |
| delta-BHC | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Dieldrin | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Endosulfan I | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Endosulfan II | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Endosulfan sulfate | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Endrin | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Endrin aldehyde | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Endrin ketone | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| gamma-BHC (Lindane) | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| gamma-Chlordane | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Heptachlor | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Heptachlor epoxide | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Methoxychlor | ug/L | - | - | 0.25 UJ | 0.25 UJ | 0.56 U | - | - | - | - | 0.25 UJ | 0.25 UJ |
| Toxaphene | ug/L | - | - | 2.0 UJ | 2.0 UJ | 1.1 U | - | - | - | - | 2.0 UJ | 2.0 UJ |
| *General Chemistry* | | | | | | | | | | | | |
| Cyanide (total) | ug/L | - | - | 0.010 U | 0.010 U | 0.010 U | 0.010 U | - | - | - | 0.010 U | 0.010 U |
| *Field Parameters* | | | | | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | - | - | - | 488 | - | - | - | - |
| Dissolved Oxygen | ug/L | - | - | - | - | - | - | 7.61 | - | - | - | - |
| Oxidation reduction potential | millivolts | - | - | - | - | - | - | 116.0 | - | - | - | - |
| pH Field | s.u. | - | - | - | - | - | - | 7.17 | - | - | - | - |
| Temperature, Field | deg C | - | - | - | - | - | - | 14.90 | - | - | - | - |
| Turbidity | NTU | - | - | - | - | - | - | 3 | - | - | - | - |

*Notes:*
U - Not detected at or above associated value.
J - Estimated concentration.
UJ - Estimated reporting detection limit.
R - Rejected.

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location* | | *S-2* | *S-2* | *S-2* | *S-2* | *S-2* | *S-3* | *S-3* | *S-3* | *S-3* | *S-3* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *002(EPA)* | *S293097(GM)* | *GW-7043-RW-082300-14* | *GW-7043-061902-BW-016* | *GW-7043-061902-BW-017* | *W-MT-026* | *W-DF-008* | *010(EPA)* | *S392997(GM)* | *GW-7043-090199-RSH-102* |
| *Sample Date:* | | *9/30/1997* | *9/30/1997* | *8/23/2000* | *6/19/2002* | *6/19/2002* | *8/7/1996* | *10/22/1996* | *9/29/1997* | *9/29/1997* | *9/1/1999* |
| | | | | | | *(Duplicate)* | | | | | |
| *Parameters* | *Units* | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| 1,1,2-Trichloroethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| 1,1-Dichloroethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| 1,1-Dichloroethene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| 1,2-Dichloroethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| 1,2-Dichloroethene (total) | ug/L | 0.5 U | 10 U | 0.11 | - | - | 43 | 2.2 J | 0.5 U | 10 U | 6.3 |
| 1,2-Dichloropropane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 2 U | 10 U | 10 U | 10 UJ | 10 UJ | 50 U | 50 U | 2 U | 10 U | 25 U |
| 2-Hexanone | ug/L | 2 U | 10 U | 10 U | 10 UJ | 10 UJ | 50 U | 50 U | 2 U | 10 U | 25 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 2 U | 10 U | 5.0 U | 5.0 UJ | 5.0 UJ | 50 U | 50 U | 2 U | 10 U | 25 U |
| Acetone | ug/L | 2 U | 10 U | 10 U | 10 UJ | 10 UJ | 31 J | 50 U | 2 U | 32 | 25 U |
| Benzene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 3.3 J | 5.2 | 4 | 3 J | 4.5 |
| Bromodichloromethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| Bromoform | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| Bromomethane (Methyl Bromide) | ug/L | 0.5 U | 10 U | 2.0 U | 2.0 UJ | 2.0 UJ | 5.0 U | 5.0 U | 0.5 U | 10 U | 5.0 U |
| Carbon disulfide | ug/L | 2 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 2 U | 10 U | 2.5 U |
| Carbon tetrachloride | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| Chlorobenzene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 2 | 10 U | 3.1 |
| Chloroethane | ug/L | 0.5 U | 10 U | 2.0 U | 2.0 U | 2.0 U | 10 U | 10 U | 0.6 | 10 U | 5.0 U |
| Chloroform (Trichloromethane) | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| Chloromethane (Methyl Chloride) | ug/L | 0.6 | 10 U | 2.0 U | 2.0 U | 2.0 U | 10 U | 10 U | 0.5 U | 10 U | 5.0 U |
| cis-1,2-Dichloroethene | ug/L | - | - | 0.11 J | 0.50 U | 0.50 U | - | - | - | - | - |
| cis-1,3-Dichloropropene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| Dibromochloromethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| Ethylbenzene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| Methylene chloride | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| Styrene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| Tetrachloroethene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| Toluene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 | 10 U | 2.5 U |
| trans-1,2-Dichloroethene | ug/L | - | - | 0.50 U | 0.50 U | 0.50 U | - | - | - | - | - |
| trans-1,3-Dichloropropene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| Trichloroethene | ug/L | 4 | 3 J | 1.2 | 7.0 | 7.0 | 5.0 U | 5.0 U | 0.5 U | 10 U | 3.7 |
| Vinyl chloride | ug/L | 0.5 U | 10 U | 2.0 U | 2.0 U | 2.0 U | 120 | 2.9 J | 0.5 U | 10 U | 5.0 U |
| Xylene (total) | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 5.0 U | 0.5 U | 10 U | 2.5 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 1,2-Dichlorobenzene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 1,3-Dichlorobenzene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 1,4-Dichlorobenzene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 2,4,5-Trichlorophenol | ug/L | 54 U | - | - | - | - | 10 UJ | 10 U | 52 U | - | - |
| 2,4,6-Trichlorophenol | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 2,4-Dichlorophenol | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 2,4-Dimethylphenol | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 2,4-Dinitrophenol | ug/L | 54 U | - | - | - | - | 50 UJ | 50 U | 52 U | - | - |
| 2,4-Dinitrotoluene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 2,6-Dinitrotoluene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 2-Chloronaphthalene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 2-Chlorophenol | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 2-Methylnaphthalene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 2-Methylphenol | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | S-2 | S-2 | S-2 | S-2 | S-2 | S-3 | S-3 | S-3 | S-3 | S-3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | 002(EPA) | S293097(GM) | GW-7043-RW-082300-14 | GW-7043-061902-BW-016 | GW-7043-061902-BW-017 | W-MT-026 | W-DF-008 | 010(EPA) | S392997(GM) | GW-7043-090199-RSH-102 |
| *Sample Date:* | | 9/30/1997 | 9/30/1997 | 8/23/2000 | 6/19/2002 | 6/19/2002 (Duplicate) | 8/7/1996 | 10/22/1996 | 9/29/1997 | 9/29/1997 | 9/1/1999 |
| *Parameters* | *Units* | | | | | | | | | | |
| 2-Nitroaniline | ug/L | 54 U | - | - | - | - | 50 UJ | 50 U | 52 U | - | - |
| 2-Nitrophenol | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 3,3'-Dichlorobenzidine | ug/L | 22 U | - | - | - | - | 50 UJ | 50 U | 21 U | - | - |
| 3-Nitroaniline | ug/L | 54 U | - | - | - | - | 50 UJ | 50 U | 52 U | - | - |
| 4,6-Dinitro-2-methylphenol | ug/L | 54 U | - | - | - | - | 50 UJ | 50 U | 52 U | - | - |
| 4-Bromophenyl phenyl ether | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 4-Chloro-3-methylphenol | ug/L | 22 U | - | - | - | - | 10 UJ | 10 U | 21 U | - | - |
| 4-Chloroaniline | ug/L | 22 U | - | - | - | - | 10 UJ | 10 U | 21 U | - | - |
| 4-Chlorophenyl phenyl ether | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 4-Methylphenol | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| 4-Nitroaniline | ug/L | 54 U | - | - | - | - | 50 UJ | 50 U | 52 U | - | - |
| 4-Nitrophenol | ug/L | 54 U | - | - | - | - | 50 UJ | 50 U | 52 U | - | - |
| Acenaphthene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Acenaphthylene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Anthracene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Benzo(a)anthracene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Benzo(a)pyrene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Benzo(b)fluoranthene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Benzo(g,h,i)perylene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Benzo(k)fluoranthene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Benzoic acid | ug/L | 54 U | - | - | - | - | - | - | 52 U | - | - |
| Benzyl Alcohol | ug/L | 11 U | - | - | - | - | - | - | 10 U | - | - |
| bis(2-Chloroethoxy)methane | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| bis(2-Chloroethyl)ether | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| bis(2-Ethylhexyl)phthalate | ug/L | 11 U | - | - | - | - | 8.2 J B | 17 | 10 U | - | - |
| Butyl benzylphthalate | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Carbazole | ug/L | - | - | - | - | - | 10 UJ | 10 U | - | - | - |
| Chrysene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Dibenz(a,h)anthracene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Dibenzofuran | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Diethyl phthalate | ug/L | 11 U | - | - | - | - | 10 UJ | 4.2 J | 10 U | - | - |
| Dimethyl phthalate | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Di-n-butylphthalate | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Di-n-octyl phthalate | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Fluoranthene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Fluorene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Hexachlorobenzene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Hexachlorobutadiene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Hexachlorocyclopentadiene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Hexachloroethane | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Indeno(1,2,3-cd)pyrene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Isophorone | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Naphthalene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Nitrobenzene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| N-Nitrosodi-n-propylamine | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| N-Nitrosodiphenylamine | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Pentachlorophenol | ug/L | 54 U | - | - | - | - | 50 UJ | 50 U | 52 U | - | - |
| Phenanthrene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Phenol | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |
| Pyrene | ug/L | 11 U | - | - | - | - | 10 UJ | 10 U | 10 U | - | - |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *S-2* | *S-2* | *S-2* | *S-2* | *S-2* | *S-3* | *S-3* | *S-3* | *S-3* | *S-3* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *002(EPA)* | *S293097(GM)* | *GW-7043-RW-082300-14* | *GW-7043-061902-BW-016* | *GW-7043-061902-BW-017* | *W-MT-026* | *W-DF-008* | *010(EPA)* | *S392997(GM)* | *GW-7043-090199-RSH-102* |
| *Sample Date:* | | *9/30/1997* | *9/30/1997* | *8/23/2000* | *6/19/2002* | *6/19/2002 (Duplicate)* | *8/7/1996* | *10/22/1996* | *9/29/1997* | *9/29/1997* | *9/1/1999* |
| *Parameters* | *Units* | | | | | | | | | | |
| *Metals* | | | | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 0.042 | 0.0195 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.054 | 0.0195 U | 0.20 U |
| Antimony (Dissolved) | ug/L | 0.0029 | 0.0029 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.0035 | 0.0029 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.0020 U | 0.0059 U | 0.010 U | 0.010 U | 0.010 U | 0.042 | 0.036 | 0.013 | 0.0319 | 0.055 |
| Barium (Dissolved) | ug/L | 0.053 | 0.0532 B | 0.20 U | 0.20 U | 0.20 U | 0.69 | 0.66 | 0.54 | 0.736 | 0.82 |
| Beryllium (Dissolved) | ug/L | 0.00030 U | 0.0001 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.0001 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.00030 U | 0.0003 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.0003 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 79.1 | 74.8 | 82.7 | 91.7 | 93.1 | 88.6 | 94.3 | 95.7 | 110 | 115 |
| Chromium Total (Dissolved) | ug/L | 0.0031 | 0.001 B | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0030 | 0.0022 B | 0.010 U |
| Cobalt (Dissolved) | ug/L | 0.00080 U | 0.0007 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.0023 | 0.005 B | 0.050 U |
| Copper (Dissolved) | ug/L | 0.0013 U | 0.0016 B | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.0013 U | 0.0024 B | 0.025 U |
| Iron | ug/L | - | - | - | - | - | - | - | - | - | 46.62 |
| Iron (Dissolved) | ug/L | 0.011 U | 0.0134 U | 0.10 U | 0.10 U | 0.10 U | 4.9 | 7.4 | 0.27 | 8.97 | 15.8 |
| Lead (Dissolved) | ug/L | 0.0018 | 0.0019 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0029 | 0.0019 U | 0.0030 U |
| Magnesium (Dissolved) | ug/L | 31.8 | 30.7 | 38.4 | 35.8 | 36.4 | 82.2 | 84.1 | 83.8 | 98.9 | 94.4 |
| Manganese (Dissolved) | ug/L | 0.0012 | 0.0001 U | 0.015 U | 0.015 U | 0.015 U | 0.088 | 0.11 | 0.097 | 0.0945 | 0.061 |
| Mercury (Dissolved) | ug/L | 0.00010 U | 0.0001 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00010 U | 0.0001 U | 0.00020 U |
| Nickel (Dissolved) | ug/L | 0.00060 U | 0.0039 B | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.017 | 0.0245 B | 0.040 U |
| Potassium (Dissolved) | ug/L | 3.2 | 2.45 BE | 5.0 U | 5.0 U | 5.0 U | 30.0 | 30.4 | 30.7 | 32.5 E | 32.0 |
| Selenium (Dissolved) | ug/L | 0.0020 U | 0.0044 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0020 U | 0.0044 U | 0.0050 U |
| Silver (Dissolved) | ug/L | 0.00070 U | 0.0008 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.00070 U | 0.0008 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 11.4 | 12.5 | 16.4 | 9.5 | 9.6 | 44.9 | 40.7 | 26.2 | 32.2 | 24.4 |
| Thallium (Dissolved) | ug/L | 0.0019 U | 0.005 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0019 U | 0.005 U | 0.010 U |
| Vanadium (Dissolved) | ug/L | 0.00080 U | 0.0007 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U | 0.0014 B | 0.050 U |
| Zinc (Dissolved) | ug/L | 0.0028 | 0.0088 BE | 0.020 U | 0.020 U | 0.020 U | 0.050 U | 0.050 U | 0.0070 | 0.0176 BE | 0.020 U |
| *PCBs* | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | 0.62 U | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - |
| Aroclor-1221 (PCB-1221) | ug/L | 0.62 U | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - |
| Aroclor-1232 (PCB-1232) | ug/L | 0.62 U | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - |
| Aroclor-1242 (PCB-1242) | ug/L | 0.62 U | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - |
| Aroclor-1248 (PCB-1248) | ug/L | 0.62 U | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - |
| Aroclor-1254 (PCB-1254) | ug/L | 0.62 U | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - |
| Aroclor-1260 (PCB-1260) | ug/L | 0.62 U | - | - | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - |
| *Gas* | | | | | | | | | | | |
| Ethane | ug/L | - | - | 0.50 U | 0.50 U | 0.50 U | - | - | - | - | 8.8 |
| Ethene | ug/L | - | - | 0.50 U | 0.50 U | 0.50 U | - | - | - | - | 0.50 U |
| *Pesticides* | | | | | | | | | | | |
| 4,4'-DDD | ug/L | 0.12 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.067 | - | - |
| 4,4'-DDE | ug/L | 0.12 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| 4,4'-DDT | ug/L | 0.12 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| Aldrin | ug/L | 0.075 | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.022 J | - | - |
| alpha-BHC | ug/L | 0.062 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - |
| alpha-Chlordane | ug/L | 0.062 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - |
| beta-BHC | ug/L | 0.062 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | S-2 | S-2 | S-2 | S-2 | S-2 | S-3 | S-3 | S-3 | S-3 | S-3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | 002(EPA) | S293097(GM) | GW-7043-RW-082300-14 | GW-7043-061902-BW-016 | GW-7043-061902-BW-017 | W-MT-026 | W-DF-008 | 010(EPA) | S392997(GM) | GW-7043-090199-RSH-102 |
| *Sample Date:* | | 9/30/1997 | 9/30/1997 | 8/23/2000 | 6/19/2002 | 6/19/2002 (Duplicate) | 8/7/1996 | 10/22/1996 | 9/29/1997 | 9/29/1997 | 9/1/1999 |
| *Parameters* | *Units* | | | | | | | | | | |
| delta-BHC | ug/L | 0.062 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - |
| Dieldrin | ug/L | 0.12 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| Endosulfan I | ug/L | 0.062 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - |
| Endosulfan II | ug/L | 0.12 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| Endosulfan sulfate | ug/L | 0.12 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| Endrin | ug/L | 0.12 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| Endrin aldehyde | ug/L | 0.12 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| Endrin ketone | ug/L | 0.12 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - |
| gamma-BHC (Lindane) | ug/L | 0.062 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - |
| gamma-Chlordane | ug/L | 0.062 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - |
| Heptachlor | ug/L | 0.062 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - |
| Heptachlor epoxide | ug/L | 0.062 U | - | - | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - |
| Methoxychlor | ug/L | 0.62 U | - | - | - | - | 0.25 UJ | 0.25 UJ | 0.56 U | - | - |
| Toxaphene | ug/L | 1.2 U | - | - | - | - | 2.0 UJ | 2.0 UJ | 1.1 U | - | - |
| *General Chemistry* | | | | | | | | | | | |
| Cyanide (total) | ug/L | 0.010 U | 0.010 U | - | - | - | 0.010 U | 0.010 U | 0.010 U | 0.010 U | - |
| *Field Parameters* | | | | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | - | - | - | - | - | - | 1329 |
| Dissolved Oxygen | ug/L | - | - | - | - | - | - | - | - | - | 1.65 |
| Oxidation reduction potential | millivolts | - | - | - | - | - | - | - | - | - | -36.9 |
| pH Field | s.u. | - | - | - | - | - | - | - | - | - | 7.59 |
| Temperature, Field | deg C | - | - | - | - | - | - | - | - | - | 17.91 |
| Turbidity | NTU | - | - | - | - | - | - | - | - | - | 7 |

*Notes:*
U - Not detected at or above associated value.
J - Estimated concentration.
UJ - Estimated reporting detection limit.
R - Rejected.

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | S-3 | S-3 | S-4 | S-4 | S-4 | S-4 | S-4 | S-4 | S-4 | S-5 | S-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | GW-7043-RW-082200-08 | GW-7043-061702-BW-004 | W-MT-022 | W-DF-002 | 003(EPA) | S493097(GM) | GW-7043-090399-RSH-109 | GW-7043-RW-082100-04 | GW-7043-061802-BW-012 | W-MT-023 | W-DF-004 |
| *Sample Date:* | | 8/22/2000 | 6/17/2002 | 8/7/1996 | 10/21/1996 | 9/30/1997 | 9/30/1997 | 9/3/1999 | 8/21/2000 | 6/18/2002 | 8/7/1996 | 10/21/1996 |
| *Parameters* | *Units* | | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| 1,1,2-Trichloroethane | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| 1,1-Dichloroethane | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.6 | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| 1,1-Dichloroethene | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 1 | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| 1,2-Dichloroethane | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| 1,2-Dichloroethene (total) | ug/L | 0.277 | - | 960 | 1000 | 590 | 420 | 420 | 53.1 | - | 130 | 61 |
| 1,2-Dichloropropane | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 10 U | 10 U | 500 U | 330 U | 2 U | 33 U | 170 U | 50 U | 50 UJ | 100 U | 50 U |
| 2-Hexanone | ug/L | 10 U | 10 U | 500 U | 330 U | 2 U | 33 U | 170 U | 50 U | 50 UJ | 100 U | 50 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 5.0 U | 5.0 U | 500 U | 330 U | 2 U | 33 U | 170 U | 25 U | 25 UJ | 15 J | 10 J |
| Acetone | ug/L | 10 U | 10 U | 500 U | 330 U | 2 U | 33 U | 170 U | 50 U | 50 UJ | 100 U | 50 U |
| Benzene | ug/L | 5.4 | 4.3 | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| Bromodichloromethane | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| Bromoform | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| Bromomethane (Methyl Bromide) | ug/L | 2.0 U | 2.0 U | 50 U | 33 U | 0.5 U | 33 U | 33 U | 10 U | 10 UJ | 10 U | 5.0 U |
| Carbon disulfide | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 2 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| Carbon tetrachloride | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| Chlorobenzene | ug/L | 5.8 | 7.1 | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 2.0 J |
| Chloroethane | ug/L | 2.0 U | 0.53 J | 100 U | 67 U | 0.6 | 33 U | 33 U | 10 U | 10 U | 20 U | 10 U |
| Chloroform (Trichloromethane) | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| Chloromethane (Methyl Chloride) | ug/L | 2.0 U | 2.0 U | 100 U | 67 U | 0.7 | 33 U | 33 U | 10 U | 10 U | 20 U | 10 U |
| cis-1,2-Dichloroethene | ug/L | 0.18 J | 6.6 | - | - | - | - | - | 52 | 59 | - | - |
| cis-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| Dibromochloromethane | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| Ethylbenzene | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 3.7 J |
| Methylene chloride | ug/L | 0.14 J | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| Styrene | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| Tetrachloroethene | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| Toluene | ug/L | 1.0 U | 0.29 J | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 21 | 37 |
| trans-1,2-Dichloroethene | ug/L | 0.097 J | 0.26 J | - | - | - | - | - | 1.1 J | 0.87 J | - | - |
| trans-1,3-Dichloropropene | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 5.0 U |
| Trichloroethene | ug/L | 1.0 U | 0.49 J | 450 | 710 | 510 | 320 | 300 | 150 | 190 | 10 U | 8.2 |
| Vinyl chloride | ug/L | 0.51 J | 27 | 63 J | 59 J | 76 | 34 | 22 J | 6.9 J | 10 U | 57 | 20 |
| Xylene (total) | ug/L | 1.0 U | 1.0 U | 50 U | 33 U | 0.5 U | 33 U | 17 U | 5.0 U | 5.0 U | 10 U | 2.9 J |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 1,2-Dichlorobenzene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 1,3-Dichlorobenzene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 1,4-Dichlorobenzene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 2,4,5-Trichlorophenol | ug/L | - | - | 10 U | 10 UJ | 52 U | - | - | - | - | 10 U | 10 UJ |
| 2,4,6-Trichlorophenol | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 2,4-Dichlorophenol | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 2,4-Dimethylphenol | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 4.6 J | 10 UJ |
| 2,4-Dinitrophenol | ug/L | - | - | 50 U | 50 UJ | 52 U | - | - | - | - | 50 U | 50 UJ |
| 2,4-Dinitrotoluene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 2,6-Dinitrotoluene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 2-Chloronaphthalene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 2-Chlorophenol | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 2-Methylnaphthalene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 2-Methylphenol | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | S-3 | S-3 | S-4 | S-4 | S-4 | S-4 | S-4 | S-4 | S-4 | S-5 | S-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-RW-082200-08* | *GW-7043-061702-BW-004* | *W-MT-022* | *W-DF-002* | *003(EPA)* | *S493097(GM)* | *GW-7043-090399-RSH-109* | *GW-7043-RW-082100-04* | *GW-7043-061802-BW-012* | *W-MT-023* | *W-DF-004* |
| *Sample Date:* | | *8/22/2000* | *6/17/2002* | *8/7/1996* | *10/21/1996* | *9/30/1997* | *9/30/1997* | *9/3/1999* | *8/21/2000* | *6/18/2002* | *8/7/1996* | *10/21/1996* |
| *Parameters* | *Units* | | | | | | | | | | | |
| 2-Nitroaniline | ug/L | - | - | 50 U | 50 UJ | 52 U | - | - | - | - | 50 U | 50 UJ |
| 2-Nitrophenol | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 3,3'-Dichlorobenzidine | ug/L | - | - | 50 U | 50 UJ | 21 U | - | - | - | - | 50 U | 50 UJ |
| 3-Nitroaniline | ug/L | - | - | 50 U | 50 UJ | 52 U | - | - | - | - | 50 U | 50 UJ |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | 50 U | 50 UJ | 52 U | - | - | - | - | 50 U | 50 UJ |
| 4-Bromophenyl phenyl ether | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 4-Chloro 3-methylphenol | ug/L | - | - | 10 U | 10 UJ | 21 U | - | - | - | - | 10 U | 10 UJ |
| 4-Chloroaniline | ug/L | - | - | 10 U | 10 UJ | 21 U | - | - | - | - | 10 U | 10 UJ |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| 4-Methylphenol | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 19 | 10 UJ |
| 4-Nitroaniline | ug/L | - | - | 50 U | 50 UJ | 52 U | - | - | - | - | 50 U | 50 UJ |
| 4-Nitrophenol | ug/L | - | - | 50 U | 50 UJ | 52 U | - | - | - | - | 50 U | 50 UJ |
| Acenaphthene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Acenaphthylene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Anthracene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Benzo(a)anthracene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Benzo(a)pyrene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Benzo(b)fluoranthene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Benzo(g,h,i)perylene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Benzo(k)fluoranthene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Benzoic acid | ug/L | - | - | - | - | 52 U | - | - | - | - | - | - |
| Benzyl Alcohol | ug/L | - | - | - | - | 10 U | - | - | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| bis(2-Chloroethyl)ether | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Butyl benzylphthalate | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Carbazole | ug/L | - | - | 10 U | 10 UJ | - | - | - | - | - | 10 U | 10 UJ |
| Chrysene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Dibenz(a,h)anthracene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Dibenzofuran | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Diethyl phthalate | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Dimethyl phthalate | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Di-n-butylphthalate | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Di-n-octyl phthalate | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Fluoranthene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Fluorene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Hexachlorobenzene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Hexachlorobutadiene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Hexachlorocyclopentadiene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Hexachloroethane | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Isophorone | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Naphthalene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Nitrobenzene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| N-Nitrosodi-n-propylamine | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| N-Nitrosodiphenylamine | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Pentachlorophenol | ug/L | - | - | 50 U | 50 UJ | 52 U | - | - | - | - | 50 U | 50 UJ |
| Phenanthrene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |
| Phenol | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 3.2 J | 10 UJ |
| Pyrene | ug/L | - | - | 10 U | 10 UJ | 10 U | - | - | - | - | 10 U | 10 UJ |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | S-3 | S-3 | S-4 | S-4 | S-4 | S-4 | S-4 | S-4 | S-4 | S-5 | S-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GW-7043-RW-082200-08* | *GW-7043-061702-BW-004* | *W-MT-022* | *W-DF-002* | *003(EPA)* | *S493097(GM)* | *GW-7043-090399-RSH-109* | *GW-7043-RW-082100-04* | *GW-7043-061802-BW-012* | *W-MT-023* | *W-DF-004* |
| *Sample Date:* | | *8/22/2000* | *6/17/2002* | *8/7/1996* | *10/21/1996* | *9/30/1997* | *9/30/1997* | *9/3/1999* | *8/21/2000* | *6/18/2002* | *8/7/1996* | *10/21/1996* |
| *Parameters* | *Units* | | | | | | | | | | | |
| *Metals* | | | | | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.037 | 0.0195 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Antimony (Dissolved) | ug/L | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.0032 | 0.0029 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.037 | 0.044 | 0.010 U | 0.010 U | 0.0020 U | 0.0059 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Barium (Dissolved) | ug/L | 0.74 | 0.90 | 0.20 U | 0.24 | 0.21 | 0.246 | 0.25 | 0.21 | 0.20 U | 0.78 | 0.63 |
| Beryllium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.0001 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U | 0.0003 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 113 | 115 | 97.9 | 109 | 108 | 116 | 119 | 109 | 92.6 | 138 | 105 |
| Chromium Total (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0020 | 0.0011 B | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Cobalt (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U | 0.0011 B | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U |
| Copper (Dissolved) | ug/L | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.0013 U | 0.0031 B | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U |
| Iron | ug/L | - | - | - | - | - | - | - | - | - | - | - |
| Iron (Dissolved) | ug/L | 14.5 | 18.7 | 0.10 U | 0.10 U | 0.011 U | 0.0134 U | 0.10 U | 0.10 U | 0.10 U | 23.5 | 8.6 |
| Lead (Dissolved) | ug/L | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0024 | 0.0019 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U |
| Magnesium (Dissolved) | ug/L | 90.6 | 84.1 | 45.6 | 51.6 | 46.0 | 49.8 | 47.7 | 46.4 | 38.1 | 41.5 | 32.5 |
| Manganese (Dissolved) | ug/L | 0.079 | 0.097 | 0.56 | 0.82 | 0.50 | 0.822 | 0.57 | 0.47 | 0.015 U | 0.53 | 0.25 |
| Mercury (Dissolved) | ug/L | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00010 U | 0.0001 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U |
| Nickel (Dissolved) | ug/L | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.0014 | 0.0054 B | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U |
| Potassium (Dissolved) | ug/L | 32.4 | 29.6 | 5.0 U | 5.0 U | 4.2 | 3.7 BE | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U |
| Selenium (Dissolved) | ug/L | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0020 U | 0.0044 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Silver (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.00070 U | 0.0008 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 20.9 | 19.1 | 6.4 | 8.8 | 6.9 | 8.56 | 9.7 | 12.8 | 6.3 | 5.4 | 8.1 |
| Thallium (Dissolved) | ug/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0019 U | 0.005 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| Vanadium (Dissolved) | ug/L | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U | 0.0007 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U |
| Zinc (Dissolved) | ug/L | 0.020 U | 0.020 U | 0.050 U | 0.050 U | 0.0032 | 0.0062 BE | 0.020 U | 0.020 U | 0.020 U | 0.050 U | 0.050 U |
| *PCBs* | | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | 1.0 UJ | 1.0 UJ | 0.56 U | - | - | - | - | 1.0 UJ | 1.0 UJ |
| *Gas* | | | | | | | | | | | | |
| Ethane | ug/L | 5.7 | 4.4 | - | - | - | - | 0.50 U | 0.50 U | 0.50 U | - | - |
| Ethene | ug/L | 0.50 U | 1.9 | - | - | - | - | 0.50 U | 0.50 U | 0.50 U | - | - |
| *Pesticides* | | | | | | | | | | | | |
| 4,4'-DDD | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| 4,4'-DDE | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| 4,4'-DDT | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Aldrin | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| alpha-BHC | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| alpha-Chlordane | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| beta-BHC | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | S-3 | S-3 | S-4 | S-4 | S-4 | S-4 | S-4 | S-4 | S-4 | S-5 | S-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | GW-7043-RW-082200-08 | GW-7043-061702-BW-004 | W-MT-022 | W-DF-002 | 003(EPA) | S493097(GM) | GW-7043-090399-RSH-109 | GW-7043-RW-082100-04 | GW-7043-061802-BW-012 | W-MT-023 | W-DF-004 |
| *Sample Date:* | | 8/22/2000 | 6/17/2002 | 8/7/1996 | 10/21/1996 | 9/30/1997 | 9/30/1997 | 9/3/1999 | 8/21/2000 | 6/18/2002 | 8/7/1996 | 10/21/1996 |
| *Parameters* | *Units* | | | | | | | | | | | |
| delta-BHC | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Dieldrin | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Endosulfan I | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Endosulfan II | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Endosulfan sulfate | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Endrin | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Endrin aldehyde | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Endrin ketone | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.11 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| gamma-BHC (Lindane) | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| gamma-Chlordane | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Heptachlor | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Heptachlor epoxide | ug/L | - | - | 0.050 UJ | 0.050 UJ | 0.056 U | - | - | - | - | 0.050 UJ | 0.050 UJ |
| Methoxychlor | ug/L | - | - | 0.25 UJ | 0.25 UJ | 0.56 U | - | - | - | - | 0.25 UJ | 0.25 UJ |
| Toxaphene | ug/L | - | - | 2.0 UJ | 2.0 UJ | 1.1 U | - | - | - | - | 2.0 UJ | 2.0 UJ |
| *General Chemistry* | | | | | | | | | | | | |
| Cyanide (total) | ug/L | - | - | 0.010 U | 0.010 U | 0.010 U | 0.010 U | - | - | - | 0.010 U | 0.010 U |
| *Field Parameters* | | | | | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | - | - | - | - | - | - | - | - |
| Dissolved Oxygen | ug/L | - | - | - | - | - | - | - | - | - | - | - |
| Oxidation reduction potential | millivolts | - | - | - | - | - | - | - | - | - | - | - |
| pH Field | s.u. | - | - | - | - | - | - | - | - | - | - | - |
| Temperature, Field | deg C | - | - | - | - | - | - | - | - | - | - | - |
| Turbidity | NTU | - | - | - | - | - | - | - | - | - | - | - |

*Notes:*
U - Not detected at or above associated value.
J - Estimated concentration.
UJ - Estimated reporting detection limit.
R - Rejected.

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *S-5* | *S-5* | *S-5* | *S-5* | *S-5* | *S-5* | *S-6* | *S-6* | *S-6* | *S-6* | *S-6* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *004(EPA)* | *S593097(GM)* | *GW-7043-090299-RSH-103* | *GW-7043-090299-RSH-104* | *GW-7043-RW-082100-07* | *GW-7043-061802-BW-010* | *W-MT-014* | *W-MK-031* | *W-MK-032* | *W-DF-006* | *006(EPA)* |
| *Sample Date:* | | *9/30/1997* | *9/30/1997* | *9/2/1999* | *9/2/1999* | *8/21/2000* | *6/18/2002* | *8/6/1996* | *9/12/1996* | *9/12/1996* | *10/21/1996* | *9/29/1997* |
| | | | | | *(Duplicate)* | | | | | *(Duplicate)* | | |
| *Parameters* | *Units* | | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| 1,1,2-Trichloroethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| 1,1-Dichloroethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| 1,1-Dichloroethene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| 1,2-Dichloroethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| 1,2-Dichloroethene (total) | ug/L | 5 | 3 J | 12 | 12 | 170.93 | - | 5.2 | 3.0 J | 3.8 J | 2.1 J | 2 |
| 1,2-Dichloropropane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 2 U | 10 U | 10 U | 10 U | 50 U | 29 UJ | 50 U | 50 U | 50 U | 50 U | 2 U |
| 2-Hexanone | ug/L | 2 U | 10 U | 10 U | 10 U | 50 U | 29 UJ | 50 U | 50 U | 50 U | 50 U | 2 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 2 U | 10 U | 10 U | 10 U | 25 U | 14 UJ | 50 U | 50 U | 50 U | 50 U | 2 U |
| Acetone | ug/L | 2 U | 10 U | 10 U | 10 U | 50 U | 29 UJ | 27 J | 50 U | 50 U | 50 U | 2 U |
| Benzene | ug/L | 0.6 | 10 U | 0.31 J | 0.33 J | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Bromodichloromethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Bromoform | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Bromomethane (Methyl Bromide) | ug/L | 0.5 U | 10 U | 2.0 U | 2.0 U | 10 U | 5.7 UJ | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Carbon disulfide | ug/L | 2 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 2 U |
| Carbon tetrachloride | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Chlorobenzene | ug/L | 0.9 | 10 U | 0.56 J | 0.74 J | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Chloroethane | ug/L | 0.5 U | 10 U | 2.0 U | 2.0 U | 10 U | 5.7 U | 10 U | 10 U | 10 U | 10 U | 0.5 U |
| Chloroform (Trichloromethane) | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Chloromethane (Methyl Chloride) | ug/L | 0.8 | 10 U | 2.0 U | 2.0 U | 10 U | 5.7 U | 10 U | 10 U | 10 U | 10 U | 0.7 |
| cis-1,2-Dichloroethene | ug/L | - | - | - | - | 170 | 84 | - | - | - | - | - |
| cis-1,3-Dichloropropene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Dibromochloromethane | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Ethylbenzene | ug/L | 1 | 10 U | 0.25 J | 0.16 J | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Methylene chloride | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Styrene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Tetrachloroethene | ug/L | 0.5 U | 10 U | 0.39 J | 0.43 J | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Toluene | ug/L | 9 | 8 J | 1.0 U | 1.0 U | 1.6 J | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.6 |
| trans-1,2-Dichloroethene | ug/L | - | - | - | - | 0.93 J | 1.4 U | - | - | - | - | - |
| trans-1,3-Dichloropropene | ug/L | 0.5 U | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| Trichloroethene | ug/L | 4 | 4 J | 6.3 | 6.8 | 11 | 27 | 23 | 23 | 27 | 24 | 24 |
| Vinyl chloride | ug/L | 0.6 | 10 U | 2.1 | 2.4 | 37 | 12 | 10 U | 10 U | 10 U | 10 U | 0.5 U |
| Xylene (total) | ug/L | 1 | 10 U | 1.0 U | 1.0 U | 5.0 U | 2.9 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 0.5 U |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 1,2-Dichlorobenzene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 1,3-Dichlorobenzene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 1,4-Dichlorobenzene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 2,4,5-Trichlorophenol | ug/L | 56 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 51 U |
| 2,4,6-Trichlorophenol | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 2,4-Dichlorophenol | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 2,4-Dimethylphenol | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 2,4-Dinitrophenol | ug/L | 56 U | - | - | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 51 U |
| 2,4-Dinitrotoluene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 2,6-Dinitrotoluene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 2-Chloronaphthalene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 2-Chlorophenol | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 2-Methylnaphthalene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 2-Methylphenol | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | S-5 | S-5 | S-5 | S-5 | S-5 | S-5 | S-6 | S-6 | S-6 | S-6 | S-6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | 004(EPA) | S693097(GM) | GW-7043-090299-RSH-103 | GW-7043-090299-RSH-104 | GW-7043-RW-082100-07 | GW-7043-061802-BW-010 | W-MT-014 | W-MK-031 | W-MK-032 | W-DF-006 | 006(EPA) |
| *Sample Date:* | | 9/30/1997 | 9/30/1997 | 9/2/1999 | 9/2/1999 (Duplicate) | 8/21/2000 | 6/18/2002 | 8/6/1996 | 9/12/1996 | 9/12/1996 (Duplicate) | 10/21/1996 | 9/29/1997 |
| *Parameters* | *Units* | | | | | | | | | | | |
| 2-Nitroaniline | ug/L | 56 U | - | - | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 51 U |
| 2-Nitrophenol | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 3,3'-Dichlorobenzidine | ug/L | 22 U | - | - | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 20 U |
| 3-Nitroaniline | ug/L | 56 U | - | - | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 51 U |
| 4,6-Dinitro-2-methylphenol | ug/L | 56 U | - | - | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 51 U |
| 4-Bromophenyl phenyl ether | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 4-Chloro-3-methylphenol | ug/L | 22 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 20 U |
| 4-Chloroaniline | ug/L | 22 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 20 U |
| 4-Chlorophenyl phenyl ether | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 4-Methylphenol | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| 4-Nitroaniline | ug/L | 56 U | - | - | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 51 U |
| 4-Nitrophenol | ug/L | 56 U | - | - | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 51 U |
| Acenaphthene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Acenaphthylene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Anthracene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Benzo(a)anthracene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Benzo(a)pyrene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Benzo(b)fluoranthene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Benzo(g,h,i)perylene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Benzo(k)fluoranthene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Benzoic acid | ug/L | 56 U | - | - | - | - | - | - | - | - | - | 51 U |
| Benzyl Alcohol | ug/L | 11 U | - | - | - | - | - | - | - | - | - | 10 U |
| bis(2-Chloroethoxy)methane | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| bis(2-Chloroethyl)ether | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| bis(2-Ethylhexyl)phthalate | ug/L | 6 J | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 2 J |
| Butyl benzylphthalate | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Carbazole | ug/L | - | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | - |
| Chrysene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Dibenz(a,h)anthracene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Dibenzofuran | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Diethyl phthalate | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Dimethyl phthalate | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Di-n-butylphthalate | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Di-n-octyl phthalate | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Fluoranthene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Fluorene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Hexachlorobenzene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Hexachlorobutadiene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Hexachlorocyclopentadiene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Hexachloroethane | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Indeno(1,2,3-cd)pyrene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Isophorone | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Naphthalene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Nitrobenzene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| N-Nitrosodi-n-propylamine | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| N-Nitrosodiphenylamine | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Pentachlorophenol | ug/L | 56 U | - | - | - | - | - | 50 U | 50 U | 50 U | 50 UJ | 51 U |
| Phenanthrene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Phenol | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Pyrene | ug/L | 11 U | - | - | - | - | - | 10 U | 10 U | 10 U | 10 UJ | 10 U |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | *S-5* | *S-5* | *S-5* | *S-5* | *S-5* | *S-5* | *S-6* | *S-6* | *S-6* | *S-6* | *S-6* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *004(EPA)* | *S593097(GM)* | *GW-7043-090299-RSH-103* | *GW-7043-090299-RSH-104* | *GW-7043-RW-082100-07* | *GW-7043-061802-BW-010* | *W-MT-014* | *W-MK-031* | *W-MK-032* | *W-DF-006* | *006(EPA)* |
| *Sample Date:* | | *9/30/1997* | *9/30/1997* | *9/2/1999* | *9/2/1999* | *8/21/2000* | *6/18/2002* | *8/6/1996* | *9/12/1996* | *9/12/1996* | *10/21/1996* | *9/29/1997* |
| | | | | | *(Duplicate)* | | | | | *(Duplicate)* | | |
| *Parameters* | *Units* | | | | | | | | | | | |
| *Metals* | | | | | | | | | | | | |
| Aluminum (Dissolved) | ug/L | 0.041 | 0.0195 U | 0.21 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.038 |
| Antimony (Dissolved) | ug/L | 0.0033 | 0.0029 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.060 U | 0.0036 |
| Arsenic (Dissolved) | ug/L | 0.0020 U | 0.0059 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0020 U |
| Barium (Dissolved) | ug/L | 0.44 | 0.483 | 0.53 | 0.53 | 0.42 | 0.31 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.071 |
| Beryllium (Dissolved) | ug/L | 0.00030 U | 0.0001 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U |
| Cadmium (Dissolved) | ug/L | 0.00030 U | 0.0003 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.00030 U |
| Calcium (Dissolved) | ug/L | 98.1 | 99.1 | 117 | 113 | 122 | 110 | 91.1 | 77.4 | 68.8 | 91.5 | 96.9 |
| Chromium Total (Dissolved) | ug/L | 0.0024 | 0.0008 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0024 |
| Cobalt (Dissolved) | ug/L | 0.00095 | 0.0017 B | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U |
| Copper (Dissolved) | ug/L | 0.0013 U | 0.0011 B | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.0013 U |
| Iron | ug/L | - | - | - | 38.51 | - | - | - | - | - | - | - |
| Iron (Dissolved) | ug/L | 0.011 U | 3.31 | 8.7 | 8.5 | 17.8 | 0.18 | 0.10 U | 0.10 U | 0.10 U | 0.10 U | 0.011 U |
| Lead (Dissolved) | ug/L | 0.0020 U | 0.002 B | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0030 U | 0.0020 |
| Magnesium (Dissolved) | ug/L | 29.3 | 29.9 | 32.3 | 31.8 | 33.6 | 37.4 | 33.6 | 27.0 | 23.3 | 31.8 | 32.2 |
| Manganese (Dissolved) | ug/L | 0.15 | 0.151 | 0.19 | 0.18 | 0.30 | 0.14 | 0.045 | 0.015 U | 0.016 | 0.015 U | 0.00040 U |
| Mercury (Dissolved) | ug/L | 0.00010 U | 0.0001 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00020 U | 0.00010 U |
| Nickel (Dissolved) | ug/L | 0.022 | 0.0232 B | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.040 U | 0.00060 U |
| Potassium (Dissolved) | ug/L | *1.7* | *1.32 BE* | *5.0 U* | *5.0 U* | *5.0 U* | *5.0 U* | *5.0 U* | *5.0 U* | *5.0 U* | *5.0 U* | 2.4 |
| Selenium (Dissolved) | ug/L | 0.0020 U | 0.0044 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0050 U | 0.0020 U |
| Silver (Dissolved) | ug/L | 0.00077 | 0.0008 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.00070 U |
| Sodium (Dissolved) | ug/L | 5.9 | 6.88 | 7.4 | 7.5 | 8.7 | 6.4 | 7.6 | 5.2 | 5.0 U | 7.8 | 5.9 |
| Thallium (Dissolved) | ug/L | 0.0019 U | 0.005 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.0019 U |
| Vanadium (Dissolved) | ug/L | 0.00080 U | 0.0007 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.00080 U |
| Zinc (Dissolved) | ug/L | 0.0054 | 0.0185 BE | 0.020 U | 0.020 U | 0.020 U | 0.062 | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.0038 |
| *PCBs* | | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | 0.50 U | - | - | - | - | - | 1.0 UJ | R | R | 1.0 UJ | 0.54 U |
| Aroclor-1221 (PCB-1221) | ug/L | 0.50 U | - | - | - | - | - | 1.0 UJ | R | R | 1.0 UJ | 0.54 U |
| Aroclor-1232 (PCB-1232) | ug/L | 0.50 U | - | - | - | - | - | 1.0 UJ | R | R | 1.0 UJ | 0.54 U |
| Aroclor-1242 (PCB-1242) | ug/L | 0.50 U | - | - | - | - | - | 1.0 UJ | R | R | 1.0 UJ | 0.54 U |
| Aroclor-1248 (PCB-1248) | ug/L | 0.50 U | - | - | - | - | - | 1.0 UJ | R | R | 1.0 UJ | 0.54 U |
| Aroclor-1254 (PCB-1254) | ug/L | 0.50 U | - | - | - | - | - | 1.0 UJ | R | R | 1.0 UJ | 0.54 U |
| Aroclor-1260 (PCB-1260) | ug/L | 0.50 U | - | - | - | - | - | 1.0 UJ | R | R | 1.0 UJ | 0.54 U |
| *Gas* | | | | | | | | | | | | |
| Ethane | ug/L | - | - | 9.3 | 9.8 | 3.4 | 3.2 | - | - | - | - | - |
| Ethene | ug/L | - | - | 6.7 | 7.0 | 9.1 | 4.9 | - | - | - | - | - |
| *Pesticides* | | | | | | | | | | | | |
| 4,4'-DDD | ug/L | 0.10 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.11 U |
| 4,4'-DDE | ug/L | 0.10 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.11 U |
| 4,4'-DDT | ug/L | 0.10 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.11 U |
| Aldrin | ug/L | 0.040 | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.054 U |
| alpha-BHC | ug/L | 0.050 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.054 U |
| alpha-Chlordane | ug/L | 0.050 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.054 U |
| beta-BHC | ug/L | 0.050 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.054 U |

# TABLE F.1

## ANALYTICAL RESULTS SUMMARY
## GROUNDWATER RESULTS
## GARLAND ROAD

| *Sample Location:* | | S-5 | S-5 | S-5 | S-5 | S-5 | S-5 | S-6 | S-6 | S-6 | S-6 | S-6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *004(EPA)* | *S593097(GM)* | *GW-7043-090299-RSH-103* | *GW-7043-090299-RSH-104* | *GW-7043-RW-082100-07* | *GW-7043-061802-BW-010* | *W-MT-014* | *W-MK-031* | *W-MK-032* | *W-DF-006* | *006(EPA)* |
| *Sample Date:* | | *9/30/1997* | *9/30/1997* | *9/2/1999* | *9/2/1999* | *8/21/2000* | *6/18/2002* | *8/6/1996* | *9/12/1996* | *9/12/1996* | *10/21/1996* | *9/29/1997* |
| | | | | | *(Duplicate)* | | | | | *(Duplicate)* | | |
| *Parameters* | *Units* | | | | | | | | | | | |
| delta-BHC | ug/L | 0.050 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.054 U |
| Dieldrin | ug/L | 0.10 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.11 U |
| Endosulfan I | ug/L | 0.050 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.054 U |
| Endosulfan II | ug/L | 0.10 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.11 U |
| Endosulfan sulfate | ug/L | 0.10 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.11 U |
| Endrin | ug/L | 0.10 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.11 U |
| Endrin aldehyde | ug/L | 0.10 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.11 U |
| Endrin ketone | ug/L | 0.10 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.11 U |
| gamma-BHC (Lindane) | ug/L | 0.050 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.054 U |
| gamma-Chlordane | ug/L | 0.050 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.054 U |
| Heptachlor | ug/L | 0.050 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.054 U |
| Heptachlor epoxide | ug/L | 0.050 U | - | - | - | - | - | 0.050 UJ | R | R | 0.050 UJ | 0.054 U |
| Methoxychlor | ug/L | 0.50 U | - | - | - | - | - | 0.25 UJ | R | R | 0.25 UJ | 0.54 U |
| Toxaphene | ug/L | 1.0 U | - | - | - | - | - | 2.0 UJ | R | R | 2.0 UJ | 1.1 U |
| *General Chemistry* | | | | | | | | | | | | |
| Cyanide (total) | ug/L | 0.010 U | 0.010 U | - | - | - | - | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| *Field Parameters* | | | | | | | | | | | | |
| Conductivity | umhos/cm | - | - | - | 685 | - | - | - | - | - | - | - |
| Dissolved Oxygen | ug/L | - | - | - | 1.76 | - | - | - | - | - | - | - |
| Oxidation reduction potential | millivolts | - | - | - | 16.1 | - | - | - | - | - | - | - |
| pH Field | s.u. | - | - | - | 7.16 | - | - | - | - | - | - | - |
| Temperature, Field | deg C | - | - | - | 19.12 | - | - | - | - | - | - | - |
| Turbidity | NTU | - | - | - | 4 | - | - | - | - | - | - | - |

*Notes:*

U - Not detected at or above associated value.

J - Estimated concentration.

UJ - Estimated reporting detection limit.

R - Rejected.

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | *S-6* | *S-6* | *S-6* | *S-6* |
|---|---|---|---|---|---|
| *Sample ID:* | | *S692997(GM)* | *GW-7043-090299-RSH-105* | *GW-7043-RW-082100-06* | *GW-7043-061802-BW-014* |
| *Sample Date:* | | *9/29/1997* | *9/2/1999* | *8/21/2000* | *6/18/2002* |
| *Parameters* | *Units* | | | | |
| *Volatile Organic Compounds* | | | | | |
| 1,1,1-Trichloroethane | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| 1,1,2-Trichloroethane | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| 1,1-Dichloroethane | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| 1,1-Dichloroethene | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| 1,2-Dichloroethane | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| 1,2-Dichloroethene (total) | ug/L | 2 J | 14 | 3.8 | - |
| 1,2-Dichloropropane | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/L | 10 U | 17 U | 10 U | 17 UJ |
| 2-Hexanone | ug/L | 10 U | 17 U | 10 U | 17 UJ |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/L | 10 U | 17 U | 5.0 U | 8.4 UJ |
| Acetone | ug/L | 10 U | 17 U | 10 U | 17 UJ |
| Benzene | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Bromodichloromethane | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Bromoform | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Bromomethane (Methyl Bromide) | ug/L | 10 U | 3.3 U | 2.0 U | 3.3 UJ |
| Carbon disulfide | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Carbon tetrachloride | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Chlorobenzene | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Chloroethane | ug/L | 10 U | 3.3 U | 2.0 U | 3.3 U |
| Chloroform (Trichloromethane) | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Chloromethane (Methyl Chloride) | ug/L | 10 U | 3.3 U | 2.0 U | 3.3 U |
| cis-1,2-Dichloroethene | ug/L | - | - | 3.8 | 4.0 |
| cis-1,3-Dichloropropene | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Dibromochloromethane | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Ethylbenzene | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Methylene chloride | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Styrene | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Tetrachloroethene | ug/L | 10 U | 0.35 J | 0.36 J | 1.7 U |
| Toluene | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| trans-1,2-Dichloroethene | ug/L | - | - | 0.50 U | 0.84 U |
| trans-1,3-Dichloropropene | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| Trichloroethene | ug/L | 20 | 54 | 39 | 62 |
| Vinyl chloride | ug/L | 10 U | 3.3 U | 2.0 U | 3.3 U |
| Xylene (total) | ug/L | 10 U | 1.7 U | 1.0 U | 1.7 U |
| *Semi-Volatile Organic Compounds* | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | - | - | - | - |
| 1,2-Dichlorobenzene | ug/L | - | - | - | - |
| 1,3-Dichlorobenzene | ug/L | - | - | - | - |
| 1,4-Dichlorobenzene | ug/L | - | - | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/L | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/L | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/L | - | - | - | - |
| 2,4-Dichlorophenol | ug/L | - | - | - | - |
| 2,4-Dimethylphenol | ug/L | - | - | - | - |
| 2,4-Dinitrophenol | ug/L | - | - | - | - |
| 2,4-Dinitrotoluene | ug/L | - | - | - | - |
| 2,6-Dinitrotoluene | ug/L | - | - | - | - |
| 2-Chloronaphthalene | ug/L | - | - | - | - |
| 2-Chlorophenol | ug/L | - | - | - | - |
| 2-Methylnaphthalene | ug/L | - | - | - | - |
| 2-Methylphenol | ug/L | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | S-6 | S-6 | S-6 | S-6 |
|---|---|---|---|---|---|
| *Sample ID:* | | S692997(GM) | GW-7043-090299-RSH-105 | GW-7043-RW-082160-06 | GW-7043-061802-BW-014 |
| *Sample Date:* | | 9/29/1997 | 9/2/1999 | 8/21/2000 | 6/18/2002 |
| *Parameters* | *Units* | | | | |
| 2-Nitroaniline | ug/L | - | - | - | - |
| 2-Nitrophenol | ug/L | - | - | - | - |
| 3,3'-Dichlorobenzidine | ug/L | - | - | - | - |
| 3-Nitroaniline | ug/L | - | - | - | - |
| 4,6-Dinitro-2-methylphenol | ug/L | - | - | - | - |
| 4-Bromophenyl phenyl ether | ug/L | - | - | - | - |
| 4-Chloro-3-methylphenol | ug/L | - | - | - | - |
| 4-Chloroaniline | ug/L | - | - | - | - |
| 4-Chlorophenyl phenyl ether | ug/L | - | - | - | - |
| 4-Methylphenol | ug/L | - | - | - | - |
| 4-Nitroaniline | ug/L | - | - | - | - |
| 4-Nitrophenol | ug/L | - | - | - | - |
| Acenaphthene | ug/L | - | - | - | - |
| Acenaphthylene | ug/L | - | - | - | - |
| Anthracene | ug/L | - | - | - | - |
| Benzo(a)anthracene | ug/L | - | - | - | - |
| Benzo(a)pyrene | ug/L | - | - | - | - |
| Benzo(b)fluoranthene | ug/L | - | - | - | - |
| Benzo(g,h,i)perylene | ug/L | - | - | - | - |
| Benzo(k)fluoranthene | ug/L | - | - | - | - |
| Benzoic acid | ug/L | - | - | - | - |
| Benzyl Alcohol | ug/L | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/L | - | - | - | - |
| bis(2-Chloroethyl)ether | ug/L | - | - | - | - |
| bis(2-Ethylhexyl)phthalate | ug/L | - | - | - | - |
| Butyl benzylphthalate | ug/L | - | - | - | - |
| Carbazole | ug/L | - | - | - | - |
| Chrysene | ug/L | - | - | - | - |
| Dibenz(a,h)anthracene | ug/L | - | - | - | - |
| Dibenzofuran | ug/L | - | - | - | - |
| Diethyl phthalate | ug/L | - | - | - | - |
| Dimethyl phthalate | ug/L | - | - | - | - |
| Di-n-butylphthalate | ug/L | - | - | - | - |
| Di-n-octyl phthalate | ug/L | - | - | - | - |
| Fluoranthene | ug/L | - | - | - | - |
| Fluorene | ug/L | - | - | - | - |
| Hexachlorobenzene | ug/L | - | - | - | - |
| Hexachlorobutadiene | ug/L | - | - | - | - |
| Hexachlorocyclopentadiene | ug/L | - | - | - | - |
| Hexachloroethane | ug/L | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | - | - |
| Isophorone | ug/L | - | - | - | - |
| Naphthalene | ug/L | - | - | - | - |
| Nitrobenzene | ug/L | - | - | - | - |
| N-Nitrosodi-n-propylamine | ug/L | - | - | - | - |
| N-Nitrosodiphenylamine | ug/L | - | - | - | - |
| Pentachlorophenol | ug/L | - | - | - | - |
| Phenanthrene | ug/L | - | - | - | - |
| Phenol | ug/L | - | - | - | - |
| Pyrene | ug/L | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | S-6 | S-6 | S-6 | S-6 |
|---|---|---|---|---|---|
| *Sample ID:* | | S692997(GM) | GW-7043-090299-RSH-105 | GW-7043-RW-082100-06 | GW-7043-061802-BW-014 |
| *Sample Date:* | | 9/29/1997 | 9/2/1999 | 8/21/2000 | 6/18/2002 |
| *Parameters* | *Units* | | | | |
| *Metals* | | | | | |
| Aluminum (Dissolved) | ug/L | 0.0195 U | 0.20 U | 0.20 U | 0.20 U |
| Antimony (Dissolved) | ug/L | 0.0029 U | 0.060 U | 0.060 U | 0.060 U |
| Arsenic (Dissolved) | ug/L | 0.0059 U | 0.010 U | 0.010 U | 0.010 U |
| Barium (Dissolved) | ug/L | 0.0794 B | 0.20 U | 0.20 U | 0.20 U |
| Beryllium (Dissolved) | ug/L | 0.0001 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Cadmium (Dissolved) | ug/L | 0.0003 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Calcium (Dissolved) | ug/L | 102 | 102 | 99.7 | 102 |
| Chromium Total (Dissolved) | ug/L | 0.0008 U | 0.010 U | 0.010 U | 0.010 U |
| Cobalt (Dissolved) | ug/L | 0 0007 U | 0.050 U | 0.050 U | 0.050 U |
| Copper (Dissolved) | ug/L | 0.0016 B | 0.025 U | 0.025 U | 0.025 U |
| Iron | ug/L | - | 1 50 | - | - |
| Iron (Dissolved) | ug/L | 0.0134 U | 0.10 U | 0.10 U | 0.10 U |
| Lead (Dissolved) | ug/L | 0.0019 U | 0.0030 U | 0.0030 U | 0.0030 U |
| Magnesium (Dissolved) | ug/L | 34.4 | 34.9 | 34.3 | 33.3 |
| Manganese (Dissolved) | ug/L | 0.0001 U | 0 015 U | 0.015 U | 0.015 U |
| Mercury (Dissolved) | ug/L | 0.0001 U | 0.00020 U | 0.00020 U | 0 00020 U |
| Nickel (Dissolved) | ug/L | 0.0013 U | 0.040 U | 0.040 U | 0.040 U |
| Potassium (Dissolved) | ug/L | 2 BE | 5.0 U | 5.0 U | 5.0 U |
| Selenium (Dissolved) | ug/L | 0.0044 U | 0.0050 U | 0.0050 U | 0.0050 U |
| Silver (Dissolved) | ug/L | 0.0008 U | 0.010 U | 0.010 U | 0.010 U |
| Sodium (Dissolved) | ug/L | 7.23 | 7.5 | 10.0 | 5.6 |
| Thallium (Dissolved) | ug/L | 0.005 U | 0.010 U | 0 010 U | 0 010 U |
| Vanadium (Dissolved) | ug/L | 0.0007 U | 0.050 U | 0.050 U | 0.050 U |
| Zinc (Dissolved) | ug/L | 0.0089 BE | 0.032 | 0.020 U | 0.046 |
| *PCBs* | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | - | - |
| *Gas* | | | | | |
| Ethane | ug/L | - | 0.50 U | 0 50 U | 0.50 U |
| Ethene | ug/L | - | 0.50 U | 0.50 U | 0.50 U |
| *Pesticides* | | | | | |
| 4,4'-DDD | ug/L | - | - | - | - |
| 4,4'-DDE | ug/L | - | - | - | - |
| 4,4'-DDT | ug/L | - | - | - | - |
| Aldrin | ug/L | - | - | - | - |
| alpha-BHC | ug/L | - | - | - | - |
| alpha-Chlordane | ug/L | - | - | - | - |
| beta-BHC | ug/L | - | - | - | - |

TABLE F.1

ANALYTICAL RESULTS SUMMARY
GROUNDWATER RESULTS
GARLAND ROAD

| *Sample Location:* | | S-6 | S-6 | S-6 | S-6 |
|---|---|---|---|---|---|
| *Sample ID:* | | S692997(GM) | GW-7043-090299-RSH-105 | GW-7043-RW-082100-06 | GW-7043-061802-BW-014 |
| *Sample Date:* | | 9/29/1997 | 9/2/1999 | 8/21/2000 | 6/18/2002 |
| *Parameters* | *Units* | | | | |
| delta-BHC | ug/L | - | - | - | - |
| Dieldrin | ug/L | - | - | - | - |
| Endosulfan I | ug/L | - | - | - | - |
| Endosulfan II | ug/L | - | - | - | - |
| Endosulfan sulfate | ug/L | - | - | - | - |
| Endrin | ug/L | - | - | - | - |
| Endrin aldehyde | ug/L | - | - | - | - |
| Endrin ketone | ug/L | - | - | - | - |
| gamma-BHC (Lindane) | ug/L | - | - | - | - |
| gamma-Chlordane | ug/L | - | - | - | - |
| Heptachlor | ug/L | - | - | - | - |
| Heptachlor epoxide | ug/L | - | - | - | - |
| Methoxychlor | ug/L | - | - | - | - |
| Toxaphene | ug/L | - | - | - | - |
| *General Chemistry* | | | | | |
| Cyanide (total) | ug/L | 0.010 U | - | - | - |
| *Field Parameters* | | | | | |
| Conductivity | umhos/cm | - | 1310 | - | - |
| Dissolved Oxygen | ug/L | - | 1.81 | - | - |
| Oxidation reduction potential | millivolts | - | 105.1 | - | - |
| pH Field | s.u. | - | 6.86 | - | - |
| Temperature, Field | deg C | - | 12.78 | - | - |
| Turbidity | NTU | - | 45 | - | - |

*Notes:*
U - Not detected at or above associated value.
J - Estimated concentration
UJ - Estimated reporting detection limit.
R - Rejected.

TABLE F.2

SUMMARY OF DETECTIONS - GROUNDWATER SAMPLE RESULTS
FIT COLLECTED SAMPLES - APRIL 1993
GARLAND ROAD LANDFILL SITE

| *Parameters* | *Sample Locations Residential Well RW-01 (µg/L)* |
|---|---|
| *Volatile Organics* | |
| 1,2-dichloroethene (total) | NA |
| 4-Methyl-2-Pentanone | NA |
| Carbon disulfide | 0.1 J |
| Ethylbenzene | NA |
| Methylene Chloride | < 2 |
| Phenol | NA |
| Toluene | NA |
| Trichloroethene | NA |
| Xylenes (total) | NA |
| *Semi-Volatile Organics* | |
| 2-methylnaphthalene | NA |
| Acenaphthene | NA |
| Acenaphthylene | NA |
| benzo (a) anthracene | NA |
| benzo (a) pyrene | NA |
| benzo (b) fluoranthene | NA |
| benzo (g,h,i) perylene | NA |
| benzo (k) fluoranthene | NA |
| bis (2-ethylhexyl) phthalate | NA |
| Chrysene | NA |
| di-n-butyl phthalate | NA |
| Dibenzofuran | NA |
| Diethylphthalate | NA |
| Fluoranthene | NA |
| Fluorene | NA |
| Indeno (1,2,3-cd) pyrene | NA |
| *Semi-Volatile Organics, continued* | |
| n-nitrosodiphenylamine | NA |
| Naphthalene | NA |
| Phenanthrene | NA |
| Pyrene | NA |
| *Pesticides* | |
| 4,4'-DDD | NA |
| 4,4'-DDE | NA |
| 4,4'-DDT | NA |
| alpha Chlordane | NA |
| delta-BHC | NA |
| Dieldrin | NA |

TABLE F.2

SUMMARY OF DETECTIONS - GROUNDWATER SAMPLE RESULTS
FIT COLLECTED SAMPLES - APRIL 1993
GARLAND ROAD LANDFILL SITE

| *Parameters* | *Sample Locations Residential Well RW-01 (µg/L)* |
|---|---|
| Endosulfan I | NA |
| Endosulfan II | NA |
| Endrin | NA |
| gamma Chlordane | NA |
| Heptachlor epoxide | NA |
| Methoxychlor (Mariate) | NA |
| *PCBs* | |
| Aroclor 1248 | NA |
| Aroclor 1254 | NA |
| *Metals* | |
| Aluminum | 35.7 B |
| Antimony | NA |
| Arsenic | NA |
| Barium | 75.3 |
| Beryllium | NA |
| Cadmium | 0.13 B |
| Calcium | 91,800 |
| Chromium | NA |
| Cobalt | NA |
| Copper | 10.5 |
| Iron | 93.6 B |
| Lead | 2.3 |
| Magnesium | 39,900 |
| Manganese | 9.5 B |
| Mercury | NA |
| Nickel | NA |
| Potassium | 1,550 B |
| Silver | NA |
| Sodium | 19,000 |
| Vanadium | NA |
| Zinc | 76.7 |

Notes:

J - Value is estimated (also indicates a compound that is detected below the Contract Required Quantitation Limit (CRQL) or Contract Required Detection Limit (CRDL)).

B - Value is below the CRDL (adjusted for percent moisture and/or dilution by the laboratory)

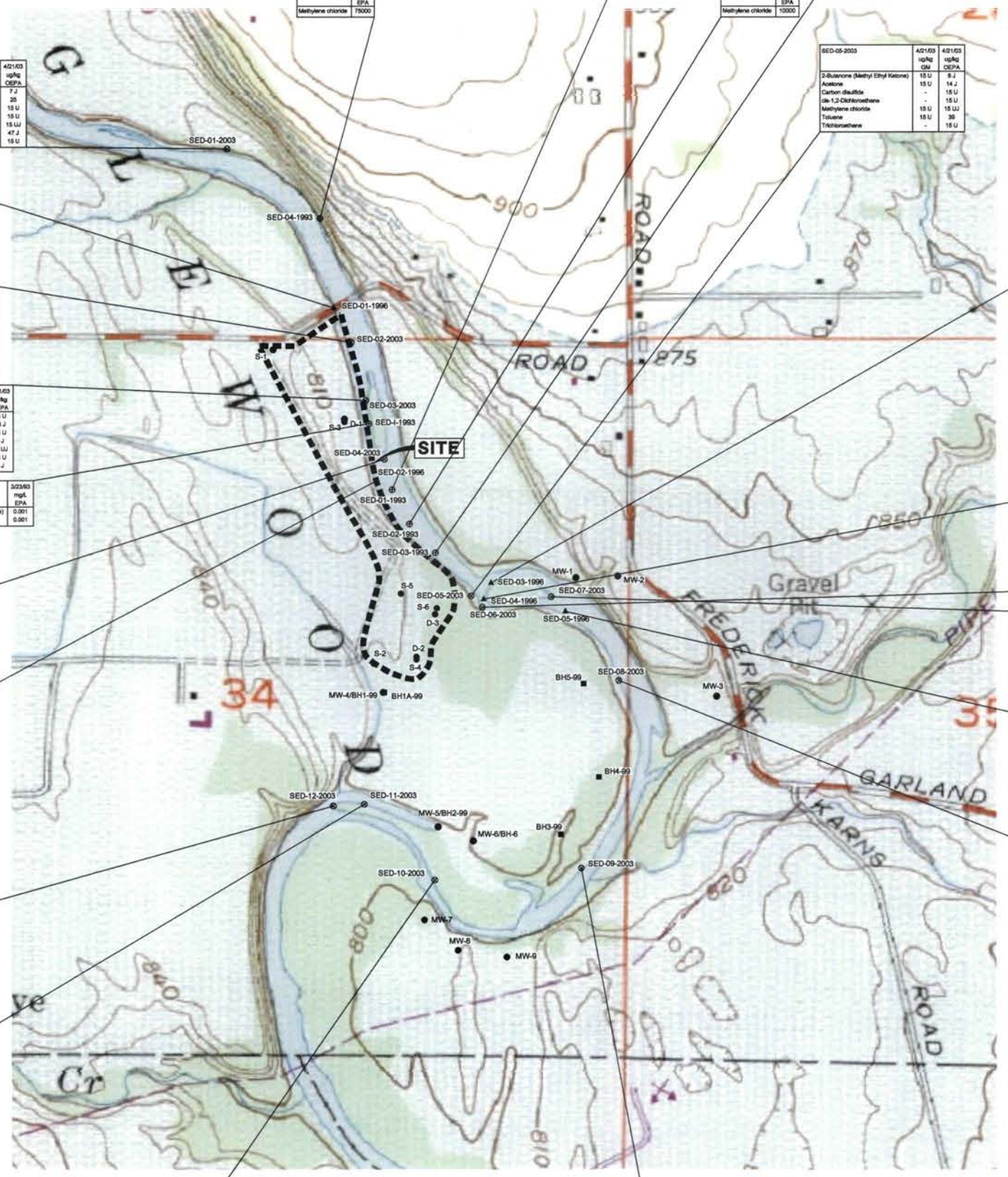
NA - Not Analyzed

G

APPENDIX G

STILL WATER RIVER SEDIMENT SAMPLE ANALYTICAL RESULTS


Figure G.1 - Sediment Data Summary - VOCs
Figure G.2 - Sediment Data Summary - SVOCs
Figure G.3 - Sediment Data Summary - Metals
Figure G.4 - Sediment Data Summary - Other
Table G.1 - Sediment Analytical Results Summary (Database)
Table G.2 - Summary of Detections - Sediment Sample Results (TAT - April 1993)




| SED-01-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 18 U | 7 J |
| Acetone | 55 U | 25 |
| Carbon disulfide | 18 U | 15 U |
| cis-1,2-Dichloroethene | 18 U | 15 U |
| Methylene chloride | 18 U | 15 UJ |
| Toluene | 48 | 47 J |
| Trichloroethene | 18 U | 15 U |

| SED-04-1993 | 4/7/93 ug/kg EPA |
|---|---|
| Methylene chloride | 75000 |

| SED-01-1993 | 4/7/93 ug/kg EPA |
|---|---|
| Methylene chloride | 10000 |

| SED-02-1993 | 4/7/93 ug/kg EPA |
|---|---|
| Methylene chloride | 10000 |

| SED-03-1993 | 4/7/93 ug/kg EPA |
|---|---|
| Methylene chloride | 10000 |

| SED-05-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 15 U | 8 J |
| Acetone | 15 U | 14 J |
| Carbon disulfide | - | 15 U |
| cis-1,2-Dichloroethene | - | 15 U |
| Methylene chloride | 15 U | 15 UJ |
| Toluene | 15 U | 39 |
| Trichloroethene | - | 15 U |

| SED-01-1996 | 8/6/96 ug/kg GM |
|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 50 U |
| Acetone | 50 U |
| Carbon disulfide | 5.0 U |
| Methylene chloride | 5.0 U |
| Toluene | 5.0 U |
| Trichloroethene | 5.0 U |

| SED-02-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 15 U | 17 U |
| Acetone | 20 U | 13 J |
| Carbon disulfide | 15 U | 17 U |
| cis-1,2-Dichloroethene | 15 U | 17 U |
| Methylene chloride | 15 U | 17 UJ |
| Toluene | 15 U | 17 U |
| Trichloroethene | 15 U | 17 U |

| SED-03-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | - | 14 U |
| Acetone | 14 U | 13 J |
| Carbon disulfide | - | 14 U |
| cis-1,2-Dichloroethene | 0.9 | 2 J |
| Methylene chloride | 14 U | 14 UJ |
| Toluene | - | 14 U |
| Trichloroethene | 1 | 5 J |

| SED-I-1993 | 3/23/93 mg/L EPA |
|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 0.001 |
| Trichloroethene | 0.001 |

| SED-04-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 20 U | 29 |
| Acetone | 76 U | 51 |
| Carbon disulfide | 20 U | 3 J |
| cis-1,2-Dichloroethene | - | 20 U |
| Methylene chloride | 20 U | 20 UJ |
| Toluene | 11000 | 4700 |
| Trichloroethene | - | 20 U |

| SED-02-1996 | 8/6/96 ug/kg GM |
|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 50 U |
| Acetone | 50 U |
| Carbon disulfide | 5.0 U |
| Methylene chloride | 5.0 U |
| Toluene | 5.0 U |
| Trichloroethene | 5.0 U |

| SED-13-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 13 U | 13 UJ |
| Acetone | 13 U | 8 J |
| Carbon disulfide | - | 13 U |
| cis-1,2-Dichloroethene | - | 13 U |
| Methylene chloride | 13 U | 13 UJ |
| Toluene | 13 U | 2 J |
| Trichloroethene | - | 13 U |

| SED-11-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 15 U | 15 UJ |
| Acetone | 15 U | 7 J |
| Carbon disulfide | 15 U | 15 UJ |
| cis-1,2-Dichloroethene | - | 15 U |
| Methylene chloride | 15 U | 15 UJ |
| Toluene | 15 U | 42 |
| Trichloroethene | - | 15 U |

| SED-10-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 15 U | 16 UJ |
| Acetone | 15 U | 16 UJ |
| Carbon disulfide | 15 U | 16 UJ |
| cis-1,2-Dichloroethene | 15 U | 16 U |
| Methylene chloride | 15 U | 16 UJ |
| Toluene | 15 U | 78 |
| Trichloroethene | 15 U | 16 U |

| SED-09-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 15 U | 15 UJ |
| Acetone | 17 U | 9 J |
| Carbon disulfide | - | 15 U |
| cis-1,2-Dichloroethene | - | 15 U |
| Methylene chloride | 15 U | 15 UJ |
| Toluene | 15 U | 3 J |
| Trichloroethene | - | 15 U |

| SED-03-1996 | 8/6/96 ug/kg GM |
|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 50 U |
| Acetone | 50 U |
| Carbon disulfide | 5.0 U |
| Methylene chloride | 5.0 U |
| Toluene | 5.0 U |
| Trichloroethene | 5.0 U |

| SED-04-1996 | 8/6/96 ug/kg GM |
|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 50 U |
| Acetone | 50 U |
| Carbon disulfide | 5.0 U |
| Methylene chloride | 5.0 U |
| Toluene | 5.0 U |
| Trichloroethene | 5.0 U |

| SED-06-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 19 U | 13 J |
| Acetone | 20 U | 24 J |
| Carbon disulfide | 19 U | 20 U |
| cis-1,2-Dichloroethene | 19 U | 20 U |
| Methylene chloride | 19 U | 20 UJ |
| Toluene | 83 | 510 |
| Trichloroethene | 19 U | 20 U |

| SED-07-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 24 U | 24 J |
| Acetone | 58 U | 44 J |
| Carbon disulfide | 24 U | 27 U |
| cis-1,2-Dichloroethene | 24 U | 27 U |
| Methylene chloride | 24 U | 27 UJ |
| Toluene | 720 | 6100 |
| Trichloroethene | 24 U | 27 U |

| SED-05-1996 | 8/6/96 ug/kg GM |
|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 50 U |
| Acetone | 15 J |
| Carbon disulfide | 5.0 U |
| Methylene chloride | 5.0 U |
| Toluene | 5.0 U |
| Trichloroethene | 5.0 U |

| SED-08-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Butanone (Methyl Ethyl Ketone) | 18 U | 18 UJ |
| Acetone | 24 U | 16 J |
| Carbon disulfide | 18 U | 19 UJ |
| cis-1,2-Dichloroethene | 18 U | 19 U |
| Methylene chloride | 18 U | 19 UJ |
| Toluene | 18 U | 17 J |
| Trichloroethene | 18 U | 19 U |

| N° | Revision | Date | Initial |
|---|---|---|---|
| | | | |

## LEGEND

- LIMIT OF SITE
- BH4-99 — BOREHOLE LOCATION
- MW-9 — MONITORING WELL LOCATION
- SED-01-1996 — GM SEDIMENT SAMPLE LOCATION
- SED-02-2003 — APPROXIMATE SEDIMENT SAMPLE LOCATION

| MW-8 | 8/8/2001 mg/L GM | 6/18/2002 mg/L GM |
|---|---|---|
| 1,1-Dichloroethane | ND (0.001) | ND (0.001) |
| 1,1-Dichloroethene | ND (0.001) | ND (0.001) |
| 1,2-Dichloroethene (total) | ND (0.0009) | - |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ND (0.006) | ND (0.0065) UJ |
| Acetone | ND (0.01) U | ND (0.01) UJ |
| Benzene | 0.00089 J | ND (0.001) |
| Carbon disulfide | ND (0.001) | ND (0.001) |
| Chlorobenzene | ND (0.001) | ND (0.001) |
| Chloroethane | ND (0.002) | ND (0.002) |
| Chloromethane (Methyl Chloride) | ND (0.002) | ND (0.002) |
| cis-1,2-Dichloroethene | ND (0.0005) | ND (0.0005) |
| Ethylbenzene | 0.00019 J | ND (0.001) |
| Methylene chloride | ND (0.001) | ND (0.001) |
| Tetrachloroethene | 0.00032 J | ND (0.001) |
| Toluene | 0.0018 | ND (0.001) |
| trans-1,2-Dichloroethene | ND (0.0005) | ND (0.0005) |
| Trichloroethene | 0.00021 J | ND (0.001) |
| Vinyl chloride | ND (0.002) | ND (0.002) |
| Xylene (total) | 0.00094 J | ND (0.001) |

SAMPLE LOCATION
SAMPLE DATE
RESULT UNIT
SAMPLE HEADER
CONCENTRATION
PARAMETER

SOURCES: U.S.G.S. QUADRANGLE MAP, WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000 AND JUNE 2001
NOVA CONSULTING INC.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

| Status | Date | Initial |
|---|---|---|
| | | |

GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

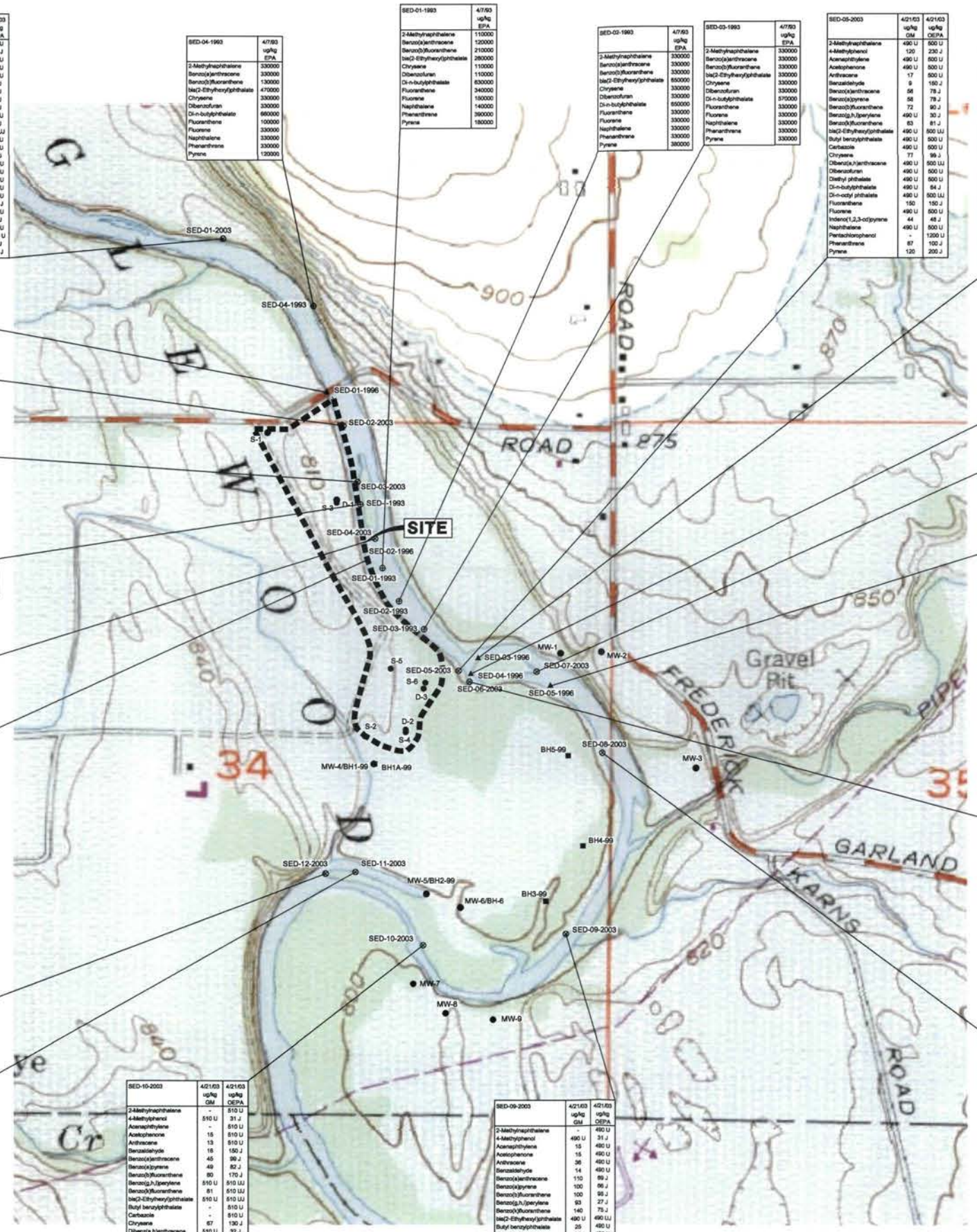
SEDIMENT DATA SUMMARY
OF VOC's

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: | Reviewed By: | Date: | |
|---|---|---|---|
| MT | JEP | MAY 2006 | |
| Scale: 1"=500' | Project N°: 07043-90 | Report N°: 014 | Drawing N°: figure G.1 |

07043-90(014)GN-WA018 MAY 31/2006




| SED-01-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Methylnaphthalene | 520 U | 500 U |
| 4-Methylphenol | 94 | 210 J |
| Acenaphthylene | 520 U | 500 U |
| Acetophenone | 16 | 500 U |
| Anthracene | 16 | 500 U |
| Benzaldehyde | 13 | 67 J |
| Benzo(a)anthracene | 42 | 73 J |
| Benzo(a)pyrene | 46 | 55 J |
| Benzo(b)fluoranthene | 64 | 80 J |
| Benzo(g,h,i)perylene | 520 U | 500 U |
| Benzo(k)fluoranthene | 53 | 49 J |
| bis(2-Ethylhexyl)phthalate | 520 U | 500 U |
| Butyl benzylphthalate | 520 U | 500 U |
| Carbazole | 520 U | 500 U |
| Chrysene | 63 | 95 J |
| Dibenz(a,h)anthracene | 520 U | 500 U |
| Dibenzofuran | 520 U | 500 U |
| Diethyl phthalate | 520 U | 500 U |
| Di-n-butylphthalate | 520 U | 500 U |
| Di-n-octyl phthalate | 520 U | 500 U |
| Fluoranthene | 130 | 180 J |
| Fluorene | 520 U | 500 U |
| Indeno(1,2,3-cd)pyrene | 34 | 30 J |
| Naphthalene | 520 U | 500 U |
| Pentachlorophenol | - | 1300 U |
| Phenanthrene | 66 | 64 J |
| Pyrene | 96 | 190 J |

| SED-01-1996 | 8/6/96 ug/kg GM |
|---|---|
| 2-Methylnaphthalene | 500 UJ |
| 4-Methylphenol | 500 UJ |
| Acenaphthylene | 500 UJ |
| Anthracene | 500 UJ |
| Benzo(a)anthracene | 500 UJ |
| Benzo(a)pyrene | 500 UJ |
| Benzo(b)fluoranthene | 500 UJ |
| Benzo(g,h,i)perylene | 500 UJ |
| Benzo(k)fluoranthene | 500 UJ |
| bis(2-Ethylhexyl)phthalate | 500 UJ |
| Butyl benzylphthalate | 500 UJ |
| Carbazole | 500 UJ |
| Chrysene | 500 UJ |
| Dibenz(a,h)anthracene | 500 UJ |
| Dibenzofuran | 500 UJ |
| Diethyl phthalate | 500 UJ |
| Di-n-butylphthalate | 500 UJ |
| Di-n-octyl phthalate | 500 UJ |
| Fluoranthene | 500 UJ |
| Fluorene | 500 UJ |
| Indeno(1,2,3-cd)pyrene | 500 UJ |
| Naphthalene | 500 UJ |
| Pentachlorophenol | R |
| Phenanthrene | 500 UJ |
| Pyrene | 500 UJ |

| SED-04-1993 | 4/7/93 ug/kg EPA |
|---|---|
| 2-Methylnaphthalene | 330000 |
| Benzo(a)anthracene | 330000 |
| Benzo(b)fluoranthene | 130000 |
| bis(2-Ethylhexyl)phthalate | 470000 |
| Chrysene | 330000 |
| Dibenzofuran | 330000 |
| Di-n-butylphthalate | 660000 |
| Fluoranthene | 100000 |
| Fluorene | 330000 |
| Naphthalene | 330000 |
| Phenanthrene | 330000 |
| Pyrene | 130000 |

| SED-01-1993 | 4/7/93 ug/kg EPA |
|---|---|
| 2-Methylnaphthalene | 110000 |
| Benzo(a)anthracene | 120000 |
| Benzo(b)fluoranthene | 210000 |
| bis(2-Ethylhexyl)phthalate | 280000 |
| Chrysene | 110000 |
| Dibenzofuran | 110000 |
| Di-n-butylphthalate | 830000 |
| Fluoranthene | 340000 |
| Fluorene | 190000 |
| Naphthalene | 140000 |
| Phenanthrene | 360000 |
| Pyrene | 180000 |

| SED-03-1993 | 4/7/93 ug/kg EPA |
|---|---|
| 2-Methylnaphthalene | 330000 |
| Benzo(a)anthracene | 330000 |
| Benzo(b)fluoranthene | 330000 |
| bis(2-Ethylhexyl)phthalate | 330000 |
| Chrysene | 330000 |
| Dibenzofuran | 330000 |
| Di-n-butylphthalate | 570000 |
| Fluoranthene | 330000 |
| Fluorene | 330000 |
| Naphthalene | 330000 |
| Phenanthrene | 330000 |
| Pyrene | 330000 |

| SED-05-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Methylnaphthalene | 490 U | 500 U |
| 4-Methylphenol | 120 | 230 J |
| Acenaphthylene | 490 U | 500 U |
| Acetophenone | 490 U | 500 U |
| Anthracene | 17 | 500 U |
| Benzaldehyde | 9 | 150 J |
| Benzo(a)anthracene | 58 | 78 J |
| Benzo(a)pyrene | 56 | 78 J |
| Benzo(b)fluoranthene | 72 | 90 J |
| Benzo(g,h,i)perylene | 490 U | 50 J |
| Benzo(k)fluoranthene | 63 | 81 J |
| bis(2-Ethylhexyl)phthalate | 490 U | 500 UJ |
| Butyl benzylphthalate | 490 U | 500 U |
| Carbazole | 490 U | 500 U |
| Chrysene | 77 | 99 J |
| Dibenz(a,h)anthracene | 490 U | 500 UJ |
| Dibenzofuran | 490 U | 500 U |
| Diethyl phthalate | 490 U | 500 U |
| Di-n-butylphthalate | 490 U | 64 J |
| Di-n-octyl phthalate | 490 U | 500 UJ |
| Fluoranthene | 150 | 190 J |
| Fluorene | 490 U | 500 U |
| Indeno(1,2,3-cd)pyrene | 44 | 45 J |
| Naphthalene | 490 U | 500 U |
| Pentachlorophenol | - | 1200 U |
| Phenanthrene | 87 | 100 J |
| Pyrene | 120 | 200 J |

| SED-03-1996 | 8/6/96 ug/kg GM |
|---|---|
| 2-Methylnaphthalene | 330 U |
| 4-Methylphenol | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 330 U |
| Benzo(a)pyrene | 330 U |
| Benzo(b)fluoranthene | 330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U |
| bis(2-Ethylhexyl)phthalate | 330 U |
| Butyl benzylphthalate | 330 U |
| Carbazole | 330 U |
| Chrysene | 330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Diethyl phthalate | 330 U |
| Di-n-butylphthalate | 330 U |
| Di-n-octyl phthalate | 330 U |
| Fluoranthene | 36 J |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Naphthalene | 330 U |
| Pentachlorophenol | R |
| Phenanthrene | 330 U |
| Pyrene | 36 J |

| SED-04-1996 | 8/6/96 ug/kg GM |
|---|---|
| 2-Methylnaphthalene | 330 U |
| 4-Methylphenol | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 330 U |
| Benzo(a)pyrene | 330 U |
| Benzo(b)fluoranthene | 330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U |
| bis(2-Ethylhexyl)phthalate | 330 U |
| Butyl benzylphthalate | 330 U |
| Carbazole | 330 U |
| Chrysene | 330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Diethyl phthalate | 330 U |
| Di-n-butylphthalate | 330 U |
| Di-n-octyl phthalate | 330 U |
| Fluoranthene | 330 U |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Naphthalene | 330 U |
| Pentachlorophenol | R |
| Phenanthrene | 330 U |
| Pyrene | 330 U |

| SED-07-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Methylnaphthalene | 790 U | 880 U |
| 4-Methylphenol | 1200 | 2300 |
| Acenaphthylene | 790 U | 880 U |
| Acetophenone | 26 | 880 U |
| Anthracene | 29 | 880 U |
| Benzaldehyde | 36 | 260 J |
| Benzo(a)anthracene | 82 | 170 J |
| Benzo(a)pyrene | 84 | 140 J |
| Benzo(b)fluoranthene | 110 | 330 J |
| Benzo(g,h,i)perylene | 790 U | 81 J |
| Benzo(k)fluoranthene | 120 | 880 UJ |
| bis(2-Ethylhexyl)phthalate | 790 U | 880 UJ |
| Butyl benzylphthalate | 790 U | 880 UJ |
| Carbazole | 790 U | 880 U |
| Chrysene | 130 | 200 J |
| Dibenz(a,h)anthracene | 790 U | 880 U |
| Dibenzofuran | 790 U | 880 U |
| Diethyl phthalate | 790 U | 880 U |
| Di-n-butylphthalate | 790 U | 85 J |
| Di-n-octyl phthalate | 790 U | 880 UJ |
| Fluoranthene | 278 | 320 J |
| Fluorene | 790 U | 880 U |
| Indeno(1,2,3-cd)pyrene | 61 | 100 J |
| Naphthalene | 790 U | 880 U |
| Pentachlorophenol | 2000 U | 2200 U |
| Phenanthrene | 113 | 180 J |
| Pyrene | 200 | 480 J |

| SED-05-1996 | 8/6/96 ug/kg GM |
|---|---|
| 2-Methylnaphthalene | 330 U |
| 4-Methylphenol | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 330 U |
| Benzo(a)pyrene | 330 U |
| Benzo(b)fluoranthene | 330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U |
| bis(2-Ethylhexyl)phthalate | 200 J |
| Butyl benzylphthalate | 330 U |
| Carbazole | 330 U |
| Chrysene | 330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Diethyl phthalate | 330 U |
| Di-n-butylphthalate | 330 U |
| Di-n-octyl phthalate | 330 U |
| Fluoranthene | 72 J |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Naphthalene | 330 U |
| Pentachlorophenol | R |
| Phenanthrene | 48 J |
| Pyrene | 94 J |

| SED-06-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Methylnaphthalene | 810 U | 640 U |
| 4-Methylphenol | 330 | 810 |
| Acenaphthylene | 810 U | 640 U |
| Acetophenone | 25 | 640 U |
| Anthracene | 25 | 42 J |
| Benzaldehyde | 18 | 180 J |
| Benzo(a)anthracene | 88 | 170 J |
| Benzo(a)pyrene | 78 | 160 J |
| Benzo(b)fluoranthene | 100 | 160 J |
| Benzo(g,h,i)perylene | 810 U | 89 J |
| Benzo(k)fluoranthene | 80 | 200 J |
| bis(2-Ethylhexyl)phthalate | 810 U | 640 UJ |
| Butyl benzylphthalate | 810 U | 640 UJ |
| Carbazole | 810 U | 640 U |
| Chrysene | 110 | 240 J |
| Dibenz(a,h)anthracene | 810 U | 40 J |
| Dibenzofuran | 810 U | 640 U |
| Diethyl phthalate | 810 U | 640 U |
| Di-n-butylphthalate | 810 U | 86 J |
| Di-n-octyl phthalate | 810 U | 640 UJ |
| Fluoranthene | 210 | 340 J |
| Fluorene | 810 U | 640 U |
| Indeno(1,2,3-cd)pyrene | 57 | 87 J |
| Naphthalene | 810 U | 640 U |
| Pentachlorophenol | 1600 U | 1600 U |
| Phenanthrene | 88 | 210 J |
| Pyrene | 180 | 480 J |

| SED-08-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Methylnaphthalene | 580 U | 610 U |
| 4-Methylphenol | 42 | 120 J |
| Acenaphthylene | 580 U | 610 U |
| Acetophenone | 21 | 610 U |
| Anthracene | 24 | 33 J |
| Benzaldehyde | 25 | 120 J |
| Benzo(a)anthracene | 73 | 160 J |
| Benzo(a)pyrene | 81 | 160 J |
| Benzo(b)fluoranthene | 91 | 150 J |
| Benzo(g,h,i)perylene | 580 U | 56 J |
| Benzo(k)fluoranthene | 110 | 170 J |
| bis(2-Ethylhexyl)phthalate | 580 U | 610 UJ |
| Butyl benzylphthalate | 580 U | 610 U |
| Carbazole | 580 U | 610 U |
| Chrysene | 110 | 240 J |
| Dibenz(a,h)anthracene | 580 U | 52 J |
| Dibenzofuran | 580 U | 610 U |
| Diethyl phthalate | 580 U | 610 U |
| Di-n-butylphthalate | 580 U | 50 J |
| Di-n-octyl phthalate | 580 U | 610 U |
| Fluoranthene | 210 | 330 J |
| Fluorene | 580 U | 610 U |
| Indeno(1,2,3-cd)pyrene | 63 | 94 J |
| Naphthalene | 580 U | 610 U |
| Pentachlorophenol | - | 1500 U |
| Phenanthrene | 86 | 250 J |
| Pyrene | 160 | 530 J |

| SED-02-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Methylnaphthalene | 490 U | 550 U |
| 4-Methylphenol | 490 U | 550 U |
| Acenaphthylene | 490 U | 550 U |
| Acetophenone | 490 U | 550 U |
| Anthracene | 17 | 550 U |
| Benzaldehyde | 9 | 42 J |
| Benzo(a)anthracene | 53 | 84 J |
| Benzo(a)pyrene | 54 | 82 J |
| Benzo(b)fluoranthene | 61 | 120 J |
| Benzo(g,h,i)perylene | 490 U | 550 U |
| Benzo(k)fluoranthene | 63 | 80 J |
| bis(2-Ethylhexyl)phthalate | 490 U | 550 UJ |
| Butyl benzylphthalate | 490 U | 550 U |
| Carbazole | 490 U | 550 U |
| Chrysene | 74 | 130 J |
| Dibenz(a,h)anthracene | 490 U | 29 J |
| Dibenzofuran | 490 U | 550 U |
| Diethyl phthalate | 490 U | 550 U |
| Di-n-butylphthalate | 490 U | 550 U |
| Di-n-octyl phthalate | 25 | 550 U |
| Fluoranthene | 140 | 190 J |
| Fluorene | 490 U | 550 U |
| Indeno(1,2,3-cd)pyrene | 42 | 51 J |
| Naphthalene | 490 U | 550 U |
| Pentachlorophenol | 1200 U | 1400 U |
| Phenanthrene | 62 | 110 J |
| Pyrene | 120 | 250 J |

| SED-03-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Methylnaphthalene | 450 U | 480 U |
| 4-Methylphenol | 450 U | 480 U |
| Acenaphthylene | 450 U | 480 U |
| Acetophenone | 450 U | 480 U |
| Anthracene | 450 U | 480 U |
| Benzaldehyde | 10 | 480 U |
| Benzo(a)anthracene | 23 | 71 J |
| Benzo(a)pyrene | 25 | 49 J |
| Benzo(b)fluoranthene | 31 | 120 J |
| Benzo(g,h,i)perylene | 450 U | 480 U |
| Benzo(k)fluoranthene | 32 | 480 U |
| bis(2-Ethylhexyl)phthalate | 450 U | 480 UJ |
| Butyl benzylphthalate | 450 U | 480 U |
| Carbazole | 450 U | 480 U |
| Chrysene | 35 | 88 J |
| Dibenz(a,h)anthracene | 450 U | 480 U |
| Dibenzofuran | 450 U | 480 U |
| Diethyl phthalate | 450 U | 35 J |
| Di-n-butylphthalate | 450 U | 130 J |
| Di-n-octyl phthalate | 450 U | 480 U |
| Fluoranthene | 57 | 120 J |
| Fluorene | 450 U | 480 U |
| Indeno(1,2,3-cd)pyrene | 19 | 30 J |
| Naphthalene | 450 U | 480 U |
| Pentachlorophenol | 1100 U | 1200 U |
| Phenanthrene | 21 | 68 J |
| Pyrene | 45 | 180 J |

| SED-1993 | 3/23/93 mg/L EPA |
|---|---|
| Pentachlorophenol | 0.01 |

| SED-04-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Methylnaphthalene | 660 U | 640 U |
| 4-Methylphenol | 3000 | 6700 |
| Acenaphthylene | 660 U | 640 U |
| Acetophenone | 22 | 640 U |
| Anthracene | 50 | 34 J |
| Benzaldehyde | 29 | 250 J |
| Benzo(a)anthracene | 99 | 220 J |
| Benzo(a)pyrene | 100 | 170 J |
| Benzo(b)fluoranthene | 110 | 200 J |
| Benzo(g,h,i)perylene | 660 U | 57 J |
| Benzo(k)fluoranthene | 130 | 180 J |
| bis(2-Ethylhexyl)phthalate | 660 U | 640 UJ |
| Butyl benzylphthalate | 660 U | 640 U |
| Carbazole | 28 | 640 U |
| Chrysene | 130 | 290 J |
| Dibenz(a,h)anthracene | 660 U | 43 J |
| Dibenzofuran | 660 U | 640 U |
| Diethyl phthalate | 660 U | 32 J |
| Di-n-butylphthalate | 660 U | 150 J |
| Di-n-octyl phthalate | 36 | 640 UJ |
| Fluoranthene | 320 | 390 J |
| Fluorene | 20 | 640 U |
| Indeno(1,2,3-cd)pyrene | 74 | 88 J |
| Naphthalene | 660 U | 640 U |
| Pentachlorophenol | 1700 U | 1600 U |
| Phenanthrene | 190 | 240 J |
| Pyrene | 230 | 580 J |

| SED-02-1996 | 8/6/96 ug/kg GM |
|---|---|
| 2-Methylnaphthalene | 330 U |
| 4-Methylphenol | 330 U |
| Acenaphthylene | 330 U |
| Anthracene | 330 U |
| Benzo(a)anthracene | 330 U |
| Benzo(a)pyrene | 330 U |
| Benzo(b)fluoranthene | 330 U |
| Benzo(g,h,i)perylene | 330 U |
| Benzo(k)fluoranthene | 330 U |
| bis(2-Ethylhexyl)phthalate | 330 U |
| Butyl benzylphthalate | 330 U |
| Carbazole | 330 U |
| Chrysene | 330 U |
| Dibenz(a,h)anthracene | 330 U |
| Dibenzofuran | 330 U |
| Diethyl phthalate | 330 U |
| Di-n-butylphthalate | 330 U |
| Di-n-octyl phthalate | 330 U |
| Fluoranthene | 57 J |
| Fluorene | 330 U |
| Indeno(1,2,3-cd)pyrene | 330 U |
| Naphthalene | 330 U |
| Pentachlorophenol | R |
| Phenanthrene | 52 J |
| Pyrene | 330 U |

| SED-12-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Methylnaphthalene | 420 U | 430 U |
| 4-Methylphenol | 420 U | 430 U |
| Acenaphthylene | 420 U | 430 U |
| Acetophenone | 420 U | 430 U |
| Anthracene | 420 U | 430 U |
| Benzaldehyde | 420 U | 430 U |
| Benzo(a)anthracene | 420 U | 40 J |
| Benzo(a)pyrene | 420 U | 37 J |
| Benzo(b)fluoranthene | 420 U | 39 J |
| Benzo(g,h,i)perylene | 420 U | 430 U |
| Benzo(k)fluoranthene | 420 U | 27 J |
| bis(2-Ethylhexyl)phthalate | 18 | 430 UJ |
| Butyl benzylphthalate | 420 U | 430 U |
| Carbazole | 420 U | 430 U |
| Chrysene | 14 | 52 J |
| Dibenz(a,h)anthracene | 420 U | 430 U |
| Dibenzofuran | 420 U | 430 U |
| Diethyl phthalate | 420 U | 430 U |
| Di-n-butylphthalate | 420 U | 28 J |
| Di-n-octyl phthalate | 420 U | 430 UJ |
| Fluoranthene | 42 | 86 J |
| Fluorene | 420 U | 430 U |
| Indeno(1,2,3-cd)pyrene | 420 U | 430 UJ |
| Naphthalene | 420 U | 430 U |
| Pentachlorophenol | 1100 UJ | 1100 U |
| Phenanthrene | 27 | 40 J |
| Pyrene | 420 U | 90 J |

| SED-11-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Methylnaphthalene | 490 U | 470 U |
| 4-Methylphenol | 82 | 180 J |
| Acenaphthylene | 490 U | 470 U |
| Acetophenone | 490 U | 470 U |
| Anthracene | 490 U | 470 U |
| Benzaldehyde | 10 | 470 U |
| Benzo(a)anthracene | 31 | 78 J |
| Benzo(a)pyrene | 37 | 75 J |
| Benzo(b)fluoranthene | 39 | 170 J |
| Benzo(g,h,i)perylene | 490 U | 28 J |
| Benzo(k)fluoranthene | 46 | 470 UJ |
| bis(2-Ethylhexyl)phthalate | 490 U | 470 UJ |
| Butyl benzylphthalate | 490 U | 470 U |
| Carbazole | 490 U | 470 U |
| Chrysene | 52 | 130 J |
| Dibenz(a,h)anthracene | 490 U | 28 J |
| Dibenzofuran | 490 U | 470 U |
| Diethyl phthalate | 490 U | 470 U |
| Di-n-butylphthalate | 490 U | 28 J |
| Di-n-octyl phthalate | 190 | 470 UJ |
| Fluoranthene | 86 | 150 J |
| Fluorene | 490 U | 470 U |
| Indeno(1,2,3-cd)pyrene | 29 | 44 J |
| Naphthalene | 490 U | 470 U |
| Pentachlorophenol | - | 1200 U |
| Phenanthrene | 43 | 78 J |
| Pyrene | 73 | 240 J |

| SED-10-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Methylnaphthalene | - | 510 U |
| 4-Methylphenol | 510 U | 31 J |
| Acenaphthylene | - | 510 U |
| Acetophenone | 16 | 510 U |
| Anthracene | 13 | 510 U |
| Benzaldehyde | 18 | 150 J |
| Benzo(a)anthracene | 45 | 99 J |
| Benzo(a)pyrene | 49 | 82 J |
| Benzo(b)fluoranthene | 80 | 170 J |
| Benzo(g,h,i)perylene | 510 U | 510 UJ |
| Benzo(k)fluoranthene | 81 | 510 UJ |
| bis(2-Ethylhexyl)phthalate | 510 U | 510 UJ |
| Butyl benzylphthalate | - | 510 U |
| Carbazole | - | 510 U |
| Chrysene | 67 | 130 J |
| Dibenz(a,h)anthracene | 510 U | 32 J |
| Dibenzofuran | - | 510 U |
| Diethyl phthalate | - | 510 U |
| Di-n-butylphthalate | 510 U | 36 J |
| Di-n-octyl phthalate | 510 U | 510 UJ |
| Fluoranthene | 130 | 180 J |
| Fluorene | - | 510 U |
| Indeno(1,2,3-cd)pyrene | 45 | 45 J |
| Naphthalene | - | 510 U |
| Pentachlorophenol | 1300 U | 57 J |
| Phenanthrene | 45 | 98 J |
| Pyrene | 96 | 230 J |

| SED-09-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 2-Methylnaphthalene | - | 490 U |
| 4-Methylphenol | 490 U | 31 J |
| Acenaphthylene | 16 | 490 U |
| Acetophenone | 15 | 490 U |
| Anthracene | 36 | 490 U |
| Benzaldehyde | 14 | 490 U |
| Benzo(a)anthracene | 110 | 99 J |
| Benzo(a)pyrene | 100 | 96 J |
| Benzo(b)fluoranthene | 100 | 99 J |
| Benzo(g,h,i)perylene | 93 | 27 J |
| Benzo(k)fluoranthene | 140 | 75 J |
| bis(2-Ethylhexyl)phthalate | 490 U | 490 UJ |
| Butyl benzylphthalate | 25 | 490 U |
| Carbazole | 27 | 490 U |
| Chrysene | 160 | 110 J |
| Dibenz(a,h)anthracene | 56 | 490 U |
| Dibenzofuran | - | 490 U |
| Diethyl phthalate | - | 490 U |
| Di-n-butylphthalate | 19 | 30 J |
| Di-n-octyl phthalate | 22 | 490 UJ |
| Fluoranthene | 290 | 130 J |
| Fluorene | - | 490 U |
| Indeno(1,2,3-cd)pyrene | 93 | 40 J |
| Naphthalene | - | 490 U |
| Pentachlorophenol | - | 1300 U |
| Phenanthrene | 170 | 72 J |
| Pyrene | 220 | 210 J |

| NO | Revision | Date | Initial |
|---|---|---|---|
| | | | |

## LEGEND

- LIMIT OF SITE
- BH4-99 — BOREHOLE LOCATION
- MW-9 — MONITORING WELL LOCATION
- SED-01-1996 — GM SEDIMENT SAMPLE LOCATION
- SED-02-2003 — APPROXIMATE SEDIMENT SAMPLE LOCATION

| MW-4 | 6/6/2001 mg/L GM | 5/1-5/2002 mg/L GM |
|---|---|---|
| 1,1-Dichloroethane | ND (0.001) | ND (0.001) |
| 1,1-Dichloroethene | ND (0.001) | ND (0.001) |
| 1,2-Dichloroethene (total) | ND (0.0008) | - |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ND (0.008) | ND (0.008) UJ |
| Acetone | ND (0.01) UJ | ND (0.01) UJ |
| Benzene | 0.00089 J | ND (0.001) |
| Carbon disulfide | ND (0.001) | ND (0.001) |
| Chlorobenzene | ND (0.001) | ND (0.001) |
| Chloroethane | ND (0.002) | ND (0.002) |
| Chloromethane (Methyl Chloride) | ND (0.002) | ND (0.002) |
| cis-1,2-Dichloroethene | ND (0.0008) | ND (0.0008) |
| Ethylbenzene | 0.00019 J | ND (0.001) |
| Methylene chloride | ND (0.001) | ND (0.001) |
| Tetrachloroethene | 0.00032 J | ND (0.001) |
| Toluene | 0.0018 | ND (0.001) |
| trans-1,2-Dichloroethene | ND (0.0008) | ND (0.0008) |
| Trichloroethene | 0.00021 J | ND (0.001) |
| Vinyl chloride | ND (0.002) | ND (0.002) |
| Xylene (total) | 0.00004 J | ND (0.001) |

SAMPLE LOCATION
SAMPLE DATE
RESULT UNIT
SAMPLE HEADER
CONCENTRATION
PARAMETER

SOURCES: U.S.G.S. QUADRANGLE MAP; WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000 AND JUNE 2001
NOVA CONSULTING INC.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

| Status | Date | Initial |
|---|---|---|
| | | |

# GARLAND ROAD LANDFILL SITE
# MIAMI COUNTY, OHIO

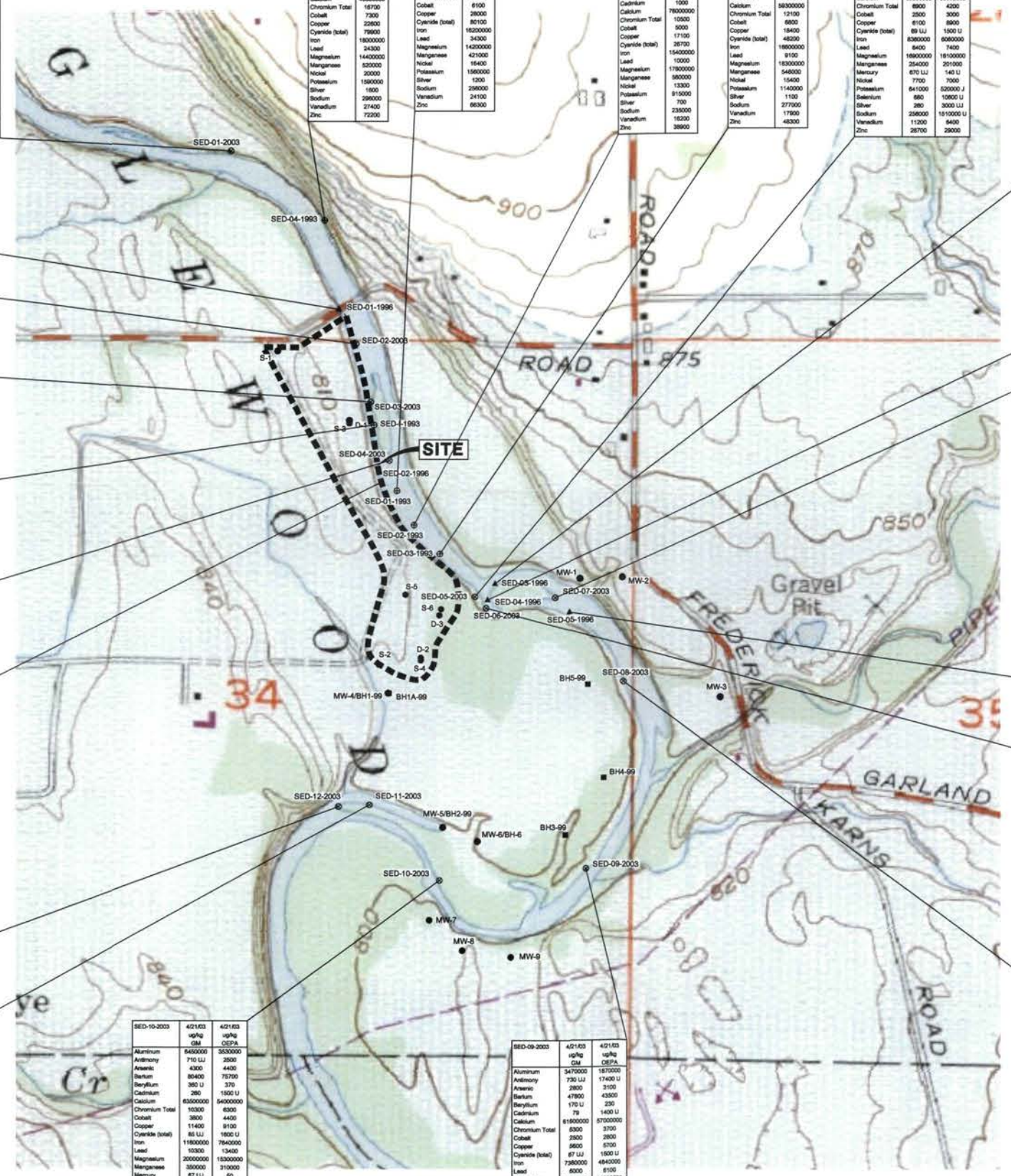
## SEDIMENT DATA SUMMARY OF SVOC's

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: | Reviewed By: | Date: | |
|---|---|---|---|
| MT | JEP | MAY 2006 | |
| Scale: 1"=500' | Project N#: 07043-90 | Report N#: 014 | Drawing N#: figure G.2 |

07043-90(014)GN-WA019 MAY 31/2006




| SED-01-1996 | 8/6/96 % GM | 8/6/96 ug/kg GM |
|---|---|---|
| Aluminum | - | 3640000 |
| Antimony | - | 6000 U |
| Arsenic | - | 3100 |
| Barium | - | 41700 |
| Beryllium | - | 500 U |
| Cadmium | - | 500 U |
| Calcium | - | 34800000 |
| Chromium Total | - | 5700 |
| Cobalt | - | 5000 U |
| Copper | - | 7800 |
| Cyanide (total) | - | 500 U |
| Iron | - | 6590000 MBB |
| Lead | - | 6800 |
| Magnesium | - | 9800000 |
| Manganese | - | 179000 |
| Mercury | - | 100 U |
| Nickel | - | 6700 |
| Potassium | - | 524000 |
| Selenium | - | 500 U |
| Silver | - | 1000 U |
| Sodium | - | 500000 U |
| Total Organic Carbon (TOC) | - | 14000000 |
| Total Solids (Residue) | 67.0 | - |
| Vanadium | - | 9000 |
| Zinc | - | 31200 |

| SED-01-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| Aluminum | 3620000 | 2730000 |
| Antimony | 780 UJ | 20200 U |
| Arsenic | 2800 | 4800 |
| Barium | 56100 | 56400 |
| Beryllium | 200 U | 290 |
| Cadmium | 180 U | 1700 U |
| Calcium | 72200000 | 87300000 |
| Chromium Total | 6700 | 4800 |
| Cobalt | 2800 | 3300 |
| Copper | 8400 | 10500 |
| Cyanide (total) | 70 UJ | 1700 U |
| Iron | 8130000 | 6780000 |
| Lead | 6900 | 7800 |
| Magnesium | 19100000 | 15700000 |
| Manganese | 247000 | 233000 |
| Mercury | 78 UJ | 40 |
| Nickel | 7700 | 8900 |
| Potassium | 986000 | 541000 J |
| Selenium | 740 | 11800 U |
| Silver | 280 | 3400 U |
| Sodium | 274000 | 1680000 U |
| Vanadium | 10800 | 7500 |
| Zinc | 29000 | 31800 |

| SED-04-1993 | 4/7/93 ug/kg EPA |
|---|---|
| Aluminum | 13000000 |
| Antimony | 12000 |
| Arsenic | 9900 |
| Barium | 114000 |
| Beryllium | 800 |
| Cadmium | 1000 |
| Calcium | 40600000 |
| Chromium Total | 16700 |
| Cobalt | 7300 |
| Copper | 22600 |
| Cyanide (total) | 79900 |
| Iron | 18000000 |
| Lead | 24300 |
| Magnesium | 14400000 |
| Manganese | 520000 |
| Nickel | 20000 |
| Potassium | 1590000 |
| Silver | 1800 |
| Sodium | 296000 |
| Vanadium | 27400 |
| Zinc | 72200 |

| SED-01-1993 | 4/7/93 ug/kg EPA |
|---|---|
| Aluminum | 11000000 |
| Antimony | 7400 |
| Arsenic | 13000 |
| Barium | 640 |
| Cadmium | 710 |
| Calcium | 38700000 |
| Chromium Total | 14800 |
| Cobalt | 6100 |
| Copper | 28000 |
| Cyanide (total) | 80100 |
| Iron | 18200000 |
| Lead | 34300 |
| Magnesium | 14200000 |
| Manganese | 421000 |
| Nickel | 16400 |
| Potassium | 1560000 |
| Silver | 1300 |
| Sodium | 256000 |
| Vanadium | 24100 |
| Zinc | 66300 |

| SED-02-1993 | 4/7/93 ug/kg EPA |
|---|---|
| Aluminum | 7390000 |
| Antimony | 13000 |
| Arsenic | 7700 |
| Barium | 105000 |
| Beryllium | 370 |
| Cadmium | 1000 |
| Calcium | 78000000 |
| Chromium Total | 10500 |
| Cobalt | 5000 |
| Copper | 17100 |
| Cyanide (total) | 35700 |
| Iron | 15400000 |
| Lead | 10000 |
| Magnesium | 17900000 |
| Manganese | 560000 |
| Nickel | 13300 |
| Potassium | 815000 |
| Silver | 700 |
| Sodium | 239000 |
| Vanadium | 16200 |
| Zinc | 38900 |

| SED-03-1993 | 4/7/93 ug/kg EPA |
|---|---|
| Aluminum | 8430000 |
| Antimony | 8000 |
| Arsenic | 7100 |
| Barium | 119000 |
| Beryllium | 550 |
| Cadmium | 580 |
| Calcium | 58300000 |
| Chromium Total | 12100 |
| Cobalt | 6800 |
| Copper | 18400 |
| Cyanide (total) | 48200 |
| Iron | 16800000 |
| Lead | 9100 |
| Magnesium | 18300000 |
| Manganese | 546000 |
| Nickel | 15400 |
| Potassium | 1140000 |
| Silver | 1100 |
| Sodium | 277000 |
| Vanadium | 17900 |
| Zinc | 48300 |

| SED-05-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| Aluminum | 4110000 | 2430000 |
| Antimony | 730 UJ | 2800 |
| Arsenic | 2500 | 3100 |
| Barium | 50900 | 50800 |
| Beryllium | 190 U | 280 |
| Cadmium | 83 | 1000 U |
| Calcium | 65000000 | 80000000 |
| Chromium Total | 8900 | 4200 |
| Cobalt | 2500 | 3000 |
| Copper | 6100 | 8900 |
| Cyanide (total) | 89 UJ | 1300 U |
| Iron | 8360000 | 6080000 |
| Lead | 6400 | 7400 |
| Magnesium | 18900000 | 18100000 |
| Manganese | 254000 | 201000 |
| Mercury | 870 UJ | 140 U |
| Nickel | 7700 | 7000 |
| Potassium | 641000 | 520000 J |
| Selenium | 880 | 10800 U |
| Silver | 280 | 3000 U |
| Sodium | 258000 | 1510000 U |
| Vanadium | 11200 | 6400 |
| Zinc | 26700 | 28000 |

| SED-03-1996 | 8/6/96 % GM | 8/6/96 ug/kg GM |
|---|---|---|
| Aluminum | - | 1330000 |
| Antimony | - | 6000 U |
| Arsenic | - | 2500 |
| Barium | - | 20000 U |
| Beryllium | - | 500 U |
| Cadmium | - | 500 U |
| Calcium | - | 72800000 |
| Chromium Total | - | 3200 |
| Cobalt | - | 5000 U |
| Copper | - | 2500 U |
| Cyanide (total) | - | 500 U |
| Iron | - | 3810000 MBB |
| Lead | - | 3000 |
| Magnesium | - | 30800000 |
| Manganese | - | 185000 |
| Mercury | - | 100 U |
| Nickel | - | 4000 U |
| Potassium | - | 500000 U |
| Selenium | - | 500 U |
| Silver | - | 1000 U |
| Sodium | - | 500000 U |
| Total Organic Carbon (TOC) | - | 2300000 |
| Total Solids (Residue) | 80.3 | - |
| Vanadium | - | 5200 |
| Zinc | - | 13600 |

| SED-04-1996 | 8/6/96 % GM | 8/6/96 ug/kg GM |
|---|---|---|
| Aluminum | - | 1250000 |
| Antimony | - | 6000 U |
| Arsenic | - | 2900 |
| Barium | - | 20000 U |
| Beryllium | - | 500 U |
| Cadmium | - | 500 U |
| Calcium | - | 81700000 |
| Chromium Total | - | 3000 |
| Cobalt | - | 5000 U |
| Copper | - | 2800 |
| Cyanide (total) | - | 500 U |
| Iron | - | 3410000 MBB |
| Lead | - | 4700 |
| Magnesium | - | 21600000 |
| Manganese | - | 144000 |
| Mercury | - | 100 U |
| Nickel | - | 4000 U |
| Potassium | - | 500000 U |
| Selenium | - | 500 U |
| Silver | - | 1000 U |
| Sodium | - | 500000 U |
| Total Organic Carbon (TOC) | - | 4100000 |
| Total Solids (Residue) | 84.7 | - |
| Vanadium | - | 5000 U |
| Zinc | - | 15600 L |

| SED-07-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| Aluminum | 8710000 | 5750000 |
| Antimony | 110 UJ | 3700 |
| Arsenic | 5400 | 6700 |
| Barium | 123000 | 133000 |
| Beryllium | 410 U | 570 |
| Cadmium | 230 | 2600 U |
| Calcium | 54900000 | 68700000 |
| Chromium Total | 12800 | 8500 |
| Cobalt | 4900 | 6500 |
| Copper | 21300 | 17900 |
| Cyanide (total) | 190 UJ | 2600 U |
| Iron | 15300000 | 12700000 |
| Lead | 13700 | 15000 |
| Magnesium | 14900000 | 15200000 |
| Manganese | 444000 | 498000 |
| Mercury | 120 UJ | 70 |
| Nickel | - | 13000/13000 |
| Potassium | 1330000 | 1030000 J |
| Selenium | 1100 | 18100 U |
| Silver | 410 | 5200 U |
| Sodium | 289000 | 2590000 U |
| Vanadium | 20500 | 13400 |
| Zinc | 66300 | 67800 |

| SED-05-1996 | 8/6/96 % GM | 8/6/96 ug/kg GM |
|---|---|---|
| Aluminum | - | 3040000 |
| Antimony | - | 6000 U |
| Arsenic | - | 2600 |
| Barium | - | 34300 |
| Beryllium | - | 500 U |
| Cadmium | - | 500 U |
| Calcium | - | 38000000 |
| Chromium Total | - | 6300 |
| Cobalt | - | 5000 U |
| Copper | - | 6100 |
| Cyanide (total) | - | 500 U |
| Iron | - | 5390000 MBB |
| Lead | - | 8500 |
| Magnesium | - | 10000000 |
| Manganese | - | 149000 |
| Mercury | - | 100 U |
| Nickel | - | 3800 |
| Potassium | - | 500000 U |
| Selenium | - | 500 U |
| Silver | - | 1000 U |
| Sodium | - | 500000 U |
| Total Organic Carbon (TOC) | - | 14000000 |
| Total Solids (Residue) | 83.9 | - |
| Vanadium | - | 6500 |
| Zinc | - | 29800 |

| SED-06-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| Aluminum | 6700000 | 3610000 |
| Antimony | 920 UJ | 5700 |
| Arsenic | 4300 | 5800 |
| Barium | 94200 | 92000 |
| Beryllium | 330 U | 420 |
| Cadmium | 180 | 1900 U |
| Calcium | 86900000 | 837000 |
| Chromium Total | 10800 | 8600 |
| Cobalt | 4200 | 4500 |
| Copper | 13600 | 12300 |
| Cyanide (total) | 150 UJ | 1900 U |
| Iron | 12700000 | 9650000 |
| Lead | 12200 | 11900 |
| Magnesium | 18600000 | 16100000 |
| Manganese | 345000 | 338000 |
| Mercury | 85 UJ | 50 |
| Nickel | 11800 | 10000 |
| Potassium | 1070000 | 720000 J |
| Selenium | 1100 | 13400 U |
| Silver | 330 | 3800 U |
| Sodium | 348000 | 1920000 U |
| Vanadium | 17100 | 9250 |
| Zinc | 49800 | 45800 |

| SED-08-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| Aluminum | 6450000 | 3530000 |
| Antimony | 880 UJ | 2700 |
| Arsenic | 3900 | 4600 |
| Barium | 88800 | 81700 |
| Beryllium | 330 U | 370 |
| Cadmium | 220 | 1800 U |
| Calcium | 62500000 | 56300000 |
| Chromium Total | 10100 | 5800 |
| Cobalt | 4000 | 4100 |
| Copper | 12500 | 9800 |
| Cyanide (total) | 130 UJ | 1800 U |
| Iron | 12500000 | 8270000 |
| Lead | 10400 | 10800 |
| Magnesium | 15800000 | 14400000 |
| Manganese | 323000 | 291000 |
| Mercury | 88 UJ | 60 |
| Nickel | 11400 | 9600 |
| Potassium | 960000 | 647000 J |
| Selenium | 790 | 12900 U |
| Silver | 310 | 3600 UJ |
| Sodium | 307000 | 1780000 U |
| Vanadium | 16200 | 8700 |
| Zinc | 48000 | 40800 |

| SED-09-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| Aluminum | 3470000 | 1870000 |
| Antimony | 730 UJ | 17400 U |
| Arsenic | 2800 | 3100 |
| Barium | 47800 | 43800 |
| Beryllium | 170 U | 230 |
| Cadmium | 79 | 1400 U |
| Calcium | 61800000 | 57000000 |
| Chromium Total | 8300 | 3700 |
| Cobalt | 2500 | 2800 |
| Copper | 3600 | 5700 |
| Cyanide (total) | 67 UJ | 1500 U |
| Iron | 7980000 | 4840000 |
| Lead | 8000 | 6100 |
| Magnesium | 16000000 | 14800000 |
| Manganese | 202000 | 190000 |
| Mercury | 70 UJ | 40 |
| Nickel | 8800 | 6200 |
| Potassium | 574000 | 412000 J |
| Selenium | 670 | 10100 U |
| Silver | 280 | 2900 UJ |
| Sodium | 288000 | 1450000 U |
| Vanadium | 10000 | 5000 |
| Zinc | 27000 | 22800 |

| SED-02-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| Aluminum | 3770000 | 2430000 |
| Antimony | 740 UJ | 2200 |
| Arsenic | 2200 | 3800 |
| Barium | 52300 | 56800 |
| Beryllium | 190 U | 270 |
| Cadmium | 89 | 1500 U |
| Calcium | 60600000 | 83000000 |
| Chromium Total | 6800 | 4800 |
| Cobalt | 2900 | 3200 |
| Copper | 8800 | 7500 |
| Cyanide (total) | 180 UJ | 1800 U |
| Iron | 8090000 | 5390000 |
| Lead | 7200 | 8800 |
| Magnesium | 15800000 | 14800000 |
| Manganese | 212000 | 213000 |
| Mercury | 74 UJ | 50 |
| Nickel | 7000 | 6900 |
| Potassium | 805000 | 486000 |
| Selenium | 890 | 10700 U |
| Silver | 270 | 3100 U |
| Sodium | 230000 | 1530000 U |
| Vanadium | 11000 | 6100 |
| Zinc | 28100 | 29100 |

| SED-03-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| Aluminum | 5030000 | 3840000 |
| Antimony | 880 UJ | 2300 |
| Arsenic | 4000 | 5200 |
| Barium | 75000 | 87800 |
| Beryllium | 200 U | 360 |
| Cadmium | 250 | 1400 U |
| Calcium | 63600000 | 61800000 |
| Chromium Total | 7900 | 6300 |
| Cobalt | 3300 | 4700 |
| Copper | 7300 | 8900 |
| Cyanide (total) | 63 UJ | 1500 U |
| Iron | 10600000 | 8610000 |
| Lead | 7800 | 9000 |
| Magnesium | 17300000 | 16900000 |
| Manganese | 323000 | 334000 |
| Mercury | 55 UJ | 40 |
| Nickel | 9100 | 10200 |
| Potassium | 698000 | 601000 |
| Selenium | 820 | 10100 U |
| Silver | 240 | 2900 UJ |
| Sodium | 299000 | 1430000 U |
| Vanadium | 13100 | 10100 |
| Zinc | 32100 | 34300 |

| SED-01-1993 | 3/23/93 mg/L EPA |
|---|---|
| Arsenic | 0.20 |
| Barium | 1.14 |
| Cadmium | 0.02 |
| Lead | 0.08 |
| Mercury | 0.02 |
| Selenium | 0.10 |
| Silver | 0.05 |

| SED-04-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| Aluminum | 7230000 | 4390000 |
| Antimony | 1000 UJ | 4800 |
| Arsenic | 4400 | 5300 |
| Barium | 103000 | 94800 |
| Beryllium | 380 U | 440 |
| Cadmium | 280 | 3000 U |
| Calcium | 67400000 | 58400000 |
| Chromium Total | 11300 | 7400 |
| Cobalt | 4800 | 5100 |
| Copper | 14800 | 12400 |
| Cyanide (total) | 150 UJ | 3000 U |
| Iron | 14000000 | 10100000 |
| Lead | 12800 | 15800 |
| Magnesium | 18600000 | 14400000 |
| Manganese | 391000 | 358000 |
| Mercury | 100 UJ | 70 |
| Nickel | 13000 | 11400 |
| Potassium | 1130000 | 776000 J |
| Selenium | 1200 | 13700 U |
| Silver | 360 | 3900 UJ |
| Sodium | 313000 | 1960000 U |
| Vanadium | 18800 | 11100 |
| Zinc | 57200 | 47000 |

| SED-02-1996 | 8/6/96 % GM | 8/6/96 ug/kg GM |
|---|---|---|
| Aluminum | - | 3540000 |
| Antimony | - | 6000 U |
| Arsenic | - | 3300 |
| Barium | - | 40300 |
| Beryllium | - | 500 U |
| Cadmium | - | 500 U |
| Calcium | - | 38900000 |
| Chromium Total | - | 5700 |
| Cobalt | - | 5000 U |
| Copper | - | 6700 |
| Cyanide (total) | - | 500 U |
| Iron | - | 6800000 MBB |
| Lead | - | 6200 |
| Magnesium | - | 11300000 |
| Manganese | - | 183000 |
| Mercury | - | 100 U |
| Nickel | - | 6800 |
| Potassium | - | 508000 |
| Selenium | - | 500 U |
| Silver | - | 1000 U |
| Sodium | - | 500000 U |
| Total Organic Carbon (TOC) | - | 9300000 |
| Total Solids (Residue) | 77.7 | - |
| Vanadium | - | 9700 |
| Zinc | - | 29600 |

| SED-12-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| Aluminum | 4300000 | 2640000 |
| Antimony | 590 UJ | 16400 |
| Arsenic | 3600 | 2800 |
| Barium | 81700 | 52800 |
| Beryllium | 240 | 290 |
| Cadmium | 110 | 1400 U |
| Calcium | 46100000 | 42700000 |
| Chromium Total | 7500 | 4500 |
| Cobalt | 3300 | 3400 |
| Copper | 6200 | 6000 |
| Cyanide (total) | 56 | 1400 U |
| Iron | 9370000 | 5800000 |
| Lead | 6700 | 8000 |
| Magnesium | 13100000 | 11700000 |
| Manganese | 316000 | 260000 |
| Mercury | 58 | 30 |
| Nickel | 8100 | 6300 |
| Potassium | 562000 | 462000 J |
| Selenium | 670 U | 9600 U |
| Silver | 210 UJ | 2700 UJ |
| Sodium | 220000 | 1370000 U |
| Vanadium | 12400 | 6700 |
| Zinc | 34700 | 35800 |

| SED-11-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| Aluminum | 5780000 | 3670000 |
| Antimony | 720 UJ | 2300 |
| Arsenic | 4300 | 4700 |
| Barium | 85300 | 67200 |
| Beryllium | 320 U | 380 |
| Cadmium | 180 | 1500 U |
| Calcium | 48000000 | 48300000 |
| Chromium Total | 9800 | 6000 |
| Cobalt | 3700 | 4400 |
| Copper | 9800 | 10100 |
| Cyanide (total) | 71 UJ | 1500 U |
| Iron | 10700000 | 8380000 |
| Lead | 9400 | 9800 |
| Magnesium | 14000000 | 12800000 |
| Manganese | 333000 | 383000 |
| Mercury | 64 UJ | 50 |
| Nickel | 9800 | 9100 |
| Potassium | 861000 | 618000 J |
| Selenium | 860 | 10200 U |
| Silver | 280 | 2900 UJ |
| Sodium | 227000 | 1480000 U |
| Vanadium | 15200 | 9800 |
| Zinc | 38800 | 33800 |

| SED-10-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| Aluminum | 5450000 | 3530000 |
| Antimony | 710 UJ | 2600 |
| Arsenic | 4300 | 4400 |
| Barium | 80400 | 75700 |
| Beryllium | 360 U | 370 |
| Cadmium | 260 | 1500 U |
| Calcium | 63500000 | 54000000 |
| Chromium Total | 10300 | 6300 |
| Cobalt | 3800 | 4400 |
| Copper | 11400 | 9100 |
| Cyanide (total) | 80 UJ | 1600 U |
| Iron | 11600000 | 7640000 |
| Lead | 10300 | 13400 |
| Magnesium | 20000000 | 15300000 |
| Manganese | 350000 | 310000 |
| Mercury | 87 UJ | 50 |
| Nickel | 11000 | 9300 |
| Potassium | 998000 | 631000 J |
| Selenium | 860 | 10800 U |
| Silver | 280 | 3100 UJ |
| Sodium | 274000 | 1540000 U |
| Vanadium | 16500 | 8600 |
| Zinc | 44400 | 38800 |

| Nº | Revision | Date | Initial |
|---|---|---|---|
| | | | |

## LEGEND

- LIMIT OF SITE
- BH4-99 — BOREHOLE LOCATION
- MW-9 — MONITORING WELL LOCATION
- SED-01-1996 — GM SEDIMENT SAMPLE LOCATION
- SED-02-2003 — APPROXIMATE SEDIMENT SAMPLE LOCATION

| MW-4 | 8/6/2001 mg/L GM | 8/18/2002 mg/L GM |
|---|---|---|
| 1,1-Dichloroethane | ND (0.001) | ND (0.001) |
| 1,1-Dichloroethene | ND (0.001) | ND (0.001) |
| 1,2-Dichloroethene (total) | ND (0.0005) | - |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ND (0.005) | ND (0.005) UJ |
| Acetone | ND (0.01) U | ND (0.01) UJ |
| Benzene | 0.00089 J | ND (0.001) |
| Carbon disulfide | ND (0.001) | ND (0.001) |
| Chlorobenzene | ND (0.001) | ND (0.001) |
| Chloroethane | ND (0.002) | ND (0.002) |
| Chloromethane (Methyl Chloride) | ND (0.002) | ND (0.002) |
| cis-1,2-Dichloroethene | ND (0.0005) | ND (0.0005) |
| Ethylbenzene | 0.00019 J | ND (0.001) |
| Methylene chloride | ND (0.001) | ND (0.001) |
| Tetrachloroethene | 0.00032 J | ND (0.001) |
| Toluene | 0.0018 | ND (0.001) |
| trans-1,2-Dichloroethene | ND (0.0005) | ND (0.0005) |
| Trichloroethene | 0.00021 J | ND (0.001) |
| Vinyl chloride | ND (0.002) | ND (0.002) |
| Xylene (total) | 0.00094 J | ND (0.001) |

SAMPLE LOCATION
SAMPLE DATE
RESULT UNIT
SAMPLE HEADER
CONCENTRATION
PARAMETER

SOURCES: U.S.G.S. QUADRANGLE MAP; WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000 AND JUNE 2001
NOVA CONSULTING INC.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

| Status | Date | Initial |
|---|---|---|
| | | |

# GARLAND ROAD LANDFILL SITE
# MIAMI COUNTY, OHIO

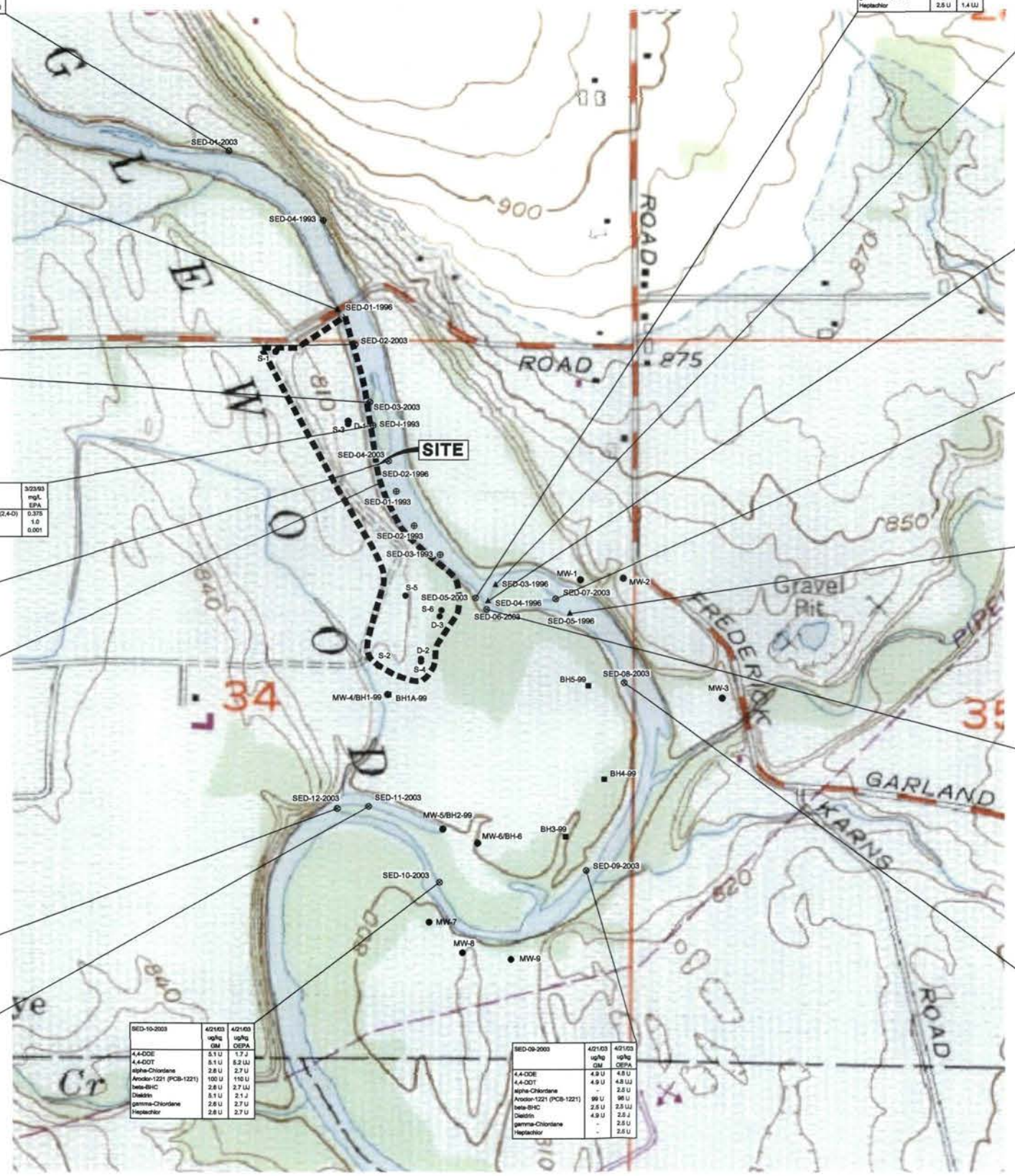
## SEDIMENT DATA SUMMARY OF METALS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: | Reviewed By: | Date: | |
|---|---|---|---|
| MT | JEP | MAY 2006 | |
| Scale: 1"=500' | Project Nº: 07043-90 | Report Nº: 014 | Drawing Nº: figure G.3 |

07043-90(014)GN-WA020 MAY 31/2006




| SED-01-1996 | 5/6/96 ug/kg GM |
|---|---|
| 4,4-DDE | 3.3 U |
| 4,4-DDT | 3.3 U |
| alpha-Chlordane | 1.7 U |
| Aroclor-1221 (PCB-1221) | 51 PF |
| beta-BHC | 1.7 U |
| Dieldrin | 3.3 U |
| gamma-Chlordane | 1.7 U |
| Heptachlor | 1.7 U |

| SED-01-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 4,4-DDE | 8.2 U | 1.4 J |
| 4,4-DDT | 44 | 3.3 J |
| alpha-Chlordane | 2.7 U | 2.6 UJ |
| Aroclor-1221 (PCB-1221) | - | 100 U |
| beta-BHC | 2.7 U | 2.6 UJ |
| Dieldrin | 8.2 U | 2.1 J |
| gamma-Chlordane | 2.7 U | 1.8 J |
| Heptachlor | 2.7 U | 1.8 UJ |

| SED-02-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 4,4-DDE | 4.9 U | 1.6 J |
| 4,4-DDT | 4.9 U | 8.5 UJ |
| alpha-Chlordane | 2.5 U | 2.8 UJ |
| Aroclor-1221 (PCB-1221) | 100 U | 110 U |
| beta-BHC | 2.5 U | 2.8 UJ |
| Dieldrin | 4.9 U | 5.5 U |
| gamma-Chlordane | 2.5 U | 2.8 U |
| Heptachlor | 2.5 U | 2.4 UJ |

| SED-03-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 4,4-DDE | 4.5 U | 4.7 U |
| 4,4-DDT | 4.5 U | 4.7 U |
| alpha-Chlordane | 2.3 U | 2.4 UJ |
| Aroclor-1221 (PCB-1221) | 92 U | 96 U |
| beta-BHC | 2.3 U | 2.4 UJ |
| Dieldrin | 4.5 U | 4.7 U |
| gamma-Chlordane | 2.3 U | 2.4 U |
| Heptachlor | 2.3 U | 1.8 UJ |

| SED-I-1993 | 3/23/93 mg/L EPA |
|---|---|
| 2,4-Dichlorophenoxyacetic acid (2,4-D) | 0.375 |
| Aroclor-1221 (PCB-1221) | 1.0 |
| Heptachlor | 0.001 |

| SED-04-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 4,4-DDE | 6.8 U | 2.4 J |
| 4,4-DDT | 6.8 U | 6.4 UJ |
| alpha-Chlordane | 3.2 | 3.3 U |
| Aroclor-1221 (PCB-1221) | - | 130 U |
| beta-BHC | 4.8 | 3.3 UJ |
| Dieldrin | 6.8 U | 2.5 J |
| gamma-Chlordane | 3.4 U | 3.3 U |
| Heptachlor | 3.4 U | 3.0 J |

| SED-02-1996 | 5/6/96 ug/kg GM |
|---|---|
| 4,4-DDE | 3.3 U |
| 4,4-DDT | 3.3 U |
| alpha-Chlordane | 1.7 U |
| Aroclor-1221 (PCB-1221) | 33 U |
| beta-BHC | 1.7 U |
| Dieldrin | 3.3 U |
| gamma-Chlordane | 1.7 U |
| Heptachlor | 1.7 U |

| SED-12-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 4,4-DDE | 4.2 UJ | 0.98 J |
| 4,4-DDT | - | 4.2 UJ |
| alpha-Chlordane | 2.2 UJ | 2.2 U |
| Aroclor-1221 (PCB-1221) | 86 UJ | 86 U |
| beta-BHC | - | 2.2 UJ |
| Dieldrin | 4.2 UJ | 4.2 U |
| gamma-Chlordane | 2.2 UJ | 2.2 U |
| Heptachlor | 2.2 UJ | 1.6 UJ |

| SED-11-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 4,4-DDE | 4.9 U | 2.3 J |
| 4,4-DDT | 4.9 U | 4.8 UJ |
| alpha-Chlordane | - | 2.6 U |
| Aroclor-1221 (PCB-1221) | 99 U | 97 U |
| beta-BHC | 2.6 U | 2.5 UJ |
| Dieldrin | 4.9 U | 2.6 J |
| gamma-Chlordane | - | 2.6 U |
| Heptachlor | 2.6 U | 1.7 UJ |

| SED-10-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 4,4-DDE | 5.1 U | 1.7 J |
| 4,4-DDT | 5.1 U | 5.2 UJ |
| alpha-Chlordane | 2.8 U | 2.7 U |
| Aroclor-1221 (PCB-1221) | 100 U | 110 U |
| beta-BHC | 2.8 U | 2.7 UJ |
| Dieldrin | 5.1 U | 2.1 J |
| gamma-Chlordane | 2.8 U | 2.7 U |
| Heptachlor | 2.8 U | 2.7 U |

| SED-09-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 4,4-DDE | 4.9 U | 4.8 U |
| 4,4-DDT | 4.9 U | 4.8 UJ |
| alpha-Chlordane | - | 2.6 U |
| Aroclor-1221 (PCB-1221) | 99 U | 98 U |
| beta-BHC | 2.6 U | 2.5 UJ |
| Dieldrin | 4.9 U | 2.6 J |
| gamma-Chlordane | - | 2.6 U |
| Heptachlor | - | 2.6 U |

| SED-05-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 4,4-DDE | 4.9 U | 1.5 J |
| 4,4-DDT | 4.9 U | 5.0 UJ |
| alpha-Chlordane | 4.6 | 2.6 UJ |
| Aroclor-1221 (PCB-1221) | 99 U | 100 U |
| beta-BHC | 2.5 U | 2.6 UJ |
| Dieldrin | 4.9 U | 2.1 J |
| gamma-Chlordane | 3.7 | 2.6 U |
| Heptachlor | 2.5 U | 1.4 UJ |

| SED-03-1996 | 5/6/96 ug/kg GM |
|---|---|
| 4,4-DDE | 3.3 U |
| 4,4-DDT | 3.3 U |
| alpha-Chlordane | 1.7 U |
| Aroclor-1221 (PCB-1221) | 33 U |
| beta-BHC | 1.7 U |
| Dieldrin | 3.3 U |
| gamma-Chlordane | 1.7 U |
| Heptachlor | 1.7 U |

| SED-04-1996 | 5/6/96 ug/kg GM |
|---|---|
| 4,4-DDE | 3.3 U |
| 4,4-DDT | 3.3 U |
| alpha-Chlordane | 1.7 U |
| Aroclor-1221 (PCB-1221) | 36 |
| beta-BHC | 1.7 U |
| Dieldrin | 3.3 U |
| gamma-Chlordane | 1.7 U |
| Heptachlor | 1.7 U |

| SED-07-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 4,4-DDE | 7.9 U | 2.3 J |
| 4,4-DDT | 7.9 U | 8.9 UJ |
| alpha-Chlordane | 14 | 4.6 U |
| Aroclor-1221 (PCB-1221) | 160 U | 180 U |
| beta-BHC | 4.0 U | 4.6 UJ |
| Dieldrin | 7.9 U | 4.8 J |
| gamma-Chlordane | 4.0 U | 4.6 U |
| Heptachlor | 4.0 U | 3.1 J |

| SED-05-1996 | 5/6/96 ug/kg GM |
|---|---|
| 4,4-DDE | 3.3 U |
| 4,4-DDT | 3.3 U |
| alpha-Chlordane | 1.7 U |
| Aroclor-1221 (PCB-1221) | 33 U |
| beta-BHC | 1.7 U |
| Dieldrin | 3.3 U |
| gamma-Chlordane | 1.7 U |
| Heptachlor | 1.7 U |

| SED-06-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 4,4-DDE | 8.1 U | 2.1 J |
| 4,4-DDT | 8.1 U | 8.4 UJ |
| alpha-Chlordane | 4.8 | 3.3 U |
| Aroclor-1221 (PCB-1221) | 120 U | 130 U |
| beta-BHC | 3.1 U | 3.3 UJ |
| Dieldrin | 8.1 U | 3.8 J |
| gamma-Chlordane | 3.1 U | 3.3 U |
| Heptachlor | 3.1 U | 2.8 UJ |

| SED-08-2003 | 4/21/03 ug/kg GM | 4/21/03 ug/kg OEPA |
|---|---|---|
| 4,4-DDE | 5.8 U | 0.84 J |
| 4,4-DDT | 30 U | 6.0 UJ |
| alpha-Chlordane | 3.7 | 0.66 J |
| Aroclor-1221 (PCB-1221) | 58 U | 120 U |
| beta-BHC | 5.0 | 3.1 UJ |
| Dieldrin | 5.8 U | 6.0 U |
| gamma-Chlordane | 300 U | 3.1 U |
| Heptachlor | 3.0 U | 1.5 UJ |

| NO | Revision | Date | Initial |
|---|---|---|---|
| | | | |

## LEGEND

- LIMIT OF SITE
- BH4-99 BOREHOLE LOCATION
- MW-9 MONITORING WELL LOCATION
- SED-01-1996 GM SEDIMENT SAMPLE LOCATION
- SED-02-2003 APPROXIMATE SEDIMENT SAMPLE LOCATION

| MW-8 | 5/8/2001 mg/L GM | 6/18/2002 mg/L GM |
|---|---|---|
| 1,1-Dichloroethene | ND (0.001) | ND (0.001) |
| 1,1-Dichloroethane | ND (0.001) | ND (0.001) |
| 1,2-Dichloroethene (total) | ND (0.0008) | - |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ND (0.006) | ND (0.006) UJ |
| Acetone | ND (0.01) U | ND (0.01) UJ |
| Benzene | 0.00089 J | ND (0.001) |
| Carbon disulfide | ND (0.001) | ND (0.001) |
| Chlorobenzene | ND (0.001) | ND (0.001) |
| Chloroethane | ND (0.002) | ND (0.002) |
| Chloromethane (Methyl Chloride) | ND (0.002) | ND (0.002) |
| cis-1,2-Dichloroethene | ND (0.0008) | ND (0.0008) |
| Ethylbenzene | 0.00019 J | ND (0.001) |
| Methylene chloride | ND (0.001) | ND (0.001) |
| Tetrachloroethene | 0.00032 J | ND (0.001) |
| Toluene | 0.0018 | ND (0.001) |
| trans-1,2-Dichloroethene | ND (0.0008) | ND (0.0008) |
| Trichloroethene | 0.00021 J | ND (0.001) |
| Vinyl chloride | ND (0.002) | ND (0.002) |
| Xylene (total) | 0.00084 J | ND (0.001) |

SAMPLE LOCATION
SAMPLE DATE
RESULT UNIT
SAMPLE HEADER
CONCENTRATION
PARAMETER

SOURCES: U.S.G.S. QUADRANGLE MAP; WEST MILTON, OHIO
WELL LOCATIONS SURVEYED AUGUST 22 AND 23, 2000 AND JUNE 2001
NOVA CONSULTING INC.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

| Status | Date | Initial |
|---|---|---|
| | | |

# GARLAND ROAD LANDFILL SITE
# MIAMI COUNTY, OHIO

## SEDIMENT DATA SUMMARY OF PESTICIDES

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: | Reviewed By: | Date: | |
|---|---|---|---|
| MT | JEP | MAY 2006 | |
| Scale: 1"=500' | Project N°: 07043-90 | Report N°: 014 | Drawing N°: figure G.4 |

07043-90(014)GN-WA021 JUN 23/2006

# TABLE G.1

## ANALYTICAL RESULTS SUMMARY
## SEDIMENT RESULTS
## GARLAND ROAD

| *Sample Location:* | | SED-1-1993 | SED-01-1996 | SED-01-2003 | SED-01-2003 | SED-02-2003 | SED-02-2003 | SED-03-2003 | SED-03-2003 | SED-04-2003 | SED-04-2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | 1~3/23/1993~N | S-MT-019 | GM-SED-1~4/21/2003~N | SED-01 | GM-SED-2~4/21/2003~N | SED-02 | GM-SED-3~4/21/2003~N | SED-03 | GM-SED-4~4/21/2003~N | SED-04 |
| *Sample Date:* | | 3/23/1993 | 8/6/1996 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 | 4/21/2003 |
| *Sample Depth:* | | | | | (0-12) in | | (0-12) in | | (0-12) in | | (0-12) in |
| *Parameters* | *Units* | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 1,1,2,2-Tetrachloroethane | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 1,1,2-Trichloroethane | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 1,1-Dichloroethane | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 1,1-Dichloroethene | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 1,2,4-Trichlorobenzene | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 1,2-Dibromo-3-chloropropane (DBCP) | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | R | 20 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 1,2-Dichlorobenzene | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 1,2-Dichloroethane | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 1,2-Dichloroethene (total) | ug/kg | - | 5.0 U | - | - | - | - | - | - | - | - |
| 1,2-Dichloropropane | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 1,3-Dichlorobenzene | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 1,4-Dichlorobenzene | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | - | 50 U | 16 U | 7 J | 15 U | 17 U | 14 U | 14 U | 20 U | 29 |
| 2-Hexanone | ug/kg | - | 50 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/kg | - | 50 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Acetone | ug/kg | - | 50 U | 55 U | 25 | 20 U | 13 J | 14 U | 13 J | 76 U | 61 |
| Benzene | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Bromodichloromethane | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Bromoform | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Bromomethane (Methyl Bromide) | ug/kg | - | 5.0 U | 16 U | 15 UJ | 15 U | 17 UJ | 14 U | 14 UJ | 20 U | 20 U |
| Carbon disulfide | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 3 J |
| Carbon tetrachloride | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Chlorobenzene | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Chloroethane | ug/kg | - | 10 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Chloroform (Trichloromethane) | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Chloromethane (Methyl Chloride) | ug/kg | - | 10 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| cis-1,2-Dichloroethene | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 0.9 | 2 J | 20 U | 20 U |
| cis-1,3-Dichloropropene | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Cyclohexane | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Dibromochloromethane | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Dichlorodifluoromethane (CFC-12) | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Ethylbenzene | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Isopropylbenzene | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Methyl acetate | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Methyl cyclohexane | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Methyl Tert Butyl Ether | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Methylene chloride | ug/kg | - | 5.0 U | 16 U | 15 UJ | 15 U | 17 UJ | 14 U | 14 UJ | 20 U | 20 UJ |
| Styrene | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Tetrachloroethene | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Toluene | ug/kg | - | 5.0 U | 48 | 47 J | 15 U | 17 U | 14 U | 14 U | 11000 | 4700 |
| trans-1,2-Dichloroethene | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| trans-1,3-Dichloropropene | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Trichloroethene | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 1 | 5 J | 20 U | 20 U |
| Trichlorofluoromethane (CFC-11) | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Trifluorotrichloroethane (Freon 113) | ug/kg | - | - | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Vinyl chloride | ug/kg | - | 10 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| Xylene (total) | ug/kg | - | 5.0 U | 16 U | 15 U | 15 U | 17 U | 14 U | 14 U | 20 U | 20 U |
| *Volatile Organic Compounds - Leachate* | | | | | | | | | | | |
| 1,1-Dichloroethene | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| 1,2-Dichloroethane | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |

# TABLE G.1

## ANALYTICAL RESULTS SUMMARY
## SEDIMENT RESULTS
## GARLAND ROAD

| *Sample Location:* | | *SED-1-1993* | *SED-01-1996* | *SED-01-2003* | *SED-01-2003* | *SED-02-2003* | *SED-02-2003* | *SED-03-2003* | *SED-03-2003* | *SED-04-2003* | *SED-04-2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *1~3/23/1993~N* | *S-MT-019* | *GM-SED-1~4/21/2003~N* | *SED-01* | *GM-SED-2~4/21/2003~N* | *SED-02* | *GM-SED-3~4/21/2003~N* | *SED-03* | *GM-SED-4~4/21/2003~N* | *SED-04* |
| *Sample Date:* | | *3/23/1993* | *8/6/1996* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth:* | | | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* |
| *Parameters* | *Units* | | | | | | | | | | |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| Benzene | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| Carbon tetrachloride | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| Chlorobenzene | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| Chloroform (Trichloromethane) | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| Tetrachloroethene | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| Trichloroethene | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| Vinyl chloride | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/kg | - | 500 UJ | - | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | ug/kg | - | 500 UJ | - | - | - | - | - | - | - | - |
| 1,3-Dichlorobenzene | ug/kg | - | 500 UJ | - | - | - | - | - | - | - | - |
| 1,4-Dichlorobenzene | ug/kg | - | 500 UJ | - | - | - | - | - | - | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 2,4,5-Trichlorophenol | ug/kg | - | 500 UJ | 1300 U | 1300 U | 1200 U | 1400 U | 1100 U | 1200 U | 1700 U | 1600 U |
| 2,4,6-Trichlorophenol | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 2,4-Dichlorophenol | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 2,4-Dimethylphenol | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 2,4-Dinitrophenol | ug/kg | - | 2400 UJ | 1300 U | 1300 U | 1200 U | 1400 U | 1100 U | 1200 U | 1700 U | 1600 U |
| 2,4-Dinitrotoluene | ug/kg | - | 500 UJ | 520 U | 500 UJ | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 2,6-Dinitrotoluene | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 2-Chloronaphthalene | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 2-Chlorophenol | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 2-Methylnaphthalene | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 2-Methylphenol | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 2-Nitroaniline | ug/kg | - | 2400 UJ | 1300 U | 1300 U | 1200 U | 1400 U | 1100 U | 1200 U | 1700 U | 1600 U |
| 2-Nitrophenol | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 3,3'-Dichlorobenzidine | ug/kg | - | 2400 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 3-Nitroaniline | ug/kg | - | 2400 UJ | 1300 U | 1300 U | 1200 U | 1400 U | 1100 U | 1200 U | 1700 U | 1600 U |
| 4,6-Dinitro-2-methylphenol | ug/kg | - | 2400 UJ | 1300 U | 1300 U | 1200 U | 1400 U | 1100 U | 1200 U | 1700 U | 1600 U |
| 4-Bromophenyl phenyl ether | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 4-Chloro-3-methylphenol | ug/kg | - | 500 UJ | 520 U | 500 UJ | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 4-Chloroaniline | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 4-Chlorophenyl phenyl ether | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| 4-Methylphenol | ug/kg | - | 500 UJ | 94 | 210 J | 490 U | 550 U | 450 U | 480 U | 3000 | 6700 |
| 4-Nitroaniline | ug/kg | - | 2400 UJ | 1300 U | 1300 U | 1200 U | 1400 U | 1100 U | 1200 U | 1700 U | 1600 U |
| 4-Nitrophenol | ug/kg | - | 2400 UJ | 1300 U | 1300 UJ | 1200 U | 1400 U | 1100 U | 1200 U | 1700 U | 1600 U |
| Acenaphthene | ug/kg | - | 500 UJ | 520 U | 500 UJ | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Acenaphthylene | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Acetophenone | ug/kg | - | - | 16 | 500 U | 490 U | 550 U | 450 U | 480 U | 22 | 640 U |
| Anthracene | ug/kg | - | 500 UJ | 16 | 500 U | 17 | 550 U | 450 U | 480 U | 50 | 34 J |
| Atrazine | ug/kg | - | - | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Benzaldehyde | ug/kg | - | - | 13 | 67 J | 9 | 42 J | 10 | 480 U | 29 | 250 J |
| Benzo(a)anthracene | ug/kg | - | 500 UJ | 42 | 73 J | 53 | 94 J | 23 | 71 J | 96 | 220 J |
| Benzo(a)pyrene | ug/kg | - | 500 UJ | 48 | 55 J | 54 | 82 J | 25 | 49 J | 100 | 170 J |
| Benzo(b)fluoranthene | ug/kg | - | 500 UJ | 64 | 80 J | 61 | 120 J | 31 | 120 J | 110 | 200 J |
| Benzo(g,h,i)perylene | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 57 J |
| Benzo(k)fluoranthene | ug/kg | - | 500 UJ | 53 | 49 J | 63 | 60 J | 32 | 480 U | 130 | 180 J |
| Biphenyl | ug/kg | - | - | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| bis(2-Chloroethoxy)methane | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| bis(2-Chloroethyl)ether | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| bis(2-Ethylhexyl)phthalate | ug/kg | - | 500 UJ | 520 U | 500 UJ | 490 U | 550 UJ | 450 U | 480 UJ | 660 U | 640 UJ |
| Butyl benzylphthalate | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Caprolactam | ug/kg | - | - | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |

TABLE G.1

ANALYTICAL RESULTS SUMMARY
SEDIMENT RESULTS
GARLAND ROAD

| *Sample Location:* | | *SED-1-1993* | *SED-01-1996* | *SED-01-2003* | *SED-01-2003* | *SED-02-2003* | *SED-02-2003* | *SED-03-2003* | *SED-03-2003* | *SED-04-2003* | *SED-04-2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *1~3/23/1993~N* | *S-MT-019* | *GM-SED-1~4/21/2003~N* | *SED-01* | *GM-SED-2~4/21/2003~N* | *SED-02* | *GM-SED-3~4/21/2003~N* | *SED-03* | *GM-SED-4~4/21/2003~N* | *SED-04* |
| *Sample Date:* | | *3/23/1993* | *8/6/1996* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth:* | | | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* |
| *Parameters* | *Units* | | | | | | | | | | |
| Carbazole | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 28 | 640 U |
| Chrysene | ug/kg | - | 500 UJ | 62 | 95 J | 74 | 130 J | 35 | 88 J | 130 | 290 J |
| Dibenz(a,h)anthracene | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 29 J | 450 U | 480 U | 660 U | 43 J |
| Dibenzofuran | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Diethyl phthalate | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 35 J | 660 U | 32 J |
| Dimethyl phthalate | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Di-n-butylphthalate | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 130 J | 660 U | 150 J |
| Di-n-octyl phthalate | ug/kg | - | 500 UJ | 520 U | 500 U | 25 | 550 U | 450 U | 480 U | 36 | 640 UJ |
| Fluoranthene | ug/kg | - | 500 UJ | 130 | 160 J | 140 | 190 J | 57 | 120 J | 320 | 390 J |
| Fluorene | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 20 | 640 U |
| Hexachlorobenzene | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Hexachlorobutadiene | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Hexachlorocyclopentadiene | ug/kg | - | 2400 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Hexachloroethane | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Indeno(1,2,3-cd)pyrene | ug/kg | - | 500 UJ | 34 | 30 J | 42 | 51 J | 19 | 30 J | 74 | 88 J |
| Isophorone | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Naphthalene | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Nitrobenzene | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| N-Nitrosodi-n-propylamine | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| N-Nitrosodiphenylamine | ug/kg | - | 500 UJ | 520 U | 500 U | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Pentachlorophenol | ug/kg | - | R | 1300 U | 1300 U | 1200 U | 1400 U | 1100 U | 1200 U | 1700 U | 1600 U |
| Phenanthrene | ug/kg | - | 500 UJ | 66 | 94 J | 62 | 110 J | 21 | 88 J | 190 | 240 J |
| Phenol | ug/kg | - | 500 UJ | 520 U | 500 UJ | 490 U | 550 U | 450 U | 480 U | 660 U | 640 U |
| Pyrene | ug/kg | - | 500 UJ | 96 | 190 J | 120 | 250 J | 45 | 180 J | 230 | 590 J |
| *Semi-Volatile Organic Compounds - Lechate* | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| 2/3-Methylphenol | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| Hexachlorobenzene | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| Hexachloroethane | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| Methylphenol (Cresol) | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| Nitrobenzene | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| Pentachlorophenol | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| Phenazopyridine Hydrochloride | ug/kg | 0.01 | - | - | - | - | - | - | - | - | - |
| *Metals* | | | | | | | | | | | |
| Aluminum | ug/kg | - | 3640 | 3620 | 2730 | 3770 | 2420 | 5030 | 3840 | 7230 | 4290 |
| Antimony | ug/kg | - | 6.0 U | 0.78 UJ | 20.2 U | 0.74 UJ | 2.2 | 0.68 UJ | 2.3 | 1.0 UJ | 4.5 |
| Arsenic | ug/kg | - | 3.1 | 2.8 | 4.6 | 2.2 | 3.6 | 4.0 | 6.2 | 4.4 | 6.3 |
| Barium | ug/kg | - | 41.7 | 56.1 | 56.4 | 52.3 | 56.5 | 75.0 | 87.6 | 103 | 94.5 |
| Beryllium | ug/kg | - | 0.50 U | 0.20 U | 0.29 | 0.19 U | 0.27 | 0.29 U | 0.39 | 0.38 U | 0.44 |
| Cadmium | ug/kg | - | 0.50 U | 0.16 U | 1.7 U | 0.069 | 1.5 U | 0.25 | 1.4 U | 0.26 | 2.0 U |
| Calcium | ug/kg | - | 34800 | 72200 | 67300 | 60500 | 53000 | 63800 | 61600 | 67400 | 58400 |
| Chromium Total | ug/kg | - | 5.7 | 6.7 | 4.8 | 6.6 | 4.6 | 7.9 | 6.3 | 11.2 | 7.4 |
| Cobalt | ug/kg | - | 5.0 U | 2.6 | 3.2 | 2.5 | 3.2 | 3.3 | 4.7 | 4.5 | 5.1 |
| Copper | ug/kg | - | 7.6 | 6.4 | 10.5 | 6.8 | 7.5 | 7.3 | 8.9 | 14.6 | 12.4 |
| Cyanide (total) | ug/kg | - | - | 0.070 UJ | 1.7 U | 0.18 UJ | 1.6 U | 0.063 UJ | 1.5 U | 0.15 UJ | 2.0 U |
| Iron | ug/kg | - | 6590 MBB | 8130 | 6780 | 8050 | 6290 | 10600 | 9810 | 14000 | 10100 |
| Lead | ug/kg | - | 6.6 | 6.9 | 7.6 | 7.2 | 8.6 | 7.8 | 9 | 12.5 | 15.6 |

# TABLE G.1

## ANALYTICAL RESULTS SUMMARY
## SEDIMENT RESULTS
## GARLAND ROAD

| *Sample Location:* | | *SED-1-1993* | *SED-01-1996* | *SED-01-2003* | *SED-01-2003* | *SED-02-2003* | *SED-02-2003* | *SED-03-2003* | *SED-03-2003* | *SED-04-2003* | *SED-04-2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *1~3/23/1993~N* | *S-MT-019* | *GM-SED-1~4/21/2003~N* | *SED-01* | *GM-SED-2~4/21/2003~N* | *SED-02* | *GM-SED-3~4/21/2003~N* | *SED-03* | *GM-SED-4~4/21/2003~N* | *SED-04* |
| *Sample Date:* | | *3/23/1993* | *8/6/1996* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth:* | | | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* |
| *Parameters* | *Units* | | | | | | | | | | |
| Magnesium | ug/kg | - | 9800 | 19100 | 15700 | 15900 | 14600 | 17300 | 16900 | 16600 | 14100 |
| Manganese | ug/kg | - | 179 | 247 | 232 | 212 | 213 | 323 | 334 | 391 | 358 |
| Mercury | ug/kg | - | 0.10 U | 0.078 UJ | 0.04 | 0.074 UJ | 0.05 | 0.065 UJ | 0.04 | 0.10 UJ | 0.07 |
| Nickel | ug/kg | - | 6.7 | 7.7 | 6.9 | 7.0 | 6.9 | 9.1 | 10.2 | 13.0 | 11.4 |
| Potassium | ug/kg | - | 524 | 589 | 541 J | 605 | 486 | 699 | 601 | 1130 | 776 J |
| Selenium | ug/kg | - | 0.50 U | 0.74 | 11.8 U | 0.69 | 10.7 U | 0.62 | 10.1 U | 1.2 | 13.7 U |
| Silver | ug/kg | - | 1.0 U | 0.28 | 3.4 UJ | 0.27 | 3.1 UJ | 0.24 | 2.9 UJ | 0.36 | 3.9 UJ |
| Sodium | ug/kg | - | 500 U | 274 | 1680 U | 230 | 1530 U | 259 | 1450 U | 313 | 1960 U |
| Thallium | ug/kg | - | 1.0 U | 0.91 UJ | 8.4 U | 0.86 UJ | 7.6 U | 0.78 UJ | 7.2 U | 1.2 UJ | 9.8 U |
| Vanadium | ug/kg | - | 9.0 | 10.8 | 7.5 | 11.0 | 6.1 | 13.1 | 10.1 | 18.6 | 11.1 |
| Zinc | ug/kg | - | 31.2 | 29.0 | 31.8 | 28.1 | 29.1 | 32.1 | 34.3 | 57.2 | 47 |
| *Metals - Leachate* | | | | | | | | | | | |
| Arsenic | ug/kg | 0.20 | - | - | - | - | - | - | - | - | - |
| Barium | ug/kg | 1.14 | - | - | - | - | - | - | - | - | - |
| Cadmium | ug/kg | 0.02 | - | - | - | - | - | - | - | - | - |
| Chromium Total (Dissolved) | ug/kg | 0.02 | - | - | - | - | - | - | - | - | - |
| Lead | ug/kg | 0.05 | - | - | - | - | - | - | - | - | - |
| Mercury | ug/kg | 0.02 | - | - | - | - | - | - | - | - | - |
| Selenium | ug/kg | 0.10 | - | - | - | - | - | - | - | - | - |
| Silver | ug/kg | 0.05 | - | - | - | - | - | - | - | - | - |
| *PCBs* | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/kg | - | 33 U | - | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/kg | - | 51 PF | - | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/kg | - | 33 U | - | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/kg | - | 33 U | - | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/kg | - | 33 U | - | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/kg | - | 33 U | - | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/kg | - | 33 U | - | - | - | - | - | - | - | - |
| *PCBs - Leachate* | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/kg | 1.0 | - | - | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/kg | 1.0 | - | - | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/kg | 1.0 | - | - | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/kg | 1.0 | - | - | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/kg | 1.0 | - | - | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/kg | 1.0 | - | - | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/kg | 1.0 | - | - | - | - | - | - | - | - | - |
| *Pesticides* | | | | | | | | | | | |
| 4,4'-DDD | ug/kg | - | 3.3 U | 5.2 U | 5.0 U | 4.9 U | 5.5 U | 4.5 U | 4.7 U | 6.6 U | 6.4 U |
| 4,4'-DDE | ug/kg | - | 3.3 U | 5.2 U | 1.4 J | 4.9 U | 1.6 J | 4.5 U | 4.7 U | 6.6 U | 2.4 J |
| 4,4'-DDT | ug/kg | - | 3.3 U | 44 | 2.2 J | 4.9 U | 5.5 UJ | 4.5 U | 4.7 UJ | 6.6 U | 6.4 UJ |
| Aldrin | ug/kg | - | 1.7 U | 2.7 U | 2.6 UJ | 2.5 U | 2.8 UJ | 2.3 U | 2.4 UJ | 3.4 U | 3.3 U |
| alpha-BHC | ug/kg | - | 1.7 U | 2.7 U | 2.6 U | 2.5 U | 2.8 U | 2.3 U | 2.4 U | 3.4 U | 3.3 U |
| alpha-Chlordane | ug/kg | - | 1.7 U | 2.7 U | 2.6 UJ | 2.5 U | 2.8 UJ | 2.3 U | 2.4 UJ | 3.2 | 3.3 U |
| Aroclor-1016 (PCB-1016) | ug/kg | - | - | 52 U | 50 U | 49 U | 55 U | 45 U | 47 U | 66 U | 64 U |
| Aroclor-1221 (PCB-1221) | ug/kg | - | - | 100 U | 100 U | 100 U | 110 U | 92 U | 96 U | 130 U | 130 U |
| Aroclor-1232 (PCB-1232) | ug/kg | - | - | 52 U | 50 U | 49 U | 55 U | 45 U | 47 U | 66 U | 64 U |
| Aroclor-1242 (PCB-1242) | ug/kg | - | - | 52 U | 50 U | 49 U | 55 U | 45 U | 47 U | 66 U | 64 U |
| Aroclor-1248 (PCB-1248) | ug/kg | - | - | 52 U | 50 U | 49 U | 55 U | 45 U | 47 U | 66 U | 64 U |

# TABLE G.1

## ANALYTICAL RESULTS SUMMARY
## SEDIMENT RESULTS
## GARLAND ROAD

| *Sample Location:* | | *SED-1-1993* | *SED-01-1996* | *SED-01-2003* | *SED-01-2003* | *SED-02-2003* | *SED-02-2003* | *SED-03-2003* | *SED-03-2003* | *SED-04-2003* | *SED-04-2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *1-3/23/1993-N* | *S-MT-019* | *GM-SED-1-4/21/2003-N* | *SED-01* | *GM-SED-2-4/21/2003-N* | *SED-02* | *GM-SED-3-4/21/2003-N* | *SED-03* | *GM-SED-4-4/21/2003-N* | *SED-04* |
| *Sample Date:* | | *3/23/1993* | *8/6/1996* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth:* | | | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* |
| *Parameters* | *Units* | | | | | | | | | | |
| Aroclor 1254 (PCB-1254) | ug/kg | - | - | 52 U | 50 U | 49 U | 55 U | 45 U | 47 U | 66 U | 64 U |
| Aroclor 1260 (PCB-1260) | ug/kg | - | - | 52 U | 50 U | 49 U | 55 U | 45 U | 47 U | 66 U | 64 U |
| beta-BHC | ug/kg | - | 1.7 U | 2.7 U | 2.6 UJ | 2.5 U | 2.8 UJ | 2.3 U | 2.4 UJ | 4.6 | 3.3 UJ |
| delta-BHC | ug/kg | - | 1.7 U | 2.7 U | 2.6 U | 2.5 U | 2.8 U | 2.3 U | 2.4 U | 3.4 U | 3.3 U |
| Dieldrin | ug/kg | - | 3.3 U | 5.2 U | 2.1 J | 4.9 U | 5.5 U | 4.5 U | 4.7 U | 6.6 U | 2.5 J |
| Endosulfan I | ug/kg | - | 1.7 U | 2.7 U | 2.6 U | 2.5 U | 2.8 U | 2.3 U | 2.4 U | 3.4 U | 3.3 U |
| Endosulfan II | ug/kg | - | 3.3 U | 5.2 U | 5.0 U | 4.9 U | 5.5 U | 4.5 U | 4.7 U | 6.6 U | 6.4 U |
| Endosulfan sulfate | ug/kg | - | 3.3 U | 5.2 U | 5.0 U | 4.9 U | 5.5 U | 4.5 U | 4.7 U | 6.6 U | 6.4 U |
| Endrin | ug/kg | - | 3.3 U | 5.2 U | 5.0 U | 4.9 U | 5.5 U | 4.5 U | 4.7 U | 6.6 U | 6.4 U |
| Endrin aldehyde | ug/kg | - | 3.3 U | 5.2 U | 5.0 U | 4.9 U | 5.5 U | 4.5 U | 4.7 U | 6.6 U | 6.4 U |
| Endrin ketone | ug/kg | - | 3.3 U | 5.2 U | 5.0 U | 4.9 U | 5.5 U | 4.5 U | 4.7 U | 6.6 U | 6.4 UJ |
| gamma-BHC (Lindane) | ug/kg | - | 1.7 U | 2.7 U | 2.6 UJ | 2.5 U | 2.8 UJ | 2.3 U | 2.4 UJ | 3.4 U | 3.3 UJ |
| gamma-Chlordane | ug/kg | - | 1.7 U | 2.7 U | 1.9 J | 2.5 U | 2.8 U | 2.3 U | 2.4 U | 3.4 U | 3.3 U |
| Heptachlor | ug/kg | - | 1.7 U | 2.7 U | 1.6 UJ | 2.5 U | 2.4 UJ | 2.3 U | 1.6 UJ | 3.4 U | 3.0 J |
| Heptachlor epoxide | ug/kg | - | 1.7 U | 2.7 U | 2.6 U | 2.5 U | 2.8 U | 2.3 U | 2.4 U | 3.4 U | 3.3 U |
| Methoxychlor | ug/kg | - | 17 U | 27 U | 26 U | 25 U | 28 U | 23 U | 24 U | 34 U | 33 UJ |
| Toxaphene | ug/kg | - | 83 U | 270 U | 260 U | 250 U | 280 U | 230 U | 240 U | 340 U | 330 U |
| *Pesticides - Leachate* | | | | | | | | | | | |
| 2,4,5-TP (Silvex) | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| 2,4-Dichlorophenoxyacetic acid (2,4-D) | ug/kg | 0.375 | - | - | - | - | - | - | - | - | - |
| Chlordane | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| Endrin | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| Heptachlor | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| Methoxychlor | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| Toxaphene | ug/kg | 0.001 | - | - | - | - | - | - | - | - | - |
| *General Chemistry* | | | | | | | | | | | |
| Cyanide (total) | ug/kg | - | 0.50 U | - | - | - | - | - | - | - | - |
| Total Organic Carbon (TOC) | ug/kg | - | 14000 | - | - | - | - | - | - | - | - |
| Total Solids (Residue) | % | - | 67.0 | - | - | - | - | - | - | - | - |

# TABLE G.1

## ANALYTICAL RESULTS SUMMARY
## SEDIMENT RESULTS
## GARLAND ROAD

| *Sample Location:* | | *SED-05-2003* | *SED-05-2003* | *SED-06-2003* | *SED-06-2003* | *SED-07-2003* | *SED-07-2003* | *SED-08-2003* | *SED-08-2003* | *SED-09-2003* | *SED-09-2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GM-SED-5~4/21/2003~N* | *SED-05* | *GM-SED-6~4/21/2003~N* | *SED-06* | *GM-SED-7~4/21/2003~N* | *SED-07* | *GM-SED-8~4/21/2003~N* | *SED-08* | *GM-SED-9~4/21/2003~N* | *SED-09* |
| *Sample Date:* | | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth:* | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* |
| *Parameters* | Units | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 1,1,2,2-Tetrachloroethane | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 1,1,2-Trichloroethane | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 1,1-Dichloroethane | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 1,1-Dichloroethene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 1,2,4-Trichlorobenzene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 1,2-Dibromo-3-chloropropane (DBCP) | ug/kg | R | 15 U | R | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 1,2-Dichlorobenzene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 1,2-Dichloroethane | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 1,2-Dichloroethene (total) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichloropropane | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 1,3-Dichlorobenzene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 1,4-Dichlorobenzene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | 15 U | 8 J | 19 U | 13 J | 24 U | 24 J | 18 U | 19 UJ | 15 U | 15 UJ |
| 2-Hexanone | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 UJ | 15 U | 15 UJ |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Acetone | ug/kg | 15 U | 14 J | 20 U | 24 J | 58 U | 44 J | 24 U | 16 J | 17 U | 9 J |
| Benzene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Bromodichloromethane | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Bromoform | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Bromomethane (Methyl Bromide) | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Carbon disulfide | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 UJ | 15 U | 15 U |
| Carbon tetrachloride | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Chlorobenzene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Chloroethane | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Chloroform (Trichloromethane) | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Chloromethane (Methyl Chloride) | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| cis-1,2-Dichloroethene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| cis-1,3-Dichloropropene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Cyclohexane | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Dibromochloromethane | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Dichlorodifluoromethane (CFC-12) | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Ethylbenzene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Isopropylbenzene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Methyl acetate | ug/kg | 15 U | 15 U | 19 U | 20 UJ | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Methyl cyclohexane | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Methyl Tert Butyl Ether | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Methylene chloride | ug/kg | 15 U | 15 UJ | 19 U | 20 UJ | 24 U | 27 UJ | 18 U | 19 UJ | 15 U | 15 UJ |
| Styrene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Tetrachloroethene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Toluene | ug/kg | 15 U | 39 | 83 | 510 | 720 | 6100 | 18 U | 17 J | 15 U | 2 J |
| trans-1,2-Dichloroethene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| trans-1,3-Dichloropropene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Trichloroethene | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Trichlorofluoromethane (CFC-11) | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Trifluorotrichloroethane (Freon 113) | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Vinyl chloride | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| Xylene (total) | ug/kg | 15 U | 15 U | 19 U | 20 U | 24 U | 27 U | 18 U | 19 U | 15 U | 15 U |
| *Volatile Organic Compounds - Leachate* | | | | | | | | | | | |
| 1,1-Dichloroethene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichloroethane | ug/kg | - | - | - | - | - | - | - | - | - | - |

# TABLE G.1

## ANALYTICAL RESULTS SUMMARY
## SEDIMENT RESULTS
## GARLAND ROAD

| *Sample Location:* | | *SED-05-2003* | *SED-05-2003* | *SED-06-2003* | *SED-06-2003* | *SED-07-2003* | *SED-07-2003* | *SED-08-2003* | *SED-08-2003* | *SED-09-2003* | *SED-09-2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GM-SED-5~4/21/2003~N* | *SED-05* | *GM-SED-6~4/21/2003~N* | *SED-06* | *GM-SED-7~4/21/2003~N* | *SED-07* | *GM-SED-8~4/21/2003~N* | *SED-08* | *GM-SED-9~4/21/2003~N* | *SED-09* |
| *Sample Date:* | | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth:* | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* |
| *Parameters* | *Units* | | | | | | | | | | |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Benzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Carbon tetrachloride | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Chlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Chloroform (Trichloromethane) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Tetrachloroethene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Trichloroethene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Vinyl chloride | ug/kg | - | - | - | - | - | - | - | - | - | - |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 1,3-Dichlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 1,4-Dichlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 2,4,5-Trichlorophenol | ug/kg | 1200 U | 1200 U | 1500 U | 1600 U | 2000 U | 2200 U | 1500 U | 1500 U | 1200 U | 1200 U |
| 2,4,6-Trichlorophenol | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 2,4-Dichlorophenol | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 2,4-Dimethylphenol | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 2,4-Dinitrophenol | ug/kg | 1200 U | 1200 U | 1500 U | 1600 U | 2000 U | 2200 U | 1500 U | 1500 U | 1200 UJ | 1200 U |
| 2,4-Dinitrotoluene | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 2,6-Dinitrotoluene | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 2-Chloronaphthalene | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 2-Chlorophenol | ug/kg | 490 U | 500 U | 6610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 2-Methylnaphthalene | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 2-Methylphenol | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 2-Nitroaniline | ug/kg | 1200 U | 1200 U | 1500 U | 1600 U | 2000 U | 2200 U | 1500 U | 1500 U | 1200 U | 1200 U |
| 2-Nitrophenol | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 3,3'-Dichlorobenzidine | ug/kg | 490 U | 500 U | 610 U | 640 UJ | 790 U | 880 UJ | 580 U | 610 U | 490 U | 490 U |
| 3-Nitroaniline | ug/kg | 1200 U | 1200 U | 1500 U | 1600 U | 2000 U | 2200 U | 1500 U | 1500 U | 1200 U | 1200 U |
| 4,6-Dinitro-2-methylphenol | ug/kg | 1200 U | 1200 U | 1500 U | 1600 U | 2000 U | 2200 U | 1500 U | 1500 U | 1200 U | 1200 U |
| 4-Bromophenyl phenyl ether | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 4-Chloro-3-methylphenol | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 4-Chloroaniline | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 4-Chlorophenyl phenyl ether | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| 4-Methylphenol | ug/kg | 120 | 230 J | 330 | 810 | 1200 | 2300 | 42 | 120 J | 490 U | 31 J |
| 4-Nitroaniline | ug/kg | 1200 U | 1200 U | 1500 U | 1600 U | 2000 U | 2200 U | 1500 U | 1500 U | 1200 U | 1200 U |
| 4-Nitrophenol | ug/kg | 1200 U | 1200 U | 1500 U | 1600 U | 2000 U | 2200 U | 1500 U | 1500 U | 1200 U | 1200 U |
| Acenaphthene | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Acenaphthylene | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 15 | 490 U |
| Acetophenone | ug/kg | 490 U | 500 U | 25 | 640 U | 28 | 880 U | 21 | 610 U | 15 | 490 U |
| Anthracene | ug/kg | 17 | 500 U | 25 | 42 J | 29 | 880 U | 24 | 33 J | 36 | 490 U |
| Atrazine | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Benzaldehyde | ug/kg | 9 | 150 J | 16 | 180 J | 35 | 260 J | 25 | 120 J | 14 | 490 U |
| Benzo(a)anthracene | ug/kg | 56 | 78 J | 68 | 170 J | 82 | 170 J | 73 | 160 J | 110 | 69 J |
| Benzo(a)pyrene | ug/kg | 58 | 78 J | 78 | 160 J | 94 | 140 J | 81 | 160 J | 100 | 66 J |
| Benzo(b)fluoranthene | ug/kg | 72 | 90 J | 100 | 160 J | 110 | 330 J | 91 | 180 J | 100 | 95 J |
| Benzo(g,h,i)perylene | ug/kg | 490 U | 30 J | 610 U | 89 J | 790 U | 81 J | 580 U | 56 J | 93 | 27 J |
| Benzo(k)fluoranthene | ug/kg | 63 | 81 J | 80 | 200 J | 120 | 880 UJ | 110 | 170 J | 140 | 75 J |
| Biphenyl | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| bis(2-Chloroethoxy)methane | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| bis(2-Chloroethyl)ether | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| bis(2-Ethylhexyl)phthalate | ug/kg | 490 U | 500 UJ | 610 U | 640 UJ | 790 U | 880 UJ | 580 U | 610 UJ | 490 U | 490 UJ |
| Butyl benzylphthalate | ug/kg | 490 U | 500 U | 610 U | 640 UJ | 790 U | 880 UJ | 580 U | 610 U | 25 | 490 U |
| Caprolactam | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |

TABLE G.1

ANALYTICAL RESULTS SUMMARY
SEDIMENT RESULTS
GARLAND ROAD

| *Sample Location:* | | *SED-05-2003* | *SED-05-2003* | *SED-06-2003* | *SED-06-2003* | *SED-07-2003* | *SED-07-2003* | *SED-08-2003* | *SED-08-2003* | *SED-09-2003* | *SED-09-2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GM-SED-5~4/21/2003~N* | *SED-05* | *GM-SED-6~4/21/2003~N* | *SED-06* | *GM-SED-7~4/21/2003~N* | *SED-07* | *GM-SED-8~4/21/2003~N* | *SED-08* | *GM-SED-9~4/21/2003~N* | *SED-09* |
| *Sample Date:* | | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth:* | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* |
| *Parameters* | *Units* | | | | | | | | | | |
| Carbazole | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 27 | 490 U |
| Chrysene | ug/kg | 77 | 99 J | 110 | 240 J | 130 | 260 J | 110 | 240 J | 150 | 110 J |
| Dibenz(a,h)anthracene | ug/kg | 490 U | 500 UJ | 610 U | 40 J | 790 U | 880 UJ | 580 U | 62 J | 56 | 490 UJ |
| Dibenzofuran | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Diethyl phthalate | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Dimethyl phthalate | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Di-n-butylphthalate | ug/kg | 490 U | 64 J | 610 U | 96 J | 790 U | 85 J | 580 U | 50 J | 19 | 39 J |
| Di-n-octyl phthalate | ug/kg | 490 U | 500 UJ | 610 U | 640 UJ | 790 U | 880 UJ | 580 U | 610 U | 22 | 490 UJ |
| Fluoranthene | ug/kg | 150 | 150 J | 210 | 340 J | 270 | 320 J | 210 | 330 J | 290 | 130 J |
| Fluorene | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Hexachlorobenzene | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Hexachlorobutadiene | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Hexachlorocyclopentadiene | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 UJ | 490 U |
| Hexachloroethane | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Indeno(1,2,3-cd)pyrene | ug/kg | 44 | 46 J | 57 | 87 J | 61 | 100 J | 60 | 84 J | 93 | 40 J |
| Isophorone | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Naphthalene | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Nitrobenzene | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| N-Nitrosodi-n-propylamine | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| N-Nitrosodiphenylamine | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Pentachlorophenol | ug/kg | 1200 U | 1200 U | 1500 U | 1600 U | 2000 U | 2200 U | 1500 U | 1500 U | 1200 U | 1200 U |
| Phenanthrene | ug/kg | 67 | 100 J | 88 | 210 J | 110 | 180 J | 86 | 250 J | 170 | 72 J |
| Phenol | ug/kg | 490 U | 500 U | 610 U | 640 U | 790 U | 880 U | 580 U | 610 U | 490 U | 490 U |
| Pyrene | ug/kg | 120 | 200 J | 160 | 460 J | 200 | 450 J | 160 | 520 J | 220 | 210 J |
| *Semi-Volatile Organic Compounds - Leachate* | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/kg | | - | - | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 2/3-Methylphenol | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Hexachlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Hexachloroethane | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Methylphenol (Cresol) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Nitrobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Pentachlorophenol | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Phenazopyridine Hydrochloride | ug/kg | - | - | - | - | - | - | - | - | - | - |
| *Metals* | | | | | | | | | | | |
| Aluminum | ug/kg | 4110 | 2430 | 6700 | 3610 | 8710 | 5700 | 6450 | 3530 | 3470 | 1870 |
| Antimony | ug/kg | 0.73 UJ | 2.8 | 0.92 UJ | 5.7 | 1.1 UJ | 3.7 | 0.86 UJ | 2.7 | 0.73 UJ | 17.4 U |
| Arsenic | ug/kg | 2.5 | 3.1 | 4.3 | 5.6 | 5.4 | 6.7 | 3.9 | 4.6 | 2.8 | 3.1 |
| Barium | ug/kg | 50.9 | 50.8 | 94.2 | 92 | 123 | 133 | 88.8 | 81.7 | 47.8 | 43.5 |
| Beryllium | ug/kg | 0.19 U | 0.28 | 0.33 U | 0.42 | 0.41 U | 0.57 | 0.33 U | 0.37 | 0.17 U | 0.23 |
| Cadmium | ug/kg | 0.093 | 1.5 U | 0.18 | 1.9 U | 0.25 | 2.6 U | 0.22 | 1.8 U | 0.079 | 1.4 U |
| Calcium | ug/kg | 65000 | 60000 | 66900 | 637 | 64900 | 69700 | 62500 | 56300 | 61600 | 57000 |
| Chromium Total | ug/kg | 6.9 | 4.2 | 10.8 | 6.6 | 12.8 | 9.5 | 10.1 | 5.8 | 6.3 | 3.7 |
| Cobalt | ug/kg | 2.5 | 3 | 4.2 | 4.5 | 4.9 | 6.5 | 4.0 | 4.1 | 2.5 | 2.8 |
| Copper | ug/kg | 6.1 | 8.9 | 13.5 | 12.3 | 21.3 | 17.9 | 12.5 | 9.9 | 5.6 | 5.7 |
| Cyanide (total) | ug/kg | 0.069 UJ | 1.5 U | 0.15 UJ | 1.9 U | 0.19 UJ | 2.6 U | 0.12 UJ | 1.8 U | 0.087 UJ | 1.5 U |
| Iron | ug/kg | 8360 | 6060 | 12700 | 8650 | 15500 | 12700 | 12500 | 8270 | 7380 | 4840 |
| Lead | ug/kg | 6.4 | 7.4 | 12.2 | 11.9 | 13.7 | 15 | 10.4 | 10.5 | 6.0 | 6.1 |

TABLE G.1

ANALYTICAL RESULTS SUMMARY
SEDIMENT RESULTS
GARLAND ROAD

| *Sample Location:* | | *SED-05-2003* | *SED-05-2003* | *SED-06-2003* | *SED-06-2003* | *SED-07-2003* | *SED-07-2003* | *SED-08-2003* | *SED-08-2003* | *SED-09-2003* | *SED-09-2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GM-SED-5~4/21/2003~N* | *SED-05* | *GM-SED-6~4/21/2003~N* | *SED-06* | *GM-SED-7~4/21/2003~N* | *SED-07* | *GM-SED-8~4/21/2003~N* | *SED-08* | *GM-SED-9~4/21/2003~N* | *SED-09* |
| *Sample Date:* | | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth:* | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* |
| *Parameters* | *Units* | | | | | | | | | | |
| Magnesium | ug/kg | 16900 | 16100 | 16600 | 16100 | 14900 | 15200 | 15800 | 14400 | 16000 | 14800 |
| Manganese | ug/kg | 254 | 201 | 345 | 338 | 444 | 486 | 323 | 291 | 202 | 190 |
| Mercury | ug/kg | 0.67 UJ | 0.14 U | 0.085 UJ | 0.05 | 0.12 UJ | 0.07 | 0.088 UJ | 0.06 | 0.070 UJ | 0.04 |
| Nickel | ug/kg | 7.7 | 7 | 11.8 | 10 | 15.0 | 15 | 11.4 | 9.6 | 6.8 | 5.2 |
| Potassium | ug/kg | 641 | 520 J | 1070 | 720 J | 1350 | 1020 J | 960 | 647 J | 574 | 412 J |
| Selenium | ug/kg | 0.68 | 10.6 U | 1.1 | 13.4 U | 1.1 | 18.1 U | 0.79 | 12.5 U | 0.67 | 10.1 U |
| Silver | ug/kg | 0.26 | 3.0 UJ | 0.33 | 3.8 UJ | 0.41 | 5.2 UJ | 0.31 | 3.6 UJ | 0.26 | 2.9 UJ |
| Sodium | ug/kg | 256 | 1510 U | 346 | 1920 U | 289 | 2590 U | 307 | 1780 U | 288 | 1450 U |
| Thallium | ug/kg | 0.85 UJ | 7.5 U | 1.1 UJ | 9.6 U | 1.3 UJ | 12.9 U | 0.99 UJ | 8.9 U | 0.85 UJ | 7.2 U |
| Vanadium | ug/kg | 11.2 | 6.4 | 17.1 | 9.2 | 20.5 | 13.4 | 16.2 | 8.7 | 10.0 | 5 |
| Zinc | ug/kg | 28.7 | 29 | 49.8 | 45.9 | 66.3 | 67.6 | 48.0 | 40.8 | 27.0 | 22.5 |
| *Metals - Leachate* | | | | | | | | | | | |
| Arsenic | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Barium | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Cadmium | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Chromium Total (Dissolved) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Lead | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Mercury | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Selenium | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Silver | ug/kg | - | - | - | - | - | - | - | - | - | - |
| *PCBs* | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| *PCBs - Leachate* | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| *Pesticides* | | | | | | | | | | | |
| 4,4'-DDD | ug/kg | 4.9 U | 5.0 U | 6.1 U | 6.4 U | 7.9 U | 8.9 UJ | 5.8 U | 6.0 UJ | 4.9 U | 4.8 U |
| 4,4'-DDE | ug/kg | 4.9 U | 1.5 J | 6.1 U | 2.1 J | 7.9 U | 2.2 J | 5.8 U | 0.84 J | 4.9 U | 4.8 U |
| 4,4'-DDT | ug/kg | 4.9 U | 5.0 UJ | 6.1 U | 6.4 UJ | 7.9 U | 8.9 UJ | 30 U | 6.0 UJ | 4.9 U | 4.8 UJ |
| Aldrin | ug/kg | 2.5 U | 2.6 UJ | 3.1 U | 3.3 UJ | 4.0 U | 4.6 U | 3.0 U | 3.1 U | 2.5 U | 2.5 U |
| alpha-BHC | ug/kg | 2.5 U | 2.6 U | 3.1 U | 3.3 U | 4.0 U | 4.6 U | 3.0 U | 3.1 U | 2.5 U | 2.5 U |
| alpha-Chlordane | ug/kg | 4.6 | 2.6 UJ | 4.9 | 3.3 U | 14 | 4.6 U | 3.7 | 0.66 J | 2.5 U | 2.5 U |
| Aroclor-1016 (PCB-1016) | ug/kg | 49 U | 50 U | 61 U | 64 U | 79 U | 89 U | 120 U | 60 U | 49 U | 48 U |
| Aroclor-1221 (PCB-1221) | ug/kg | 99 U | 100 U | 120 U | 130 U | 160 U | 180 U | 58 U | 120 U | 99 U | 98 U |
| Aroclor-1232 (PCB-1232) | ug/kg | 49 U | 50 U | 61 U | 64 U | 79 U | 89 U | 58 U | 60 U | 49 U | 48 U |
| Aroclor-1242 (PCB-1242) | ug/kg | 49 U | 50 U | 61 U | 64 U | 79 U | 89 U | 58 U | 60 U | 49 U | 48 U |
| Aroclor-1248 (PCB-1248) | ug/kg | 49 U | 50 U | 61 U | 64 U | 79 U | 89 U | 58 U | 60 U | 49 U | 48 U |

TABLE G.1

ANALYTICAL RESULTS SUMMARY
SEDIMENT RESULTS
GARLAND ROAD

| *Sample Location:* | | *SED-05-2003* | *SED-05-2003* | *SED-06-2003* | *SED-06-2003* | *SED-07-2003* | *SED-07-2003* | *SED-08-2003* | *SED-08-2003* | *SED-09-2003* | *SED-09-2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GM-SED-5~4/21/2003~N* | *SED-05* | *GM-SED-6~4/21/2003~N* | *SED-06* | *GM-SED-7~4/21/2003~N* | *SED-07* | *GM-SED-8~4/21/2003~N* | *SED-08* | *GM-SED-9~4/21/2003~N* | *SED-09* |
| *Sample Date:* | | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* |
| *Sample Depth.* | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* |
| *Parameters* | *Units* | | | | | | | | | | |
| Aroclor-1254 (PCB-1254) | ug/kg | 49 U | 50 U | 61 U | 64 U | 79 U | 89 U | 58 U | 60 U | 49 U | 48 U |
| Aroclor-1260 (PCB-1260) | ug/kg | 49 U | 50 U | 61 U | 64 U | 79 U | 89 U | 58 U | 60 U | 49 U | 48 U |
| beta-BHC | ug/kg | 2.5 U | 2.6 UJ | 3.1 U | 3.3 UJ | 4.0 U | 4.6 UJ | 5.0 | 3.1 UJ | 2.5 U | 2.5 UJ |
| delta-BHC | ug/kg | 2.5 U | 2.6 U | 3.1 U | 3.3 U | 4.0 U | 4.6 U | 3.0 U | 3.1 U | 2.5 U | 2.5 U |
| Dieldrin | ug/kg | 4.9 U | 2.1 J | 6.1 U | 3.6 J | 7.9 U | 4.8 J | 5.8 U | 6.0 U | 4.9 U | 2.6 J |
| Endosulfan I | ug/kg | 2.5 U | 2.6 U | 3.1 U | 3.3 U | 4.0 U | 4.6 U | 5.8 U | 3.1 U | 2.5 U | 2.5 U |
| Endosulfan II | ug/kg | 4.9 U | 5.0 U | 6.1 U | 6.4 U | 7.9 U | 8.9 U | 5.8 U | 6.0 U | 4.9 U | 4.8 U |
| Endosulfan sulfate | ug/kg | 4.9 U | 5.0 U | 6.1 U | 6.4 U | 7.9 U | 8.9 U | 5.8 U | 6.0 U | 4.9 U | 4.8 U |
| Endrin | ug/kg | 4.9 U | 5.0 U | 6.1 U | 6.4 U | 7.9 U | 8.9 U | 5.8 U | 6.0 U | 4.9 U | 4.8 U |
| Endrin aldehyde | ug/kg | 4.9 U | 5.0 U | 6.1 U | 6.4 U | 7.9 U | 8.9 U | 5.8 U | 6.0 U | 4.9 U | 4.8 U |
| Endrin ketone | ug/kg | 4.9 U | 5.0 U | 6.1 U | 6.4 U | 7.9 U | 8.9 UJ | 5.8 U | 6.0 UJ | 4.9 U | 4.8 UJ |
| gamma-BHC (Lindane) | ug/kg | 2.5 U | 2.6 UJ | 3.1 U | 3.3 UJ | 4.0 U | 4.6 UJ | 3.0 U | 3.1 UJ | 2.5 U | 2.5 UJ |
| gamma-Chlordane | ug/kg | 3.7 | 2.6 U | 3.1 U | 3.3 U | 4.0 U | 4.6 U | 300 U | 3.1 U | 2.5 U | 2.5 U |
| Heptachlor | ug/kg | 2.5 U | 1.4 UJ | 3.1 U | 2.5 UJ | 4.0 U | 3.1 J | 3.0 U | 1.5 UJ | 2.5 U | 2.5 U |
| Heptachlor epoxide | ug/kg | 2.5 U | 2.6 U | 3.1 U | 3.3 U | 4.0 U | 4.6 U | 3.0 U | 3.1 U | 2.5 U | 2.5 U |
| Methoxychlor | ug/kg | 25 U | 26 U | 31 U | 33 U | 40 U | 46 UJ | 5.8 U | 31 UJ | 25 U | 25 UJ |
| Toxaphene | ug/kg | 250 U | 260 U | 310 U | 330 U | 400 U | 460 U | 58 U | 310 U | 250 U | 250 U |
| *Pesticides - Leachate* | | | | | | | | | | | |
| 2,4,5-TP (Silvex) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 2,4-Dichlorophenoxyacetic acid (2,4-D) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Chlordane | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Endrin | ug/kg | - | | - | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Heptachlor | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Methoxychlor | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Toxaphene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| *General Chemistry* | | | | | | | | | | | |
| Cyanide (total) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Total Organic Carbon (TOC) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Total Solids (Residue) | % | - | - | - | - | - | - | - | - | - | - |

TABLE G.1

ANALYTICAL RESULTS SUMMARY
SEDIMENT RESULTS
GARLAND ROAD

| *Sample Location:* | | *SED-10-2003* | *SED-10-2003* | *SED-11-2003* | *SED-11-2003* | *SED-12-2003* | *SED-12-2003* | *SED-01-1993* | *SED-02-1996* | *SED-02-1993* | *SED-03-1996* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GM-SED-10-4/21/2003-N* | *SED-10* | *GM-SED-11-4/21/2003-N* | *SED-11* | *GM-SED-12-4/21/2003-N* | *SED-12* | *SD-01-04/07/1993-N* | *S-MT-018* | *SD-02-04/07/1993-N* | *S-MT-017* |
| *Sample Date:* | | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/7/1993* | *8/6/1996* | *4/7/1993* | *8/6/1996* |
| *Sample Depth:* | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | | | |
| *Parameters* | *Units* | | | | | | | | | | |
| *Volatile Organic Compounds* | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| 1,1,2,2-Tetrachloroethane | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| 1,1,2-Trichloroethane | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| 1,1-Dichloroethane | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| 1,1-Dichloroethene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| 1,2,4-Trichlorobenzene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| 1,2-Dibromo-3-chloropropane (DBCP) | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| 1,2-Dibromoethane (Ethylene Dibromide) | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| 1,2-Dichlorobenzene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| 1,2-Dichloroethane | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| 1,2-Dichloroethene (total) | ug/kg | - | - | - | - | - | - | - | 5.0 U | - | 5.0 U |
| 1,2-Dichloropropane | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| 1,3-Dichlorobenzene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| 1,4-Dichlorobenzene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | 15 U | 16 UJ | 15 U | 15 UJ | 13 U | 13 UJ | - | 50 U | - | 50 U |
| 2-Hexanone | ug/kg | 15 U | 16 UJ | 15 U | 15 UJ | 13 U | 13 U | - | 50 U | - | 50 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 50 U | - | 50 U |
| Acetone | ug/kg | 15 U | 16 UJ | 15 U | 7 J | 13 U | 6 J | - | 50 U | - | 50 U |
| Benzene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Bromodichloromethane | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Bromoform | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Bromomethane (Methyl Bromide) | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Carbon disulfide | ug/kg | 15 U | 16 UJ | 15 U | 15 UJ | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Carbon tetrachloride | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Chlorobenzene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Chloroethane | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 10 U | - | 10 U |
| Chloroform (Trichloromethane) | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Chloromethane (Methyl Chloride) | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 10 U | - | 10 U |
| cis-1,2-Dichloroethene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| cis-1,3-Dichloropropene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Cyclohexane | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| Dibromochloromethane | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Dichlorodifluoromethane (CFC-12) | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| Ethylbenzene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Isopropylbenzene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| Methyl acetate | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| Methyl cyclohexane | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| Methyl Tert Butyl Ether | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| Methylene chloride | ug/kg | 15 U | 16 UJ | 15 U | 15 UJ | 13 U | 13 UJ | 10 | 5.0 U | 10 | 5.0 U |
| Styrene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Tetrachloroethene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Toluene | ug/kg | 15 U | 78 | 15 U | 42 | 13 U | 2 J | - | 5.0 U | - | 5.0 U |
| trans-1,2-Dichloroethene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| trans-1,3-Dichloropropene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Trichloroethene | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| Trichlorofluoromethane (CFC-11) | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| Trifluorotrichloroethane (Freon 113) | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | - | - | - |
| Vinyl chloride | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 10 U | - | 10 U |
| Xylene (total) | ug/kg | 15 U | 16 U | 15 U | 15 U | 13 U | 13 U | - | 5.0 U | - | 5.0 U |
| *Volatile Organic Compounds - Leachate* | | | | | | | | | | | |
| 1,1-Dichloroethene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 1,2-Dichloroethane | ug/kg | - | - | - | - | - | - | - | - | - | - |

TABLE G.1

ANALYTICAL RESULTS SUMMARY
SEDIMENT RESULTS
GARLAND ROAD

| *Sample Location:* | | *SED-10-2003* | *SED-10-2003* | *SED-11-2003* | *SED-11-2003* | *SED-12-2003* | *SED-12-2003* | *SED-01-1993* | *SED-02-1996* | *SED-02-1993* | *SED-03-1996* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GM-SED-10~4/21/2003~N* | *SED-10* | *GM-SED-11~4/21/2003~N* | *SED-11* | *GM-SED-12~4/21/2003~N* | *SED-12* | *SD-01~04/07/1993~N* | *S-MT-018* | *SD-02~04/07/1993~N* | *S-MT-017* |
| *Sample Date:* | | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/7/1993* | *8/6/1996* | *4/7/1993* | *8/6/1996* |
| *Sample Depth:* | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | | | |
| *Parameters* | *Units* | | | | | | | | | | |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Benzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Carbon tetrachloride | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Chlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Chloroform (Trichloromethane) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Tetrachloroethene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Trichloroethene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Vinyl chloride | ug/kg | - | - | - | - | - | - | - | - | - | - |
| *Semi-Volatile Organic Compounds* | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/kg | - | - | - | - | - | - | - | 330 U | - | 330 U |
| 1,2-Dichlorobenzene | ug/kg | - | - | - | - | - | - | - | 330 U | - | 330 U |
| 1,3-Dichlorobenzene | ug/kg | - | - | - | - | - | - | - | 330 U | - | 330 U |
| 1,4-Dichlorobenzene | ug/kg | - | - | - | - | - | - | - | 330 U | - | 330 U |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 2,4,5-Trichlorophenol | ug/kg | 1300 U | 1300 U | 1200 U | 1200 U | 1100 U | 1100 U | - | 330 U | - | 330 U |
| 2,4,6-Trichlorophenol | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 2,4-Dichlorophenol | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 2,4-Dimethylphenol | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 2,4-Dinitrophenol | ug/kg | 1300 UJ | 1300 U | 1200 UJ | 1200 U | 1100 UJ | 1100 U | - | 1600 U | - | 1600 U |
| 2,4-Dinitrotoluene | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 2,6-Dinitrotoluene | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 2-Chloronaphthalene | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 2-Chlorophenol | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 2-Methylnaphthalene | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | 110 | 330 U | 330 | 330 U |
| 2-Methylphenol | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 2-Nitroaniline | ug/kg | 1300 U | 1300 U | 1200 U | 1200 U | 1100 U | 1100 U | - | 1600 U | - | 1600 U |
| 2-Nitrophenol | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 3,3'-Dichlorobenzidine | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 1600 U | - | 1600 U |
| 3-Nitroaniline | ug/kg | 1300 U | 1300 U | 1200 U | 1200 U | 1100 U | 1100 U | - | 1600 U | - | 1600 U |
| 4,6-Dinitro-2-methylphenol | ug/kg | 1300 U | 1300 U | 1200 U | 1200 U | 1100 U | 1100 U | - | 1600 U | - | 1600 U |
| 4-Bromophenyl phenyl ether | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 4-Chloro-3-methylphenol | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 4-Chloroaniline | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 4-Chlorophenyl phenyl ether | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| 4-Methylphenol | ug/kg | 510 U | 31 J | 52 | 160 J | 420 U | 430 U | - | 330 U | - | 330 U |
| 4-Nitroaniline | ug/kg | 1300 U | 1300 U | 1200 U | 1200 U | 1100 U | 1100 U | - | 1600 U | - | 1600 U |
| 4-Nitrophenol | ug/kg | 1300 U | 1300 U | 1200 U | 1200 U | 1100 U | 1100 U | - | 1600 U | - | 1600 U |
| Acenaphthene | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| Acenaphthylene | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| Acetophenone | ug/kg | 15 | 510 U | 490 U | 470 U | 420 UJ | 430 U | - | - | - | - |
| Anthracene | ug/kg | 13 | 510 U | 490 U | 470 U | 420 UJ | 430 U | - | 330 U | - | 330 U |
| Atrazine | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | - | - | - |
| Benzaldehyde | ug/kg | 16 | 150 J | 10 | 470 U | 420 UJ | 430 U | - | - | - | - |
| Benzo(a)anthracene | ug/kg | 45 | 99 J | 31 | 78 J | 420 UJ | 40 J | 120 | 330 U | 330 | 330 U |
| Benzo(a)pyrene | ug/kg | 49 | 82 J | 37 | 75 J | 420 U | 37 J | - | 330 U | - | 330 U |
| Benzo(b)fluoranthene | ug/kg | 60 | 170 J | 39 | 170 J | 420 U | 39 J | 210 | 330 U | 330 | 330 U |
| Benzo(g,h,i)perylene | ug/kg | 510 U | 510 UJ | 490 U | 28 J | 420 UJ | 430 UJ | - | 330 U | - | 330 U |
| Benzo(k)fluoranthene | ug/kg | 61 | 510 UJ | 46 | 470 UJ | 420 U | 27 J | - | 330 U | - | 330 U |
| Biphenyl | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| bis(2-Chloroethyl)ether | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| bis(2-Ethylhexyl)phthalate | ug/kg | 510 U | 510 UJ | 490 U | 470 UJ | 16 | 430 UJ | 280 | 330 U | 650 | 330 U |
| Butyl benzylphthalate | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| Caprolactam | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | - | - | - |

TABLE G.1

ANALYTICAL RESULTS SUMMARY
SEDIMENT RESULTS
GARLAND ROAD

| *Sample Location:* | | *SED-10-2003* | *SED-10-2003* | *SED-11-2003* | *SED-11-2003* | *SED-12-2003* | *SED-12-2003* | *SED-01-1993* | *SED-02-1996* | *SED-02-1993* | *SED-03-1996* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GM-SED-10-4/21/2003-N* | *SED-10* | *GM-SED-11-4/21/2003-N* | *SED-11* | *GM-SED-12-4/21/2003-N* | *SED-12* | *SD-01-04/07/1993-N* | *S-MT-018* | *SD-02-04/07/1993-N* | *S-MT-017* |
| *Sample Date:* | | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/7/1993* | *8/6/1996* | *4/7/1993* | *8/6/1996* |
| *Sample Depth:* | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | | | |
| *Parameters* | *Units* | | | | | | | | | | |
| Carbazole | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 UJ | 430 U | - | 330 U | - | 330 U |
| Chrysene | ug/kg | 67 | 130 J | 52 | 130 J | 14 | 52 J | 110 | 330 U | 330 | 330 U |
| Dibenz(a,h)anthracene | ug/kg | 510 U | 32 J | 490 U | 26 J | 420 U | 430 UJ | - | 330 U | - | 330 U |
| Dibenzofuran | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | 110 | 330 U | 330 | 330 U |
| Diethyl phthalate | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| Dimethyl phthalate | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| Di-n-butylphthalate | ug/kg | 510 U | 35 J | 490 U | 25 J | 420 UJ | 28 J | 630 | 330 U | 650 | 330 U |
| Di-n-octyl phthalate | ug/kg | 510 U | 510 UJ | 190 | 470 UJ | 420 UJ | 430 UJ | - | 330 U | - | 330 U |
| Fluoranthene | ug/kg | 120 | 160 J | 89 | 150 J | 42 | 66 J | 340 | 57 J | 330 | 36 J |
| Fluorene | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | 150 | 330 U | 330 | 330 U |
| Hexachlorobenzene | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| Hexachlorobutadiene | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| Hexachlorocyclopentadiene | ug/kg | 510 UJ | 510 U | 490 UJ | 470 U | 420 U | 430 U | - | 1600 U | - | 1600 U |
| Hexachloroethane | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| Indeno(1,2,3-cd)pyrene | ug/kg | 45 | 45 J | 29 | 44 J | 420 U | 430 UJ | - | 330 U | - | 330 U |
| Isophorone | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| Naphthalene | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | 140 | 330 U | 330 | 330 U |
| Nitrobenzene | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| N-Nitrosodi-n-propylamine | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| N-Nitrosodiphenylamine | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| Pentachlorophenol | ug/kg | 1300 U | 57 J | 1200 U | 1200 U | 1100 UJ | 1100 U | - | R | - | R |
| Phenanthrene | ug/kg | 45 | 98 J | 43 | 76 J | 27 | 40 J | 390 | 52 J | 330 | 330 U |
| Phenol | ug/kg | 510 U | 510 U | 490 U | 470 U | 420 U | 430 U | - | 330 U | - | 330 U |
| Pyrene | ug/kg | 96 | 230 J | 73 | 240 J | 420 UJ | 90 J | 180 | 330 U | 380 | 35 J |
| *Semi-Volatile Organic Compounds - Leachate* | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 2,4-Dinitrotoluene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 2/3-Methylphenol | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 2-Methylphenol | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Hexachlorobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Hexachlorobutadiene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Hexachloroethane | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Methylphenol (Cresol) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Nitrobenzene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Pentachlorophenol | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Phenazopyridine Hydrochloride | ug/kg | - | - | - | - | - | - | - | - | - | - |
| *Metals* | | | | | | | | | | | |
| Aluminum | ug/kg | 6450 | 3530 | 5780 | 3570 | 4320 | 2640 | 11000 | 3540 | 7390 | 1330 |
| Antimony | ug/kg | 0.71 UJ | 2.5 | 0.72 UJ | 2.3 | 0.59 UJ | 16.4 | 12 | 6.0 U | 12 | 6.0 U |
| Arsenic | ug/kg | 4.3 | 4.4 | 4.3 | 4.7 | 3.6 | 2.8 | 7.4 | 3.3 | 7.7 | 2.5 |
| Barium | ug/kg | 80.4 | 75.7 | 65.3 | 67.2 | 51.7 | 52.6 | 135 | 40.3 | 105 | 20.0 U |
| Beryllium | ug/kg | 0.36 U | 0.37 | 0.32 U | 0.38 | 0.24 | 0.29 | 0.64 | 0.50 U | 0.37 | 0.50 U |
| Cadmium | ug/kg | 0.26 | 1.5 U | 0.16 | 1.5 U | 0.11 | 1.4 U | 0.71 | 0.50 U | 1 | 0.50 U |
| Calcium | ug/kg | 63500 | 54000 | 48000 | 48300 | 46100 | 42700 | 38700 | 38900 | 76000 | 72800 |
| Chromium Total | ug/kg | 10.3 | 6.3 | 8.8 | 6 | 7.5 | 4.5 | 14.6 | 5.7 | 10.5 | 3.2 |
| Cobalt | ug/kg | 3.8 | 4.4 | 3.7 | 4.4 | 3.3 | 3.4 | 6.1 | 5.0 U | 5.0 | 5.0 U |
| Copper | ug/kg | 11.4 | 9.1 | 9.8 | 10.1 | 6.2 | 6 | 28.0 | 6.7 | 17.1 | 2.5 U |
| Cyanide (total) | ug/kg | 0.085 UJ | 1.6 U | 0.071 UJ | 1.5 U | 0.056 | 1.4 U | 80.1 | - | 26.7 | - |
| Iron | ug/kg | 11600 | 7640 | 10700 | 8380 | 9370 | 5900 | 16200 | 6800 MBB | 15400 | 3610 MBB |
| Lead | ug/kg | 10.3 | 13.4 | 9.4 | 9.8 | 6.7 | 8 | 34.3 | 6.2 | 10.0 | 3.0 |

TABLE G.1

ANALYTICAL RESULTS SUMMARY
SEDIMENT RESULTS
GARLAND ROAD

| *Sample Location:* | | *SED-10-2003* | *SED-10-2003* | *SED-11-2003* | *SED-11-2003* | *SED-12-2003* | *SED-12-2003* | *SED-01-1993* | *SED-02-1996* | *SED-02-1993* | *SED-03-1996* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GM-SED-10~4/21/2003~N* | *SED-10* | *GM-SED-11~4/21/2003~N* | *SED-11* | *GM-SED-12~4/21/2003~N* | *SED-12* | *SD-01~04/07/1993~N* | *S-MT-018* | *SD-02~04/07/1993~N* | *S-MT-017* |
| *Sample Date:* | | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/7/1993* | *8/6/1996* | *4/7/1993* | *8/6/1996* |
| *Sample Depth:* | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | | | |
| *Parameters* | *Units* | | | | | | | | | | |
| Magnesium | ug/kg | 20000 | 15300 | 14000 | 12800 | 13100 | 11700 | 14200 | 11300 | 17800 | 35600 |
| Manganese | ug/kg | 350 | 310 | 333 | 383 | 316 | 260 | 421 | 183 | 560 | 165 |
| Mercury | ug/kg | 0.067 UJ | 0.05 | 0.064 UJ | 0.05 | 0.058 | 0.03 | - | 0.10 U | - | 0.10 U |
| Nickel | ug/kg | 11.0 | 9.3 | 9.6 | 9.1 | 8.1 | 6.3 | 16.4 | 6.8 | 13.3 | 4.0 U |
| Potassium | ug/kg | 966 | 631 J | 861 | 616 J | 562 | 462 J | 1560 | 508 | 915 | 500 U |
| Selenium | ug/kg | 0.66 | 10.8 U | 0.66 | 10.2 U | 0.67 U | 9.6 U | - | 0.50 U | - | 0.50 U |
| Silver | ug/kg | 0.26 | 3.1 UJ | 0.26 | 2.9 UJ | 0.21 UJ | 2.7 UJ | 1.2 | 1.0 U | 0.7 | 1.0 U |
| Sodium | ug/kg | 274 | 1540 U | 227 | 1460 U | 220 | 1370 U | 256 | 500 U | 235 | 500 U |
| Thallium | ug/kg | 0.82 UJ | 7.7 U | 0.83 UJ | 7.3 U | 0.68 UJ | 6.8 U | - | 1.0 U | - | 1.0 U |
| Vanadium | ug/kg | 16.5 | 8.6 | 15.2 | 9.8 | 12.4 | 6.7 | 24.1 | 9.7 | 16.2 | 5.2 |
| Zinc | ug/kg | 44.4 | 36.6 | 38.8 | 33.9 | 24.7 | 25.6 | 66.3 | 29.9 | 38.9 | 13.6 |
| *Metals - Leachate* | | | | | | | | | | | |
| Arsenic | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Barium | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Cadmium | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Chromium Total (Dissolved) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Lead | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Mercury | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Selenium | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Silver | ug/kg | - | - | - | - | - | - | - | - | - | - |
| *PCBs* | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/kg | - | - | - | - | - | - | - | 33 U | - | 33 U |
| Aroclor-1221 (PCB-1221) | ug/kg | - | - | - | - | - | - | - | 33 U | - | 33 U |
| Aroclor-1232 (PCB-1232) | ug/kg | - | - | - | - | - | - | - | 33 U | - | 33 U |
| Aroclor-1242 (PCB-1242) | ug/kg | - | - | - | - | - | - | - | 33 U | - | 33 U |
| Aroclor-1248 (PCB-1248) | ug/kg | - | - | - | - | - | - | - | 33 U | - | 33 U |
| Aroclor-1254 (PCB-1254) | ug/kg | - | - | - | - | - | - | - | 33 U | - | 33 U |
| Aroclor-1260 (PCB-1260) | ug/kg | - | - | - | - | - | - | - | 33 U | - | 33 U |
| *PCBs - Leachate* | | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/kg | - | | - | - | - | - | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| *Pesticides* | | | | | | | | | | | |
| 4,4'-DDD | ug/kg | 5.1 U | 5.2 U | 4.9 U | 4.8 U | 4.2 UJ | 4.2 U | - | 3.3 U | - | 3.3 U |
| 4,4'-DDE | ug/kg | 5.1 U | 1.7 J | 4.9 U | 2.3 J | 4.2 UJ | 0.86 J | - | 3.3 U | - | 3.3 U |
| 4,4'-DDT | ug/kg | 5.1 U | 5.2 UJ | 4.9 U | 4.8 UJ | 4.2 UJ | 4.2 UJ | - | 3.3 U | - | 3.3 U |
| Aldrin | ug/kg | 2.6 U | 2.7 U | 2.5 U | 2.5 U | 2.2 UJ | 2.2 U | - | 1.7 U | - | 1.7 U |
| alpha-BHC | ug/kg | 2.6 U | 2.7 U | 2.5 U | 2.5 U | 2.2 UJ | 2.2 U | - | 1.7 U | - | 1.7 U |
| alpha-Chlordane | ug/kg | 2.6 U | 2.7 U | 2.5 U | 2.5 U | 2.2 UJ | 2.2 U | - | 1.7 U | - | 1.7 U |
| Aroclor-1016 (PCB-1016) | ug/kg | 51 U | 52 U | 49 U | 48 U | 42 UJ | 42 U | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/kg | 100 U | 110 U | 99 U | 97 U | 86 UJ | 86 U | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/kg | 51 U | 52 U | 49 U | 48 U | 42 UJ | 42 U | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/kg | 51 U | 52 U | 49 U | 48 U | 42 UJ | 42 U | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/kg | 51 U | 52 U | 49 U | 48 U | 42 UJ | 42 U | - | - | - | - |

TABLE G.1

ANALYTICAL RESULTS SUMMARY
SEDIMENT RESULTS
GARLAND ROAD

| *Sample Location:* | | *SED-10-2003* | *SED-10-2003* | *SED-11-2003* | *SED-11-2003* | *SED-12-2003* | *SED-12-2003* | *SED-01-1993* | *SED-02-1996* | *SED-02-1993* | *SED-03-1996* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample ID:* | | *GM-SED-10~4/21/2003~N* | *SED-10* | *GM-SED-11~4/21/2003~N* | *SED-11* | *GM-SED-12~4/21/2003~N* | *SED-12* | *SD-01~04/07/1993~N* | *S-MT-018* | *SD-02~04/07/1993~N* | *S-MT-017* |
| *Sample Date:* | | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/21/2003* | *4/7/1993* | *8/6/1996* | *4/7/1993* | *8/6/1996* |
| *Sample Depth:* | | | *(0-12) in* | | *(0-12) in* | | *(0-12) in* | | | | |
| *Parameters* | *Units* | | | | | | | | | | |
| Aroclor-1254 (PCB-1254) | ug/kg | 51 U | 52 U | 49 U | 48 U | 42 UJ | 42 U | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/kg | 51 U | 52 U | 49 U | 48 U | 42 UJ | 42 U | - | - | - | - |
| beta-BHC | ug/kg | 2.6 U | 2.7 UJ | 2.5 U | 2.5 UJ | 2.2 UJ | 2.2 UJ | - | 1.7 U | - | 1.7 U |
| delta-BHC | ug/kg | 2.6 U | 2.7 U | 2.5 U | 2.5 U | 2.2 UJ | 2.2 U | - | 1.7 U | - | 1.7 U |
| Dieldrin | ug/kg | 5.1 U | 2.1 J | 4.9 U | 2.6 J | 4.2 UJ | 4.2 U | - | 3.3 U | - | 3.3 U |
| Endosulfan I | ug/kg | 2.6 U | 2.7 U | 2.5 U | 2.5 U | 2.2 UJ | 2.2 U | - | 1.7 U | - | 1.7 U |
| Endosulfan II | ug/kg | 5.1 U | 5.2 U | 4.9 U | 4.8 U | 4.2 UJ | 4.2 U | - | 3.3 U | - | 3.3 U |
| Endosulfan sulfate | ug/kg | 5.1 U | 5.2 U | 4.9 U | 4.8 U | 4.2 UJ | 4.2 U | - | 3.3 U | - | 3.3 U |
| Endrin | ug/kg | 5.1 U | 5.2 U | 4.9 U | 4.8 U | 4.2 UJ | 4.2 U | - | 3.3 U | - | 3.3 U |
| Endrin aldehyde | ug/kg | 5.1 U | 5.2 U | 4.9 U | 4.8 U | 4.2 UJ | 4.2 U | - | 3.3 U | - | 3.3 U |
| Endrin ketone | ug/kg | 5.1 U | 5.2 UJ | 4.9 U | 4.8 UJ | 4.2 UJ | 4.2 UJ | - | 3.3 U | - | 3.3 U |
| gamma-BHC (Lindane) | ug/kg | 2.6 U | 2.7 UJ | 2.5 U | 2.5 UJ | 2.2 UJ | 2.2 UJ | - | 1.7 U | - | 1.7 U |
| gamma-Chlordane | ug/kg | 2.6 U | 2.7 U | 2.5 U | 2.5 U | 2.2 UJ | 2.2 U | - | 1.7 U | - | 1.7 U |
| Heptachlor | ug/kg | 2.6 U | 2.7 U | 2.5 U | 1.7 UJ | 2.2 UJ | 1.6 UJ | - | 1.7 U | - | 1.7 U |
| Heptachlor epoxide | ug/kg | 2.6 U | 2.7 U | 2.5 U | 2.5 U | 2.2 UJ | 2.2 U | - | 1.7 U | - | 1.7 U |
| Methoxychlor | ug/kg | 26 U | 27 UJ | 25 U | 25 UJ | 22 UJ | 22 UJ | - | 17 U | - | 17 U |
| Toxaphene | ug/kg | 260 U | 270 U | 250 U | 250 U | 220 UJ | 220 U | - | 83 U | - | 83 U |
| *Pesticides - Leachate* | | | | | | | | | | | |
| 2,4,5-TP (Silvex) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| 2,4-Dichlorophenoxyacetic acid (2,4-D) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Chlordane | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Endrin | ug/kg | - | - | - | - | - | - | - | - | - | - |
| gamma-BHC (Lindane) | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Heptachlor | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Methoxychlor | ug/kg | - | - | - | - | - | - | - | - | - | - |
| Toxaphene | ug/kg | - | - | - | - | - | - | - | - | - | - |
| *General Chemistry* | | | | | | | | | | | |
| Cyanide (total) | ug/kg | - | - | - | - | - | - | - | 0.50 U | - | 0.50 U |
| Total Organic Carbon (TOC) | ug/kg | - | - | - | - | - | - | - | 9300 | - | 2300 |
| Total Solids (Residue) | % | - | - | - | - | - | - | - | 77.7 | - | 80.3 |

# TABLE G.1

## ANALYTICAL RESULTS SUMMARY
## SEDIMENT RESULTS
## GARLAND ROAD

| *Sample Location:* | | *SED-03-1993* | *SED-04-1996* | *SED-04-1993* | *SED-05-1996* |
|---|---|---|---|---|---|
| *Sample ID:* | | *SD-03-04/07/1993-N* | *S-MT-016* | *SD-04-04/07/1993-N* | *S-MT-015* |
| *Sample Date:* | | *4/7/1993* | *8/6/1996* | *4/7/1993* | *8/6/1996* |
| *Sample Depth:* | | | | | |
| *Parameters* | *Units* | | | | |
| *Volatile Organic Compounds* | | | | | |
| 1,1,1-Trichloroethane | ug/kg | - | 5.0 U | - | 5.0 U |
| 1,1,2,2-Tetrachloroethane | ug/kg | - | 5.0 U | - | 5.0 U |
| 1,1,2-Trichloroethane | ug/kg | - | 5.0 U | - | 5.0 U |
| 1,1-Dichloroethane | ug/kg | - | 5.0 U | - | 5.0 U |
| 1,1-Dichloroethene | ug/kg | - | 5.0 U | - | 5.0 U |
| 1,2,4-Trichlorobenzene | ug/kg | - | - | - | - |
| 1,2-Dibromo-3-chloropropane (DBCP) | ug/kg | - | - | - | - |
| 1,2-Dibromoethane (Ethylene Dibromide) | ug/kg | - | - | - | - |
| 1,2-Dichlorobenzene | ug/kg | - | - | - | - |
| 1,2-Dichloroethane | ug/kg | - | 5.0 U | - | 5.0 U |
| 1,2-Dichloroethene (total) | ug/kg | - | 5.0 U | - | 5.0 U |
| 1,2-Dichloropropane | ug/kg | - | 5.0 U | - | 5.0 U |
| 1,3-Dichlorobenzene | ug/kg | - | - | - | - |
| 1,4-Dichlorobenzene | ug/kg | - | - | - | - |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | - | 50 U | - | 50 U |
| 2-Hexanone | ug/kg | - | 50 U | - | 50 U |
| 4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) | ug/kg | - | 50 U | - | 50 U |
| Acetone | ug/kg | - | 50 U | - | 15 J |
| Benzene | ug/kg | - | 5.0 U | - | 5.0 U |
| Bromodichloromethane | ug/kg | - | 5.0 U | - | 5.0 U |
| Bromoform | ug/kg | - | 5.0 U | - | 5.0 U |
| Bromomethane (Methyl Bromide) | ug/kg | - | 5.0 U | - | 5.0 U |
| Carbon disulfide | ug/kg | - | 5.0 U | - | 5.0 U |
| Carbon tetrachloride | ug/kg | - | 5.0 U | - | 5.0 U |
| Chlorobenzene | ug/kg | - | 5.0 U | - | 5.0 U |
| Chloroethane | ug/kg | - | 10 U | - | 10 U |
| Chloroform (Trichloromethane) | ug/kg | - | 5.0 U | - | 5.0 U |
| Chloromethane (Methyl Chloride) | ug/kg | - | 10 U | - | 10 U |
| cis-1,2-Dichloroethene | ug/kg | - | - | - | - |
| cis-1,3-Dichloropropene | ug/kg | - | 5.0 U | - | 5.0 U |
| Cyclohexane | ug/kg | - | - | - | - |
| Dibromochloromethane | ug/kg | - | 5.0 U | - | 5.0 U |
| Dichlorodifluoromethane (CFC-12) | ug/kg | - | - | - | - |
| Ethylbenzene | ug/kg | - | 5.0 U | - | 5.0 U |
| Isopropylbenzene | ug/kg | - | - | - | - |
| Methyl acetate | ug/kg | - | - | - | - |
| Methyl cyclohexane | ug/kg | - | - | - | - |
| Methyl Tert Butyl Ether | ug/kg | - | - | - | - |
| Methylene chloride | ug/kg | 10 | 5.0 U | 75 | 5.0 U |
| Styrene | ug/kg | - | 5.0 U | - | 5.0 U |
| Tetrachloroethene | ug/kg | - | 5.0 U | - | 5.0 U |
| Toluene | ug/kg | - | 5.0 U | - | 5.0 U |
| trans-1,2-Dichloroethene | ug/kg | - | - | - | - |
| trans-1,3-Dichloropropene | ug/kg | - | 5.0 U | - | 5.0 U |
| Trichloroethene | ug/kg | - | 5.0 U | - | 5.0 U |
| Trichlorofluoromethane (CFC-11) | ug/kg | - | - | - | - |
| Trifluorotrichloroethane (Freon 113) | ug/kg | - | - | - | - |
| Vinyl chloride | ug/kg | - | 10 U | - | 10 U |
| Xylene (total) | ug/kg | - | 5.0 U | - | 5.0 U |
| *Volatile Organic Compounds - Leachate* | | | | | |
| 1,1-Dichloroethene | ug/kg | - | - | - | - |
| 1,2-Dichloroethane | ug/kg | - | - | - | - |

TABLE G.1

ANALYTICAL RESULTS SUMMARY
SEDIMENT RESULTS
GARLAND ROAD

| *Sample Location:* | | *SED-03-1993* | *SED-04-1996* | *SED-04-1993* | *SED-05-1996* |
|---|---|---|---|---|---|
| *Sample ID:* | | *SD-03-04/07/1993-N* | *S-MT-016* | *SD-04-04/07/1993-N* | *S-MT-015* |
| *Sample Date:* | | *4/7/1993* | *8/6/1996* | *4/7/1993* | *8/6/1996* |
| *Sample Depth:* | | | | | |
| *Parameters* | *Units* | | | | |
| 2-Butanone (Methyl Ethyl Ketone) | ug/kg | - | - | - | - |
| Benzene | ug/kg | - | - | - | - |
| Carbon tetrachloride | ug/kg | - | - | - | - |
| Chlorobenzene | ug/kg | - | - | - | - |
| Chloroform (Trichloromethane) | ug/kg | - | - | - | - |
| Tetrachloroethene | ug/kg | - | - | - | - |
| Trichloroethene | ug/kg | - | - | - | - |
| Vinyl chloride | ug/kg | - | - | - | - |
| *Semi-Volatile Organic Compounds* | | | | | |
| 1,2,4-Trichlorobenzene | ug/kg | - | 330 U | - | 330 U |
| 1,2-Dichlorobenzene | ug/kg | - | 330 U | - | 330 U |
| 1,3-Dichlorobenzene | ug/kg | - | 330 U | - | 330 U |
| 1,4-Dichlorobenzene | ug/kg | - | 330 U | - | 330 U |
| 2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether) | ug/kg | - | 330 U | - | 330 U |
| 2,4,5-Trichlorophenol | ug/kg | - | 330 U | - | 330 U |
| 2,4,6-Trichlorophenol | ug/kg | - | 330 U | - | 330 U |
| 2,4-Dichlorophenol | ug/kg | - | 330 U | - | 330 U |
| 2,4-Dimethylphenol | ug/kg | - | 330 U | - | 330 U |
| 2,4-Dinitrophenol | ug/kg | - | 1600 U | - | 1600 U |
| 2,4-Dinitrotoluene | ug/kg | - | 330 U | - | 330 U |
| 2,6-Dinitrotoluene | ug/kg | - | 330 U | - | 330 U |
| 2-Chloronaphthalene | ug/kg | - | 330 U | - | 330 U |
| 2-Chlorophenol | ug/kg | - | 330 U | - | 330 U |
| 2-Methylnaphthalene | ug/kg | 330 | 330 U | 330 | 330 U |
| 2-Methylphenol | ug/kg | - | 330 U | - | 330 U |
| 2-Nitroaniline | ug/kg | - | 1600 U | - | 1600 U |
| 2-Nitrophenol | ug/kg | - | 330 U | - | 330 U |
| 3,3'-Dichlorobenzidine | ug/kg | - | 1600 U | - | 1600 U |
| 3-Nitroaniline | ug/kg | - | 1600 U | - | 1600 U |
| 4,6-Dinitro-2-methylphenol | ug/kg | - | 1600 U | - | 1600 U |
| 4-Bromophenyl phenyl ether | ug/kg | - | 330 U | - | 330 U |
| 4-Chloro-3-methylphenol | ug/kg | - | 330 U | - | 330 U |
| 4-Chloroaniline | ug/kg | - | 330 U | - | 330 U |
| 4-Chlorophenyl phenyl ether | ug/kg | - | 330 U | - | 330 U |
| 4-Methylphenol | ug/kg | - | 330 U | - | 330 U |
| 4-Nitroaniline | ug/kg | - | 1600 U | - | 1600 U |
| 4-Nitrophenol | ug/kg | - | 1600 U | - | 1600 U |
| Acenaphthene | ug/kg | - | 330 U | - | 330 U |
| Acenaphthylene | ug/kg | - | 330 U | - | 330 U |
| Acetophenone | ug/kg | - | - | - | - |
| Anthracene | ug/kg | - | 330 U | - | 330 U |
| Atrazine | ug/kg | - | - | - | - |
| Benzaldehyde | ug/kg | - | - | - | - |
| Benzo(a)anthracene | ug/kg | 330 | 330 U | 330 | 330 U |
| Benzo(a)pyrene | ug/kg | - | 330 U | - | 330 U |
| Benzo(b)fluoranthene | ug/kg | 330 | 330 U | 130 | 330 U |
| Benzo(g,h,i)perylene | ug/kg | - | 330 U | - | 330 U |
| Benzo(k)fluoranthene | ug/kg | - | 330 U | - | 330 U |
| Biphenyl | ug/kg | - | - | - | - |
| bis(2-Chloroethoxy)methane | ug/kg | - | 330 U | - | 330 U |
| bis(2-Chloroethyl)ether | ug/kg | - | 330 U | - | 330 U |
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 | 330 U | 470 | 200 J |
| Butyl benzylphthalate | ug/kg | - | 330 U | - | 330 U |
| Caprolactam | ug/kg | - | - | - | - |

TABLE G.1

ANALYTICAL RESULTS SUMMARY
SEDIMENT RESULTS
GARLAND ROAD

| *Sample Location:* | | *SED-03-1993* | *SED-04-1996* | *SED-04-1993* | *SED-05-1996* |
|---|---|---|---|---|---|
| *Sample ID:* | | *SD-03-04/07/1993-N* | *S-MT-016* | *SD-04-04/07/1993-N* | *S-MT-015* |
| *Sample Date:* | | *4/7/1993* | *8/6/1996* | *4/7/1993* | *8/6/1996* |
| *Sample Depth:* | | | | | |
| *Parameters* | *Units* | | | | |
| Carbazole | ug/kg | - | 330 U | - | 330 U |
| Chrysene | ug/kg | 330 | 330 U | 330 | 330 U |
| Dibenz(a,h)anthracene | ug/kg | - | 330 U | - | 330 U |
| Dibenzofuran | ug/kg | 330 | 330 U | 330 | 330 U |
| Diethyl phthalate | ug/kg | - | 330 U | - | 330 U |
| Dimethyl phthalate | ug/kg | - | 330 U | - | 330 U |
| Di-n-butylphthalate | ug/kg | 570 | 330 U | 660 | 330 U |
| Di-n-octyl phthalate | ug/kg | - | 330 U | - | 330 U |
| Fluoranthene | ug/kg | 330 | 330 U | 100 | 72 J |
| Fluorene | ug/kg | 330 | 330 U | 330 | 330 U |
| Hexachlorobenzene | ug/kg | - | 330 U | - | 330 U |
| Hexachlorobutadiene | ug/kg | - | 330 U | - | 330 U |
| Hexachlorocyclopentadiene | ug/kg | - | 1600 U | - | 1600 U |
| Hexachloroethane | ug/kg | - | 330 U | - | 330 U |
| Indeno(1,2,3-cd)pyrene | ug/kg | - | 330 U | - | 330 U |
| Isophorone | ug/kg | - | 330 U | - | 330 U |
| Naphthalene | ug/kg | 330 | 330 U | 330 | 330 U |
| Nitrobenzene | ug/kg | - | 330 U | - | 330 U |
| N-Nitrosodi-n-propylamine | ug/kg | - | 330 U | - | 330 U |
| N-Nitrosodiphenylamine | ug/kg | - | 330 U | - | 330 U |
| Pentachlorophenol | ug/kg | - | R | - | R |
| Phenanthrene | ug/kg | 330 | 330 U | 330 | 48 J |
| Phenol | ug/kg | - | 330 U | - | 330 U |
| Pyrene | ug/kg | 330 | 330 U | 120 | 94 J |
| *Semi-Volatile Organic Compounds - Leachate* | | | | | |
| 1,4-Dichlorobenzene | ug/kg | - | - | - | - |
| 2,4,5-Trichlorophenol | ug/kg | - | - | - | - |
| 2,4,6-Trichlorophenol | ug/kg | - | - | - | - |
| 2,4-Dinitrotoluene | ug/kg | - | - | - | - |
| 2/3-Methylphenol | ug/kg | - | - | - | - |
| 2-Methylphenol | ug/kg | - | - | - | - |
| Hexachlorobenzene | ug/kg | - | - | - | - |
| Hexachlorobutadiene | ug/kg | - | - | - | - |
| Hexachloroethane | ug/kg | - | - | - | - |
| Methylphenol (Cresol) | ug/kg | - | - | - | - |
| Nitrobenzene | ug/kg | - | - | - | - |
| Pentachlorophenol | ug/kg | - | - | - | - |
| Phenazopyridine Hydrochloride | ug/kg | - | - | - | - |
| *Metals* | | | | | |
| Aluminum | ug/kg | 8430 | 1250 | 12800 | 3040 |
| Antimony | ug/kg | 8.5 | 6.0 U | 12 | 6.0 U |
| Arsenic | ug/kg | 7.1 | 2.5 | 9.9 | 2.6 |
| Barium | ug/kg | 119 | 20.0 U | 114 | 34.3 |
| Beryllium | ug/kg | 0.55 | 0.50 U | 0.80 | 0.50 U |
| Cadmium | ug/kg | 0.58 | 0.50 U | 1 | 0.50 U |
| Calcium | ug/kg | 59300 | 81700 | 40600 | 38000 |
| Chromium Total | ug/kg | 12.1 | 3.0 | 16.7 | 6.3 |
| Cobalt | ug/kg | 6.8 | 5.0 U | 7.3 | 5.0 U |
| Copper | ug/kg | 18.4 | 2.8 | 22.6 | 6.1 |
| Cyanide (total) | ug/kg | 48.2 | - | 79.9 | - |
| Iron | ug/kg | 16600 | 3410 MBB | 18000 | 5390 MBB |
| Lead | ug/kg | 9.1 | 4.7 | 24.3 | 9.5 |

# TABLE G.1

## ANALYTICAL RESULTS SUMMARY
## SEDIMENT RESULTS
## GARLAND ROAD

| *Sample Location:* | | *SED-03-1993* | *SED-04-1996* | *SED-04-1993* | *SED-05-1996* |
|---|---|---|---|---|---|
| *Sample ID:* | | *SD-03-04/07/1993-N* | *S-MT-016* | *SD-04-04/07/1993-N* | *S-MT-015* |
| *Sample Date:* | | *4/7/1993* | *8/6/1996* | *4/7/1993* | *8/6/1996* |
| *Sample Depth:* | | | | | |
| *Parameters* | *Units* | | | | |
| Magnesium | ug/kg | 18300 | 21600 | 14400 | 10000 |
| Manganese | ug/kg | 546 | 144 | 520 | 149 |
| Mercury | ug/kg | - | 0.10 U | - | 0.10 U |
| Nickel | ug/kg | 15.4 | 4.0 U | 20.0 | 5.6 |
| Potassium | ug/kg | 1140 | 500 U | 1590 | 500 U |
| Selenium | ug/kg | - | 0.50 U | - | 0.50 U |
| Silver | ug/kg | 1.1 | 1.0 U | 1.6 | 1.0 U |
| Sodium | ug/kg | 277 | 500 U | 296 | 500 U |
| Thallium | ug/kg | - | 1.0 U | - | 1.0 U |
| Vanadium | ug/kg | 17.9 | 5.0 U | 27.4 | 8.5 |
| Zinc | ug/kg | 48.3 | 15.5 L | 72.2 | 29.6 |
| *Metals - Leachate* | | | | | |
| Arsenic | ug/kg | - | - | - | - |
| Barium | ug/kg | - | - | - | - |
| Cadmium | ug/kg | - | - | - | - |
| Chromium Total (Dissolved) | ug/kg | - | - | - | - |
| Lead | ug/kg | - | - | - | - |
| Mercury | ug/kg | - | - | - | - |
| Selenium | ug/kg | - | - | - | - |
| Silver | ug/kg | - | - | - | - |
| *PCBs* | | | | | |
| Aroclor-1016 (PCB-1016) | ug/kg | - | 33 U | - | 33 U |
| Aroclor-1221 (PCB-1221) | ug/kg | - | 36 | - | 33 U |
| Aroclor-1232 (PCB-1232) | ug/kg | - | 33 U | - | 33 U |
| Aroclor-1242 (PCB-1242) | ug/kg | - | 33 U | - | 33 U |
| Aroclor-1248 (PCB-1248) | ug/kg | - | 33 U | - | 33 U |
| Aroclor-1254 (PCB-1254) | ug/kg | - | 33 U | - | 33 U |
| Aroclor-1260 (PCB-1260) | ug/kg | - | 33 U | - | 33 U |
| PCBs - *Leachate* | | | | | |
| Aroclor-1016 (PCB-1016) | ug/kg | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/kg | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/kg | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/kg | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/kg | - | - | - | - |
| Aroclor-1254 (PCB-1254) | ug/kg | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/kg | - | - | - | - |
| *Pesticides* | | | | | |
| 4,4'-DDD | ug/kg | - | 3.3 U | - | 3.3 U |
| 4,4'-DDE | ug/kg | - | 3.3 U | - | 3.3 U |
| 4,4'-DDT | ug/kg | - | 3.3 U | - | 3.3 U |
| Aldrin | ug/kg | - | 1.7 U | - | 1.7 U |
| alpha-BHC | ug/kg | - | 1.7 U | - | 1.7 U |
| alpha-Chlordane | ug/kg | - | 1.7 U | - | 1.7 U |
| Aroclor-1016 (PCB-1016) | ug/kg | - | - | - | - |
| Aroclor-1221 (PCB-1221) | ug/kg | - | - | - | - |
| Aroclor-1232 (PCB-1232) | ug/kg | - | - | - | - |
| Aroclor-1242 (PCB-1242) | ug/kg | - | - | - | - |
| Aroclor-1248 (PCB-1248) | ug/kg | - | - | - | - |

TABLE G.1

ANALYTICAL RESULTS SUMMARY
SEDIMENT RESULTS
GARLAND ROAD

| *Sample Location:* | | *SED-03-1993* | *SED-04-1996* | *SED-04-1993* | *SED-05-1996* |
|---|---|---|---|---|---|
| *Sample ID:* | | *SD-03-04/07/1993-N* | *S-MT-016* | *SD-04-04/07/1993-N* | *S-MT-015* |
| *Sample Date:* | | *4/7/1993* | *8/6/1996* | *4/7/1993* | *8/6/1996* |
| *Sample Depth:* | | | | | |
| *Parameters* | *Units* | | | | |
| Aroclor-1254 (PCB-1254) | ug/kg | - | - | - | - |
| Aroclor-1260 (PCB-1260) | ug/kg | - | - | - | - |
| beta-BHC | ug/kg | - | 1.7 U | - | 1.7 U |
| delta-BHC | ug/kg | - | 1.7 U | - | 1.7 U |
| Dieldrin | ug/kg | - | 3.3 U | - | 3.3 U |
| Endosulfan I | ug/kg | - | 1.7 U | - | 1.7 U |
| Endosulfan II | ug/kg | - | 3.3 U | - | 3.3 U |
| Endosulfan sulfate | ug/kg | - | 3.3 U | - | 3.3 U |
| Endrin | ug/kg | - | 3.3 U | - | 3.3 U |
| Endrin aldehyde | ug/kg | - | 3.3 U | - | 3.3 U |
| Endrin ketone | ug/kg | - | 3.3 U | - | 3.3 U |
| gamma-BHC (Lindane) | ug/kg | - | 1.7 U | - | 1.7 U |
| gamma-Chlordane | ug/kg | - | 1.7 U | - | 1.7 U |
| Heptachlor | ug/kg | - | 1.7 U | - | 1.7 U |
| Heptachlor epoxide | ug/kg | - | 1.7 U | - | 1.7 U |
| Methoxychlor | ug/kg | - | 17 U | - | 17 U |
| Toxaphene | ug/kg | - | 83 U | - | 83 U |
| *Pesticides - Leachate* | | | | | |
| 2,4,5-TP (Silvex) | ug/kg | - | - | - | - |
| 2,4-Dichlorophenoxyacetic acid (2,4-D) | ug/kg | - | - | - | - |
| Chlordane | ug/kg | - | - | - | - |
| Endrin | ug/kg | - | - | - | - |
| gamma-BHC (Lindane) | ug/kg | - | - | - | - |
| Heptachlor | ug/kg | - | - | - | - |
| Methoxychlor | ug/kg | - | - | - | - |
| Toxaphene | ug/kg | - | - | - | - |
| *General Chemistry* | | | | | |
| Cyanide (total) | ug/kg | - | 0.50 U | - | 0.50 U |
| Total Organic Carbon (TOC) | ug/kg | - | 4100 | - | 14000 |
| Total Solids (Residue) | % | - | 84.7 | - | 63.9 |

TABLE G.2

SUMMARY OF DETECTIONS - SEDIMENT SAMPLE RESULTS
FIT COLLECTED SAMPLES - APRIL 1993
GARLAND ROAD LANDFILL SITE

| *Parameters* | *Sediment SD-01 (µg/kg)* | *Sediment SD-02 (µg/kg)* | *Sediment SD-03 (µg/kg)* | *Background Sediment SD-04 (µg/kg)* |
|---|---|---|---|---|
| *Volatile Organics* | | | | |
| 1,2-dichloroethene (total) | NA | NA | NA | NA |
| 4-Methyl-2-Pentanone | NA | NA | NA | NA |
| Carbon disulfide | NA | NA | NA | NA |
| Ethylbenzene | NA | NA | NA | NA |
| Methylene Chloride | < 10 | < 10 | < 10 | 75 |
| Phenol | NA | NA | NA | NA |
| Toluene | NA | NA | NA | NA |
| Trichloroethene | NA | NA | NA | NA |
| Xylenes (total) | NA | NA | NA | NA |
| *Semi-Volatile Organics* | | | | |
| 2-methylnaphthalene | 110 J | < 330 | < 330 | < 330 |
| Acenaphthene | NA | NA | NA | NA |
| Acenaphthylene | NA | NA | NA | NA |
| benzo (a) anthracene | 120 J | < 330 | < 330 | < 330 |
| benzo (a) pyrene | NA | NA | NA | NA |
| benzo (b) fluoranthene | 210 J | < 330 | < 330 | 130 J |
| benzo (g,h,i) perylene | NA | NA | NA | NA |
| benzo (k) fluoranthene | NA | NA | NA | NA |
| bis (2-ethylhexyl) phthalate | 280 UJ | 650 U | < 330 | 470 UJ |
| Chrysene | 110 J | < 330 | < 330 | < 330 |
| di-n-butyl phthalate | 630 U | 650 U | 570 U | 660 U |
| Dibenzofuran | 110 J | < 330 | < 330 | < 330 |
| Diethylphthalate | NA | NA | NA | NA |
| Fluoranthene | 340 J | < 330 | < 330 | 100 J |
| Fluorene | 150 J | < 330 | < 330 | < 330 |
| Indeno (1,2,3-cd) pyrene | NA | NA | NA | NA |
| *Semi-Volatile Organics, continued* | | | | |
| n-nitrosodiphenylamine | NA | NA | NA | NA |
| Naphthalene | 140 J | < 330 | < 330 | < 330 |
| Phenanthrene | 390 J | < 330 | < 330 | < 330 |
| Pyrene | 180 J | 380 J | < 330 | 120 J |
| *Pesticides* | | | | |
| 4,4'-DDD | NA | NA | NA | NA |
| 4,4'-DDE | NA | NA | NA | NA |
| 4,4'-DDT | NA | NA | NA | NA |
| alpha Chlordane | NA | NA | NA | NA |
| delta-BHC | NA | NA | NA | NA |
| Dieldrin | NA | NA | NA | NA |
| Endosulfan I | NA | NA | NA | NA |
| Endosulfan II | NA | NA | NA | NA |
| Endrin | NA | NA | NA | NA |
| gamma Chlordane | NA | NA | NA | NA |
| Heptachlor epoxide | NA | NA | NA | NA |
| Methoxychlor (Mariate) | NA | NA | NA | NA |

TABLE G.2

SUMMARY OF DETECTIONS - SEDIMENT SAMPLE RESULTS
FIT COLLECTED SAMPLES - APRIL 1993
GARLAND ROAD LANDFILL SITE

| *Parameters* | *Sediment SD-01 (µg/kg)* | *Sediment SD-02 (µg/kg)* | *Sediment SD-03 (µg/kg)* | *Background Sediment SD-04 (µg/kg)* |
|---|---|---|---|---|
| *PCBs* | | | | |
| Aroclor 1248 | NA | NA | NA | NA |
| Aroclor 1254 | NA | NA | NA | NA |
| *Metals* | | | | |
| Aluminum | 11,000 | 7,390 | 8430 | 12,800 |
| Antimony | < 12 | < 12 | 8.5 BNJ | < 12 |
| Arsenic | 7.4 NJ | 7.7 NJ | 7.1 NJ | 9.9 NJ |
| Barium | 135 | 105 | 119 | 114 |
| *Metals, continued* | | | | |
| Beryllium | 0.64 B | 0.37 B | 0.55 B | 0.80 B |
| Cadmium | 0.71 B | < 1 | 0.58 B | < 1 |
| Calcium | 38,700 | 76,000 | 59,300 | 40,600 |
| Chromium | 14.6 | 10.5 | 12.1 | 16.7 |
| Cobalt | 6.1 B | 5.0 B | 6.8 B | 7.3 B |
| Copper | 28.0 | 17.1 | 18.4 | 22.6 |
| Iron | 16,200 | 15,400 | 16,600 | 18,000 |
| Lead | 34.3 N | 10.0 SN | 9.1 SN | 24.3 N |
| Magnesium | 14,200 | 17,800 | 18,300 | 14,400 |
| Manganese | 421 | 560 | 546 | 520 |
| Mercury | NA | NA | NA | NA |
| Nickel | 16.4 | 13.3 | 15.4 | 20.0 |
| Potassium | 1,560 | 915 B | 1,140 B | 1,590 |
| Silver | 1.2 B | 0.7 B | 1.1 B | 1.6 B |
| Sodium | 256 B | 235 B | 277 B | 296 B |
| Vanadium | 24.1 | 16.2 | 17.9 | 27.4 |
| Zinc | 66.3 | 38.9 | 48.3 | 72.2 |
| Cyanide | 80.1 | 26.7 | 48.2 | 79.9 |

Notes:

J - Value is estimated (also indicates a compound that is detected below the Contract Required Quantitation Limit (CRQL) or Contract Required Detection Limit (CRDL)).
U - Compound was detected in an associated laboratory blank.
P - Variance between GC columns was greater than 25 percent in pesticide or Aroclor (PCB) analyses. The lower value is reported.
C - Identity of pesticide/PCB compound was confirmed by GC/MS.
X - Result cannot be confirmed by CLP protocols - compound may or may not be present.
B - Value is below the CRDL (adjusted for percent moisture and/or dilution by the laboratory).
E - Value is estimated due to matrix interferences.
N - Matrix spike percent recovery values were outside of control limits.
W - Furnace AA post - digestion spike recovery values were outside of control limits.
S - Analyte concentration was determined by method of Standard Additions (MSA).
+ - Correlation coefficient for MSA was less than 0.995
NA - Not Analyzed

H

APPENDIX H

2003 OEPA/GM SOIL AND SEDIMENT SAMPLE ANALYTICAL RESULTS

- GM 2003 Soil and Sediment Data Summary
- OEPA Expanded Site Investigation (Soil and Sediment Data)

Garland Road Superfund Site
Soil Split Sample Results
Samples Collected April 21, 2003

| Sample Identification | SO-1 | SO-2 | SO-3 | SO-4 | SO-5 | SO-14 Duplicate SO-5 | SO-6 |
|---|---|---|---|---|---|---|---|
| **VOAs ug/kg** | | | | | | | |
| Dichlorodifloromethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Chloromethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Vinyl chloride | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Bromomethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Chloroethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Trichlorofluoromethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 1,1-Dichloroethene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 1, 1, 2 - Trichloro - 1, 2, 2 - Trifluoroethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Acetone | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Carbon disulfide | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Methyl Acetate | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Methylene chloride | 0.7 J | 13 U | 0.7 J | 0.7 J | 14 U | 22 U | 1 J |
| trans - 1, 2 - Dichloroethene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Methyl - tert - butyl ether | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 1, 1 - Dichloroethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| cis - 1, 2 - Dichloroethene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 2 - Butanone | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Chloroform | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 1, 1, 1 - Trichloroethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Cyclohexane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Carbon tetrachloride | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Benzene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 1, 2 - Dichloroethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Trichloroethene | 4 J | 13 U | 0.5 J | 7 J | 150 | 250 | 19 |
| Methylcyclohexane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 1, 2 - Dichloropropane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Bromodichloromethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| cis - 1, 3 - Dichloropropene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 4 - Methyl - 2 - Pentanone | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Toluene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Trans - 1, 3 - Dichloropropene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 1, 1, 2 - Trichloroethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Tetrachloroethene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 2 - Hexanone | 12 U J | 13 U J | 12 U J | 12 U J | 14 U J | 22 U J | 12 U J |
| romochloromethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| - Dibromoethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Chlorobenzene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Ethylbenzene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Xylene (total) | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Styrene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Bromoform | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| Isopropylbenzene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 1, 1, 2, 2 - Tetrachloroethane | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 1, 3 - Dichlorobenzene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 1, 4 - Dichlorobenzene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 1, 2 - Dichlorobenzene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |
| 1, 2 - Dibromo - 3 - Chloropropane | 12 U | 13 U | 12 U | 12 U | 14 U | R | 12 U |
| 1, 2, 4 - Trichlorobenzene | 12 U | 13 U | 12 U | 12 U | 14 U | 22 U | 12 U |

*Garland Road Superfund Site*
**Soil Split Sample Results**
**Samples Collected April 21, 2003**

| Sample Identification | SO-7 | SO-8 | SO-9 | SO-10 | SO-11 | SO-12 | SO-13 |
|---|---|---|---|---|---|---|---|
| **VOAs ug/kg** | | | | | | | |
| Dichlorodifloromethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Chloromethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Vinyl chloride | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Bromomethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Chloroethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Trichlorofluoromethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1,1-Dichloroethene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1, 1, 2 - Trichloro - 1, 2, 2 - Trifluoroethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Acetone | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Carbon disulfide | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Methyl Acetate | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Methylene chloride | 22 | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| trans - 1, 2 - Dichloroethene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Methyl - tert - butyl ether | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1, 1 - Dichloroethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| cis - 1, 2 - Dichloroethene | 0.5 J | 13 U | 11 J | 13 U | 12 U | 13 U | 14 U |
| 2 - Butanone | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Chloroform | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1, 1, 1 - Trichloroethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Cyclohexane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Carbon tetrachloride | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Benzene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1, 2 - Dichloroethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Trichloroethene | 170 | 21 | 110 | 13 U | 5 J | 4 J | 14 U |
| Methylcyclohexane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1, 2 - Dichloropropane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Bromodichloromethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| cis - 1, 3 - Dichloropropene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 4 - Methyl - 2 - Pentanone | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Toluene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Trans - 1, 3 - Dichloropropene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1, 1, 2 - Trichloroethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Tetrachloroethene | 0.7 J | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 2 - Hexanone | 14 U J | 13 U J | 16 U J | 13 U J | 12 U J | 13 U | 14 UJ |
| Dibromochloromethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1, 2 - Dibromoethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Chlorobenzene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Ethylbenzene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Xylene (total) | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Styrene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Bromoform | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| Isopropylbenzene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1, 1, 2, 2 - Tetrachloroethane | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1, 3 - Dichlorobenzene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1, 4 - Dichlorobenzene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1, 2 - Dichlorobenzene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |
| 1, 2 - Dibromo - 3 - Chloropropane | R | 13 U | 16 U | 13 U | R | R | R |
| 1, 2, 4 - Trichlorobenzene | 14 U | 13 U | 16 U | 13 U | 12 U | 13 U | 14 U |

Garland Road Superfund Site
Soil Split Sample Results
Samples Collected April 21, 2003

| Sample Identification | SO-1 | SO-2 | SO-3 | SO-4 | SO-5 | SO-14 Duplicate SO-5 | SO-6 |
|---|---|---|---|---|---|---|---|
| **Semivolatile Organics ug/kg** | | | | | | | |
| Benzaldehyde | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Phenol | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Bis(s - chloroethyl) ether | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 2 - Chlorophenol | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 2 - Methylphenol | 410 U | 420 U | 400 U | 39 J | 120 J | 100 J | 390 U |
| 2, 2 - oxybis (1 - Chloropropane) | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Acetophenone | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 4 - Methylphenol | 410 U | 420 U | 400 U | 130 J | 360 J | 270 J | 390 U |
| N - Nitroso - di - n - propylamine | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 56 J |
| Hexachloroethane | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Nitrobenzene | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Isophorone | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 2 - Nitrophenol | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 2, 4 - Dimethylphenol | 410 U | 420 U | 400 U | 43 J | 450 U | 440 U | 390 U |
| bis (2 - Chloroethoxy) methane | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 2, 4 - Dichlorophenol | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Naphthalene | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 4 - Chloroaniline | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Hexachlorobutadiene | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Caprolactam | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 4 - Chloro - 3 - methylphenol | 17 J | 33 J | 400 U | 380 U | 450 U | 440 U | 390 U |
| 2 - Methylnaphthalene | 410 U | 420 U | 400 U | 380 U | 21 J | 23 J | 22 J |
| Hexachlorocyclopentadiene | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 2, 4, 6 - Trichlorophenol | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 2, 4, 5 - Trichlorophenol | 1000 U | 1100 U | 1000 U | 950 U | 1100 U | 1100 U | 990 U |
| 1, 1 - Biphenyl | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 2 - Chloronaphthalene | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 2 - Nitroaniline | 1000 U | 1100 U | 1000 U | 950 U | 1100 U | 1100 U | 990 U |
| Dimethylphthalate | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 2, 6 - Dinitrotoluene | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Acenaphthylene | 410 U | 120 J | 30 J | 380 U | 450 U | 440 U | 390 U |
| 3 - Nitroaniline | 1000 U | 1100 U | 1000 U | 950 U | 1100 U | 1100 U | 390 U |
| naphthene | 410 U | 77 J | 120 J | 380 U | 450 U | 440 U | 990 U |
| - Dinitrophenol | 1000 U | 1100 U | 1000 U | 950 U | 1100 U | 1100 U | 990 U |
| - Nitrophenol | 1000 U | 1100 U | 1000 U | 950 U | 1100 U | 1100 U | 990 U |
| Dibenzofuran | 410 U | 41 J | 47 J | 380 U | 450 U | 440 U | 390 U |
| 2, 4 - Dinitrotoluene | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 16 J |
| Diethylphthalate | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Flourene | 410 U | 84 J | 110 J | 380 U | 450 U | 440 U | 390 U |
| 4 - Chlorophenyl-phenylether | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| 4 - Nitroaniline | 1000 U | 1100 U | 1000 U | 950 U | 1100 U | 1100 U | 990 U |
| 4, 6 - Dinitro - 2 - methylphenol | 1000 U | 1100 U | 1000 U | 950 U | 1100 U | 1100 U | 990 U |
| N - Nitrosodiphenylamine (1) | 410 U | 420 U | 400 U | 380 U | 32 J | 22 J | 390 U |
| 4 - Bromophenyl-phenylether | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Hexachlorobenzene | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Atrazine | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Pentachlorophenol | 1000 U | 1100 U | 1000 U | 950 U | 1100 U | 1100 U | 990 U |
| Phenanthrene | 24 J | 780 | 1800 | 380 U | 26 J | 28 J | 14 J |
| Anthracene | 410 U | 300 J | 450 | 380 U | 450 U | 440 U | 390 U |
| Carbazole | 410 U | 140 J | 310 J | 380 U | 450 U | 440 U | 390 U |
| Di - n - butylphthalate | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Flouranthene | 73 J | 1000 | 3500 | 30 J | 95 J | 81 J | 32 J |
| Pyrene | 65 J | 810 | 2500 | 21 J | 71 J | 61 J | 41 J |
| Butylbenzylphthalate | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 110 J |
| 3, 3 - Dichlorobenzidine | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| Benzo (a) anthracene | 33 J | 420 | 1400 | 380 U | 31 J | 23 J | 17 J |
| Chrysene | 53 J | 450 | 1700 | 27 J | 85 J | 68 J | 36 J |
| bis (2 - Ethylhexyl) phthalate | 22 J | 240 J | 380 J | 100 J | 210 J | 190 J | 590 |
| Di - n - octylphthalate | 410 U | 420 U | 400 U | 380 U | 450 U | 440 U | 390 U |
| benzo (b) fluoranthene | 59 J | 460 | 1500 | 21 J | 68 J | 55 J | 35 J |
| Benzo (k) fluoranthene | 43 J | 400 J | 1200 | 380 U | 44 J | 31 J | 20 J |
| Benzo (a) pyrene | 37 J | 450 | 1300 | 12 J | 40 J | 34 J | 23 J |
| Indeno (1, 2, 3 - cd) pyrene | 34 J | 330 J | 820 | 380 U | 25 J | 22 J | 16 J |
| Dibenzo (a, h) anthracene | 410 U | 120 J | 350 J | 380 U | 450 U | 440 U | 390 U |
| Benzo (g, h, i) perylene | 410 U | 250 J | 510 | 380 U | 450 U | 440 U | 390 U |

Garland Road Superfund Site
Soil Split Sample Results
Samples Collected April 21, 2003

| Sample Identification | SO-7 | SO-8 | SO-9 | SO-10 | SO-11 | SO-12 | SO-13 |
|---|---|---|---|---|---|---|---|
| **Semivolatile Organics ug/kg** | | | | | | | |
| Benzaldehyde | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Phenol | 450 U | 440 U | 520 U | 410 U | 400 U | 47 J | 460 U |
| Bis(s - chloroethyl) ether | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 2 - Chlorophenol | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 2 - Methylphenol | 29 J | 27 J | 74 J | 410 U | 400 U | 420 U | 460 U |
| 2, 2 - oxybis (1 - Chloropropane) | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Acetophenone | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 4 - Methylphenol | 450 U | 80 J | 230 J | 410 U | 34 U J | 53 J | 460 U |
| N - Nitroso - di - n - propylamine | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Hexachloroethane | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Nitrobenzene | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Isophorone | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 2 - Nitrophenol | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 2, 4 - Dimethylphenol | 450 U | 29 J | 520 U | 410 U | 400 U | 23 J | 460 U |
| bis (2 - Chloroethoxy) methane | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 2, 4 - Dichlorophenol | 450 U | 440 U | 520 U | 410 U | 15 J | 420 U | 460 U |
| Naphthalene | 65 J | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 4 - Chloroaniline | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Hexachlorobutadiene | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Caprolactam | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 4 - Chloro - 3 - methylphenol | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 2 - Methylnaphthalene | 280 J | 440 U | 24 J | 410 U | 400 U | 420 U | 460 U |
| Hexachlorocyclopentadiene | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 2, 4, 6 - Trichlorophenol | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 2, 4, 5 - Trichlorophenol | 1100 U | 1100 U | 1300 U | 1000 U | 1000 U | 1100 U | 1200 U |
| 1, 1 - Biphenyl | 35 J | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 2 - Chloronaphthalene | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 2 - Nitroaniline | 1100 U | 1100 U | 1300 U | 1000 U | 1000 U | 1100 U | 1200 U |
| Dimethylphthalate | 450 U | 440 U | 520 U | 210 J | 400 U | 420 U | 460 U |
| 2, 6 - Dinitrotoluene | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Acenaphthylene | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 18 J |
| 3 - Nitroaniline | 1100 U | 1100 U | 1300 U | 1000 U | 1000 U | 420 U | 1200 U |
| Acenaphthene | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 2, 4 - Dinitrophenol | 1100 U | 1100 U | 1300 U | 1000 U | 1000 U | 1100 U | 1200 U |
| 4 - Nitrophenol | 1100 U | 1100 U | 1300 U | 1000 U | 1000 U | 1100 U | 1200 U |
| Dibenzofuran | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 2, 4 - Dinitrotoluene | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Diethylphthalate | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Flourene | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 4 - Chlorophenyl-phenylether | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| 4 - Nitroaniline | 1100 U | 1100 U | 1300 U | 410 U | 1000 U | 1100 U | 1200 U |
| 4, 6 - Dinitro - 2 - methylphenol | 1100 U | 1100 U | 1300 U | 1000 U | 1000 U | 1100 U | 1200 U |
| N - Nitrosodiphenylamine (1) | 30 J | 440 U | 520 U | 1000 U | 400 U | 420 U | 460 U |
| 4 - Bromophenyl-phenylether | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Hexachlorobenzene | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Atrazine | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Pentachlorophenol | 1100 U | 1100 U | 1300 U | 1000 U | 1000 U | 1100 U | 1200 U |
| Phenanthrene | 28 J | 19 J | 45 J | 77 J | 110 J | 120 J | 58 J |
| Anthracene | 11 J | 13 J | 13 J | 18 J | 15 J | 23 J | 19 J |
| Carbazole | 450 U | 440 U | 520 U | 12 J | 19 J | 24 J | 16 J |
| Di - n - butylphthalate | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Flouranthene | 50 J | 47 J | 130 J | 140 J | 160 J | 180 J | 140 J |
| Pyrene | 46 J | 40 J | 92 J | 110 J | 130 J | 140 J | 110 J |
| Butylbenzylphthalate | 120 J | 440 U | 520 U | 45 J | 47 J | 66 J | 460 U |
| 3, 3 - Dichlorobenzidine | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| Benzo (a) anthracene | 19 J | 21 J | 51 J | 55 J | 60 J | 70 J | 52 J |
| Chrysene | 37 J | 41 J | 94 J | 73 J | 78 J | 89 J | 80 J |
| bis (2 - Ethylhexyl) phthalate | 780 | 120 J | 260 J | 870 | 68 J | 60 J | 61 J |
| Di - n - octylphthalate | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |
| benzo (b) fluoranthene | 29 J | 45 J | 80 J | 52 J | 55 J | 72 J | 80 J |
| Benzo (k) fluoranthene | 27 J | 23 J | 61 J | 69 J | 57 J | 64 J | 64 J |
| Benzo (a) pyrene | 26 J | 25 J | 53 J | 49 J | 48 J | 61 J | 56 J |
| Indeno (1, 2, 3 - cd) pyrene | 16 J | 27 J | 38 J | 37 J | 34 J | 38 J | 46 J |
| Dibenzo (a, h) anthracene | 450 U | 440 U | 520 U | 410 U | 400 U | 14 J | 460 U |
| Benzo (g, h, i) perylene | 450 U | 440 U | 520 U | 410 U | 400 U | 420 U | 460 U |

Garland Road Superfund Site
*Soil Split Sample Results*
Samples Collected April 21, 2003

| Sample Identification | SO-1 | SO-2 | SO-3 | SO-4 | SO-5 | SO-14 Duplicate SO-5 | SO-6 |
|---|---|---|---|---|---|---|---|
| **Pesticides ug/kg** | | | | | | | |
| alpha - BHC | 2.1 U | 2.2 U | 2.0 U | 2.0 U | 2.3 U | 2.3 U | 2.0 U |
| beta - BHC | 2.1 U | 2.2 U | 2.0 U | 2.0 U | 2.3 U | 2.3 U | 2.0 U |
| delta - BHC | 2.1 U | 2.2 U | 2.0 U | 2.0 U | 2.3 U | 2.3 U | 2.0 U |
| gamma - BHC (Lindane) | 2.1 U | 2.2 U | 2.0 U | 2.0 U | 2.3 U | 2.3 U | 2.0 U |
| Heptachlor | 2.1 U | 2.2 U | 2.0 U | 2.0 U | 2.3 U | 2.3 U | 2.0 U |
| Aldrin | 2.1 U | 2.2 U | 2.0 U | 2.0 U | 2.3 U | 2.3 U | 2.0 U |
| Heptachlor epoxide | 2.1 U | 2.2 U | 2.0 U | 2.0 U | 2.3 U | 2.3 U | 2.0 U |
| Endosulfan I | 2.1 U | 2.2 U | 2.0 U | 2.0 U | 2.3 U | 2.3 U | 2.0 U |
| Dieldrin | 4.1 U | 4.2 U | 4.0 U | 6.8 J | 4.5 U | 4.4 U | 3.9 U |
| 4,4 - DDE | 2.7 J | 4.2 U | 4.5 J | 34 J | 84 J | 71 J | 18 J |
| Endrin | 4.1 U | 4.2 U | 7.6 J | 3.8 U | 4.5 U | 4.4 U | 3.9 U |
| Endosulfan II | 4.1 U | 4.2 U | 4.0 U | 3.8 U | 12 | 8.4 | 3.9 U |
| 4,4 - DDD | 4.1 U | 4.2 U | 4.0 U | 3.8 U | 11 J | 7.5 J | 3.9 U |
| Endosulfan sulfate | 2.9 J | 4.2 U | 4.0 U | 9.7 J | 12 J | 8.0 J | 6.9 J |
| 4,4 - DDT | 4.1 U | 4.2 U | 4.0 U | 3.8 U | 4.5 U | 4.4 U | 3.9 U |
| Methoxychlor | 21 U | 22 U | 20 U | 20 U | 23 U | 23 U | 20 U |
| Endrin ketone | 4.1 U | 4.2 U | 4.0 U | 3.8 U | 4.5 U | 4.4 U | 3.9 U |
| Endrin aldehyde | 4.5 | 4.2 U | 5.6 J | 13 | 14 J | 10 J | 9.2 J |
| alpha - Chlordane | 2.1 U | 2.2 U | 2.0 U | 2.0 U | 2.3 U | 2.3 U | 2.0 U |
| gamma - Chlordane | 2.1 U | 2.2 U | 5.5 U J | 2.0 U | 2.3 U | 2.3 U | 2.0 U |
| Toxaphene | 210 U | 220 U | 200 U | 200 U | 230 U | 230 U | 200 U |
| Aroclor -1016 | 41 U | 42 U | 40 U | 38 U | 45 U | 44 U | 39 U |
| Aroclor -1221 | 83 U | 85 U | 81 U | 77 U | 92 U | 89 U | 80 U |
| Aroclor -1232 | 41 U | 42 U | 40 U | 38 U | 45 U | 44 U | 39 U |
| Aroclor -1242 | 41 U | 42 U | 40 U | 38 U | 45 U | 44 U | 39 U |
| Aroclor -1248 | 41 U | 42 U | 40 U | 38 U | 45 U | 44 U | 39 U |
| Aroclor -1254 | 41 U | 42 U | 40 U | 550 | 580 | 470 J | 300 |
| Aroclor -1260 | 41 U | 42 U | 40 U | 38 U | 45 U | 44 U | 39 U |
| | | | | | | | |
| **Total Metals mg/kg** | | | | | | | |
| Aluminum | 9910 | 9170 | 8260 | 4500 | 7330 | 8130 | 6810 |
| Antimony | 0.62 U J | 0.77 J | 0.59 U J | 0.56 U J | 1.0 J | 1.1 J | 0.68 J |
| Arsenic | 7.8 | 7.7 | 8.0 | 5.7 | 6.6 | 6.7 | 7.9 |
| Barium | 112 | 127 | 234 | 1390 | 4620 | 4020 | 1790 |
| Beryllium | 0.55 | 0.56 | 0.47 | 0.24 | 0.39 | 0.42 | 0.33 |
| Cadmium | 0.38 U | 0.45 U | 0.41 U | 0.32 U | 0.63 U | 0.70 U | 0.73 |
| Calcium | 52800 J | 30300 J | 28600 J | 109000 J | 11500 J | 15100 J | 56200 J |
| Chromium | 13.9 | 12.9 | 15.8 | 27.1 | 82.1 | 71.2 | 36.4 |
| Cobalt | 6.3 | 7.9 | 6.3 | 6.7 | 18.7 | 16.1 | 8.0 |
| Copper | 16.0 | 14.7 | 19.0 | 44.8 | 143 | 136 | 43.9 |
| Iron | 17800 | 17400 | 16200 | 11400 | 19500 | 17800 | 18900 |
| Lead | 20.1 | 32.4 | 40.5 | 459 | 2290 | 1560 | 307 |
| Magnesium | 15300 J | 13200 J | 13800 J | 59200 J | 52000 J | 41200 J | 36700 J |
| Manganese | 550 | 822 | 496 | 418 | 648 | 700 | 392 |
| Mercury | 0.87 | 0.59 | 0.33 | 0.10 | 0.20 | 0.13 | 6.2 |
| Nickel | 17.0 | 14.2 | 18.4 | 68.3 | 257 | 191 | 78.8 |
| Potassium | 1650 J | 1140 J | 991 J | 936 J | 1210 J | 1210 J | 957 J |
| Selenium | 0.57 U | 0.55 U | 0.55 | 0.52 U | 0.61 U | 0.59 U | 0.51 U |
| Silver | 0.25 U | 0.22 U | 0.21 U | 0.20 U | 0.32 U | 0.23 U | 0.20 U |
| Sodium | 156 U | 182 U | 144 U | 189 U | 81.3 U | 78.7 U | 84.9 U |
| Thallium | 0.71 U J | 0.70 U J | 0.69 U J | 0.65 U J | 0.78 U J | 0.75 U J | 0.64 U J |
| Vanadium | 23.3 | 22.7 | 20.8 | 15.0 | 22.0 | 23.6 | 19.4 |
| Zinc | 90.7 | 60.8 | 72.4 | 128 | 321 | 319 | 168 |
| Cyanide | 0.16 J | 0.16 J | 0.19 J | 0.18 J | 0.46 | 0.61 | 0.28 |

Notes
(1) - Cannot be separated from Diphenylamine

Garland Road Superfund Site
Soil Split Sample Results
Samples Collected April 21, 2003

| Sample Identification | SO-7 | SO-8 | SO-9 | SO-10 | SO-11 | SO-12 | SO-13 |
|---|---|---|---|---|---|---|---|
| **Pesticides ug/kg** | | | | | | | |
| alpha - BHC | 2.3 U | 2.3 U | 2.7 U | 2.1 U | 2.1 U | 2.2 U | 2.4 U |
| beta - BHC | 2.3 U | 2.3 U | 2.7 U | 2.1 U | 2.1 U | 2.2 U | 2.4 U |
| delta - BHC | 2.3 U | 2.3 U | 2.7 U | 2.1 U | 2.1 U | 2.2 U | 2.4 U |
| gamma - BHC (Lindane) | 2.3 U | 2.3 U | 2.7 U | 2.1 U | 2.1 U | 2.2 U | 2.4 U |
| Heptachlor | 2.3 U | 2.3 U | 2.7 U | 2.1 U | 2.1 U | 2.2 U | 2.4 U |
| Aldrin | 2.3 U | 2.3 U | 2.7 U | 2.1 U | 2.1 U | 2.2 U | 2.4 U |
| Heptachlor epoxide | 2.3 U | 2.3 U | 2.7 U | 2.1 U | 2.1 U | 2.2 U | 2.4 U |
| Endosulfan I | 2.3 U | 2.3 U | 2.7 U | 2.1 U | 2.1 U | 2.2 U | 2.4 U |
| Dieldrin | 12 | 4.4 U | 5.2 U | 4.1 U | 4.0 U | 4.2 U | 4.6 U |
| 4,4 - DDE | 37 J | 26 J | 78 J | 4.7 J | 5.6 J | 4.2 U | 3.7 J |
| Endrin | 4.5 U | 4.4 U | 5.2 U | 4.1 U | 4.0 U | 4.2 U | 4.6 U |
| Endosulfan II | 4.5 U | 4.4 U | 5.2 U | 4.1 U | 4.0 U | 4.2 U | 4.6 U |
| 4,4 - DDD | 4.2 J | 2.7 J | 4.9 J | 4.1 U | 4.0 U | 4.2 U | 4.6 U |
| Endosulfan sulfate | 14 J | 3.1 J | 13 J | 4.1 U | 4.0 U | 4.2 U | 4.6 U |
| 4,4 - DDT | 4.5 U | 4.4 U | 5.2 U | 4.1 U | 4.0 U | 4.2 U | 4.6 U |
| Methoxychlor | 23 U | 23 U | 27 U | 21 U | 21 U | 22 U | 24 U |
| Endrin ketone | 4.5 U | 4.4 U | 5.2 U | 4.1 U | 4.0 U | 4.2 U | 4.6 U |
| Endrin aldehyde | 4.5 U | 6.8 J | 16 J | 4.1 U | 2.5 J | 3.0 J | 4.6 U |
| alpha - Chlordane | 2.3 U | 2.3 U | 2.7 U | 2.1 U | 2.1 U | 2.2 U | 2.4 U |
| gamma - Chlordane | 2.3 U | 2.3 U | 2.7 U | 2.1 U | 2.1 U | 2.2 U | 2.4 U |
| Toxaphene | 230 U | 230 U | 270 U | 210 U | 210 U | 220 U | 240 U |
| Aroclor -1016 | 45 U | 44 U | 52 U | 41 U | 40 U | 42 U | 46 U |
| Aroclor -1221 | 91 U | 89 U | 100 U | 84 U | 82 U | 86 U | 93 U |
| Aroclor -1232 | 45 U | 44 U | 52 U | 41 U | 40 U | 42 U | 46 U |
| Aroclor -1242 | 45 U | 44 U | 52 U | 41 U | 40 U | 42 U | 46 U |
| Aroclor -1248 | 45 U | 44 U | 52 U | 41 U | 40 U | 42 U | 46 U |
| Aroclor -1254 | 680 | 240 | 740 | 99 | 89 J | 130 | 46 U |
| Aroclor -1260 | 45 U | 44 U | 52 U | 41 U | 40 U | 42 U | 46 U |
| | | | | | | | |
| **Total Metals mg/kg** | | | | | | | |
| Aluminum | 8160 | 9430 | 7180 | 10600 | 15300 | 16700 | 11800 |
| Antimony | 0.83 J | 0.61 UJ | 1.1 J | 0.66 J | 0.60 UJ | 0.75 J | 0.69 J |
| Arsenic | 6.5 | 6.7 | 6.3 | 9.5 | 11.2 | 12.3 | 7.7 |
| Barium | 1990 | 1390 | 2800 | 240 | 1450 | 1630 | 126 |
| Beryllium | 0.38 | 0.51 | 0.42 | 0.58 | 0.73 | 0.73 | 0.57 |
| Cadmium | 1.9 | 0.45 U | 1.1 | 0.62 | 0.37 U | 0.42 U | 0.64 U |
| Calcium | 44300 J | 39100 J | 31800 J | 55400 J | 27200 J | 18400 J | 39000 J |
| Chromium | 41.1 | 30.8 | 44.9 | 17.2 | 35.3 | 50.4 | 17.3 |
| Cobalt | 9.1 | 8.2 | 11.6 | 6.7 | 9.7 | 12.3 | 7.3 |
| Copper | 44.9 | 48.5 | 51.0 | 24.9 | 32.1 | 38.6 | 23.6 |
| Iron | 15400 | 17000 | 18900 | 19900 | 23600 | 26300 | 20600 |
| Lead | 623 | 338 | 816 | 93.4 | 93.9 | 779 | 22.1 |
| Magnesium | 37000 J | 29400 J | 36100 J | 24800 J | 19200 J | 28200 J | 13100 J |
| Manganese | 378 | 560 | 422 | 564 | 614 | 658 | 533 |
| Mercury | 1.4 | 0.32 | 0.75 | 2.9 | 0.11 | 0.12 | 0.12 |
| Nickel | 94.1 | 64.1 | 135 | 24.1 | 71.9 | 128 | 20.0 |
| Potassium | 1050 J | 1580 J | 1350 J | 1510 J | 1300 J | 1480 J | 1730 J |
| Selenium | 0.59 U | 0.56 U | 0.96 | 0.53 U | 0.56 U | 0.56 U | 1.3 |
| Silver | 0.23 U | 0.22 U | 0.28 U | 0.21 U | 0.22 U | 0.22 U | 0.25 U |
| Sodium | 84.5 U | 82.1 U | 93.8 U | 176 U | 114 U | 73.9 U | 218 U |
| Thallium | 0.74 UJ | 0.71 UJ | 0.89 UJ | 0.67 UJ | 0.70 UJ | 0.70 UJ | 0.76 UJ |
| Vanadium | 21.7 | 23.1 | 18.6 | 28.0 | 36.5 | 39.7 | 25.7 |
| Zinc | 167 | 161 | 294 | 93.9 | 111 | 133 | 86.9 |
| Cyanide | 0.41 | 0.46 | 0.83 | 0.22 | 0.47 | 0.39 | 0.23 |

Notes:
(1) - Cannot be separated from Diphenylamine

Garland Road Superfund Site
Sediment Split Sample Results
Samples Collected April 21, 2003

| Sample Identification | SED-1 | SED-2 | SED-3 | SED-4 | SED-5 | SED-6 |
|---|---|---|---|---|---|---|
| *VOAs ug/kg* | | | | | | |
| Dichlorodifloromethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Chloromethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Vinyl chloride | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Bromomethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Chloroethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Trichlorofluoromethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1,1-Dichloroethene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1, 1, 2 - Trichloro - 1, 2, 2 - Trifluoroethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Acetone | 55 U | 20 U | 14 U | 76 U | 15 U | 20 U |
| Carbon disulfide | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Methyl Acetate | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Methylene chloride | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| trans - 1, 2 - Dichloroethene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Methyl - tert - butyl ether | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1, 1 - Dichloroethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| cis - 1, 2 - Dichloroethene | 16 U | 15 U | 0.9 J | 20 U | 15 U | 19 U |
| 2 - Butanone | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Chloroform | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1, 1, 1 - Trichloroethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Cyclohexane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Carbon tetrachloride | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Benzene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1, 2 - Dichloroethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Trichloroethene | 16 U | 15 U | 1 J | 20 U | 15 U | 19 U |
| Methylcyclohexane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1, 2 - Dichloropropane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Bromodichloromethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| cis - 1, 3 - Dichloropropene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 4 - Methyl - 2 - Pentanone | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Toluene | 48 | 15 U | 14 U | 11000 J | 15 U | 83 |
| Trans - 1, 3 - Dichloropropene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1, 1, 2 - Trichloroethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Tetrachloroethene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 2 - Hexanone | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Dibromochloromethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1, 2 - Dibromoethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Chlorobenzene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Ethylbenzene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Xylene (total) | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Styrene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Bromoform | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| Isopropylbenzene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1, 1, 2, 2 - Tetrachloroethane | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1, 3 - Dichlorobenzene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1, 4 - Dichlorobenzene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1, 2 - Dichlorobenzene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |
| 1, 2 - Dibromo - 3 - Chloropropane | 16 U | 15 U | 14 U | R | R | R |
| 1, 2, 4 - Trichlorobenzene | 16 U | 15 U | 14 U | 20 U | 15 U | 19 U |

**Garland Road Superfund Site**
**Sediment Split Sample Results**
**Samples Collected April 21, 2003**

| Sample Identification | SED-7 | SED-8 | SED-9 | SED-10 | SED-11 | SED-12 |
|---|---|---|---|---|---|---|
| ***VOAs ug/kg*** | | | | | | |
| Dichlorodifloromethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Chloromethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Vinyl chloride | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Bromomethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Chloroethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Trichlorofluoromethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1,1-Dichloroethene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 1, 2 - Trichloro - 1, 2, 2 - Trifluoroethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Acetone | 58 U | 24 U | 17 U | 15 U | 15 U | 13 U |
| Carbon disulfide | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Methyl Acetate | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Methylene chloride | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| trans - 1, 2 - Dichloroethene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Methyl - tert - butyl ether | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 1 - Dichloroethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| cis - 1, 2 - Dichloroethene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 2 - Butanone | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Chloroform | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 1, 1 - Trichloroethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Cyclohexane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Carbon tetrachloride | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Benzene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 2 - Dichloroethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Trichloroethene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Methylcyclohexane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 2 - Dichloropropane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Bromodichloromethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| cis - 1, 3 - Dichloropropene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 4 - Methyl - 2 - Pentanone | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Toluene | 720 | 18 U | 15 U | 15 U | 15 U | 13 U |
| Trans - 1, 3 - Dichloropropene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 1, 2 - Trichloroethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Tetrachloroethene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 2 - Hexanone | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Dibromochloromethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 2 - Dibromoethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Chlorobenzene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Ethylbenzene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Xylene (total) | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Styrene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Bromoform | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| Isopropylbenzene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 1, 2, 2 - Tetrachloroethane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 3 - Dichlorobenzene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 4 - Dichlorobenzene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 2 - Dichlorobenzene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 2 - Dibromo - 3 - Chloropropane | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |
| 1, 2, 4 - Trichlorobenzene | 24 U | 18 U | 15 U | 15 U | 15 U | 13 U |

**Garland Road Superfund Site**
**Sediment Split Sample Results**
**Samples Collected April 21, 2003**

| Sample Identification | SED-1 | SED-2 | SED-3 | SED-4 | SED-5 | SED-6 |
|---|---|---|---|---|---|---|
| **Semivolatile Organics ug/kg** | | | | | | |
| Benzaldehyde | 13 J | 9 J | 10 J | 29 J | 9 J | 16 J |
| Phenol | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Bis(s - chloroethyl) ether | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2 - Chlorophenol | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2 - Methylphenol | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2, 2 - oxybis (1 - Chloropropane) | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Acetophenone | 16 J | 490 U | 450 U | 22 J | 490 U | 25 J |
| 4 - Methylphenol | 94 J | 490 U | 450 U | 3000 | 120 J | 330 J |
| N - Nitroso - di - n - propylamine | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Hexachloroethane | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Nitrobenzene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Isophorone | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2 - Nitrophenol | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2, 4 - Dimethylphenol | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| bis (2 - Chloroethoxy) methane | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2, 4 - Dichlorophenol | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Naphthalene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 4 - Chloroaniline | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Hexachlorobutadiene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Caprolactam | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 4 - Chloro - 3 - methylphenol | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2 - Methylnaphthalene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Hexachlorocyclopentadiene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2, 4, 6 - Trichlorophenol | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2, 4, 5 - Trichlorophenol | 1300 U | 1200 U | 1100 U | 1700 U | 1200 U | 1500 U |
| 1, 1 - Biphenyl | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2 - Chloronaphthalene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2 - Nitroaniline | 1300 U | 1200 U | 1100 U | 1700 U | 1200 U | 1500 U |
| Dimethylphthalate | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2, 6 - Dinitrotoluene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Acenaphthylene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 3 - Nitroaniline | 1300 U | 1200 U | 1100 U | 1700 U | 1200 U | 1500 U |
| Acenaphthene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2, 4 - Dinitrophenol | 1300 U | 1200 U | 1100 U | 1700 U | 1200 U | 1500 U |
| 4 - Nitrophenol | 1300 U | 1200 U | 1100 U | 1700 U | 1200 U | 1500 U |
| Dibenzofuran | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 2, 4 - Dinitrotoluene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Diethylphthalate | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Flourene | 520 U | 490 U | 20 J | 660 U | 490 U | 610 U |
| 4 - Chlorophenyl-phenylether | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 4 - Nitroaniline | 1300 U | 1200 U | 1100 U | 1700 U | 1200 U | 1500 U |
| 4, 6 - Dinitro - 2 - methylphenol | 1300 U | 1200 U | 1100 U | 1700 U | 1200 U | 1500 U |
| N - Nitrosodiphenylamine (1) | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 4 - Bromophenyl-phenylether | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Hexachlorobenzene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Atrazine | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Pentachlorophenol | 1300 U | 1200 U | 1100 U | 1700 U | 1200 U | 1500 U |
| Phenanthrene | 66 J | 62 J | 21 J | 190 J | 67 J | 88 J |
| Anthracene | 16 J | 17 J | 450 U | 50 J | 17 J | 25 J |
| Carbazole | 520 U | 490 U | 450 U | 28 J | 490 U | 610 U |
| Di - n - butylphthalate | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Flouranthene | 130 J | 140 J | 57 J | 320 J | 150 J | 210 J |
| Pyrene | 96 J | 120 J | 45 J | 230 J | 120 J | 160 J |
| Butylbenzylphthalate | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| 3, 3 - Dichlorobenzidine | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Benzo (a) anthracene | 42 J | 53 J | 23 J | 96 J | 56 J | 68 J |
| Chrysene | 62 J | 74 J | 35 J | 130 J | 77 J | 110 J |
| bis (2 - Ethylhexyl) phthalate | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Di - n - octylphthalate | 520 U | 25 J | 450 U | 36 J | 490 U | 610 U |
| benzo (b) fluoranthene | 64 J | 61 J | 31 J | 110 J | 72 J | 100 J |
| Benzo (k) fluoranthene | 53 J | 63 J | 32 J | 130 J | 63 J | 80 J |
| Benzo (a) pyrene | 48 J | 54 J | 25 J | 100 J | 58 J | 78 J |
| Indeno (1, 2, 3 - cd) pyrene | 34 J | 42 J | 19 J | 74 J | 44 J | 57 J |
| Dibenzo (a, h) anthracene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |
| Benzo (g, h, i) perylene | 520 U | 490 U | 450 U | 660 U | 490 U | 610 U |

Garland Road Superfund Site
Sediment Split Sample Results
Samples Collected April 21, 2003

| Sample Identification | SED-7 | SED-8 | SED-9 | SED-10 | SED-11 | SED-12 |
|---|---|---|---|---|---|---|
| *Semivolatile Organics ug/kg* | | | | | | |
| Benzaldehyde | 35 J | 25 J | 14 J | 16 J | 10 J | 420 U |
| Phenol | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| Bis(s - chloroethyl) ether | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| 2 - Chlorophenol | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| 2 - Methylphenol | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| 2, 2 - oxybis (1 - Chloropropane) | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| Acetophenone | 28 J | 21 J | 15 J | 15 J | 490 U | 420 U |
| 4 - Methylphenol | 1200 | 42 J | 490 U | 510 U | 52 J | 420 U |
| N - Nitroso - di - n - propylamine | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| Hexachloroethane | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| Nitrobenzene | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| Isophorone | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| 2 - Nitrophenol | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| 2, 4 - Dimethylphenol | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| bis (2 - Chloroethoxy) methane | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| 2, 4 - Dichlorophenol | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| Naphthalene | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| 4 - Chloroaniline | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| Hexachlorobutadiene | 790 U | 580 U | 490 U J | 510 U J | 490 U J | 420 U |
| Caprolactam | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U |
| 4 - Chloro - 3 - methylphenol | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| 2 - Methylnaphthalene | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| Hexachlorocyclopentadiene | 790 U | 580 U | 490 U J | 510 U J | 490 U J | 420 U J |
| 2, 4, 6 - Trichlorophenol | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| 2, 4, 5 - Trichlorophenol | 2000 U | 1500 U | 1200 U | 1300 U | 1200 U | 1100 U J |
| 1, 1 - Biphenyl | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| 2 - Chloronaphthalene | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| 2 - Nitroaniline | 2000 U | 1500 U | 1200 U | 1300 U | 1200 U | 1100 U J |
| Dimethylphthalate | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| 2, 6 - Dinitrotoluene | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| Acenaphthylene | 790 U | 580 U | 15 J | 510 U | 490 U | 420 U J |
| 3 - Nitroaniline | 2000 U | 1500 U | 1200 U | 1300 U | 1200 U | 1100 U J |
| Acenaphthene | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| 2, 4 - Dinitrophenol | 2000 U | 1500 U | 1200 U J | 1300 U J | 1200 U | 1100 U J |
| 4 - Nitrophenol | 2000 U | 1500 U | 1200 U | 1300 U | 1200 U | 1100 U J |
| Dibenzofuran | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| 2, 4 - Dinitrotoluene | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| Diethylphthalate | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| Flourene | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| 4 - Chlorophenyl-phenylether | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| 4 - Nitroaniline | 2000 U | 1500 U | 1200 U | 1300 U | 1200 U | 1100 U J |
| 4, 6 - Dinitro - 2 - methylphenol | 2000 U | 1500 U | 1200 U | 1300 U | 1200 U | 1100 U J |
| N - Nitrosodiphenylamine (1) | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| 4 - Bromophenyl-phenylether | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| Hexachlorobenzene | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| Atrazine | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| Pentachlorophenol | 2000 U | 1500 U | 1200 U | 1300 U | 1200 U | 1100 U J |
| Phenanthrene | 110 J | 86 J | 170 J | 45 J | 43 J | 27 J |
| Anthracene | 29 J | 24 J | 36 J | 13 J | 490 U | 420 U J |
| Carbazole | 790 U | 580 U | 27 J | 510 U | 490 U | 420 U J |
| Di - n - butylphthalate | 790 U | 580 U | 19 J | 510 U | 490 U | 420 U J |
| Flouranthene | 270 J | 210 J | 290 J | 120 J | 89 J | 42 J |
| Pyrene | 200 J | 160 J | 220 J | 96 J | 73 J | 420 U J |
| Butylbenzylphthalate | 790 U | 580 U | 25 J | 510 U | 490 U | 420 U J |
| 3, 3 - Dichlorobenzidine | 790 U | 580 U | 490 U | 510 U | 490 U | 420 U J |
| Benzo (a) anthracene | 82 J | 73 J | 110 J | 45 J | 31 J | 420 U J |
| Chrysene | 130 J | 110 J | 150 J | 67 J | 52 J | 14 J |
| bis (2 - Ethylhexyl) phthalate | 790 U | 580 U | 490 U | 510 U | 490 U | 16 J |
| Di - n - octylphthalate | 790 U | 580 U | 22 J | 510 U | 190 J | 420 U J |
| benzo (b) fluoranthene | 110 J | 91 J | 100 J | 60 J | 39 J | 420 U J |
| Benzo (k) fluoranthene | 120 J | 110 J | 140 J | 61 J | 46 J | 420 U J |
| Benzo (a) pyrene | 94 J | 81 J | 100 J | 49 J | 37 J | 420 U J |
| Indeno (1, 2, 3 - cd) pyrene | 61 J | 60 J | 93 J | 45 J | 29 J | 420 U J |
| Dibenzo (a, h) anthracene | 790 U | 580 U | 56 J | 510 U | 490 U | 420 U J |
| Benzo (g, h, i) perylene | 790 U | 580 U | 93 J | 510 U | 490 U | 420 U J |

**Garland Road Superfund Site**
**Sediment Split Sample Results**
**Samples Collected April 21, 2003**

| Sample Identification | SED-1 | SED-2 | SED-3 | SED-4 | SED-5 | SED-6 |
|---|---|---|---|---|---|---|
| **Pesticides ug/kg** | | | | | | |
| alpha - BHC | 2.7 U | 2.5 U | 2.3 U | 3.4 U | 2.5 U | 3.1 U |
| beta - BHC | 2.7 U | 2.5 U | 2.3 U | 4.6 | 2.5 U | 3.1 U |
| delta - BHC | 2.7 U | 2.5 U | 2.3 U | 3.4 U | 2.5 U | 3.1 U |
| gamma - BHC (Lindane) | 2.7 U | 2.5 U | 2.3 U | 3.4 U | 2.5 U | 3.1 U |
| Heptachlor | 2.7 U | 2.5 U | 2.3 U | 3.4 U | 2.5 U | 3.1 U |
| aldrin | 2.7 U | 2.5 U | 2.3 U | 3.4 U | 2.5 U | 3.1 U |
| Heptachlor epoxide | 2.7 U | 2.5 U | 2.3 U | 3.4 U | 2.5 U | 3.1 U |
| Endosulfan I | 2.7 U | 2.5 U | 2.3 U | 3.4 U | 2.5 U | 3.1 U |
| Dieldrin | 5.2 U | 4.9 U | 4.5 U | 6.6 U | 4.9 U | 6.1 U |
| 4, 4 - DDE | 5.2 U | 4.9 U | 4.5 U | 6.6 U | 4.9 U | 6.1 U |
| Endrin | 5.2 U | 4.9 U | 4.5 U | 6.6 U | 4.9 U | 6.1 U |
| Endosulfan II | 5.2 U | 4.9 U | 4.5 U | 6.6 U | 4.9 U | 6.1 U |
| 4, 4 - DDD | 5.2 U | 4.9 U | 4.5 U | 6.6 U | 4.9 U | 6.1 U |
| Endosulfan sulfate | 5.2 U | 4.9 U | 4.5 U | 6.6 U | 4.9 U | 6.1 U |
| 4, 4 - DDT | 44 | 4.9 U | 4.5 U | 6.6 U | 4.9 U | 6.1 U |
| Methoxychlor | 27 U | 25 U | 23 U | 34 U | 25 U | 31 U |
| Endrin keton | 5.2 U | 4.9 U | 4.5 U | 6.6 U | 4.9 U | 6.1 U |
| Endrin aldehyde | 5.2 U | 4.9 U | 4.5 U | 6.6 U | 4.9 U | 6.1 U |
| alpha - Chlordane | 2.7 U | 2.5 U | 2.3 U | 3.2 J | 4.6 J | 4.9 J |
| gamma - Chlordane | 2.7 U | 2.5 U | 2.3 U | 3.4 U | 3.7 J | 3.1 U |
| Toxaphene | 270 U | 250 U | 230 U | 340 U | 250 U | 310 U |
| Aroclor -1016 | 52 U | 49 U | 45 U | 66 U | 49 U | 61 U |
| Aroclor -1221 | 100 U | 100 U | 92 U | 130 U | 99 U | 120 U |
| Aroclor -1232 | 52 U | 49 U | 45 U | 66 U | 49 U | 61 U |
| Aroclor -1242 | 52 U | 49 U | 45 U | 66 U | 49 U | 61 U |
| Aroclor -1248 | 52 U | 49 U | 45 U | 66 U | 49 U | 61 U |
| Aroclor -1254 | 52 U | 49 U | 45 U | 66 U | 49 U | 61 U |
| Aroclor -1260 | 52 U | 49 U | 45 U | 66 U | 49 U | 61 U |
| **Total Metals mg/kg** | | | | | | |
| Aluminum | 3620 | 3770 | 5030 | 7230 | 4110 | 6700 |
| Antimony | 0.78 U J | 0.74 U J | 0.68 U J | 1.0 U J | 0.73 U J | 0.92 U J |
| Arsenic | 2.8 | 2.2 | 4.0 | 4.4 | 2.5 | 4.3 |
| Barium | 56.1 | 52.3 | 75.0 | 103 | 50.9 | 94.2 |
| Beryllium | 0.20 U | 0.19 U | 0.29 U | 0.38 U | 0.19 U | 0.33 U |
| Cadmium | 0.16 U | 0.069 J | 0.25 | 0.26 | 0.093 J | 0.18 J |
| Calcium | 72200 | 60500 | 63800 | 67400 | 65000 | 66900 |
| Chromium | 6.7 | 6.6 | 7.9 | 11.2 | 6.9 | 10.8 |
| Cobalt | 2.6 | 2.5 | 3.3 | 4.5 | 2.5 | 4.2 |
| Copper | 6.4 | 6.8 | 7.3 | 14.6 | 6.1 | 13.5 |
| Iron | 8130 | 8050 | 10600 | 14000 | 8360 | 12700 |
| Lead | 6.9 | 7.2 | 7.8 | 12.5 | 6.4 | 12.2 |
| Magnesium | 19100 | 15900 | 17300 | 16600 | 16900 | 16600 |
| Manganese | 247 | 212 | 323 | 391 | 254 | 345 |
| Mercury | 0.078 U J | 0.074 U J | 0.065 U J | 0.10 U J | 0.067 U J | 0.085 U J |
| Nickel | 7.7 | 7.0 | 9.1 | 13.0 | 7.7 | 11.8 |
| Potassium | 589 J | 605 J | 699 J | 1130 J | 641 J | 1070 J |
| Selenium | 0.74 J | 0.69 U | 0.62 U | 1.2 J | 0.68 U | 1.1 J |
| Silver | 0.28 U | 0.27 U | 0.24 U | 0.36 U | 0.26 U | 0.33 U |
| Sodium | 274 | 230 | 259 | 313 | 256 | 346 |
| Thallium | 0.91 U J | 0.86 U J | 0.78 U J | 1.2 U J | 0.85 U J | 1.1 U J |
| Vanadium | 10.8 | 11.0 | 13.1 | 18.6 | 11.2 | 17.1 |
| Zinc | 29.0 J | 28.1 J | 32.1 J | 57.2 J | 28.7 J | 49.8 J |
| Cyanide | 0.070 U J | 0.18 U J | 0.063 U J | 0.15 U J | 0.069 U J | 0.15 U J |

Notes:
(1) - Cannot be separated from Diphenylamine

Garland Road Superfund Site
Sediment Split Sample Results
Samples Collected April 21, 2003

| Sample Identification | SED-7 | SED-8 | SED-9 | SED-10 | SED-11 | SED-12 |
|---|---|---|---|---|---|---|
| **Pesticides ug/kg** | | | | | | |
| alpha - BHC | 4.0 U | 3.0 U | 2.5 U | 2.6 U | 2.5 U | 2.2 U J |
| beta - BHC | 4.0 U | 5.0 | 2.5 U | 2.6 U | 2.5 U | 2.2 U J |
| delta - BHC | 4.0 U | 3.0 U | 2.5 U | 2.6 U | 2.5 U | 2.2 U J |
| gamma - BHC (Lindane) | 4.0 U | 3.0 U | 2.5 U | 2.6 U | 2.5 U | 2.2 U J |
| Heptachlor | 4.0 U | 3.0 U | 2.5 U | 2.6 U | 2.5 U | 2.2 U J |
| aldrin | 4.0 U | 3.0 U | 2.5 U | 2.6 U | 2.5 U | 2.2 U J |
| Heptachlor epoxide | 4.0 U | 3.0 U | 2.5 U | 2.6 U | 2.5 U | 2.2 U J |
| Endosulfan I | 4.0 U | 3.0 U | 2.5 U | 2.6 U | 2.5 U | 2.2 U J |
| Dieldrin | 7.9 U | 5.8 U | 4.9 U | 5.1 U | 4.9 U | 4.2 U J |
| 4, 4 - DDE | 7.9 U | 5.8 U | 4.9 U | 5.1 U | 4.9 U | 4.2 U J |
| Endrin | 7.9 U | 5.8 U | 4.9 U | 5.1 U | 4.9 U | 4.2 U J |
| Endosulfan II | 7.9 U | 5.8 U | 4.9 U | 5.1 U | 4.9 U | 4.2 U J |
| 4, 4 - DDD | 7.9 U | 5.8 U | 4.9 U | 5.1 U | 4.9 U | 4.2 U J |
| Endosulfan sulfate | 7.9 U | 5.8 U | 4.9 U | 5.1 U | 4.9 U | 4.2 U J |
| 4, 4 - DDT | 7.9 U | 5.8 U | 4.9 U | 5.1 U | 4.9 U | 4.2 U J |
| Methoxychlor | 40 U | 30 U | 25 U | 26 U | 25 U | 22 U J |
| Endrin keton | 7.9 U | 5.8 U | 4.9 U | 5.1 U | 4.9 U | 4.2 U J |
| Endrin aldehyde | 7.9 U | 5.8 U | 4.9 U | 5.1 U | 4.9 U | 4.2 U J |
| alpha - Chlordane | 14 | 3.7 J | 2.5 U | 2.6 U | 2.5 U | 2.2 U J |
| gamma - Chlordane | 4.0 U | 3.0 U | 2.5 U | 2.6 U | 2.5 U | 2.2 U J |
| Toxaphene | 400 U | 300 U | 250 U | 260 U | 250 U | 220 U J |
| Aroclor -1016 | 79 U | 58 U | 49 U | 51 U | 49 U | 42 U J |
| Aroclor -1221 | 160 U | 120 U | 99 U | 100 U | 99 U | 86 U J |
| Aroclor -1232 | 79 U | 58 U | 49 U | 51 U | 49 U | 42 U J |
| Aroclor -1242 | 79 U | 58 U | 49 U | 51 U | 49 U | 42 U J |
| Aroclor -1248 | 79 U | 58 U | 49 U | 51 U | 49 U | 42 U J |
| Aroclor -1254 | 79 U | 58 U | 49 U | 51 U | 49 U | 42 U J |
| Aroclor -1260 | 79 U | 58 U | 49 U | 51 U | 49 U | 42 U J |
| **Total Metals mg/kg** | | | | | | |
| Aluminum | 8710 | 6450 | 3470 | 6450 | 5780 | 4320 |
| Antimony | 1.1 U J | 0.86 U J | 0.73 U J | 0.71 U J | 0.72 U J | 0.59 U J |
| Arsenic | 5.4 | 3.9 | 2.8 | 4.3 | 4.3 | 3.6 |
| Barium | 123 | 88.8 | 47.8 | 80.4 | 65.3 | 51.7 |
| Beryllium | 0.41 U | 0.33 U | 0.17 U | 0.36 U | 0.32 U | 0.24 |
| Cadmium | 0.25 J | 0.22 | 0.079 J | 0.26 | 0.16 | 0.11 J |
| Calcium | 64900 | 62500 | 61600 | 63500 | 48000 | 46100 |
| Chromium | 12.8 | 10.1 | 6.3 | 10.3 | 8.8 | 7.5 |
| Cobalt | 4.9 | 4.0 | 2.5 | 3.8 | 3.7 | 3.3 |
| Copper | 21.3 | 12.5 | 5.6 | 11.4 | 9.8 | 6.2 |
| Iron | 15500 | 12500 | 7380 | 11600 | 10700 | 9370 |
| Lead | 13.7 | 10.4 | 6.0 | 10.3 | 9.4 | 6.7 |
| Magnesium | 14900 | 15800 | 16000 | 20000 | 14000 | 13100 |
| Manganese | 444 | 323 | 202 | 350 | 333 | 316 |
| Mercury | 0.12 U J | 0.088 U J | 0.070 U J | 0.067 U J | 0.064 U J | 0.058 U |
| Nickel | 15.0 | 11.4 | 6.8 | 11.0 | 9.6 | 8.1 |
| Potassium | 1350 J | 960 J | 574 J | 966 J | 861 J | 562 J |
| Selenium | 1.1 U | 0.79 U | 0.67 U | 0.66 J | 0.66 U | 0.67 U |
| Silver | 0.41 U | 0.31 U | 0.26 U | 0.26 U | 0.26 U | 0.21 U J |
| Sodium | 289 J | 307 | 288 | 274 | 227 | 220 J |
| Thallium | 1.3 U J | 0.99 U J | 0.85 U J | 0.82 U J | 0.83 U J | 0.68 U J |
| Vanadium | 20.5 | 16.2 | 10.0 | 16.5 | 15.2 | 12.4 |
| Zinc | 66.3 J | 48.0 J | 27.0 J | 44.4 J | 38.8 J | 24.7 J |
| Cyanide | 0.19 U J | 0.12 U J | 0.087 U J | 0.085 U J | 0.071 U J | 0.056 J |

Notes:
(1) - Cannot be separated from Diphenylamine

**OHIO ENVIRONMENTAL PROTECTION AGENCY (Ohio EPA)**

**DIVISION OF EMERGENCY & REMEDIAL RESPONSE (DERR)**

# EXPANDED SITE INVESTIGATION (ESI) APPROVAL FORM

## ***Garland Road Landfill***

Prepared by: Diane L. Crosby — 9/25/03
Diane L. Crosby, Site Coordinator — Date
Ohio EPA, DERR-SIFU

Reviewed by: Joseph M. Smindak — 9/25/03
Joe Smindak, Senior Site Coordinator — Date
Ohio EPA, DERR-SWDO

Approved by: Laura J. Ripley — 9/30/2003
Laura Ripley, Early Action Project Manager — Date
U.S. EPA, Region 5

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Upon review and approval of this ESI, please sign and fax this sheet to:
(614) 836-8795, Attention: Diane Crosby

---

**OhioEPA**
State of Ohio Environmental Protection Agency

STREET ADDRESS:
Lazarus Government Center
122 S. Front Street
Columbus, Ohio 43215

TELE: (614) 644-3020 FAX: (614) 644-3184

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P.O. Box 1049
Columbus, OH 43216-1049

September 25, 2003

Ms. Laura Ripley
Early Action Project Manager
SE-4J
U.S. EPA Region V
77 West Jackson Blvd.
Chicago, Illinois 60604-3590

Re: Expanded Site Investigation Report for Garland Road Landfill

Dear Ms. Ripley:

The Expanded Site Investigation report for the Garland Road Landfill site, Pre-score package, and transmittal memorandum are enclosed and is considered to be the final report necessary to fulfill our 2003 cooperative agreement requirement for this site.

Please direct any comments or questions to me at (614) 836-8756.

Sincerely,

Diane L. Crosby

Diane L. Crosby
Site Coordinator
Ohio Environmental Protection Agency
Division of Emergency and Remedial Response
Site Investigation Field Unit

Enclosures

Bob Taft, Governor
Jennette Bradley, Lieutenant Governor
Christopher Jones, Director

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# *EXPANDED SITE INVESTIGATION (ESI)*

## GARLAND ROAD LANDFILL

**Miami County**
**West Milton, Ohio**
**39° 56' 7.0" N**
**84° 18' 5.0" W**

**U.S. EPA ID: OHD981960545**

**Prepared by:**

**OHIO ENVIRONMENTAL PROTECTION AGENCY**
**Division of Emergency & Remedial Response**

**September, 2003**

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Complete Analytical Results — Appendix A

Geographic Information System Maps and Data — Appendix B

Well Logs — Appendix C

Site Photographic Log — Appendix D

## 1.0 EXECUTIVE SUMMARY

Ohio Environmental Protection Agency (Ohio EPA) personnel conducted an Expanded Site Investigation (ESI) at the former Garland Road Landfill (site) in West Milton, Ohio, Miami County on April 21, 2003. The purpose of this ESI was to further investigate the concentration and extent of run-off originating from the site post drum removal and how it affects the Stillwater River which borders the eastern boundary of the site (Figure 1).

Work conducted during the ESI included the collection of twenty-six (26) soil and sediment samples. This total includes background and duplicate samples.

## 2.0 INTRODUCTION

The Ohio EPA, Division of Emergency and Remedial Response (DERR) formed a cooperative agreement with the United States Environmental Protection Agency (U.S. EPA) Region V to conduct an ESI of the former Garland Road Landfill, EPA ID# OHN981960545 (Latitude 39° 56' 7.0", Longitude 84° 18' 5.0").

## 3.0 SITE BACKGROUND

### 3.1 Site Description and History

The Garland Road Landfill (site) is an inactive landfill that occupies about 15 acres south of West Milton in Miami County, Ohio (Figure 1). The site is bordered on the north by Frederick-Garland Road, on the east by the Stillwater River, on the south by Waterwheel Farm, and on the west by a small unnamed creek and Waterwheel Farm. The cities of West Milton and Union lie north and south of the site, respectively. The site topography is comprised of small hills, with a slight slope towards the river. A steep erosional bank exists where the site borders the Stillwater River.

The site lies on the Stillwater River's floodplain. The river borders the entire eastern boundary of the landfill. The southern portion of the site floods two to three times a year. The Stillwater River is used as a subsistence and recreational fishery. It is also designated as a state scenic river. A small creek, which receives drainage from the farmland west of the landfill and from the western portion of the site flows north to south into the Stillwater River (Figure 2).

The area surrounding the site is rural. It is used primarily for agricultural purposes. The nearest residence is located 700 feet northeast of the site. There are 162 private residences located within 1 mile of the site. The site is only partially fenced and easily accessible.

Landfill operations began on a 15-acre portion of the Waterwheel Farm in the early 1960s under the ownership of Harold Ostrov. The B & W Realty Company purchased

the farm from Mr. Ostrov in 1966, at which time the landfill was inactive. The landfill property was then leased to B & W landfill, which recommenced operations under a Miami County Health Department license. In 1970, shortly after the start-up of the nearby Miami County incinerator, landfill operations ceased. In 1973, the B & W Realty Company changed its name to B & W Agency Company and sold the landfill property to Paul and Martha Theis. The B & W Agency Company ceased business operations in 1974 (OEPA, 1992).

The landfill was used to dispose of domestic, commercial, and industrial wastes. Considerable amounts of liquids and sludges were allegedly disposed of in the landfill by General Motors Inland Division in Vandalia, Ohio. Jim White, former owner of B & W landfill, stated that GM Inland disposed of about 2,000 cubic yards of waste per month at the site. The materials disposed of include vinyl materials, brake waste materials, and liquid wastes. Anonymous complaints from nearby residents indicated that over 400 drums of toluene-2,4-diisocyanate and paint wastes were buried on site by GM. In addition to industrial waste, household waste was disposed of by private haulers. All wastes disposed of on site were placed in trenches that were between 15 to 20 feet deep. According to a former West Milton fire chief and local citizens, the landfill was regularly on fire (OEPA, 1992).

On November 8, 1993, U.S. EPA issued a Unilateral Administrative Order (Order) pursuant to Section 106(a) of CERCLA, 42 U.S.C 9606(a).

A removal action work plan was approved by U.S. EPA on September 19, 1994. A river bank drum removal work plan was approved August 1995.

Drum removal activities were conducted between September 1994 and June 1996 in accordance with the work plans. Drum removal consisted of the following activities:

1. Buried drum location by test pit excavation;
2. Drum excavation and inspection;
3. Drum sampling;
4. Drum overpacking and staging;
5. Waste consolidation; and
6. Drum transportation and disposal.

A total of 8,830 surface and subsurface drums containing waste and 286 drums containing quartz were removed from the site and an additional 240 drums of waste (which had been released from damaged drums during inspection and over packing) were removed. Approximately 14,700 tons of soil were treated between September 1994 and September 1997.

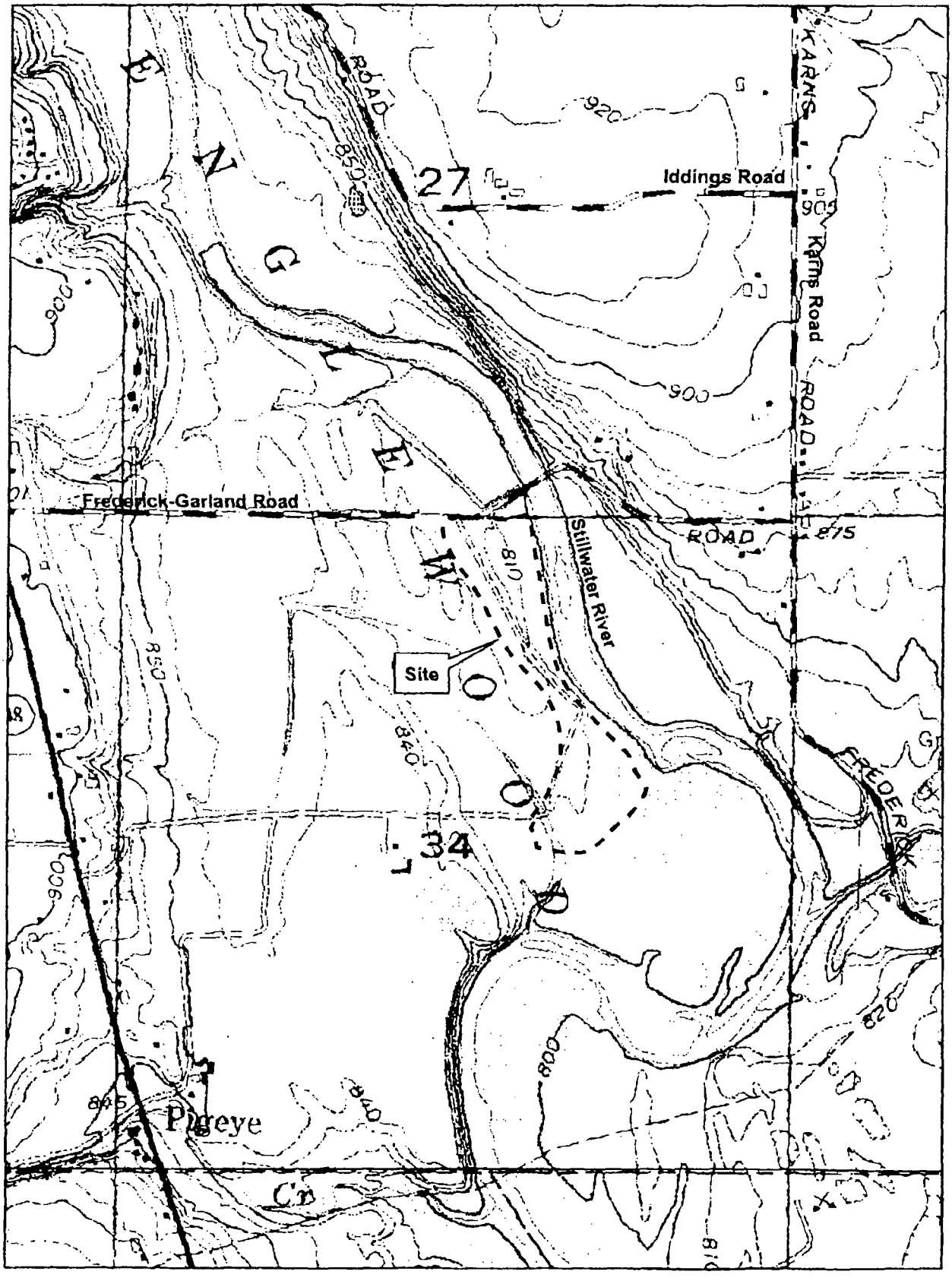


**Figure 1: Garland Road Landfill**
**Site Location Map**

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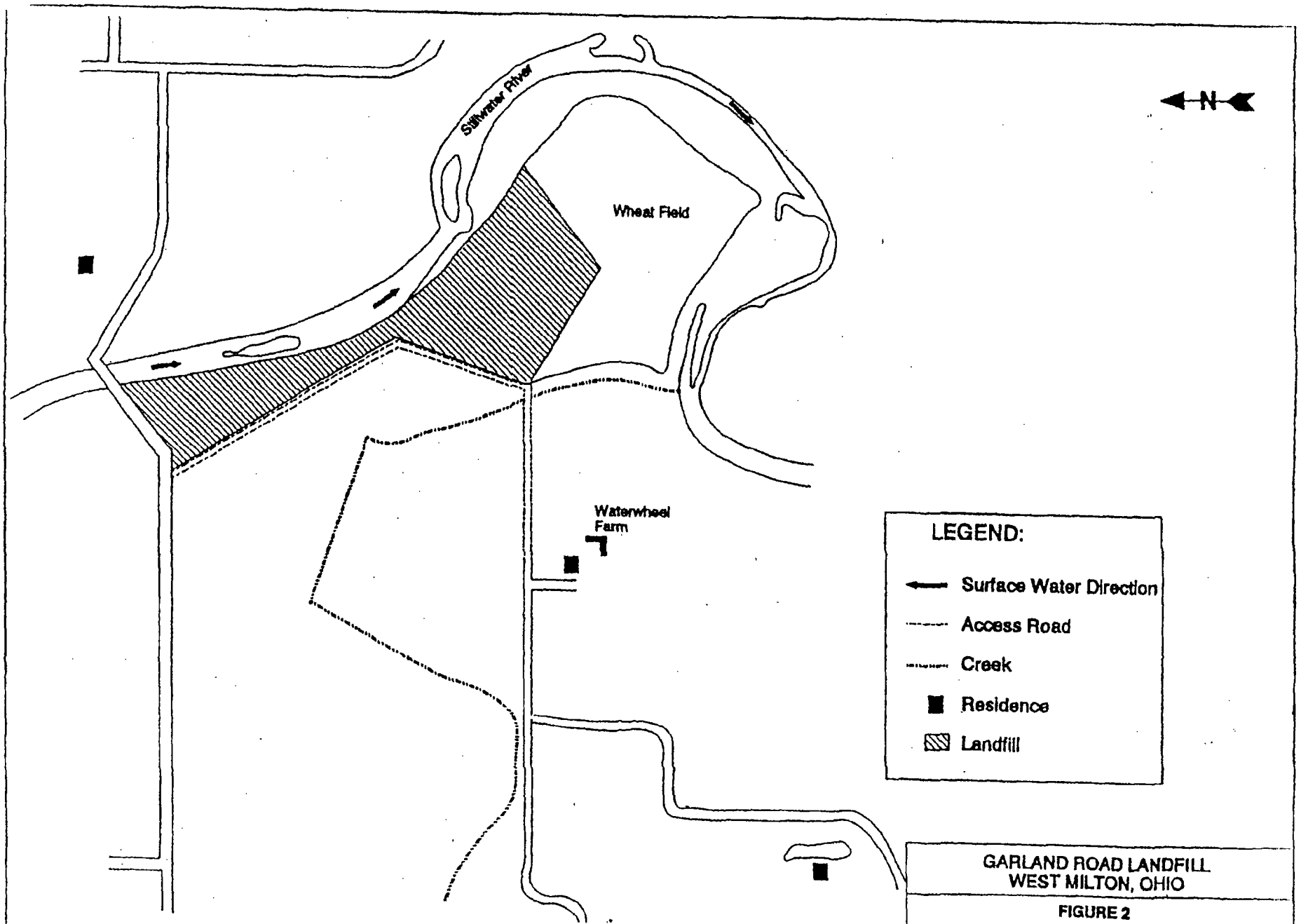



SOURCE: Modified from USGS, 1955 and Ohio Department of Transportation, 1968.

SCALE: 1" = 750'

GARLAND ROAD LANDFILL
WEST MILTON, OHIO

FIGURE 2
SITE FEATURES

### 3.2 Site Geology and Hydrology

The site is underlain by glacial deposits covering shale and limestone bedrock (ODNR, 1960). These deposits are made up largely of clay till, sand, and gravel. Private residential well supplies are mostly developed from the underlying shale and limestone bedrock aquifer; however, municipal and a small number of residential supplies are obtained from sand and gravel lenses along the Stillwater River (ODNR, 1960).

Three major overburden stratigraphic units have been identified at the site. They are: the fill/waste unit, till unit, and the sand/gravel unit. The fill/waste unit has a maximum thickness of approximately 30 feet. In the central portion of the site, a till unit occurs beneath the fill/waste unit. It has a maximum thickness of approximately 15 feet.

The sand/gravel unit is present across the entire site and directly overlies the bedrock surface. It has a thickness of approximately 20 feet. In places the sand/gravel unit is the uppermost overburden unit (e.g. at the south end of the site). The central portion of the site is overlain by the till unit. Where the till unit is absent, the fill/waste unit directly overlays the sand/gravel unit. Bridge foundation borings and residential well samples indicate the sand/gravel unit extends beneath the Stillwater River to the east, in the northern portion of the site. This sand/gravel unit slopes upward steeply, following the bedrock slope, and decreases in thickness towards the east.

The limestone bedrock is encountered at approximately 12 to 60 feet below ground surface at the site. The borings to the north of the site and regional wells indicate considerable bedrock relief. The bedrock is close to the ground surface and appears to slope towards the river along the eastern and western riverbanks.

The Stillwater River flows from north to south along the eastern boundary of the site. The river channel ranges from approximately 100 to 200 feet wide. The site is situated in the floodplain. Precipitation and runoff either flows east towards the Stillwater River, or remains on site, draining into the existing low areas (such as ditches or depressions). Surface waters which do not flow directly off site are expected to infiltrate into the upper water table zone flow regime.

Nearby residents obtain drinking water from the cities of West Milton and Union or from private wells. These private wells draw water primarily from the bedrock aquifer. This aquifer is overlain by glacial deposits that consist of clay till, sand and gravel.

## 4.0 SAMPLING LOCATIONS AND DISCUSSION OF RESULTS

Soil and sediment samples were collected during the ESI sampling event. Samples were analyzed by U.S. EPA Contract Laboratory Program (CLP) laboratories. Analyses included the following parameters: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, total analyte metals (TAL) and Cyanide. Complete analytical results of this investigation are contained in Appendix A. Significant findings are located in Tables I-2. The data were reviewed by U.S. EPA Region V personnel for compliance with the Contract Laboratory Program (CLP), and electronically validated by using the U.S. EPA Computer-Aided Data Review and Evaluation (CADRE) software program.

A photographic log of Garland Road Landfill can be found in Appendix D. Standard quality assurance and quality control (QA/QC) procedures for ESI field activities were followed during the investigation. Procedures for sample collection, packaging and shipping, and equipment decontamination, are documented in the Quality Assurance Project Plan (QAPP), for Region V Superfund SI activities for Ohio EPA, and the Ohio EPA Field Standard Operating Procedures (Reference 9).

### 4.1 Soil

A total of fourteen (14) soil samples (depicted in Figure #3) were collected, including background and duplicate samples. Soil samples were collected to determine the potential for direct exposure of contaminants to the public and to determine the potential for migration of the contaminants to the Stillwater River. Soil sample locations were chosen based on historical records, drum removal areas and current physical appearance of the landfill. The following is a discussion of soil sample locations and results. Refer to Table 1 for significant findings.

Sample SO-01 (E0569/ME0569) was collected in the southwest corner of the landfill in a mounded pile 12-18" from the surface. No significant VOCs, SVOCs, TAL metals or Cyanide were detected. The pesticide Endrin was detected at 3.5 ug/kg.

Sample SO-02 (E0570/ME0570) was collected in the southwest corner of the landfill in a mounded pile of rubber extrusions. No significant VOCs, SVOCs, TAL metals or Cyanide were detected. The pesticide 4,4-DDT was detected at 3.8 ug/kg.

Sample SO-03 (E0571/ME0571) was collected in another pile in the southwest portion of the landfill 18-20" from the surface. No significant VOCs, TAL metals or Cyanide were detected. The following SVOCs were detected: Phenanthrene at 790 ug/kg, Fluoranthene at 1700 ug/kg, Pyrene at 2600 ug/kg, Benzo(a)anthracene at 1300 ug/kg, Chrysene at 1700 ug/kg, Benzo(b)fluoranthene at 1200 ug/kg, Benzo(k)fluoranthene at 1200 ug/kg, Benzo(a)pyrene at 1200 ug/kg, Indeno(1,2,3-cd)pyrene at 860 ug/kg, Dibenzo(a,h)anthracene at 400 ug/kg, Benzo(g,h,i)perylene at 850 ug/kg.

The following pesticides were detected in sample SO-03: Dieldrin at 3.8 ug/kg, 4,4-DDT at 19 ug/kg, Gamma-chlordane at 4.8 ug/kg and Arochlor-1254 at 120 ug/kg.

Sample SO-04 (E0572/ME0572) was collected on a mound of dirt off an access road and on the side of the berm 12-20" from the surface. No significant SVOC were detected. The VOC Trichloroethene was detected at 30 ug/kg. The following pesticides were detected: Dieldrin at 7.6 ug/kg, Endosulfan II at 12 ug/kg, 4,4-DDT at 24 ug/kg, Methoxychlor at 26 ug/kg and Arochlor-1254 at 220 ug/kg.

The following TAL metals were detected in sample SO-04: Barium at 1500 mg/kg, Lead at 635 mg/kg, Magnesium at 37400 mg/kg and Nickel at 74 mg/kg.

Sample SO-05 (E0573/ME0573) and SO-14 (E0582/ME0582) were collected along a berm of soil near the road. The VOC Trichloroethene was detected at 5900 ug/kg. The following SVOCs were detected: Phenol at 480 ug/kg and 4-methylphenol at 330 ug/kg, The following pesticides were detected: Aldrin at 7.2 ug/kg, Heptachlor Epoxide at 1.3 ug/kg, Endosulfan I at 11 ug/kg, Dieldrin at 17 ug/kg, 4,4-DDE at 24 ug/kg, Endosulfan II at 20 ug/kg, 4,4-DDD at 9.5 ug/kg, Endosulfan Sulfate 12 ug/kg, 4,4-DDT at 52 ug/kg, Methoxychlor at 28 ug/kg, Alpha-chlordane at 9.3 ug/kg and Arochlor-1254 at 500 ug/kg.

Significant TAL metals detected in SO-05/SO-14 include the following: Barium at 4670 mg/kg, Chromium at 70.7, Copper at 238 mg/kg, Lead at 1890 mg/kg, Magnesium at 37200 mg/kg, Nickel at 206 mg/kg and Zinc at 387 mg/kg.

Sample SO-06 was collected in a landfill debris area in 18-23" from surface. No significant SVOCs were detected. The VOC Trichloroethene was detected at 93 ug/kg. The pesticides 4,4-DDT was detected at 8.4 ug/kg and Arochlor-1254 at 71 ug/kg. TAL metals detected include the following: Barium at 1000 mg/kg, Lead at 364 mg/kg, Magnesium at 35700 mg/kg, Mercury at 5.4 mg/kg and Nickel at 55 mg/kg.

Sample SO-07 (E0575/ME0575) was collected in 0-12" of soil on the west side of the landfill. The VOC Trichloroethene was detected at 250 ug/kg. The following SVOCs were detected: Phenol at 690 ug/kg, Naphthalene at 370 ug/kg, 2-Methylnaphthalene at 3300 ug/kg, Fluorene at 340 ug/kg, Di-n-butylphthalate at 900 ug/kg, Butylbenzylphthalate at 28000 ug/kg and Bis(2-ethylhexyl)phthalate at 3500 ug/kg. The pesticide 4,4-DDT was detected at 4.9 ug/kg.

Significant TAL metals detected in sample SO-07 include the following: Barium at 1610 mg/kg, Lead at 597 mg/kg, Mercury at 4 mg/kg and Nickel at 66 mg/kg.

Sample SO-08 (E0576/ME0576) was collected in a depression in the landfill 18-24" below surface. No significant VOCs or SVOCs were detected. The following pesticides were detected: Endosulfan II at 9.2 ug/kg, 4,4-DDT at 15 ug/kg, Gamma-chlordane at 2.1 ug/kg and Arochlor-1254 at 100 ug/kg.

Sample SO-09 (E0577/ME0577) was collected in the same depression as SO-08 that is prone to flooding 12-20" below ground surface. The following significant VOCs were detected: cis-1,2-Dichloroethene at 78 ug/kg and Trichloroethene at 1000 ug/kg. The SVOC Butylbenzylphthalate was detected at 710 ug/kg.

The following pesticides were detected in sample SO-09: Aldrin at 2.8 ug/kg, Dieldrin at 17 ug/kg, 4,4-DDE at 19 ug/kg, Endosulfan II at 23 ug/kg, 4,4-DDD at 4.9 ug/kg, 4,4-DDT at 56 ug/kg, Alpha-chlordane at 5.4 ug/kg and Arochlor-1254 at 510 ug/kg.

The following TAL metals were detected in sample SO-09: Barium at 2780 mg/kg, Chromium at 40.4 mg/kg, Lead at 825 mg/kg, Magnesium at 40100 mg/kg, Mercury at .87 mg/kg, Nickel at 130 mg/kg and Zinc at 275 mg/kg.

Sample SO-10 (E0578/ME0578) was collected from the side of a fill area. No significant VOCs or SVOCs were detected. The following pesticides were detected: 4,4-DDT at 6.4 ug/kg, Gamma-chlordane at 1.7 ug/kg and Arochlor-1254 at 51 ug/kg. The TAL Metal Lead was detected at 96.1 mg/kg.

Sample SO-11 (E0579/ME0579) and SO-12 (E0580/ME0580) was collected in 0-12" of soil in the west side of the landfill, north of the other soil samples. No significant SVOCs were detected. The VOC Trichloroethene was detected at 18 mg/kg. The following pesticides were detected: 4,4-DDT at 11 ug/kg, Gamma-Chlordane at 3.5 ug/kg and Arochlor-1254 at 92 ug/kg. The following TAL metals were detected: Barium at 1320 mg/kg, Lead at 116 mg/kg and Nickel at 57.2 mg/kg.

**4.2 Sediment**

A total of twelve (12) sediment samples (depicted in Figure 3), including background and duplicate samples were collected. Sediment samples were collected in the Stillwater River which borders the eastern boundary of the landfill.

Sample Sed-01 was collected upstream of Frederick-Garland Road on the east side of the river and 2-3' from the bank. No significant VOCs, SVOCs, Pesticides, TAL Metals or Cyanide were detected.

Sample Sed-02 was collected downstream of Frederick-Garland Road on the west side of the river and 2' from the bank. No significant VOCs, SVOCs, Pesticides, TAL Metals or Cyanide were detected.

Sample Sed-03 was collected at the island in the river on the west side of the river about 2' from the bank. No significant VOCs, SVOCs, Pesticides, TAL Metals or Cyanide were detected.

Sample Sed-04 was collected at the bottom of the island on the west side of the river 2' from the bank and about 90 meters down stream of Sed-03. Significant findings

include the VOC Toluene at 4700 ppb. The following SVOCs were detected: 4-Methylphenol at 6700 ug/kg and Pyrene at 590 ug/kg. The pesticide Heptachlor was detected at 3 ug/kg. No significant TAL metals or Cyanide were detected.

Sample Sed-05 was collected on the west side of the river, 30 meters upstream of a riffle and 2' from the bank. No significant VOCs, SVOCs, Pesticides, TAL Metals or Cyanide were detected.

Sample Sed-06 was collected on the west side of the river at the oxbow and riffle area approximately 5' from the bank. The only significant compound detected was the SVOC 4-Methylphenol at 810 ug/kg.

Sample Sed-07 was collected on the west side of the river and 2' from the bank. Significant findings include the VOC Toluene at 6100 ug/kg. The following SVOCs were detected: 4-Methylphenol at 2300 ug/kg and Benzo(b)fluoranthene at 330 ug/kg. The pesticide Heptachlor was detected at 3.1 ug/kg. No significant TAL metals or Cyanide were detected.

Sample Sed-08 was collected on the west bank, 2' from the bank and near an old bridge abutment. No significant VOCs, SVOCs, Pesticides, TAL Metals or Cyanide were detected.

Sample Sed-09 was collected on the west bank, 2' from the bank and 100 meters downstream in the oxbow. No significant VOCs, SVOCs, Pesticides, TAL Metals or Cyanide were detected.

Sample Sed-10 was collected on the west bank, 2' from the bank near a swale. No significant VOCs, SVOCs, Pesticides, TAL Metals or Cyanide were detected.

Sample Sed-11 was collected 15' from the mouth of an unnamed tributary of the Stillwater River. No significant VOCs, SVOCs, Pesticides, TAL Metals or Cyanide were detected.

Sample Sed-12 was collected 20 meters downstream of a tributary of the Stillwater River and 2' from the west bank in an eddy area. No significant VOCs, SVOCs, Pesticides, or Cyanide were detected. The TAL metal Antimony was detected at 16.4 mg/kg.

GARLAND ROAD LANDFILL
SAMPLING LOCATIONS
APRIL 21, 2003

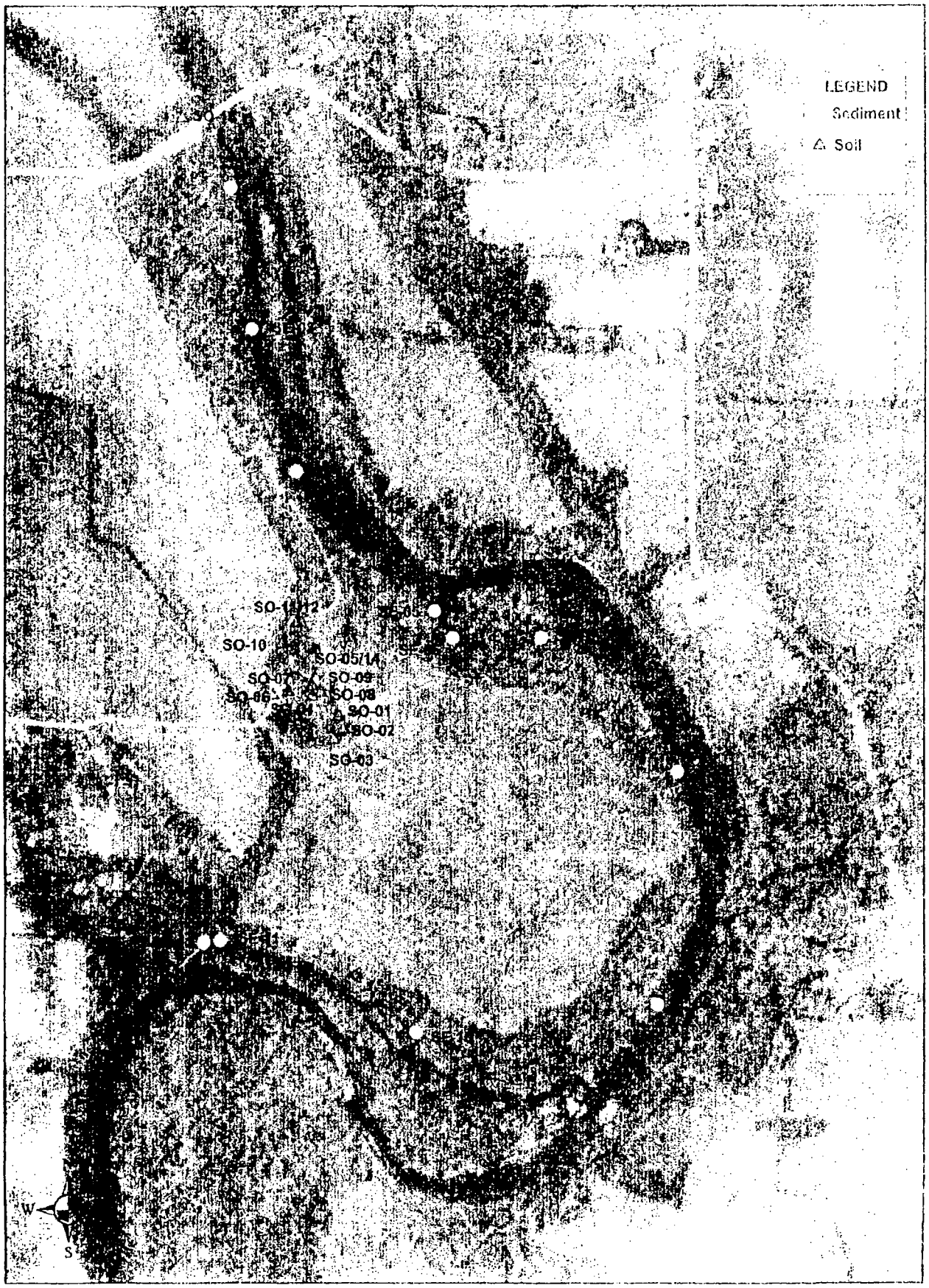


Table 1
Garland Road Landfill Significant Hits
Soil Samples

| SAMPLE NUMBERS | | E0569 ME0569 | E0570 ME0570 | E0571 ME0571 | E0572 ME0572 | E0573 ME0573 | E0574 ME0574 | E0575 ME0575 | E0576 ME0576 | E0577 ME0577 | E0578 ME0578 | E0579 ME0579 | E0580 ME0580 | E0581 ME0581 | E0582 ME0582 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:30 | 10:50 | 11:10 | 11:30 | 12:00 | 13:45 | 14:05 | 14:35 | 14:25 | 15:30 | 15:45 | 15:50 | 11:45 | 12:20 |
| SAMPLE DEPTH | | 12" | 12 – 20" | 18 – 20" | 12 -20" | 16 – 20" | 18 – 23" | 12" | 18 – 24" | 12 – 20" | 12" | 0 – 1' | 0 – 1' | 12" | 16 – 20" |
| QA/QC DESCRIPTION (if applicable) | | SO-01 | SO-02 | SO-03 | SO-04 | SO-05 | SO-06 | SO-07 | SO-08 | SO-09 | SO-10 | SO-11 | SO-12 | SO-13 | SO-14 |
| COMPOUND DETECTED (ug/kg) | | | | | | | | | | | | | | | |
| *VOLATILE ORGANIC COMPOUNDS* | *CRQL* | | | | | | | | | | | | | | |
| Methylene Chloride | 10 ug/kg | 13UJ | 13UJ | 12UJ | 11UJ | 13UJ | 23UJ | 25UJ | 13UJ | 32UJ | 11UJ | 13UJ | 12UJ | 14UJ | **39J** |
| cis-1,2-Dichloroethene | 10 ug/kg | 13U | 13U | 12U | 11U | 3J | 23U | 25U | 13UJ | **78J** | 11U | 13U | 12U | 14U | 140U |
| Trichloroethene | 10 ug/kg | 8J | 3J | 2J | **30** | **1300** | **93** | **250** | 4L | **1000J** | 11U | **17** | **18** | 14U | **5900J** |
| *SEMI-VOLATILE ORGANIC COMPOUNI* | *CRQL* | | | | | | | | | | | | | | |
| Phenol | 330 ug/kg | 420U | 410U | 390U | 89J | **480** | 380U | **690** | 420U | 520U | 370U | 410U | 410U | 450U | **330J** |
| 4-methylphenol | 330 ug/kg | 420U | 410U | 390U | 55J | **330J** | 63J | 120J | 70J | 180J | 370U | 22J | 34J | 450U | 270J |
| Naphthalene | 330 ug/kg | 420U | 410U | 390U | 370U | 22J | 380U | **370J** | 420U | 32J | 370U | 410U | 410U | 450UJ | 27J |
| 2-methylnaphthalene | 330 ug/kg | 420U | 410U | 390U | 370U | 49J | 42J | **3300** | 420U | 100J | 370U | 410U | 410U | 450UJ | 53J |
| Fluorene | 330 ug/kg | 420U | 410U | 56J | 370UJ | 420UJ | 380U | **340J** | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| phenanthrene | 330 ug/kg | 150J | 35J | **790** | 55J | 58J | 37J | 200J | 34J | 48J | 47J | 100J | 99J | 81J | 54J |
| di-n-butylphthalate | 330 ug/kg | 26J | 30J | 41J | 32J | 32J | 30J | **900J** | 43J | 120J | 19J | 23J | 410UJ | 28J | 47J |
| Fluoranthene | 330 ug/kg | 210J | 93J | **1700** | 150J | 420UJ | 380U | 410UJ | 420U | 520UJ | 80J | 130J | 100J | 120J | 440UJ |
| Pyrene | 330 ug/kg | 210J | 140J | **2600J** | 120J | 420UJ | 80J | 110J | 91J | 94J | 74J | 140J | 180J | 190J | 120J |
| Butylbenzylphthalate | 330 ug/kg | 420UJ | 410U | 110J | 370UJ | 110J | 380UJ | **28000J** | 420UJ | **710J** | U | 410U | 410R | 450R | 440UJ |
| Benzo(a)anthracene | 330 ug/kg | 91J | 80J | **1300J** | 76J | 38J | 30J | 28J | 30J | 36J | 32J | 60J | 62J | 63J | 45J |
| Chrysene | 330 ug/kg | 120J | 110J | **1700J** | 120J | 92J | 64J | 67J | 61J | 89J | 50J | 75J | 78J | 100J | 100J |
| bis(2-ethylhexyl)phthalate | 330 ug/kg | 420UJ | 410UJ | 720UJ | 370UJ | 420UJ | 1300UJ | **3500J** | 430UJ | 680UJ | 890U | 410UJ | 410UJ | 450UJ | 440UJ |
| Benzo(b)fluoranthene | 330 ug/kg | 120J | 140J | **1200J** | 84J | 61J | 47J | 38J | 52J | 70J | 42J | 62J | 52J | 80J | 57J |
| Benzo(k)fluoranthene | 330 ug/kg | 100J | 110J | **1200J** | 86J | 36J | 38J | 29J | 34J | 55J | 39J | 48J | 60J | 80J | 51J |
| Benzo(a)pyrene | 330 ug/kg | 110J | 120J | **1200J** | 97J | 42J | 42J | 29J | 37J | 55J | 38J | 58J | 62J | 79J | 41J |
| Indeno(1,2,3-cd)pyrene | 330 ug/kg | 110J | 100J | **860J** | 100J | 33J | 61J | 31J | 40J | 57J | 33J | 42J | 50J | 84J | 42J |
| Dibenzo(a,h)anthracene | 330 ug/kg | 420UJ | 49J | **400J** | 370UJ | 420UJ | 28J | 410UJ | 420UJ | 520UJ | 370U | 410U | 410R | 450R | 440UJ |
| Benzo(g,h,I)perylene | 330 ug/kg | 53J | 100J | **850J** | 83J | 82J | 60J | 41J | 52J | 95J | 28J | 37J | 55J | 78J | 110J |

Table 1
Garland Road Landfill Significant Hits
Soil Samples

| SAMPLE NUMBERS | | E0569 ME0569 | E0570 ME0570 | E0571 ME0571 | E0572 ME0572 | E0573 ME0573 | E0574 ME0574 | E0575 ME0575 | E0576 ME0576 | E0577 ME0577 | E0578 ME0578 | E0579 ME0579 | E0580 ME0580 | E0581 ME0581 | E0582 ME0582 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:30 | 10:50 | 11:10 | 11:30 | 12:00 | 13:45 | 14:05 | 14:35 | 14:25 | 15:30 | 15:45 | 15:50 | 11:45 | 12:20 |
| SAMPLE DEPTH | | 12" | 12 – 20" | 18 – 20" | 12 -20" | 16 – 20" | 18 – 23" | 12" | 18 – 24" | 12 – 20" | 12" | 0 – 1' | 0 – 1' | 12" | 16 – 20" |
| QA/QC DESCRIPTION (if applicable) | | SO-01 | SO-02 | SO-03 | SO-04 | SO-05 | SO-06 | SO-07 | SO-08 | SO-09 | SO-10 | SO-11 | SO-12 | SO-13 | SO-14 |
| *PESTICIDES/PCBs* | *CRQL* | | | | | | | | | | | | | | |
| aldrin | 1.7 ug/kg | 2.2U | 2.1U | 2.0U | 1.4J | **7.2** | 2.0U | 2.1UJ | 0.99J | **2.8** | 0.17J | 1.6J | 2.1U | 2.3U | **5.9** |
| heptachlor epoxide | 1.7 ug/kg | 2.2U | 2.1U | 2.0U | 1.9U | 2.2U | 2.0U | 2.1UJ | 2.2U | 2.7U | 1.9U | 2.1U | 2.1U | 2.3U | **1.3J** |
| endosulfan I | 1.7 ug/k | 2.2U | 2.1U | 2.0U | 1.9U | **4.6J** | 2.0U | 2.1UJ | 2.2UJ | 2.7UJ | 1.9U | 2.1U | 2.1U | 2.3U | **11** |
| dieldrin | 3.3 ug/k | 2.7J | 1.0J | **3.8J** | **7.6J** | **13** | 2.0J | 0.90J | 4.6 | **17** | 1.4J | 2.9J | 1.8J | 1.1J | **17** |
| 4,4-DDE | 3.3 ug/k | 2.7J | 4.1U | 5.6 | 13J | **22J** | 3.2J | 1.8J | 6.1J | **19J** | 3.1J | 5.6 | 2.3J | 2.7J | **24** |
| Endrin | 3.3 ug/k | **3.5J** | 4.1U | 1.0J | 3.7U | 4.2U | 3.8U | 4.1UJ | 4.3U | 5.2U | 3.7U | 4.1R | 4.1U | 4.6U | 4.4U |
| Endosulfan II | 3.3 ug/k | 4.2U | 4.1U | 3.9U | **12J** | **20** | 3.8U | 4.1UJ | **9.2** | **23** | 1.9J | 2.7J | 4.1U | 4.6U | 4.4U |
| 4,4-DDD | 3.3 ug/k | 2.1J | 4.1U | 3.9U | 1.7J | **6.7** | 0.71J | 4.1UJ | 2.0J | **4.9J** | 3.7U | 1.1J | .82J | 4.6U | **9.5** |
| Endosulfan sulfate | 3.3 ug/k | 4.2U | 4.1U | 3.9U | 3.7U | 4.2U | 1.7J | 4.1UJ | 4.3U | 5.2U | 3.7U | 4.1U | **35** | 1.3J | **12** |
| 4,4-DDT | 3.3 ug/k | 3.1J | **3.8J** | **19J** | **24J** | **52J** | **8.4J** | **4.9J** | **15J** | **56J** | **6.4** | **11** | **8** | **1.8J** | **39** |
| methoxychlor | 17.0 ug/k | 2.3UJ | 21UJ | 20UJ | **26J** | 22UJ | 20UJ | 21UJ | 22UJ | 27UJ | 19U | 21U | 21U | 23U | **28** |
| alpha-chlordane | 1.7 ug/k | 1.3J | 2.1U | 2.0U | 1.9U | 2.2UJ | 2.0U | 2.1UJ | 1.3J | **5.4J** | 1.9U | 1.2J | 1.3J | 2.3U | **9.3** |
| gamma-chlordane | 1.7 ug/k | 2.2U | 2.1U | **4.8** | 1.9U | 2.2UJ | 2.0U | 2.1UJ | **2.1J** | 2.7UJ | **1.7J** | **3.5** | 1.3J | 2.3U | 2.3U |
| aroclor-1254 | 33 ug/k | 42U | 41U | **120** | **220** | **490** | **71** | **35** | **100** | **510** | **51** | **92** | **52** | 46U | **500** |
| ANALYTE DETECTED (mg/kg) | | | | | | | | | | | | | | | |
| *TAL METALS/CYANIDE* | *CRDL* | | | | | | | | | | | | | | |
| barium | 40 mg/k | 102 | 170 | 197 | **1500** | **3650** | **1000** | **1610** | **1610** | **2780** | 222 | **1260** | **1320** | 117 | **4670** |
| chromium | 2 mg/k | 8.9 | 8.7 | 9.6 | 25.8 | **68.6** | 23.4 | 24.3 | 25.2 | **40.4** | 12.9 | 23.2 | 19.8 | 10.7 | **70.7** |
| copper | 5 mg/k | 12.7 | 9.9 | 13.8 | 38.1 | **158** | 28.8 | 29.3 | 46.8 | 45 | 24.7 | 23.5 | 20.8 | 17.8 | **238** |
| lead | 0.6 mg/k | 20.7 | 27.5 | 44.7 | **635** | **1480** | **364** | **597** | **405** | **825** | **96.1** | **115** | **116** | 23 | **1890** |
| magnesium | 1000 mg/k | 16400 | 11900 | 22200 | **37400** | 34100 | **35700** | 20100 | 20800 | **40100** | 18700 | 14400 | 28400 | 11900 | **37200** |
| mercury | 0.1 mg/k | **1.3J** | 0.35 | 0.31 | 0.14 | 0.22 | **5.4** | **4** | **0.49** | **0.87** | 0.14J | 0.090J | 0.11J | 0.12 | 0.24J |
| nickel | 8 mg/k | 13.4 | 12.6 | 12.9 | **74** | **189** | **55** | **66** | **65.3** | **130** | 20.5 | **57.2** | 47.4 | 16.2 | **206** |
| zinc | 4 mg/k | 65.9 | 35.1 | 55.1 | 133 | **289** | 128 | 140 | 161 | **275** | 125 | 93.5 | 83.1 | 66 | **387** |

Table 2
Garland Road Landfill Significant Hits
Sediment Samples

| SAMPLE NUMBERS | | E0555 ME0555 | E0556 ME0556 | E0557 ME0557 | E0558 ME0558 | E0559 ME0559 | E0560 ME0560 | E0561 ME0661 | E0562 ME0562 | E0563 ME0563 | E0564 ME0564 | E0565 ME0565 | E0566 ME0566 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:25 | 10:50 | 11:10 | 11:35 | 12:00 | 12:35 | 14:00 | 14:20 | 14:35 | 15:10 | 15:40 | 15:30 |
| SAMPLE DEPTH | | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" |
| QA/QC DESCRIPTION (if applicable) | | SED-01 | SED-02 | SED-03 | SED-04 | SED-05 | SED-06 | SED-07 | SED-08 | SED-09 | SED-10 | SED-11 | SED-12 |
| COMPOUND DETECTED (ug/kg) | | | | | | | | | | | | | |
| *VOLATILE ORGANIC COMPOUNDS* | *CRQL* | | | | | | | | | | | | |
| 2-Butanone | 10 ug/kg | 7J | 17U | 14U | **29** | 8J | 13J | **24J** | 19UJ | 15UJ | 16UJ | 15UJ | 13UJ |
| Toluene | 10 ug/kg | 47J | 17U | 14U | **4700** | 39 | **510** | **6100** | 17J | 2J | 78 | 42 | 2J |
| *SEMI-VOLATILE ORGANIC COMPOUN* | *CRQL* | | | | | | | | | | | | |
| 4-methylphenol | 330 ug/kg | 210J | 550U | 480U | **6700** | 230J | **810** | **2300** | 120J | 31J | 31J | 160J | 430U |
| Pyrene | 330 ug/kg | 190J | 250J | 180J | **590J** | 200J | 460J | 450J | 520J | 210J | 230J | 240J | 90J |
| Benzo(b)fluoranthene | 330 ug/kg | 80J | 120J | 120J | 200J | 90J | 160J | **330J** | 180J | 95J | 170J | 170J | 39J |
| *PESTICIDES/PCBs* | *CRQL* | | | | | | | | | | | | |
| heptachlor | 1.7 ug/kg | 1.6UJ | 2.4UJ | 1.6UJ | **3.0J** | 1.4UJ | 2.5UJ | **3.1J** | 1.5UJ | 2.5U | 2.7U | 1.7UJ | 1.6UJ |
| gamma-chlordane | 1.7 ug/kg | **1.9J** | 2.8U | 2.4U | 3.3U | 2.6U | 3.3U | 4.6U | 3.1U | 2.5U | 2.7U | 2.5U | 2.2U |
| *TAL METALS/CYANIDE* | *CRDL* | | | | | | | | | | | | |
| antimony | 12 mg/kg | 20.2U | 2.2 | 2.3 | 4.5 | 2.8 | 5.7 | 3.7 | 2.7 | 17.4U | 2.5 | 2.3 | **16.4** |

# 5.0 MIGRATION EXPOSURE PATHWAY DISCUSSION

## 5.1 Surface Water Exposure Pathway

The site is located on the flood plain of the Stillwater River. The river borders the entire eastern edge of the landfill. The potential for release of contaminants via overland migration and flood is high because source areas are uncovered and the southern portion of the site floods two to three times a year. The bank of the Stillwater River is eroding, causing remaining drums and other wastes to be released into the river. Drums have been found along the bank of the river about 200 feet downstream of the site (OEPA, 1992).

The Stillwater River is about 200 feet wide at the site (USGS, 1995). The river's flow rate is an average of 450 cubic feet per second (PRC, 1993a). The Stillwater River flows into the Great Miami River about 20 miles southeast of the site. The Stillwater River is a state-designated scenic river and is used for subsistence and recreational fishing (ODNR, 1985). The fishery and sensitive environment in the Stillwater River are the primary targets of concern associated with the surface water pathway. There is evidence of fishing and other recreational activities occurring in the Stillwater River adjacent to the site. The following State Threatened and Endangered Species are located within the 15-mile downstream target distance limit (TDL): Dwarf Bulrush, Snuffbox, Smooth Beard-Tongue, Tansy Mustard and Pondhorn.

The Village of West Milton obtains its municipal water supplies from an intake on the Stillwater River about 2 miles upstream of the site. This intake serves a population of about 5000 (2000 US Census). No drinking water intakes exist within TDLdownstream of the site.

## 5.2 Air Exposure Pathway

A comprehensive air sampling program was not implemented at the site during the PA/SI. However portable air monitoring was conducted during soil sampling. Portions of the landfill were covered after the drum removal and soil was treated post removal. There are portions of the landfill that are currently not covered with limited vegetation. The estimated population within a 4-mile radius of the facility is 17,625 (2000 Census).

## 5.3 Soil Exposure Pathway

VOCs, Arochlor 1242 (a polychlorinated biphenyl), pesticides, and heavy metals were detected in on-site and drum samples (pre-removal), and the public could come into contact with these hazardous substances because the site is only partially fenced and easily accessible. There are no homes, schools, or daycare facilities on or within 200 feet of areas of suspected surficial soil contamination. There are also no terrestrial sensitive environments in areas of suspected soil contamination.

According to the site owner, people have been observed jumping the fence to use the area for recreational purposes (hunting and fishing). The population within a 1-mile radius of the site is about 568 persons (2000 US Census).

5.4 Ground Water Exposure Pathway

The Garland Road landfill is an unlined and uncapped landfill that is situated on the flood plain of the Stillwater River. Large quantities of industrial wastes were openly dumped in the landfill. The landfill's volume is not known, although wastes were thought to be buried at depths of 15 to 20 feet below ground service (bgs). Volatile organic compounds (VOC), pesticides and heavy metals have been detected in on-site soil and drum samples.

The site is underlain by glacial deposits covering shale and limestone bedrock (ODNR, 1960). These deposits are made up largely of clay till, sand, and gravel. Private residential wells supplies are mostly developed from the underlying shale and limestone bedrock aquifer; however, municipal and a small number of residential supplies are obtained from sand and gravel lenses along the Stillwater River (ODNR, 1960).

Ground water targets within 4 miles of the site are relatively limited. Most of the population within 4 miles of the site obtains drinking water from municipal supplies. The city of Union has municipal wells located 2 miles south and downstream of the site. These wells draw water from the same permeable sand and gravel deposits adjacent to the Stillwater River as those which underlie the site. The wells provide 6400 people (Ohio EPA, Div. of Drinking and Ground Water) with their water supply.

In response to increased demand, the city of Union has plans to develop additional drinking water supplies from the permeable sand and gravel deposits adjacent to the Stillwater River near the Miami/Montgomery County line, about 4,000 feet south of the site. Investigative work performed by General Motors Corporation under a 1996 non-time-critical removal action AOC with U.S. EPA Region 5 has tracked a plume of site-related VOCs 2,000 feet south of the site to within 2,000 feet of where the city of Union plans to develop future drinking water supplies. This is a strong concern to both the city of Union and the state of Ohio given that the actual extent of site-related VOC contamination in ground water is as yet unknown.

Residents not served by municipal supplies obtain water from private wells; however, the population using these wells are unlikely targets because the wells are developed in thin beds of shale and limestone. The sand and gravel units probably receive water from the bedrock units. Ground water movement in the vicinity of the site is known to move south along the trend of the Stillwater River towards the city of Union's current and planned drinking water supply wells. There are no drinking water wells between the site and the adjacent river.

The site owner has a drinking water well within 0.50 mile of the landfill. This well could not be affected by the landfill because that well is hydraulically up gradient of the landfill. The well is located 3,000 feet southeast of the site and draws water from sand and gravel at about 32 feet bgs (ODNR, 1961).

## 6.0 REFERENCES

1. Screening Site Inspection - Site-Specific Implementation Plan for Garland Road Landfill, Garland Road and Stillwater River, West Milton, Ohio 45332, March 5, 1993.

2. Engineering Evaluation and Cost Analysis (EE/CA) Report, Garland Road Landfill, Miami County, Ohio; Conestoga-Rovers & Associates; October, 1998.

3. Ohio EPA Quality Assurance Project Plan for Superfund Site Investigation Activities conducted by Ohio EPA. May 14, 1998.

4. Federal Register; Volume 55 No. 241; December 1990.

5. United States Environmental Protection Agency. Hazard Ranking System Guidance Manual. Publication 9345.1-07. PB92-963377. EPA 540-R-92-026. November 1002.

6. Ohio Environmental Protection Agency (Ohio EPA), Southwest District Office files.

7. Ohio EPA; Data; Geographical Information Systems.

8. Ohio EPA Regulations, Volume One; Chapter 3745-1-24. 1999 Edition.

9. 2000 U.S. Census

# APPENDIX A

# COMPLETE ANALYTICAL RESULTS

Comprehensive Analytical Results -
Soil Samples

| SAMPLE NUMBERS | | E0569 ME0569 | E0570 ME0570 | E0571 ME0571 | E0572 ME0572 | E0573 ME0573 | E0574 ME0574 | E0575 ME0575 | E0576 ME0576 | E0577 ME0577 | E0578 ME0578 | E0579 ME0579 | E0580 ME0580 | E0581 ME0581 | E0582 ME0582 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:30 | 10:50 | 11:10 | 11:30 | 12:00 | 13:45 | 14:05 | 14:35 | 14:25 | 15:30 | 15:45 | 15:50 | 11:45 | 12:20 |
| SAMPLE DEPTH | | 12" | 12 – 20" | 18 – 20" | 12 -20" | 16 – 20" | 18 – 23" | 12" | 18 – 24" | 12 – 20" | 12" | 0 – 1' | 0 – 1' | 12" | 16 – 20" |
| QA/QC DESCRIPTION (if applicable) | | SO-01 | SO-02 | SO-03 | SO-04 | SO-05 | SO-06 | SO-07 | SO-08 | SO-09 | SO-10 | SO-11 | SO-12 | SO-13 | SO-14 |
| COMPOUND DETECTED (ug/kg) | | | | | | | | | | | | | | | |
| *VOLATILE ORGANIC COMPOUNDS* | *CRQL* | | | | | | | | | | | | | | |
| dichlorodifluoromethane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| Chloromethane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| vinyl chloride | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| Bromomethane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| Chloroethane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| Trichlorofluoromethane | 10 ug/kg | 13U | 13U | 12U | **5J** | **6J** | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| 1,1-Dichloroethene | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| Acetone | 10 ug/kg | 13UJ | 13UJ | 12UJ | 11U | 13U | 23UJ | 25UJ | 13UJ | 32UJ | 11UJ | 13UJ | 12UJ | 14UJ | 140UJ |
| Carbon Disulfide | 10 ug/kg | 13UJ | 13UJ | 12UJ | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| Methyl Acetate | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23UJ | 25UJ | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| Methylene Chloride | 10 ug/kg | 13UJ | 13UJ | 12UJ | 11UJ | 13UJ | 23UJ | 25UJ | 13UJ | 32UJ | 11UJ | 13UJ | 12UJ | 14UJ | **39J** |
| trans-1,2-Dichloroethene | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| Methyl tert-Butyl Ether | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| 1,1-Dichloroethane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| cis-1,2-Dichloroethene | 10 ug/kg | 13U | 13U | 12U | 11U | **3J** | 23U | 25U | 13UJ | **78J** | 11U | 13U | 12U | 14U | 140U |
| 2-Butanone | 10 ug/kg | 13UJ | 13UJ | 12UJ | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| Chloroform | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| 1,1,1-Trichloroethane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| Cyclohexane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| Carbon Tetrachloride | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| benzene | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| 1,2-Dichloroethane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| Trichloroethene | 10 ug/kg | **8J** | **3J** | **2J** | **30** | **1300** | **93** | **250** | **4L** | **1000J** | 11U | **17** | **18** | 14U | **5900J** |
| Methylcyclohexane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| 1,2-Dichloropropane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| Bromodichloromethane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| cis-1,3-Dichloropropene | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| 4-Methyl-2-Pentanone | 10 ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |

Comprehensive Analytical Results -
Soil Samples

| SAMPLE NUMBERS | | E0569 ME0569 | E0570 ME0570 | E0571 ME0571 | E0572 ME0572 | E0573 ME0573 | E0574 ME0574 | E0575 ME0575 | E0576 ME0576 | E0577 ME0577 | E0578 ME0578 | E0579 ME0579 | E0580 ME0580 | E0581 ME0581 | E0582 ME0582 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:30 | 10:50 | 11:10 | 11:30 | 12:00 | 13:45 | 14:05 | 14:35 | 14:25 | 15:30 | 15:45 | 15:50 | 11:45 | 12:20 |
| SAMPLE DEPTH | | 12" | 12 – 20" | 18 – 20" | 12 -20" | 16 – 20" | 18 – 23" | 12" | 18 – 24" | 12 – 20" | 12" | 0 – 1' | 0 – 1' | 12" | 16 – 20" |
| QA/QC DESCRIPTION (if applicable) | | SO-01 | SO-02 | SO-03 | SO-04 | SO-05 | SO-06 | SO-07 | SO-08 | SO-09 | SO-10 | SO-11 | SO-12 | SO-13 | SO-14 |
| COMPOUND DETECTED (ug/kg) | | | | | | | | | | | | | | | |
| *VOLATILE ORGANIC COMPOUNDS* | *CRQL* | | | | | | | | | | | | | | |
| Toluene | 10 ug/kg | 13U | 13U | 12U | 11U | **2J** | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| trans-1,3-Dichloropropene | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| 1,1,2-Trichloroethane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| Tetrachloroethene | 10 ug/kg | 13U | 13U | 12U | 11U | **2J** | 23U | 25U | 13UJ | **4J** | 11U | 13U | 12U | 14U | 140UJ |
| 2-Hexanone | 10 ug/kg | 13UJ | 13UJ | 12UJ | 11U | 13UJ | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| Dibromochloromethane | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| 1,2-Dibromoethane | 10 ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| Chlorobenzene | 10 ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 7L | 32U | 11U | 13U | 12U | 14U | 140UJ |
| Ethylbenzene | 10 ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| Xylenes (total) | 10 ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| Styrene | 10 ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| Bromoform | 10 ug/kg | 13U | 13U | 12U | 11U | 13U | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140U |
| Isopropylbenzene | 10 ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| 1,1,2,2-Tetrchloroethane | 10ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| 1,3-Dichlorobenzene | 10 ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| 1,4-Dichlorobenzene | 10 ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 1L | 32U | 11U | 13U | 12U | 14U | 140UJ |
| 1,2-Dichlorobenzene | 10ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| 1,2-Dibromo-3-chloropropane | 10 ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| 1,2,4-Trichlorobenzene | 10 ug/kg | 13U | 13U | 12U | 11U | 13UJ | 23U | 25U | 13UJ | 32U | 11U | 13U | 12U | 14U | 140UJ |
| *SEMI-VOLATILE ORGANIC COMPOUN* | *CRQL* | | | | | | | | | | | | | | |
| Benzaldehyde | 330 ug/kg | **40J** | **56J** | **160J** | **53J** | **120J** | **180J** | **220J** | **360J** | **850.** | **21J** | **24J** | **23J** | **510** | **250J** |
| Phenol | 330 ug/kg | 420U | 410U | 390U | **89J** | **480** | 380U | **690** | 420U | 520U | 370U | 410U | 410U | 450U | **330J** |
| bis-(2-Chloroethyl)ether | 330 ug/kg | 420U | 410U | 390U | 370U | 420U | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450U | 440U |
| 2-Chlorophenol | 330 ug/kg | 420U | 410U | 390U | 370U | 420U | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450U | 440U |
| 2-Methylphenol | 330 ug/kg | 420U | 410U | 390U | 370U | **100J** | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450U | **92J** |
| 2,2'-oxybis(1-Chloropropane) | 330 ug/kg | 420U | 410U | 390U | 370U | 420U | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450U | 440U |
| Acetophenone | 330 ug/kg | 420U | 410U | 390U | 370U | **31J** | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450U | 440U |
| 4-methylphenol | 330 ug/kg | 420U | 410U | 390U | **55J** | **330J** | **63J** | **120J** | **70J** | **180J** | 370U | **22J** | **34J** | 450U | **270J** |
| n-nitroso-di-n-dipropylamine | 330 ug/kg | 420U | 410U | 390U | 370U | 420U | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450U | 440U |
| hexachloroethane | 330 ug/kg | 420U | 410U | 390U | 370U | 420U | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450U | 440U |
| nitrob[illegible]ne | 330 ug/kg | 420U | 410U | 390U | 37[illegible] | 420UJ | 380U | 410U | 420U | 520U | 370U | 410U | 410U | [illegible]UJ | 440UJ |

Comprehensive Analytical Results -
Soil Samples

| SAMPLE NUMBERS | | E0569 ME0569 | E0570 ME0570 | E0571 ME0571 | E0572 ME0572 | E0573 ME0573 | E0574 ME0574 | E0575 ME0575 | E0576 ME0576 | E0577 ME0577 | E0578 ME0578 | E0579 ME0579 | E0580 ME0580 | E0581 ME0581 | E0582 ME0582 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:30 | 10:50 | 11:10 | 11:30 | 12:00 | 13:45 | 14:05 | 14:35 | 14:25 | 15:30 | 15:45 | 15:50 | 11:45 | 12:20 |
| SAMPLE DEPTH | | 12" | 12 – 20" | 18 – 20" | 12 -20" | 16 – 20" | 18 – 23" | 12" | 18 – 24" | 12 – 20" | 12" | 0 – 1' | 0 – 1' | 12" | 16 – 20" |
| QA/QC DESCRIPTION (if applicable) | | SO-01 | SO-02 | SO-03 | SO-04 | SO-05 | SO-06 | SO-07 | SO-08 | SO-09 | SO-10 | SO-11 | SO-12 | SO-13 | SO-14 |
| isophorone | 330 ug/kg | 420U | 410U | 390U | 370U | 420UJ | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450UJ | 440UJ |
| 2-nitrophenol | 330 ug/kg | 420U | 410U | 390U | 370U | 420UJ | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450UJ | 440UJ |
| 2,4-dimethylphenol | 330 ug/kg | 420U | 410U | 390U | **26J** | **150J** | **34J** | 410U | **24J** | **71J** | 370U | 410U | 410U | 450UJ | **150J** |
| bis-(2-Chloroethoxy)methane | 330 ug/kg | 420U | 410U | 390U | 370U | 420UJ | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450UJ | 440UJ |
| 2,4-dichlorophenol | 330 ug/kg | 420U | 410U | 390U | 370U | 420UJ | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450UJ | 440UJ |
| Naphthalene | 330 ug/kg | 420U | 410U | 390U | 370U | **22J** | 380U | **370J** | 420U | **32J** | 370U | 410U | 410U | 450UJ | **27J** |
| 4-Chloroaniline | 330 ug/kg | 420U | 410U | 390U | 370U | 420UJ | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450UJ | 440UJ |
| Hexachlorobutadiene | 330 ug/kg | 420U | 410U | 390U | 370U | 420UJ | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450UJ | 440UJ |
| Caprolactam | 330 ug/kg | 420U | 410U | 390U | 370U | 420UJ | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450UJ | 440UJ |
| 4-chloro-3-methylphenol | 330 ug/kg | 420U | 410U | 390U | 370U | 420UJ | 380U | 410U | 420U | 520U | 370U | 410U | 410U | 450UJ | 440UJ |
| 2-methylnaphthalene | 330 ug/kg | 420U | 410U | 390U | 370U | **49J** | **42J** | **3300** | 420U | **100J** | 370U | 410U | 410U | 450UJ | **53J** |
| Hexachlorocylopentadiene | 330 ug/kg | 420U | 410U | 390U | 370UJ | 420UJ | 380U | 410U | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| COMPOUND DETECTED (ug/kg) | | | | | | | | | | | | | | | |
| *SEMI-VOLATILE ORGANIC COMPOUN* | *CRQL* | | | | | | | | | | | | | | |
| 2,4,6-Trichlorophenol | 330 ug/kg | 420U | 410U | 390U | 370UJ | 420UJ | 380U | 410U | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| 2,4,5-Trichlorophenol | 330 ug/kg | 1000U | 1000U | 980U | 930UJ | 1100UJ | 960U | 1000U | 1100U | 1300UJ | 930U | 1000U | 1000UJ | 1100UJ | 1100UJ |
| 1,1'Biphenyl | 800 ug/kg | 420U | 410U | 390U | 370UJ | **30J** | 380U | **390J** | 420U | **26J** | 370U | 410U | 410UJ | 450UJ | **32J** |
| 2-Chloronaphthalene | 330 ug/kg | 420U | 410U | 390U | 370UJ | 420UJ | 380U | 410U | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| 2-Nitroaniline | 800 ug/kg | 1000U | 1000U | 980U | 930UJ | 1100UJ | 960U | 1000U | 1100U | 1300UJ | 930U | 1000U | 1000UJ | 1100UJ | 1100UJ |
| Dimethylphthalate | 330 ug/kg | 420U | 410U | 390U | 370UJ | 420UJ | 380U | 410U | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| 2,6-Dinitrotoluene | 330 ug/kg | 420U | 410U | 390U | 370UJ | 420UJ | 380U | 410U | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| Acenaphthylene | 330 ug/kg | 420U | **34J** | **27J** | 370UJ | 420UJ | 380U | **100J** | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| 3-Nitroaniline | 330 ug/kg | 1000U | 1000U | 980U | 930UJ | 1100UJ | 960U | 1000U | 1100U | 1300UJ | 930U | 1000U | 1000UJ | 1100UJ | 1100UJ |
| Acenaphthene | 330 ug/kg | 420U | 410U | **56J** | 370UJ | 420UJ | 380U | **95J** | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| 2,4-dinitrophenol | 800 ug/kg | 1000UJ | 1000U | 980U | 930UJ | 1100UJ | 960U | 1000U | 1100U | 1300UJ | 930U | 1000U | 1000UJ | 1100UJ | 1100UJ |
| 4-nitrophenol | 800 ug/kg | 1000U | 1000U | 980U | 930UJ | 1100UJ | 960U | 1000U | 1100U | 1300UJ | **35J** | 1000U | 1000UJ | 1100UJ | 1100UJ |
| Dibenzofuran | 330 ug/kg | 420U | 410U | **23J** | 370UJ | 420UJ | 380U | **130J** | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| 2,4-Dinitrotoluene | 330 ug/kg | 420U | 410U | 390U | 370UJ | 420UJ | 380U | 410U | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| diethylphthalate | 330 ug/kg | 420U | 410U | 390U | 370UJ | 420UJ | 380U | 410U | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| Fluorene | 330 ug/kg | 420U | 410U | **56J** | 370UJ | 420UJ | 380U | **340J** | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| 4-Chlorophenyl-phenyl ether | 330 ug/kg | 420U | 410U | 390U | 370UJ | 420UJ | 380U | 410U | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| 4-Nitroanilene | 800 ug/kg | 1000U | 1000U | 980U | 930UJ | 1100UJ | 960U | 1000U | 1100U | 1300UJ | 930U | 1000U | 1000UJ | 1100UJ | 1100UJ |
| 4,6-dinitro-2-methylphenol | 800 ug/kg | 1000UJ | 1000U | 980U | 930UJ | 1100UJ | 960U | 1000UJ | 1100U | 1300UJ | 930U | 1000U | 1000UJ | 1100UJ | 1100UJ |

Comprehensive Analytical Results -
Soil Samples

| SAMPLE NUMBERS | | E0569 ME0569 | E0570 ME0570 | E0571 ME0571 | E0572 ME0572 | E0573 ME0573 | E0574 ME0574 | E0575 ME0575 | E0576 ME0576 | E0577 ME0577 | E0578 ME0578 | E0579 ME0579 | E0580 ME0580 | E0581 ME0581 | E0582 ME0582 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:30 | 10:50 | 11:10 | 11:30 | 12:00 | 13:45 | 14:05 | 14:35 | 14:25 | 15:30 | 15:45 | 15:50 | 11:45 | 12:20 |
| SAMPLE DEPTH | | 12" | 12 – 20" | 18 – 20" | 12 -20" | 16 – 20" | 18 – 23" | 12" | 18 – 24" | 12 – 20" | 12" | 0 – 1' | 0 – 1' | 12" | 16 – 20" |
| QA/QC DESCRIPTION (if applicable) | | SO-01 | SO-02 | SO-03 | SO-04 | SO-05 | SO-06 | SO-07 | SO-08 | SO-09 | SO-10 | SO-11 | SO-12 | SO-13 | SO-14 |
| N-Nitrosodiphenylamine | 330 ug/kg | 420UJ | 410U | 390U | 370UJ | 420UJ | 380U | 410UJ | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| 4-Bromophenyl-phenylether | 330 ug/kg | 420UJ | 410U | 390U | 370UJ | 420UJ | 380U | 410UJ | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| Hexachlorobenzene | 330 ug/kg | 420UJ | 410U | 390U | 370UJ | 420UJ | 380U | 410UJ | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| Atrazine | 800 ug/kg | 420UJ | 410U | 390U | 370UJ | 420UJ | 380U | 410UJ | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| Pentachlorophenol | 330 ug/kg | 1000UJ | 32J | 980U | 930UJ | 1100UJ | 960U | 1000UJ | 1100U | 1300UJ | 930U | 1000U | 1000UJ | 1100UJ | 1100UJ |
| phenanthrene | 330 ug/kg | 150J | 35J | 790 | 55J | 58J | 37J | 200J | 34J | 48J | 47J | 100J | 99J | 81J | 54J |
| Anthracene | 330 ug/kg | 33J | 32J | 280J | 370UJ | 420UJ | 380U | 30J | 420U | 520UJ | 370U | 21J | 410UJ | 450UJ | 440UJ |
| Carbazole | 330 ug/kg | 420UJ | 410U | 59J | 370UJ | 420UJ | 380U | 410UJ | 420U | 520UJ | 370U | 410U | 410UJ | 450UJ | 440UJ |
| di-n-butylphthalate | 330 ug/kg | 26J | 30J | 41J | 32J | 32J | 30J | 900J | 43J | 120J | 19J | 23J | 410UJ | 28J | 47J |
| Fluoranthene | 330 ug/kg | 210J | 93J | 1700 | 150J | 420UJ | 380U | 410UJ | 420U | 520UJ | 80J | 130J | 100J | 120J | 440UJ |
| COMPOUND DETECTED (ug/kg) | | | | | | | | | | | | | | | |
| *SEMI-VOLATILE ORGANIC COMPOUN* | *CRQL* | | | | | | | | | | | | | | |
| Pyrene | 330 ug/kg | 210J | 140J | 2600J | 120J | 420UJ | 80J | 110J | 91J | 94J | 74J | 140J | 180J | 190J | 120J |
| Butylbenzylphthalate | 330 ug/kg | 420UJ | 410U | 110J | 370UJ | 110J | 380UJ | 28000J | 420UJ | 710J | U | 410U | 410R | 450R | 440UJ |
| 3,3'Dichlorobenzidine | 330 ug/kg | 420UJ | 410U | 390UJ | 370UJ | 420UJ | 380UJ | 410UJ | 420UJ | 520UJ | 370U | 410U | 410R | 450R | 440UJ |
| Benzo(a)anthracene | 330 ug/kg | 91J | 80J | 1300J | 76J | 38J | 30J | 28J | 30J | 36J | 32J | 60J | 62J | 63J | 45J |
| Chrysene | 330 ug/kg | 120J | 110J | 1700J | 120J | 92J | 64J | 67J | 61J | 89J | 50J | 75J | 78J | 100J | 100J |
| bis(2-ethylhexyl)phthalate | 330 ug/kg | 420UJ | 410UJ | 720UJ | 370UJ | 420UJ | 1300UJ | 3500J | 430UJ | 680UJ | 890U | 410UJ | 410UJ | 450UJ | 440UJ |
| Di-n-octylphthalate | 330 ug/kg | 420UJ | 410UJ | 390UJ | 370UJ | 420UJ | 380UJ | 410UJ | 420UJ | 520UJ | 370U | 410U | 410R | 450R | 440UJ |
| Benzo(b)fluoranthene | 330 ug/kg | 120J | 140J | 1200J | 84J | 61J | 47J | 38J | 52J | 70J | 42J | 62J | 52J | 80J | 57J |
| Benzo(k)fluoranthene | 330 ug/kg | 100J | 110J | 1200J | 86J | 36J | 38J | 29J | 34J | 55J | 39J | 48J | 60J | 80J | 51J |
| Benzo(a)pyrene | 330 ug/kg | 110J | 120J | 1200J | 97J | 42J | 42J | 29J | 37J | 55J | 38J | 58J | 62J | 79J | 41J |
| Indeno(1,2,3-cd)pyrene | 330 ug/kg | 110J | 100J | 860J | 100J | 33J | 61J | 31J | 40J | 57J | 33J | 42J | 50J | 84J | 42J |
| Dibenzo(a,h)anthracene | 330 ug/kg | 420UJ | 49J | 400J | 370UJ | 420UJ | 28J | 410UJ | 420UJ | 520UJ | 370U | 410U | 410R | 450R | 440UJ |
| Benzo(g,h,I)perylene | 330 ug/kg | 53J | 100J | 850J | 83J | 82J | 60J | 41J | 52J | 95J | 28J | 37J | 55J | 78J | 110J |

Comprehensive Analytical Results -
Soil Samples

| SAMPLE NUMBERS | | E0569 ME0569 | E0570 ME0570 | E0571 ME0571 | E0572 ME0572 | E0573 ME0573 | E0574 ME0574 | E0575 ME0575 | E0576 ME0576 | E0577 ME0577 | E0578 ME0578 | E0579 ME0579 | E0580 ME0580 | E0581 ME0581 | E0582 ME0582 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:30 | 10:50 | 11:10 | 11:30 | 12:00 | 13:45 | 14:05 | 14:35 | 14:25 | 15:30 | 15:45 | 15:50 | 11:45 | 12:20 |
| SAMPLE DEPTH | | 12" | 12 – 20" | 18 – 20" | 12 -20" | 16 – 20" | 18 – 23" | 12" | 18 – 24" | 12 – 20" | 12" | 0 – 1' | 0 – 1' | 12" | 16 – 20" |
| QA/QC DESCRIPTION (if applicable) | | SO-01 | SO-02 | SO-03 | SO-04 | SO-05 | SO-06 | SO-07 | SO-08 | SO-09 | SO-10 | SO-11 | SO-12 | SO-13 | SO-14 |
| *PESTICIDES/PCBs* | *CRQL* | | | | | | | | | | | | | | |
| alpha-BHC | 1.7 ug/kg | 2.2U | 2.1U | 2.0U | 1.9U | 2.2UJ | 2.0U | 2.1UJ | 2.2UJ | 2.7UJ | 1.9U | 2.1U | 2.1UJ | 2.3UJ | 2.3UJ |
| beta-BHC | 1.7 ug/kg | 2.2U | 2.1UJ | 2.0UJ | 1.9UJ | 2.2UJ | 2.0UJ | 2.1UJ | 2.2UJ | 2.7UJ | 1.9U | 2.1U | 2.1UJ | 2.3UJ | 2.3UJ |
| delta-BHC | 1.7 ug/kg | 2.2U | 2.1U | 2.0U | 1.9U | 2.2U | 2.0U | 2.1UJ | 2.2UJ | 2.7U | 1.9U | 2.1U | 2.1U | 2.3U | 2.3U |
| gamma-BHC (Lindane) | 1.7 ug/kg | 2.2U | 2.1UJ | 2.0UJ | 1.9UJ | 2.2UJ | 2.0UJ | 2.1UJ | 2.2UJ | 2.7UJ | 1.9U | 2.1U | 2.1UJ | 2.3UJ | **0.48J** |
| heptachlor | 1.7 ug/kg | 2.6U | 2.1U | 0.95UJ | 0.62UJ | 2.2U | 0.41UJ | 0.57UJ | 2.2U | 2.7U | 0.98UJ | 0.74UJ | 1.2UJ | 0.83UJ | 1.5UJ |
| aldrin | 1.7 ug/kg | 2.2U | 2.1U | 2.0U | **1.4J** | **7.2** | 2.0U | 2.1UJ | **0.99J** | **2.8** | **0.17J** | **1.6J** | 2.1U | 2.3U | **5.9** |
| heptachlor epoxide | 1.7 ug/kg | 2.2U | 2.1U | 2.0U | 1.9U | 2.2U | 2.0U | 2.1UJ | 2.2U | 2.7U | 1.9U | 2.1U | 2.1U | 2.3U | **1.3J** |
| endosulfan I | 1.7 ug/kg | 2.2U | 2.1U | 2.0U | 1.9U | **4.6J** | 2.0U | 2.1UJ | 2.2UJ | 2.7UJ | 1.9U | 2.1U | 2.1U | 2.3U | **11** |
| dieldrin | 3.3 ug/kg | **2.7J** | **1.0J** | **3.8J** | **7.6J** | **13** | **2.0J** | **0.90J** | **4.6** | **17** | **1.4J** | **2.9J** | **1.8J** | **1.1J** | **17** |
| 4,4-DDE | 3.3 ug/kg | **2.7J** | 4.1U | **5.6** | **13J** | **22J** | **3.2J** | **1.8J** | **6.1J** | **19J** | **3.1J** | **5.6** | **2.3J** | **2.7J** | **24** |
| Endrin | 3.3 ug/kg | **3.5J** | 4.1U | **1.0J** | 3.7U | 4.2U | 3.8U | 4.1UJ | 4.3U | 5.2U | 3.7U | **4.1R** | 4.1U | 4.6U | 4.4U |
| Endosulfan II | 3.3 ug/kg | 4.2U | 4.1U | 3.9U | **12J** | **20** | 3.8U | 4.1UJ | **9.2** | **23** | **1.9J** | **2.7J** | 4.1U | 4.6U | 4.4U |
| 4,4-DDD | 3.3 ug/kg | **2.1J** | 4.1U | 3.9U | **1.7J** | **6.7** | **0.71J** | 4.1UJ | **2.0J** | **4.9J** | 3.7U | **1.1J** | **.82J** | 4.6U | **9.5** |
| Endosulfan sulfate | 3.3 ug/kg | 4.2U | 4.1U | 3.9U | 3.7U | 4.2U | **1.7J** | 4.1UJ | 4.3U | 5.2U | 3.7U | 4.1U | **35** | **1.3J** | **12** |
| 4,4-DDT | 3.3 ug/kg | **3.1J** | **3.8J** | **19J** | **24J** | **52J** | **8.4J** | **4.9J** | **15J** | **56J** | **6.4** | **11** | **8** | **1.8J** | **39** |

COMPOUND DETECTED (ug/kg)

| *PESTICIDES/PCBs* | *CRQL* | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| methoxychlor | 17.0 ug/kg | 2.3UJ | 21UJ | 20UJ | **26J** | 22UJ | 20UJ | 21UJ | 22UJ | 27UJ | 19U | 21U | 21U | 23U | **28** |
| endrin ketone | 3.3 ug/kg | 4.2U | 4.1UJ | 3.9UJ | 3.7UJ | 4.2UJ | 3.8UJ | 4.1UJ | 4.3UJ | 5.2UJ | 3.7U | 0.62NJ | 4.1U | 4.6U | 4.4U |
| endrin aldehyde | 3.3 ug/kg | 4.2U | 4.1U | 3.9U | 3.7U | 4.2U | 3.8U | 4.1UJ | 4.3U | 5.2U | 3.7U | 4.1U | 4.1U | 4.6U | 4.4U |
| alpha-chlordane | 1.7 ug/kg | **1.3J** | 2.1U | 2.0U | 1.9U | 2.2UJ | 2.0U | 2.1UJ | **1.3J** | **5.4J** | 1.9U | **1.2J** | **1.3J** | 2.3U | **9.3** |
| gamma-chlordane | 1.7 ug/kg | 2.2U | 2.1U | **4.8** | 1.9U | 2.2UJ | 2.0U | 2.1UJ | **2.1J** | 2.7UJ | **1.7J** | **3.5** | **1.3J** | 2.3U | 2.3U |
| toxaphene | 170 ug/kg | 220U | 210U | 200U | 190U | 220U | 200U | 210UJ | 220U | 270U | 190U | 210U | 210U | 230U | 230U |
| aroclor-1016 | 33 ug/kg | 42U | 41U | 39U | 37U | 42U | 38U | 41UJ | 43U | 52U | 37U | 41U | 41U | 46U | 44U |
| aroclor-1221 | 33 ug/kg | 86U | 83U | 79U | 76U | 86U | 78U | 83UJ | 87U | 110U | 75U | 83U | 82U | 92U | 90U |
| aroclor-1232 | 67 ug/kg | 42U | 41U | 39U | 37U | 42U | 38U | 41UJ | 43U | 52U | 37U | 41U | 41U | 46U | 44U |
| aroclor-1242 | 33 ug/kg | 42U | 41U | 39U | 37U | 42U | 38U | 41UJ | 43U | 52U | 37U | 41U | 41U | 46U | 44U |
| aroclor-1248 | 33 ug/kg | 42U | 41U | 39U | 37U | 42U | 38U | 41UJ | 43U | 52U | 37U | 41U | 41U | 46U | 44U |
| aroclor-1254 | 33 ug/kg | 42U | 41U | **120** | **220** | **490** | **71** | **35** | **100** | **510** | **51** | **92** | **52** | 46U | **500** |
| aroclor-1260 | 33 ug/kg | 42U | 41U | 39U | 37U | 42U | 38U | 41UJ | 43U | 52U | 37U | 41U | 41U | 46U | 44U |

Comprehensive Analytical Results -
Soil Samples

| SAMPLE NUMBERS | | E0569 ME0569 | E0570 ME0570 | E0571 ME0571 | E0572 ME0572 | E0573 ME0573 | E0574 ME0574 | E0575 ME0575 | E0576 ME0576 | E0577 ME0577 | E0578 ME0578 | E0579 ME0579 | E0580 ME0580 | E0581 ME0581 | E0582 ME0582 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:30 | 10:50 | 11:10 | 11:30 | 12:00 | 13:45 | 14:05 | 14:35 | 14:25 | 15:30 | 15:45 | 15:50 | 11:45 | 12:20 |
| SAMPLE DEPTH | | 12" | 12 – 20" | 18 – 20" | 12 -20" | 16 – 20" | 18 – 23" | 12" | 18 – 24" | 12 – 20" | 12" | 0 – 1' | 0 – 1' | 12" | 16 – 20" |
| QA/QC DESCRIPTION (if applicable) | | SO-01 | SO-02 | SO-03 | SO-04 | SO-05 | SO-06 | SO-07 | SO-08 | SO-09 | SO-10 | SO-11 | SO-12 | SO-13 | SO-14 |
| ANALYTE DETECTED (mg/kg) | | | | | | | | | | | | | | | |
| *TAL METALS/CYANIDE* | *CRDL* | | | | | | | | | | | | | | |
| aluminum | 40 mg/k | 5740 | 5810 | 5250 | 2570 | 4890 | 3450 | 3410 | 6200 | 4670 | 6680 | 8480 | 6180 | 6720 | 4500 |
| antimony | 12 mg/k | 1.5 | 14.9U | 2.3 | 1.8 | 4.1 | 2.1 | 3 | 1.7 | 2.1 | 13.6U | 2.8 | 2.9 | 2 | 4.1 |
| arsenic | 2 mg/k | 4.7 | 6.1 | 7 | 5.9 | 8.7 | 8.1 | 5.5 | 6 | 7.1 | 8.4 | 11.3 | 6.6 | 5.9 | 6.8 |
| barium | 40 mg/k | 102 | 170 | 197 | 1500 | 3650 | 1000 | 1610 | 1610 | 2780 | 222 | 1260 | 1320 | 117 | 4670 |
| beryllium | 1 mg/k | 0.54 | 0.56 | 0.48 | 0.28 | 0.45 | 0.33 | 0.34 | 0.58 | 0.5 | 0.56 | 0.66 | 0.59 | 0.62 | 0.49 |
| cadmium | 1 mg/k | 1.2U | 1.2U | 1.2U | 1.1U | 1.4U | 1.2U | 2.4 | 1.3U | 0.54 | 0.63 | 1.2U | 1.3U | 1.4 | 1.3U |
| calcium | 1000 mg/k | 35600 | 25000 | 43300 | 79600 | 16700 | 60700 | 30700 | 28600 | 47800 | 37600 | 22200 | 46300 | 35200 | 10600 |
| chromium | 2 mg/k | 8.9 | 8.7 | 9.6 | 25.8 | 68.6 | 23.4 | 24.3 | 25.2 | 40.4 | 12.9 | 23.2 | 19.8 | 10.7 | 70.7 |
| cobalt | 10 mg/k | 6.4 | 8.2 | 6.1 | 7.3 | 17.2 | 6.8 | 7.1 | 9.9 | 12.4 | 7.5 | 10.6 | 8.5 | 7.2 | 17.5 |
| copper | 5 mg/k | 12.7 | 9.9 | 13.8 | 38.1 | 158 | 28.8 | 29.3 | 46.8 | 45 | 24.7 | 23.5 | 20.8 | 17.8 | 238 |
| iron | 20 mg/k | 11200 | 10800 | 11000 | 7910 | 30600 | 10600 | 8640 | 15400 | 17900 | 16500 | 17500 | 11200 | 12900 | 11900 |
| lead | 0.6 mg/k | 20.7 | 27.5 | 44.7 | 635 | 1480 | 364 | 597 | 405 | 825 | 96.1 | 115 | 116 | 23 | 1890 |
| magnesium | 1000 mg/k | 16400 | 11900 | 22200 | 37400 | 34100 | 35700 | 20100 | 20800 | 40100 | 18700 | 14400 | 28400 | 11900 | 37200 |
| manganese | 3 mg/k | 494 | 990 | 475 | 303 | 730 | 348 | 290 | 642 | 492 | 534 | 573 | 547 | 500 | 552 |
| mercury | 0.1 mg/k | 1.3J | 0.35 | 0.31 | 0.14 | 0.22 | 5.4 | 4 | 0.49 | 0.87 | 0.14J | 0.090J | 0.11J | 0.12 | 0.24J |
| nickel | 8 mg/k | 13.4 | 12.6 | 12.9 | 74 | 189 | 55 | 66 | 65.3 | 130 | 20.5 | 57.2 | 47.4 | 16.2 | 206 |
| potassium | 1000 mg/k | 1270J | 890J | 846J | 659J | 878J | 568J | 556J | 1240J | 1080J | 1210J | 834J | 716J | 1270 | 856J |
| selenium | 1 mg/k | 8.6U | 8.7U | 8.4U | 7.8U | 9.5U | 8.4U | 9.0U | 9.3U | 11.3U | 7.9U | 8.6U | 8.9U | 9.6 | 9.4U |
| silver | 2 mg/k | 2.4UJ | 2.5UJ | 2.4UJ | 2.2UJ | 2.7UJ | 2.4UJ | 2.6UJ | 2.7UJ | 3.2UJ | 2.3UJ | 2.4UJ | 0.27J | 2.8 | 2.7UJ |
| sodium | 1000 mg/k | 1220U | 1240U | 1200U | 1110U | 1350U | 1200U | 1290U | 1330U | 109J | 1130U | 1220U | 1270U | 1380 | 1350U |
| thallium | 2 mg/k | 6.1U | 6.2U | 6.0U | 5.6U | 6.8U | 6.0U | 6.4U | 6.7U | 8.0U | 5.7U | 6.1U | 6.3U | 6.9 | 6.7U |
| vanadium | 10 mg/k | 14.7 | 15.7 | 14.4 | 8.4 | 16.9 | 11.3 | 10.4 | 17.7 | 12.9 | 20.6 | 25.6 | 18.1 | 15.5 | 15.1 |
| zinc | 4 mg/k | 65.9 | 35.1 | 55.1 | 133 | 289 | 128 | 140 | 161 | 275 | 125 | 93.5 | 83.1 | 66 | 387 |
| cyanide | 2 mg/k | 1.2U | 1.2U | 1.2U | 1.1U | 1.4U | 1.2U | 1.3U | 1.3U | 1.6U | 1.1U | 1.2U | 1.3U | 1.4 | 1.3U |

Comprehensive Analytical Results - Sediment Samples

| SAMPLE NUMBERS | | E0555 ME0555 | E0556 ME0556 | E0557 ME0557 | E0558 ME0558 | E0559 ME0559 | E0560 ME0560 | E0561 ME0661 | E0562 ME0562 | E0563 ME0563 | E0564 ME0564 | E0565 ME0565 | E0566 ME0566 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:25 | 10:50 | 11:10 | 11:35 | 12:00 | 12:35 | 14:00 | 14:20 | 14:35 | 15:10 | 15:40 | 15:30 |
| SAMPLE DEPTH | | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" |
| QA/QC DESCRIPTION (if applicable) | | SED-01 | SED-02 | SED-03 | SED-04 | SED-05 | SED-06 | SED-07 | SED-08 | SED-09 | SED-10 | SED-11 | SED-12 |
| COMPOUND DETECTED (ug/kg) | | | | | | | | | | | | | |
| *VOLATILE ORGANIC COMPOUNDS* | *CRQL* | | | | | | | | | | | | |
| dichlorodifluoromethane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Chloromethane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| vinyl chloride | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Bromomethane | 10 ug/kg | 15UJ | 17UJ | 14UJ | 20UJ | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Chloroethane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Trichlorofluoromethane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,1-Dichloroethene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Acetone | 10 ug/kg | **25** | **13J** | **13J** | **61** | **14J** | **24J** | **44J** | **16J** | **9J** | 16UJ | **7J** | **6J** |
| Carbon Disulfide | 10 ug/kg | 15U | 17U | 14U | **3J** | 15U | 20U | 27U | 19UJ | 15UJ | 16UJ | 15UJ | 13U |
| Methyl Acetate | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20UJ | 27U | 19U | 15U | 16U | 15U | 13U |
| Methylene Chloride | 10 ug/kg | 15UJ | 17UJ | 14UJ | 20UJ | 15UJ | 20UJ | 27UJ | 19UJ | 15UJ | 16UJ | 15UJ | 13UJ |
| trans-1,2-Dichloroethene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Methyl tert-Butyl Ether | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,1-Dichloroethane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| cis-1,2-Dichloroethene | 10 ug/kg | 15U | 17U | **2J** | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 2-Butanone | 10 ug/kg | **7J** | 17U | 14U | **29** | **8J** | **13J** | **24J** | 19UJ | 15UJ | 16UJ | 15UJ | 13UJ |
| Chloroform | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,1,1-Trichloroethane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Cyclohexane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Carbon Tetrachloride | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| benzene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,2-Dichloroethane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Trichloroethene | 10 ug/kg | 15U | 17U | **5J** | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Methylcyclohexane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,2-Dichloropropane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Bromodichloromethane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| cis-1,3-Dichloropropene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 4-Methyl-2-Pentanone | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |

## Comprehensive Analytical Results - Sediment Samples

| SAMPLE NUMBERS | E0555 ME0555 | E0556 ME0556 | E0557 ME0557 | E0558 ME0558 | E0559 ME0559 | E0560 ME0560 | E0561 ME0661 | E0562 ME0562 | E0563 ME0563 | E0564 ME0564 | E0565 ME0565 | E0566 ME0566 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | 10:25 | 10:50 | 11:10 | 11:35 | 12:00 | 12:35 | 14:00 | 14:20 | 14:35 | 15:10 | 15:40 | 15:30 |
| SAMPLE DEPTH | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" |
| QA/QC DESCRIPTION (if applicable) | SED-01 | SED-02 | SED-03 | SED-04 | SED-05 | SED-06 | SED-07 | SED-08 | SED-09 | SED-10 | SED-11 | SED-12 |
| COMPOUND DETECTED (ug/kg) | | | | | | | | | | | | |
| *VOLATILE ORGANIC COMPOUNDS* | *CRQL* | | | | | | | | | | | |
| Toluene | 10 ug/kg | **47J** | 17U | 14U | **4700** | **39** | **510** | **6100** | **17J** | **2J** | **78** | **42** | **2J** |
| trans-1,3-Dichloropropene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,1,2-Trichloroethane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Tetrachloroethene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 2-Hexanone | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19UJ | 15UJ | 16UJ | 15UJ | 13U |
| Dibromochloromethane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,2-Dibromoethane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Chlorobenzene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Ethylbenzene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Xylenes (total) | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Styrene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Bromoform | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| Isopropylbenzene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,1,2,2-Tetrchloroethane | 10ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,3-Dichlorobenzene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,4-Dichlorobenzene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,2-Dichlorobenzene | 10ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,2-Dibromo-3-chloropropane | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| 1,2,4-Trichlorobenzene | 10 ug/kg | 15U | 17U | 14U | 20U | 15U | 20U | 27U | 19U | 15U | 16U | 15U | 13U |
| *SEMI-VOLATILE ORGANIC COMPOUN* | *CRQL* | | | | | | | | | | | |
| Benzaldehyde | 330 ug/kg | **67J** | **42J** | 480U | **250J** | **150J** | **180J** | **260J** | **120J** | 490U | **150J** | 470U | 430U |
| Phenol | 330 ug/kg | 500UJ | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| bis-(2-Chloroethyl)ether | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 2-Chlorophenol | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 2-Methylphenol | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 2,2'-oxybis(1-Chloropropane) | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| Acetophenone | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 4-methylphenol | 330 ug/kg | **210J** | 550U | 480U | **6700** | **230J** | **810** | **2300** | **120J** | **31J** | **31J** | **160J** | 430U |
| n-nitroso-di-n-dipropylamine | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| hexachloroethane | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| nitrobenzene | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| isophorone | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |

Comprehensive Analytical Results - Sediment Samples

| SAMPLE NUMBERS | | E0555 ME0555 | E0556 ME0556 | E0557 ME0557 | E0558 ME0558 | E0559 ME0559 | E0560 ME0560 | E0561 ME0661 | E0562 ME0562 | E0563 ME0563 | E0564 ME0564 | E0565 ME0565 | E0566 ME0566 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:25 | 10:50 | 11:10 | 11:35 | 12:00 | 12:35 | 14:00 | 14:20 | 14:35 | 15:10 | 15:40 | 15:30 |
| SAMPLE DEPTH | | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" |
| QA/QC DESCRIPTION (if applicable) | | SED-01 | SED-02 | SED-03 | SED-04 | SED-05 | SED-06 | SED-07 | SED-08 | SED-09 | SED-10 | SED-11 | SED-12 |
| 2-nitrophenol | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 2,4-dimethylphenol | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| bis-(2-Chloroethoxy)methane | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 2,4-dichlorophenol | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| Naphthalene | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 4-Chloroaniline | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| Hexachlorobutadiene | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| Caprolactam | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 4-chloro-3-methylphenol | 330 ug/kg | 500UJ | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 2-methylnaphthalene | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| Hexachlorocylopentadiene | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| COMPOUND DETECTED (ug/kg) | | | | | | | | | | | | | |
| *SEMI-VOLATILE ORGANIC COMPOUN* | *CRQL* | | | | | | | | | | | | |
| 2,4,6-Trichlorophenol | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 2,4,5-Trichlorophenol | 330 ug/kg | 1300U | 1400U | 1200U | 1600U | 1200U | 1600U | 2200U | 1500U | 1200U | 1300U | 1200U | 1100U |
| 1,1'Biphenyl | 800 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 2-Chloronaphthalene | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 2-Nitroaniline | 800 ug/kg | 1300U | 1400U | 1200U | 1600U | 1200U | 1600U | 2200U | 1500U | 1200U | 1300U | 1200U | 1100U |
| Dimethylphthalate | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 2,6-Dinitrotoluene | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| Acenaphthylene | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 3-Nitroaniline | 330 ug/kg | 1300U | 1400U | 1200U | 1600U | 1200U | 1600U | 2200U | 1500U | 1200U | 1300U | 1200U | 1100U |
| Acenaphthene | 330 ug/kg | 500UJ | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 2,4-dinitrophenol | 800 ug/kg | 1300U | 1400U | 1200U | 1600U | 1200U | 1600U | 2200U | 1500U | 1200U | 1300U | 1200U | 1100U |
| 4-nitrophenol | 800 ug/kg | 1300UJ | 1400U | 1200U | 1600U | 1200U | 1600U | 2200U | 1500U | 1200U | 1300U | 1200U | 1100U |
| Dibenzofuran | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 2,4-Dinitrotoluene | 330 ug/kg | 500UJ | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| diethylphthalate | 330 ug/kg | 500U | 550U | **35J** | **32J** | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| Fluorene | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 4-Chlorophenyl-phenyl ether | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 4-Nitroanilene | 800 ug/kg | 1300U | 1400U | 1200U | 1600U | 1200U | 1600U | 2200U | 1500U | 1200U | 1300U | 1200U | 1100U |
| 4,6-dinitro-2-methylphenol | 800 ug/kg | 1300U | 1400U | 1200U | 1600U | 1200U | 1600U | 2200U | 1500U | 1200U | 1300U | 1200U | 1100U |
| N-Nitrosodiphenylamine | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| 4-Bromophenyl-phenylether | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |

Comprehensive Analytical Results - Sediment Samples

| SAMPLE NUMBERS | | E0555 ME0555 | E0556 ME0556 | E0557 ME0557 | E0558 ME0558 | E0559 ME0559 | E0560 ME0560 | E0561 ME0661 | E0562 ME0562 | E0563 ME0563 | E0564 ME0564 | E0565 ME0565 | E0566 ME0566 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:25 | 10:50 | 11:10 | 11:35 | 12:00 | 12:35 | 14:00 | 14:20 | 14:35 | 15:10 | 15:40 | 15:30 |
| SAMPLE DEPTH | | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" |
| QA/QC DESCRIPTION (if applicable) | | SED-01 | SED-02 | SED-03 | SED-04 | SED-05 | SED-06 | SED-07 | SED-08 | SED-09 | SED-10 | SED-11 | SED-12 |
| Hexachlorobenzene | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| Atrazine | 800 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| Pentachlorophenol | 330 ug/kg | 1300U | 1400U | 1200U | 1600U | 1200U | 1600U | 2200U | 1500U | 1200U | 57J | 1200U | 1100U |
| phenanthrene | 330 ug/kg | 94J | 110J | 88J | 240J | 100J | 210J | 180J | 250J | 72J | 98J | 76J | 40J |
| Anthracene | 330 ug/kg | 500U | 550U | 480U | 34J | 500U | 42J | 880U | 33J | 490U | 510U | 470U | 430U |
| Carbazole | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640U | 880U | 610U | 490U | 510U | 470U | 430U |
| di-n-butylphthalate | 330 ug/kg | 500U | 550U | 130J | 150J | 64J | 96J | 85J | 50J | 39J | 35J | 25J | 28J |
| Fluoranthene | 330 ug/kg | 160J | 190J | 120J | 390J | 150J | 340J | 320J | 330J | 130J | 160J | 150J | 66J |
| COMPOUND DETECTED (ug/kg) | | | | | | | | | | | | | |
| *SEMI-VOLATILE ORGANIC COMPOUN* | *CRQL* | | | | | | | | | | | | |
| Pyrene | 330 ug/kg | 190J | 250J | 180J | 590J | 200J | 460J | 450J | 520J | 210J | 230J | 240J | 90J |
| Butylbenzylphthalate | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640UJ | 880UJ | 610U | 490U | 510U | 470U | 430U |
| 3,3'Dichlorobenzidine | 330 ug/kg | 500U | 550U | 480U | 640U | 500U | 640UJ | 880UJ | 610U | 490U | 510U | 470U | 430U |
| Benzo(a)anthracene | 330 ug/kg | 73J | 94J | 71J | 220J | 78J | 170J | 170J | 160J | 69J | 99J | 78J | 40J |
| Chrysene | 330 ug/kg | 95J | 130J | 88J | 290J | 99J | 240J | 260J | 240J | 110J | 130J | 130J | 52J |
| bis(2-ethylhexyl)phthalate | 330 ug/kg | 500UJ | 550UJ | 480UJ | 640UJ | 500UJ | 640UJ | 880UJ | 610UJ | 490UJ | 510UJ | 470UJ | 430UJ |
| Di-n-octylphthalate | 330 ug/kg | 500U | 550U | 480U | 640UJ | 500UJ | 640UJ | 880UJ | 610U | 490UJ | 510UJ | 470UJ | 430UJ |
| Benzo(b)fluoranthene | 330 ug/kg | 80J | 120J | 120J | 200J | 90J | 160J | 330J | 180J | 95J | 170J | 170J | 39J |
| Benzo(k)fluoranthene | 330 ug/kg | 49J | 60J | 480U | 180J | 81J | 200J | 880UJ | 170J | 75J | 510UJ | 470UJ | 27J |
| Benzo(a)pyrene | 330 ug/kg | 55J | 82J | 49J | 170J | 78J | 160J | 140J | 160J | 66J | 82J | 75J | 37J |
| Indeno(1,2,3-cd)pyrene | 330 ug/kg | 30J | 51J | 30J | 88J | 46J | 87J | 100J | 84J | 40J | 45J | 44J | 430UJ |
| Dibenzo(a,h)anthracene | 330 ug/kg | 500U | 29J | 480U | 43J | 500UJ | 40J | 880UJ | 62J | 490UJ | 32J | 26J | 430UJ |
| Benzo(g,h,I)perylene | 330 ug/kg | 500U | 550U | 480U | 57J | 30J | 89J | 81J | 56J | 27J | 510UJ | 28J | 430UJ |
| *PESTICIDES/PCBs* | *CRQL* | | | | | | | | | | | | |
| alpha-BHC | 1.7 ug/kg | 2.6U | 2.8U | 2.4U | 3.3U | 2.6U | 3.3U | 4.6U | 3.1U | 2.5U | 2.7U | 2.5U | 2.2U |
| beta-BHC | 1.7 ug/kg | 2.6UJ | 2.8UJ | 2.4UJ | 3.3UJ | 2.6UJ | 3.3UJ | 4.6UJ | 3.1UJ | 2.5UJ | 2.7UJ | 2.5UJ | 2.2UJ |
| delta-BHC | 1.7 ug/kg | 2.6U | 2.8U | 2.4U | 3.3U | 2.6U | 3.3U | 4.6U | 3.1U | 2.5U | 2.7U | 2.5U | 2.2U |
| gamma-BHC (Lindane) | 1.7 ug/kg | 2.6UJ | 2.8UJ | 2.4UJ | 3.3UJ | 2.6UJ | 3.3UJ | 4.6UJ | 3.1UJ | 2.5UJ | 2.7UJ | 2.5UJ | 2.2UJ |
| heptachlor | 1.7 ug/kg | 1.6UJ | 2.4UJ | 1.6UJ | 3.0J | 1.4UJ | 2.5UJ | 3.1J | 1.5UJ | 2.5U | 2.7U | 1.7UJ | 1.6UJ |
| aldrin | 1.7 ug/kg | 2.6UJ | 2.8UJ | 2.4UJ | 3.3U | 2.6UJ | 3.3UJ | 4.6U | 3.1U | 2.5U | 2.7U | 2.5U | 2.2U |
| heptachlor epoxide | 1.7 ug/kg | 2.6U | 2.8U | 2.4U | 3.3U | 2.6U | 3.3U | 4.6U | 3.1U | 2.5U | 2.7U | 2.5U | 2.2U |
| endosulfan I | 1.7 ug/kg | 2.6U | 2.8U | 2.4U | 3.3U | 2.6U | 3.3U | 4.6U | 3.1U | 2.5U | 2.7U | 2.5U | 2.2U |
| dieldrin | 3.3 ug/kg | 2.1J | 5.5U | 4.7U | 2.5J | 2.1J | 3.6J | 4.8J | 6.0U | 2.5J | 2.1J | ? | 4.2U |

## Comprehensive Analytical Results - Sediment Samples

| SAMPLE NUMBERS | | E0555 ME0555 | E0556 ME0556 | E0557 ME0557 | E0558 ME0558 | E0559 ME0559 | E0560 ME0560 | E0561 ME0661 | E0562 ME0562 | E0563 ME0563 | E0564 ME0564 | E0565 ME0565 | E0566 ME0566 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:25 | 10:50 | 11:10 | 11:35 | 12:00 | 12:35 | 14:00 | 14:20 | 14:35 | 15:10 | 15:40 | 15:30 |
| SAMPLE DEPTH | | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" |
| QA/QC DESCRIPTION (if applicable) | | SED-01 | SED-02 | SED-03 | SED-04 | SED-05 | SED-06 | SED-07 | SED-08 | SED-09 | SED-10 | SED-11 | SED-12 |
| 4,4-DDE | 3.3 ug/kg | 1.4J | 1.6J | 4.7U | 2.4J | 1.5J | 2.1J | 2.2J | 0.84J | 4.8U | 1.7J | 2.3J | 0.86J |
| Endrin | 3.3 ug/kg | 5.0U | 5.5U | 4.7U | 6.4U | 5.0U | 6.4U | 8.9U | 6.0U | 4.8U | 5.2U | 4.8U | 4.2U |
| Endosulfan II | 3.3 ug/kg | 5.0U | 5.5U | 4.7U | 6.4U | 5.0U | 6.4U | 8.9U | 6.0U | 4.8U | 5.2U | 4.8U | 4.2U |
| 4,4-DDD | 3.3 ug/kg | 5.0U | 5.5U | 4.7U | 6.4U | 5.0U | 6.4U | 8.9UJ | 6.0UJ | 4.8U | 5.2U | 4.8U | 4.2U |
| Endosulfan sulfate | 3.3 ug/kg | 5.0U | 5.5U | 4.7U | 6.4U | 5.0U | 6.4U | 8.9U | 6.0U | 4.8U | 5.2U | 4.8U | 4.2U |
| 4,4-DDT | 3.3 ug/kg | 2.2J | 5.5UJ | 4.7UJ | 6.4UJ | 5.0UJ | 6.4UJ | 8.9UJ | 6.0UJ | 4.8UJ | 5.2UJ | 4.8UJ | 4.2UJ |
| methoxychlor | 17.0 ug/kg | 26U | 28U | 24U | 33UJ | 26U | 33U | 46UJ | 31UJ | 25UJ | 27UJ | 25UJ | 22UJ |
| endrin ketone | 3.3 ug/kg | 5.0U | 5.5U | 4.7U | 6.4UJ | 5.0U | 6.4U | 8.9UJ | 6.0UJ | 4.8UJ | 5.2UJ | 4.8UJ | 4.2UJ |
| endrin aldehyde | 3.3 ug/kg | 5.0U | 5.5U | 4.7U | 6.4U | 5.0U | 6.4U | 8.9U | 6.0U | 4.8U | 5.2U | 4.8U | 4.2U |
| alpha-chlordane | 1.7 ug/kg | 2.6UJ | 2.8UJ | 2.4UJ | 3.3U | 2.6UJ | 3.3U | 4.6U | 0.66J | 2.5U | 2.7U | 2.5U | 2.2U |
| gamma-chlordane | 1.7 ug/kg | 1.9J | 2.8U | 2.4U | 3.3U | 2.6U | 3.3U | 4.6U | 3.1U | 2.5U | 2.7U | 2.5U | 2.2U |
| toxaphene | 170 ug/kg | 260U | 280U | 240U | 330U | 260U | 330U | 460U | 310U | 250U | 270U | 250U | 220U |
| aroclor-1016 | 33 ug/kg | 50U | 55U | 47U | 64U | 50U | 64U | 89U | 60U | 48U | 52U | 48U | 42U |
| aroclor-1221 | 33 ug/kg | 100U | 110U | 96U | 130U | 100U | 130U | 180U | 120U | 98U | 110U | 97U | 86U |
| aroclor-1232 | 67 ug/kg | 50U | 55U | 47U | 64U | 50U | 64U | 89U | 60U | 48U | 52U | 48U | 42U |
| aroclor-1242 | 33 ug/kg | 50U | 55U | 47U | 64U | 50U | 64U | 89U | 60U | 48U | 52U | 48U | 42U |
| aroclor-1248 | 33 ug/kg | 50U | 55U | 47U | 64U | 50U | 64U | 89U | 60U | 48U | 52U | 48U | 42U |
| aroclor-1254 | 33 ug/kg | 50U | 55U | 47U | 64U | 50U | 64U | 89U | 60U | 48U | 52U | 48U | 42U |
| aroclor-1260 | 33 ug/kg | 50U | 55U | 47U | 64U | 50U | 64U | 89U | 60U | 48U | 52U | 48U | 42U |
| **ANALYTE DETECTED (mg/kg)** | | | | | | | | | | | | | |
| *TAL METALS/CYANIDE* | *CRDL* | | | | | | | | | | | | |
| aluminum | 40 mg/kg | 2730 | 2420 | 3840 | 4290 | 2430 | 3610 | 5700 | 3530 | 1870 | 3530 | 3570 | 2640 |
| antimony | 12 mg/kg | 20.2U | 2.2 | 2.3 | 4.5 | 2.8 | 5.7 | 3.7 | 2.7 | 17.4U | 2.5 | 2.3 | 16.4 |
| arsenic | 2 mg/kg | 4.6 | 3.6 | 6.2 | 6.3 | 3.1 | 5.6 | 6.7 | 4.6 | 3.1 | 4.4 | 4.7 | 2.8 |
| barium | 40 mg/kg | 56.4 | 56.5 | 87.6 | 94.5 | 50.8 | 92 | 133 | 81.7 | 43.5 | 75.7 | 67.2 | 52.6 |
| beryllium | 1 mg/kg | 0.29 | 0.27 | 0.39 | 0.44 | 0.28 | 0.42 | 0.57 | 0.37 | 0.23 | 0.37 | 0.38 | 0.29 |
| cadmium | 1 mg/kg | 1.7U | 1.5U | 1.4U | 2.0U | 1.5U | 1.9U | 2.6U | 1.8U | 1.4U | 1.5U | 1.5U | 1.4U |
| calcium | 1000 mg/kg | 67300 | 53000 | 61600 | 58400 | 60000 | 63700 | 69700 | 56300 | 57000 | 54000 | 48300 | 42700 |
| chromium | 2 mg/kg | 4.8 | 4.6 | 6.3 | 7.4 | 4.2 | 6.6 | 9.5 | 5.8 | 3.7 | 6.3 | 6 | 4.5 |
| cobalt | 10 mg/kg | 3.2 | 3.2 | 4.7 | 5.1 | 3 | 4.5 | 6.5 | 4.1 | 2.8 | 4.4 | 4.4 | 3.4 |
| copper | 5 mg/kg | 10.5 | 7.5 | 8.9 | 12.4 | 8.9 | 12.3 | 17.9 | 9.9 | 5.7 | 9.1 | 10.1 | 6 |
| iron | 20 mg/kg | 6780 | 6290 | 9810 | 10100 | 6060 | 8650 | 12700 | 8270 | 4840 | 7640 | 8380 | 5900 |
| lead | 0.6 mg/kg | 7.6 | 8.6 | 9 | 15.6 | 7.4 | 11.9 | 15 | 10.5 | 6.1 | 13.4 | 9.8 | 8 |
| magnesium | 1000 mg/kg | 15700 | 14600 | 16900 | 14400 | 16100 | 16100 | 15200 | 14400 | 14800 | 15300 | 12800 | 11700 |

Comprehensive Analytical Results - Sediment Samples

| SAMPLE NUMBERS | | E0555 ME0555 | E0556 ME0556 | E0557 ME0557 | E0558 ME0558 | E0559 ME0559 | E0560 ME0560 | E0561 ME0661 | E0562 ME0562 | E0563 ME0563 | E0564 ME0564 | E0565 ME0565 | E0566 ME0566 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE SAMPLE COLLECTED | | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 | 04/21/03 |
| TIME SAMPLE COLLECTED | | 10:25 | 10:50 | 11:10 | 11:35 | 12:00 | 12:35 | 14:00 | 14:20 | 14:35 | 15:10 | 15:40 | 15:30 |
| SAMPLE DEPTH | | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" | 0-12" |
| QA/QC DESCRIPTION (if applicable) | | SED-01 | SED-02 | SED-03 | SED-04 | SED-05 | SED-06 | SED-07 | SED-08 | SED-09 | SED-10 | SED-11 | SED-12 |
| manganese | 3 mg/kg | **232** | **213** | **334** | **358** | **201** | **338** | **486** | **291** | **190** | **310** | **383** | **260** |
| mercury | 0.1 mg/kg | **0.04** | **0.05** | **0.04** | **0.07** | 0.14U | **0.05** | **0.07** | **0.06** | **0.04** | **0.05** | **0.05** | **0.03** |
| nickel | 8 mg/kg | **6.9** | **6.9** | **10.2** | **11.4** | **7** | **10** | **15** | **9.6** | **5.2** | **9.3** | **9.1** | **6.3** |
| potassium | 1000 mg/kg | **541J** | **486J** | **601J** | **776J** | **520J** | **720J** | **1020J** | **647J** | **412J** | **631J** | **616J** | **462J** |
| selenium | 1 mg/kg | 11.8U | 10.7U | 10.1U | 13.7U | 10.6U | 13.4U | 18.1U | 12.5U | 10.1U | 10.8U | 10.2U | 9.6U |
| silver | 2 mg/kg | 3.4UJ | 3.1UJ | 2.9UJ | 3.9UJ | 3.0UJ | 3.8UJ | 5.2UJ | 3.6UJ | 2.9UJ | 3.1UJ | 2.9UJ | 2.7UJ |
| sodium | 1000 mg/kg | 1680U | 1530U | 1450U | 1960U | 1510U | 1920U | 2590U | 1780U | 1450U | 1540U | 1460U | 1370U |
| thallium | 2 mg/kg | 8.4U | 7.6U | 7.2U | 9.8U | 7.5U | 9.6U | 12.9U | 8.9U | 7.2U | 7.7U | 7.3U | 6.8U |
| vanadium | 10 mg/kg | **7.5** | **6.1** | **10.1** | **11.1** | **6.4** | **9.2** | **13.4** | **8.7** | **5** | **8.6** | **9.8** | **6.7** |
| zinc | 4 mg/kg | **31.8** | **29.1** | **34.3** | **47** | **29** | **45.9** | **67.6** | **40.8** | **22.5** | **36.6** | **33.9** | **25.6** |
| cyanide | 2 mg/kg | 1.7U | 1.6U | 1.5U | 2.0U | 1.5U | 1.9U | 2.6U | 1.8U | 1.5U | 1.6U | 1.5U | 1.4U |

# APPENDIX B

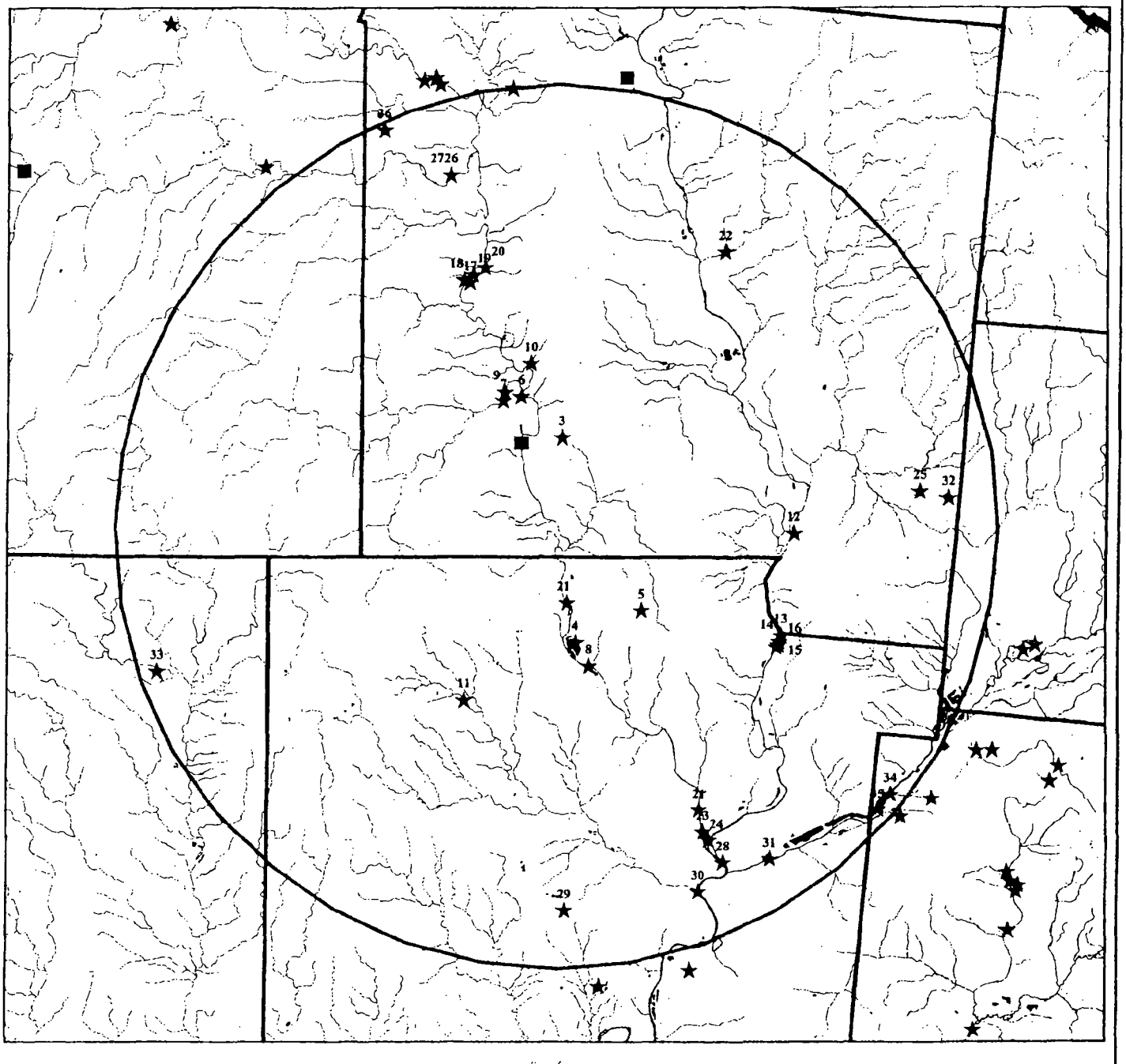
# GEOGRAPHIC INFORMATION SYSTEM MAPS AND DATA

*Division of Emergency & Remedial Response*

GEOGRAPHIC INFORMATION SYSTEM 15-MILE RADIUS MAP

NATURAL HERITAGE DATA

# Garland Road Landfill




Site

★ US Endangered/Threatened Species

★ Ohio Endangered/Threatened Species

Public Surface Water Systems

■ Community

■ Non-Community/Transient

■ Non-Community/Non-Transient

Rivers & Streams

Wetland Area

Lakes & Ponds

Limit of Radius From Site

County Boundaries

4 0 4 8 Miles

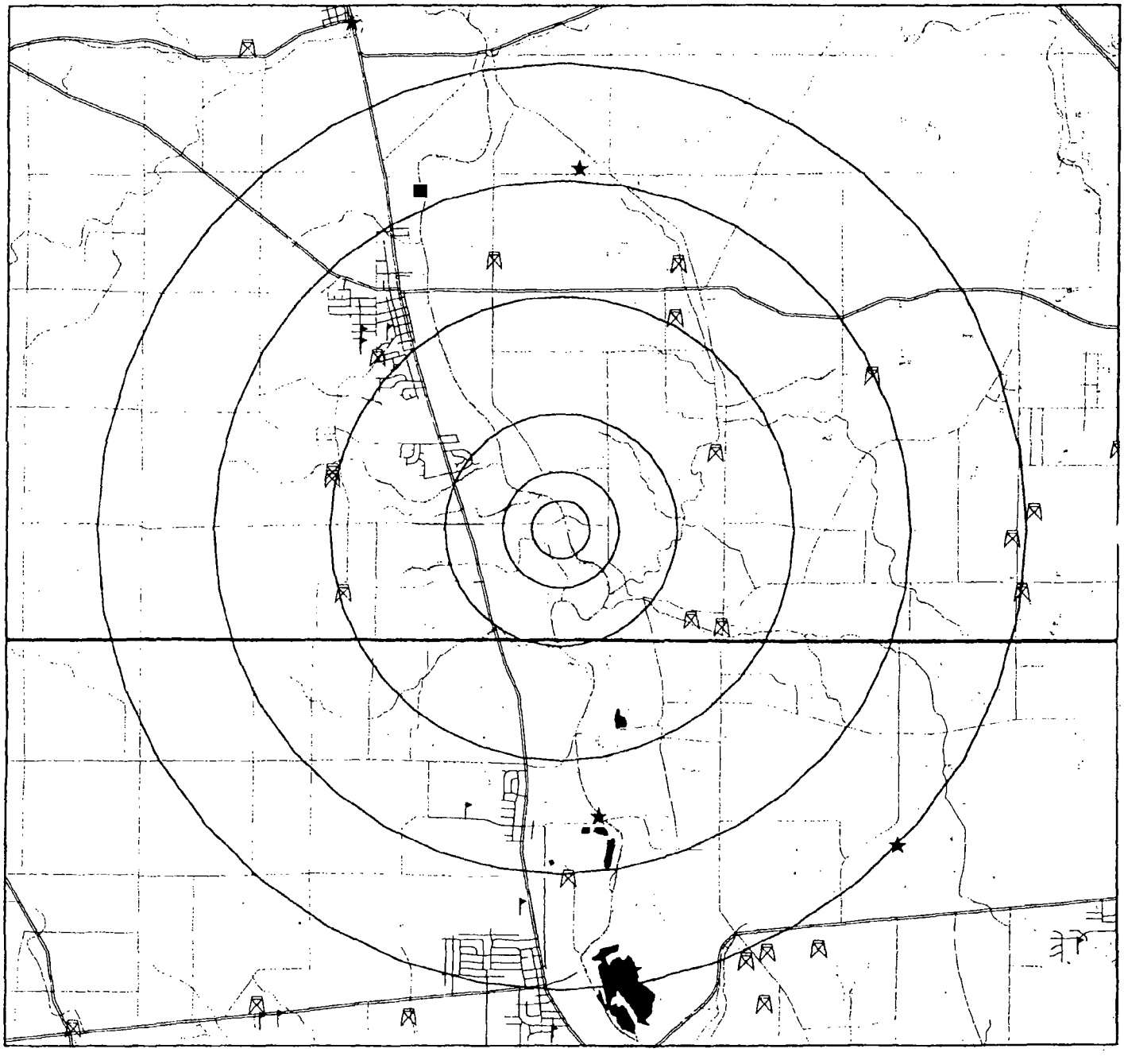
N

*Division of Emergency & Remedial Response*

GEOGRAPHIC INFORMATION SYSTEM 4-MILE RADIUS MAP

# Miami County

# Garland Road Landfill



Site
School
Hospital
Public Surface Water Systems
Public Ground Water Systems
US Endangered/Threatened Species
Ohio Endangered/Threatened Species

Wetland Area
Lakes & Ponds
Wellhead Protection Area
Limit of Radius From Site
County Boundaries

Rivers & Streams
Railroad
State and Federal Highways
Local Roads
Municipal Roads

N

2 0 2 Miles

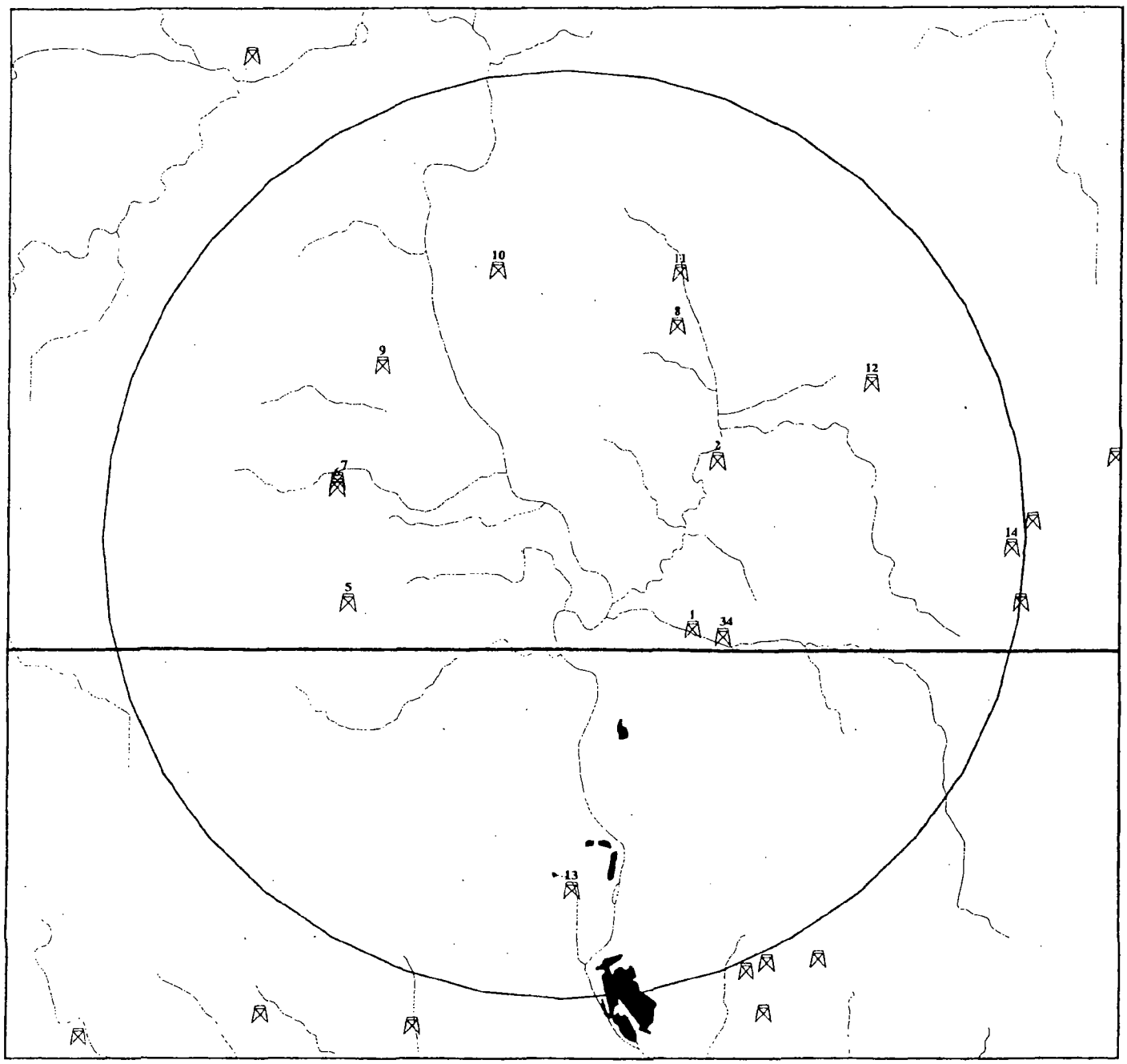
OhioEPA

*Division of Emergency & Remedial Response*

GEOGRAPHIC INFORMATION SYSTEM 4-MILE RADIUS MAP

# PUBLIC GROUND WATER SYSTEMS

## Garland Road Landfill




Site

Public Ground Water Systems
- Community
- Non-Community/Transient
- Non-Community/Non-Transient

Rivers & Streams
Wellhead Protection Area
Lakes & Ponds
Limit of Radius From Site
County Boundaries

1 0 1 Miles

N

**Garland Road Landfill**
**Population**

| RADIUS | TOTAL | WHITE | BLACK | INDIAN | ASIAN | HAWAII_PAC | OTHER | HOUSING |
|---|---|---|---|---|---|---|---|---|
| 3.00 - 4.00 | 6417 | 6217 | 96 | 10 | 36 | 1 | 57 | 2485 |
| 2.00 - 3.00 | 6470 | 6303 | 45 | 13 | 18 | 1 | 91 | 2467 |
| 1.00 - 2.00 | 3976 | 3884 | 23 | 7 | 14 | 0 | 47 | 1565 |
| 0.50 - 1.00 | 568 | 558 | 2 | 1 | 2 | 0 | 5 | 233 |
| 0.25 - 0.50 | 141 | 138 | 0 | 0 | 0 | 0 | 1 | 58 |
| 0.00 - 0.25 | 53 | 52 | 0 | 0 | 0 | 0 | 0 | 22 |
| TOTALS | 17625 | 17152 | 166 | 31 | 70 | 2 | 201 | 6830 |

Garland Road Landfill
Public Ground Water Systems

| ID_ | PWS_ID | SYS_TYPE | NAME | ADDRESS | CITY | ST. | DIST. | POP. |
|---|---|---|---|---|---|---|---|---|
| 1 | 5532912 | Non-Community/Transient | MILLERS GROVE POOL | 11995 FREDERICK ROAD | VANDALIA | OH | 1.3714 | 425 |
| 2 | 5536812 | Non-Community/Transient | BRUSHCREEK CHURCH OF GOD | 6370 KESSLER-FREDERICK ROAD | TIPP CITY | OH | 1.4782 | 85 |
| 3 | 5540912 | Non-Community/Transient | SUGAR GROVE BIBLE CHURCH | 7875 S. KESSLER-FREDERICK ROAD | TIPP CITY | OH | 1.6245 | 85 |
| 4 | 5548712 | Non-Community/Non-Transient | DAYTON CHRISTIAN-SUGRGRV | 7875 KESSLER-FREDRICK ROAD | TIPP CITY | OH | 1.6245 | 165 |
| 5 | 5544112 | Non-Community/Transient | HIGHLAND BRE-CHRIST CH. | 7210 SOUTH JAY ROAD | WEST MILTON | OH | 1.9622 | 100 |
| 6 | 5532712 | Non-Community/Transient | MEMORIAL HOLINESS CAMP | 7410 MISHLER DRIVE | WEST MILTON | OH | 2.0258 | 375 |
| 7 | 5532722 | Non-Community/Transient | MEMORIAL HOLINESS LODGE | 7410 MISHLER DRIVE | WEST MILTON | OH | 2.0376 | 75 |
| 8 | 5545112 | Non-Community/Transient | NASHVILLE UNITED CHURCH | 4540 WEST STATE ROUTE 571 | WEST MILTON | OH | 2.0545 | 90 |
| 9 | 5536012 | Non-Community/Transient | VFW NO. 8211 | BOX 266 SOUTH STATE ROUTE 48 | WEST MILTON | OH | 2.1647 | 40 |
| 10 | 5533612 | Non-Community/Transient | STILLWATER RIDGE, INC. | 6165 STATE ROUTE 571 | WEST MILTON | OH | 2.3689 | 100 |
| 11 | 5545012 | Non-Community/Transient | NASHVILLE RECREATION PK. | 2227 W STATE ROUTE 571 | WEST MILTON | OH | 2.4775 | 200 |
| 12 | 5532212 | Non-Community/Transient | HOMESTEAD GOLF COURSE | 5327 WORLEY ROAD | TIPP CITY | OH | 2.9742 | 200 |
| 13 | 5702512 | Community | UNION, CITY OF | 118 NORTH MAIN STREET | UNION | OH | 3.0474 | 6400 |
| 14 | 5539012 | Non-Community/Transient | GOOD SHEPHERD CHURCH | 7240 SOUTH PETERS ROAD | TIPP CITY | OH | 3.8830 | 60 |

Garland Road Landfill
Natural Heritage Data

| ID_ | STATUS | DISTANCE | SCI_NAME | COM_NAME |
|---|---|---|---|---|
| 1 | State Endangered | 2.5184 | EPIOBLASMA TRIQUETRA | SNUFFBOX |
| 2 | State Endangered | 2.5184 | VILLOSA FABALIS | RAYED BEAN |
| 3 | State Threatened | 3.1086 | VERATRUM WOODII | WOOD'S HELLEBORE |
| 4 | State Threatened | 3.8767 | LIPOCARPHA MICRANTHA | DWARF BULRUSH |
| 5 | State Threatened | 4.0019 | BARTRAMIA LONGICAUDA | UPLAND SANDPIPER |
| 6 | State Threatened | 4.6601 | VERATRUM WOODII | WOOD'S HELLEBORE |
| 7 | Federally Endangered | 4.7202 | MYOTIS SODALIS | INDIANA BAT |
| 8 | State Endangered | 4.7429 | EPIOBLASMA TRIQUETRA | SNUFFBOX |
| 9 | State Threatened | 4.9675 | VERATRUM WOODII | WOOD'S HELLEBORE |
| 10 | State Threatened | 5.6925 | VERATRUM WOODII | WOOD'S HELLEBORE |
| 11 | State Threatened | 6.5612 | ORCONECTES SLOANII | SLOAN'S CRAYFISH |
| 12 | State Threatened | 8.0730 | VERATRUM WOODII | WOOD'S HELLEBORE |
| 13 | State Threatened | 8.4504 | VERATRUM WOODII | WOOD'S HELLEBORE |
| 14 | State Threatened | 8.4643 | VERATRUM WOODII | WOOD'S HELLEBORE |
| 15 | State Endangered | 8.4700 | VIBURNUM MOLLE | SOFT-LEAVED ARROW-WOOD |
| 16 | State Threatened | 8.4882 | PENSTEMON PALLIDUS | DOWNY WHITE BEARD-TONGUE |
| 17 | State Threatened | 8.8790 | VERATRUM WOODII | WOOD'S HELLEBORE |
| 18 | State Threatened | 9.0254 | VERATRUM WOODII | WOOD'S HELLEBORE |
| 19 | State Threatened | 9.0952 | VERATRUM WOODII | WOOD'S HELLEBORE |
| 20 | State Endangered | 9.2037 | CAMPANULA ROTUNDIFOLIA | HAREBELL |
| 21 | State Endangered | 10.6612 | EPIOBLASMA TRIQUETRA | SNUFFBOX |
| 22 | State Endangered | 11.0086 | HYBOGNATHUS NUCHALIS | MISSISSIPPI SILVERY MINNOW |
| 23 | State Endangered | 11.4087 | PENSTEMON LAEVIGATUS | SMOOTH BEARD-TONGUE |
| 24 | State Threatened | 11.7522 | DESCURAINIA PINNATA | TANSY-MUSTARD |
| 25 | State Threatened | 12.3984 | TRIGLOCHIN MARITIMUM | SEASIDE ARROW-GRASS |
| 26 | State Endangered | 12.5270 | CAMPANULA ROTUNDIFOLIA | HAREBELL |
| 27 | State Threatened | 12.5270 | CALAMINTHA ARKANSANA | LIMESTONE SAVORY |
| 28 | State Threatened | 12.6643 | UNIOMERUS TETRALASMUS | PONDHORN |
| 29 | State Threatened | 12.9813 | CLONOPHIS KIRTLANDII | KIRTLAND'S SNAKE |
| 30 | State Endangered | 13.2332 | NYCTANASSA VIOLACEA | YELLOW-CROWNED NIGHT-HERON |
| 31 | State Endangered | 13.3456 | GOMPHUS EXTERNUS | PLAINS CLUBTAIL |
| 32 | State Threatened | 13.3579 | UTRICULARIA INTERMEDIA | FLAT-LEAVED BLADDERWORT |
| 33 | Federally Endangered | 14.3775 | MYOTIS SODALIS | INDIANA BAT |
| 34 | Federally Endangered | 14.4469 | MYOTIS SODALIS | INDIANA BAT |
| 35 | State Endangered | 14.4696 | SISTRURUS CATENATUS | EASTERN MASSASAUGA |
| 36 | State Threatened | 14.7225 | HELIANTHUS MOLLIS | ASHY SUNFLOWER |
| | | | | |
| | | | | |
| | | | | |

# APPENDIX C

# WELL LOGS

# WE LOG AND DRILLING RE ORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 395294

County Miami Township Union Section of Township

Owner Joe Falb Address 5997 W. Frederick-Garland Rd., W. Milton,

Location of property Same.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing (see below) 25

Type of screen 4" slotted PVC PIPE LINER Length of screen (51 ft)

Type of pump 1 H.P. UEJ Gould Sub. & Pit Adapt. Wells water tight cap.

Capacity of pump 1200 GPH at well, Excess 100 lb. pressure at tank-offset about

Depth of pump setting 570 ft. 1" PVC pipe pump set at about 44 ft. - Wire: 500 ft #8 then 125 ft #10 down to pump.

Date of completion

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 40 G.P.M. Duration of test hrs.

Drawdown to 25 ft. Date 10-16-70

Static level-depth to water 17 ft.

Quality (clear, cloudy, taste, odor) Clear-no odor, Taste OK.

Pump installed by Lorin C. Snell

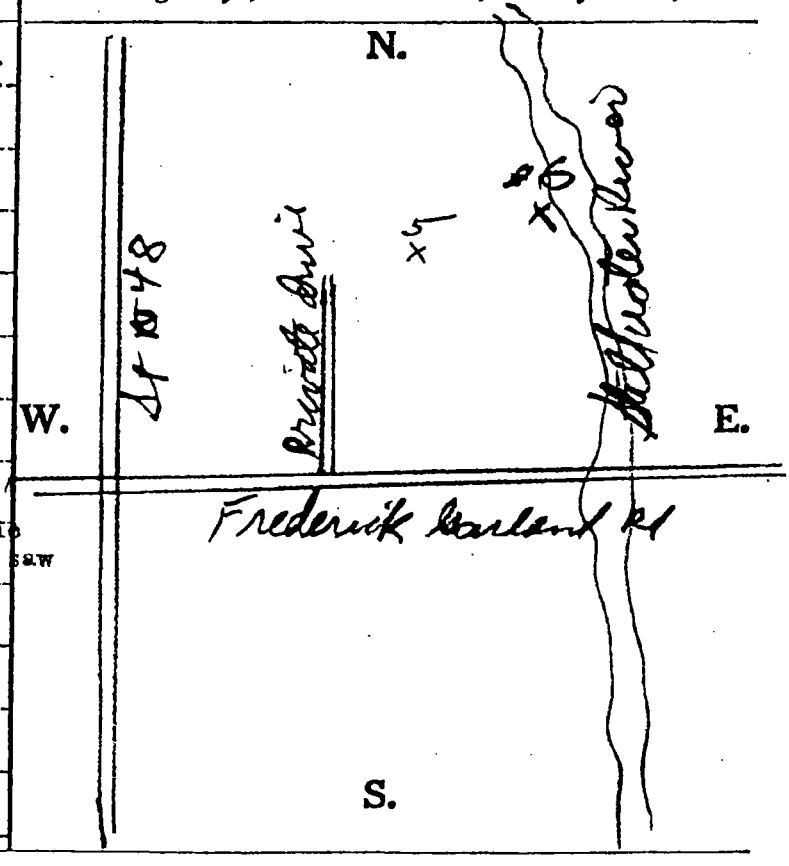
## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| WELL # 5: Dry & pulled casing dirt and hardpan | 0 Feet | 14 Ft. |
| Yellow gravelly Hardpan | 14 | 28 |
| Blue clay gravelly | 28 | 42 |
| Hard blue rock | 42 | 45 |
| WELL # 6: (at river) Dirt and clay | 0 | 18 |
| Very h ard cemented gravelly Hardpan- (muddy) | 18 | 35 |
| Very hard cemented very gravelly hardpan (not as muddy) | 35 | 45 |
| Hard Cemented gravelly Hardpan Muddy- not as gravelly | 45 | 50 |
| Hard Blue Rock | 50 | 58 |

25 ft 5 5/8 casing- perforated from ~~[illegible]~~ 21 to 25 ft- then installed 51 ft 4" PVC plastic liner- perforated lengthwise with hand electric saw whole length.

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm LORIN C. SNELL
WELL DRILLING—PUMPS

Address LAURA, O. RR. #1-MARKLEY RD. PH.

Date

Signed

*If additional space is needed to complete well log, use next consecutive numbered form.

423

Revised Code, Sec. 1521.0

OR TYPEWRITER
DO NOT USE INK.

1562 W. First Avenue
Columbus 12, Ohio

County Miami Township Union Section of Township

Owner Village of West Milton Address West Milton, Ohio

Location of property M. Minker Property

| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter ..... Length of casing ..... | Pumping Rate ..... G.P.M. Duration of test ..... hrs. |
| Type of screen ..... Length of screen ..... | Drawdown ..... ft. Date ..... |
| Type of pump ..... | Static level-depth to water ..... ft. |
| Capacity of pump ..... | Quality (clear, cloudy, taste, odor) ..... |
| Depth of pump setting ..... | |
| Date of completion October 29, 1963 | Pump installed by ..... |

WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Top Soil and Sub Soil | 0 Feet | 6½ Ft. |
| Sand and Gravel | 6½ | 16' 9" |
| Blue Shale - Some Hard layers | 16' 9" | 24' 9" |
| 20 ft. of casing. After cased to Clay, there was very little water | | |

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

Test Hole No. 8

W. E.

S.

See reverse side for instructions

Drilling Firm Brumbaugh Enterprises Soil and Gravel Explorations Date Log Rec'd. 3-24-64

Address West Milton, Ohio Signed Copied by RKC Pilot of Water

1110

DNR 7802.93
TYPE OR USE PEN
SELF TRANSCRIBING
PRESS HARD

# WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources, Divison of Water
1939 Fountain Square Drive, Columbus, Ohio 43224 Phone (614) 265-6739

794689
Redrill
Permit Number 145

JNTY MIAMI TOWNSHIP Union SECTION/LOT No. _____ (CIRCLE ONE)

OWNER/BUILDER (CIRCLE ONE OR BOTH) UNIBILT Homes PROPERTY ADDRESS Karns Rd. (ADDRESS OF WELL LOCATION ▲)

LOCATION OF PROPERTY West side of Karns, 1st place North of Frederick Garland

## CONSTRUCTION DETAILS

**CASING** Borehole Diameter 7 7/8 in.

[1] Diameter 5½ in. Length 49 ft. Wall Thickness SDR21 in.
[2] Diameter _____ in. Length _____ ft. Wall Thickness _____ in.

Type: [1] [2] Steel [1] [2] Galv. [X] [2] PVC [1] [2] Other _____

Joints: [1] [2] Threaded [1] [2] Welded [X] [2] Solvent [1] [2] Other _____

Liner: Length _____ Type _____ Wall Thickness _____ in.

**SCREEN**
Type (wire wrapped, louvered, etc.) slotted Material PVC
Length 5 ft. Diameter 5½ in.
Set between 49 ft. and 54 ft. Slot .051

**GROUT**
Material Benseal&EZmud Volume used 75 gal
Method of installation Pumped / tremie tube
Depth: placed from 49 ft. to 0 ft.

**GRAVEL PACK** (Filter Pack)
Material Pea gravel Volume used 75 gal
Method of installation gravity
Depth: placed from 49 ft. to 54 ft.

**Pitless Device** ☐ Adapter ☐ Preassembled unit
**Use of Well** Home
[X] Rotary ☐ Cable ☐ Augered ☐ Driven ☐ Dug ☐ Other _____
Date of Completion 8/12/94

## WELL LOG*

INDICATE DEPTH(S) AT WHICH WATER IS ENCOUNTERED.
Show color, texture, hardness, and formation: sandstone, shale, limestone, gravel, clay, sand, etc.

| | From | To |
|---|---|---|
| Brown clay | 0 | 15' |
| Gray clay | 15' | 45½ |
| Orange gravel & rock | 45½' | 48' |
| ay clay & gravel | 48' | 49' |
| Gravel | 49' | 54' |
| Gray clay mixed with gravel | 54' | 59' |
| Gray clay | 59' | 64' |
| Blue shale | 64' | 68' |
| Total Depth 54' | | |

*If additional space is needed to complete well log, use next consecutively numbered form.

## WELL TEST

☐ Bailing ☐ Pumping* [X] Other Air
Test rate 15 gpm Duration of test 1 hrs.
Drawdown 12' ft.
Measured from: [X] top of casing ☐ ground level ☐ Other _____
Static Level (depth to water) 34 ft. Date: 8/12/94
Quality (clear, cloudy, taste, odor) clear

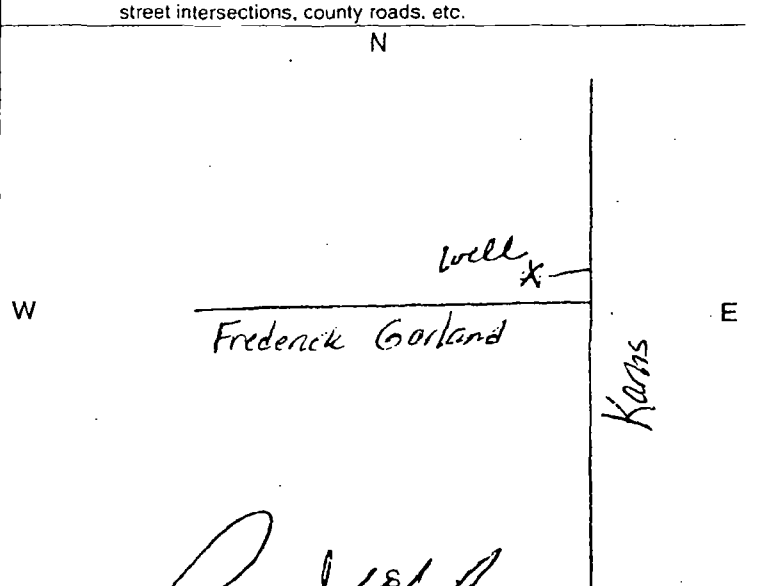
*(Attach a copy of the pumping test record, per section 1521.05, ORC)

## PUMP

Type of pump _____ Capacity _____ gpm
Pump set at _____ ft.
Pump installed by _____

## SKETCH SHOWING WELL LOCATION

Show distances well lies from numbered state highways, street intersections, county roads, etc.




I hereby certify the information given is accurate and correct to the best of my knowledge.

g Firm Wiley Well Drilling, Inc.
Address R.R. 4 Box 273
City, State, Zip Union City, IN 47390

Signed _____
Date 8/22/94
ODH Registration Number 164

Completion of this form is required by section 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.

# WELL LOG AND DRILLING REPORT

666914

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY - SELF-TRANSCRIBING

Permit Number _____

COUNTY _____ TOWNSHIP Union SECTION OF TOWNSHIP _____

OWNER _____ ADDRESS _____

LOCATION OF PROPERTY _____

## CONSTRUCTION DETAILS

Casing diameter 5 Length of casing 25

Type of screen — Length of screen —

Type of pump Deep well 1/3 HP

Capacity of pump 12

Depth of pump setting 126

Date of completion 7/16/87

Rotary ☒ or Cable ☐

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 3 gpm Duration of test 1 hrs

Drawdown _____ ft Date 7/16/87

Static level (depth to water) 22 ft

Quality (clear, cloudy, taste, odor) _____

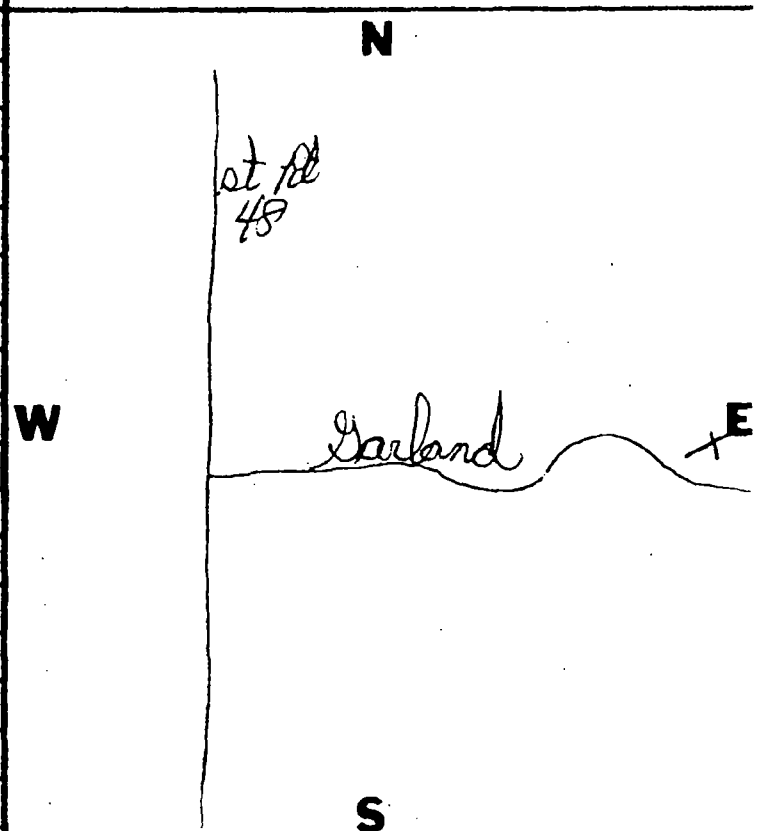
Pump installed by Natures Energies

## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| Clay | 0 ft | 21 ft |
| Limestone | 21 | 32 |
| Shale | 32 | 140 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




* If additional space is needed to complete well log, use next consecutively numbered form.

DNR 7802

DRILLING FIRM Natures Energies REGISTRATION NUMBER 295 DATE 7/20/87

ADDRESS Lucas Ohio SIGNED Richard Billingsley

Completion of this form is required by 1521.05, Ohio Revised Code - file within 30 days after completion.

WHITE ORIGINAL COPY - ODNR, DIVISION OF WATER, FOUNTAIN SQ., COLS., OHIO 43224 / Blue - Customer's Copy / Pink - Driller's Copy / Green - Local Health Dept. Copy

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

Nº 351694

County Miami Township Union Section of Township

Owner Joe Falt Address 5997 W Frederick Garland Rd

Location of property West Milton Ohio

## CONSTRUCTION DETAILS

Casing diameter 8 6 ft Length of casing 5 5/8

Type of screen Length of screen

~~Type of pump~~ 5 GPM coming in at 3 ft

~~Capacity of pump~~ after rain at day total down

Depth of pump setting Bottom 44 ft casing perforated

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 1 G.P.M. Duration of test 2 hrs.

Drawdown to 90 ft. Date 12-8-67

Static level-depth to water 23 ft.

Quality (clear, cloudy, taste, odor) OK

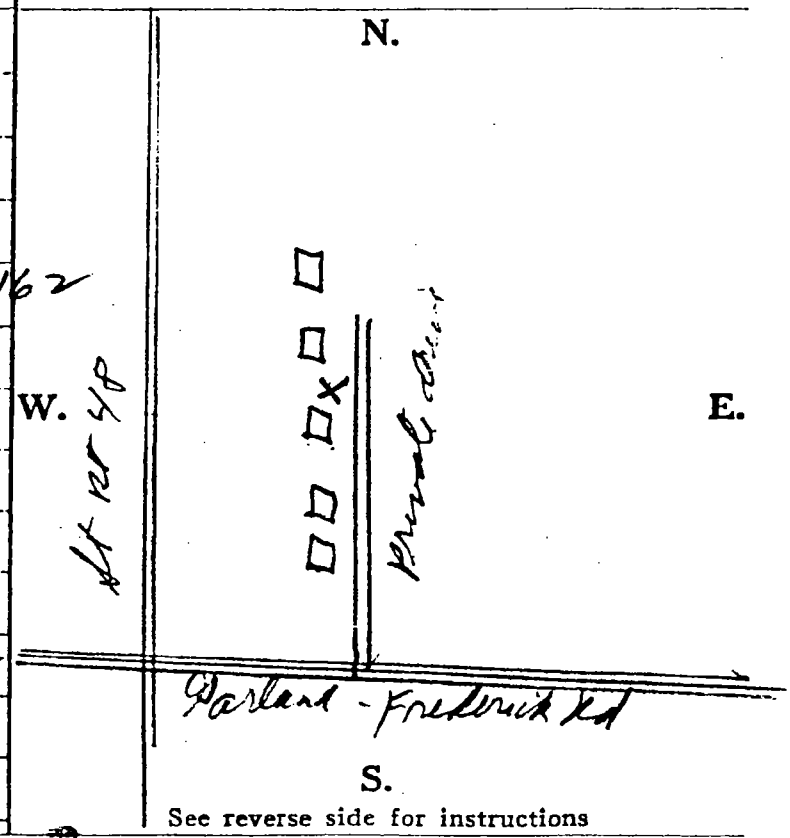
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 2 Ft. |
| Soft Limestone | 2 | 15 |
| Blue Clay & Blue Rock | 15 | 72 |
| Hard Blue Rock | 72 | 145 |
| Hard Blue Rock with Caverns | 145 | 162 |
| Hard Blue Rock | 162 | 170 |
| Hard Blue Rock + Blue Clay | 170 | 180 |
| Drawdown to 110-120 ft - 8 GPM at 150 ft. | | |
| Drawdown to 90 ft at 14 GPM at 180 ft. | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL
WELL DRILLING—PUMPS

Address LAURA, O. RR. #1-MARKLEY RD.-PH.

Date

Signed

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

Nº 351692

(3 wells)

County Miami Township Union Section of Township

Owner Joe Falb Address 5997 W Frederick Garland Rd West Milton

Location of property Same

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 31

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate G.P.M. Duration of test hrs.

Drawdown ft. Date 11-7-67

Static level-depth to water 15 G water ft.

Quality (clear, cloudy, taste, odor) 1 gpm.

Water on Top of Blue clay

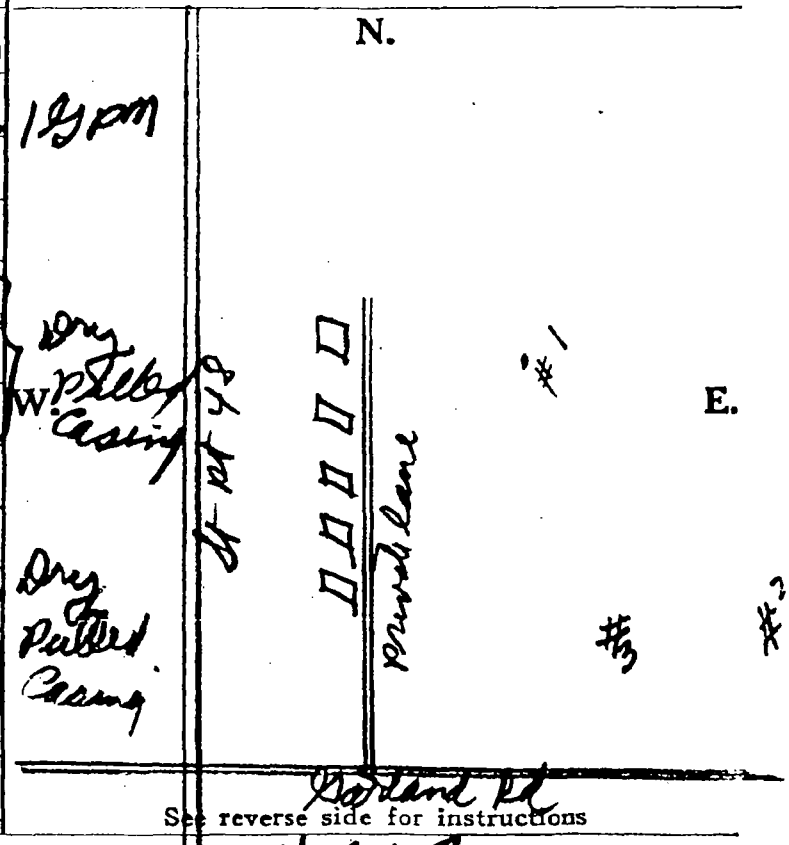
Pump installed by

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To | |
|---|---|---|---|
| #1 Dirt | 0 Feet | 2 Ft. | |
| Yellow gravelly clay | 2 | 30 | 1 gpm |
| Blue clay | 30 | 33 | |
| Blue Rock | 33 | 38 | |
| #2: Dirt | 0 | 2 | |
| Grey Hardpan | 2 | 32 | Dry W. Pulled Casing |
| Blue clay + Rock | 32 | 37 | |
| #3: Dirt | 0 | 3 | |
| Hardpan | 3 | 17 | Dry Pulled Casing |
| Blue clay | 17 | 21 | |
| Blue Rock | 21 | 28 | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL WELL DRILLING—PUMPS

Address LAURA, O. RR. #1-MARKLEY RD.-PH. 698-4227

Date 11-7-67

Signed Lorin C Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

815 Chittenden Ave
Columbus O. 43215

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

№ 351658

County Miami Township Union Section of Township

Owner Pat Ronicker Address RR1 West Milton Ohio

Location of property 2nd property E of Stillwater River on Garland Rd

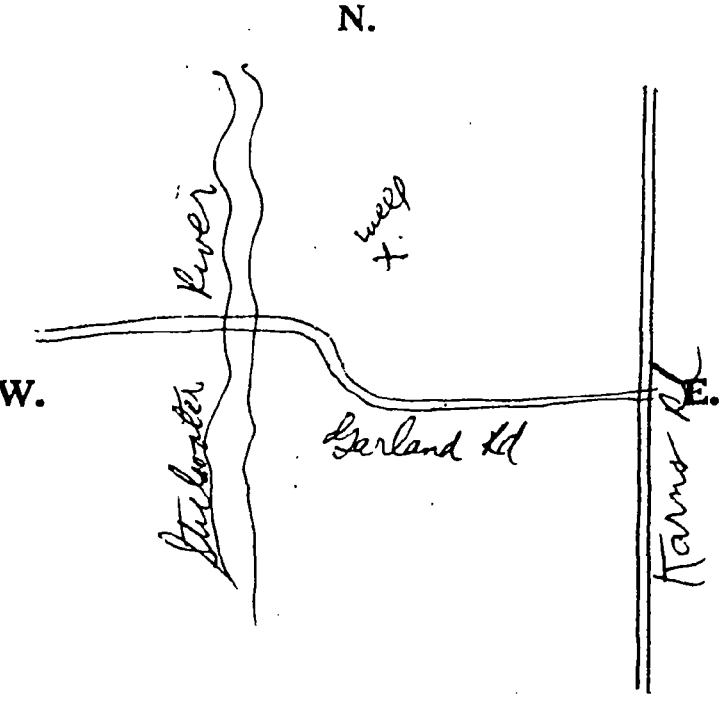
| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter 5 5/8 Steel Length of casing 29 ft | Pumping Rate 20 G.P.M. Duration of test hrs. |
| Type of screen Length of screen | Drawdown to 37 ft. Date 1-3-67 |
| Type of pump | Static level-depth to water 25 ft. |
| Capacity of pump | Quality (clear, cloudy, taste, odor) |
| Depth of pump setting | |
| Date of completion | Pump installed by |

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt + Stones | 0 Feet | 11 Ft. |
| Soft Limestone | 11 | 18 |
| Blue clay | 18 | 23 |
| Limestone | 23 | 42 |
| Blue clay | 42 | 78 |
| Blue clay harder at about 70 | | |
| Blue Rock | 78 | 94 |
| First water at 42-45 ft | | |
| Casing drove to refusal - | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL WELL DRILLING—PUMPS Date 1-3-67

Address LAURA, O. RR. #1-MARKLEY RD.-PH. 698-4222 Signed Lorin C Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 395262

County Miami Township Union Section of Township

Owner Bob Porter Address 5235 Barland Rd

Location of property 5235 Barland Rd - West Milton Ohio

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 + shoe Length of casing 33

Type of screen Length of screen

Type of pump 3/4 Bouldart Pit adapt

Capacity of pump

Depth of pump setting 53 from pit adapt

Date of completion 8-1-69

## BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 30 G.P.M. Duration of test hrs.

Drawdown ft. Date 8-1-69

Static level-depth to water 24 ft.

Quality (clear, cloudy, taste, odor) recovery

Pate - 18 hrs

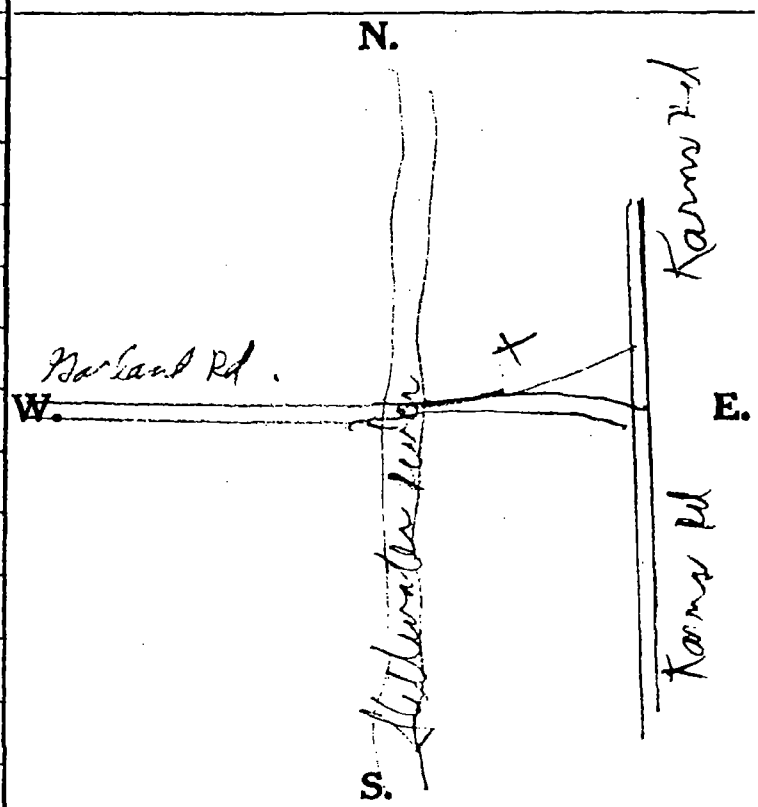
Pump installed by Lorin C Snell

## WELL LOG*

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 3 Ft. |
| Hardpan & Rocks | 3 | 21 |
| Grey Rock | 21 | 37 |
| Blue clay & Rock | 37 | 75 |
| Medium Hard Black | 75 | 84 |
| Hit water at 35 ft | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




Drilling Firm LORIN C. SNELL
WELL DRILLING—PUMPS
Address LAURA, O. RR. #1-MARKLEY RD.-PH. 698-2227

Date 8-1-69

Signed Lorin C Snell

*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

(X-R 902) 9/10/59 K

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

LOCATED

No 151381

County Miami Township Union Section of Township or Lot Number 22 E

Owner M. E. Pohlschneider Address West Milton O

Location of property 1 mi East of West Milton O. on So. side of St. Rt 71

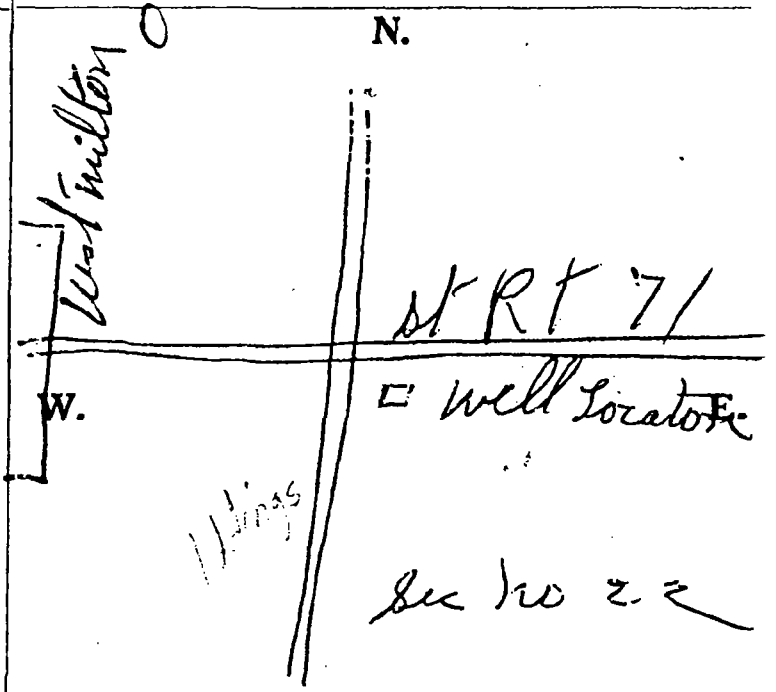
| CONSTRUCTION DETAILS | PUMPING TEST |
|---|---|
| Casing diameter 4½ Length of casing 13 | Pumping rate G.P.M. Duration of test hrs. |
| Type of screen none Length of screen | Drawdown 80 ft. Date 9-8-55 |
| Type of pump | Developed capacity 5 G.P.M. |
| Capacity of pump | Static level—depth to water 12 ft. |
| Depth of pump setting | Pump installed by |

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 4 Ft. |
| Limestone | 4 | 95 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Hole + Middlebrook Date 9-8-55

Address 136 S. Wayne St Piqua O Signed Herbert Hole

X= 1,494,800 ±
Y= 718,200 S

#514 LOC [illegible] 155
(CONTOUR 940' - HAND LEVEL)
9/10/59 RT.

STATE OF OHIO
OHIO WATER RESOURCES BOARD
DEPARTMENT OF PUBLIC WORKS
706 Ohio Depts. Bldg., Columbus, Ohio

Nº 13869

514

LOCATED

# WELL LOG AND DRILLING REPORT

County Miami Township Union Section of Township or Lot Number 22E

Owner Harold Antonides Address 1413 Coventry Rd Dayton 2

Location of Property 1/2 mi W of Karns Rd on Shearer Rd

## CASING RECORD

Casing Diameter 5 5/8 galv

Length of Casing 10 ft 6"

Length of Screen

Type of Screen

Type of Pump

Capacity of Pump

Depth of Pump Setting

## PUMPING TEST

Date 2-17-53

Developed Capacity 5 gpm

Duration of Test Hrs.

Pumping Rate 10 G.P.M.

Drawdown to 82 ft 9" Ft.

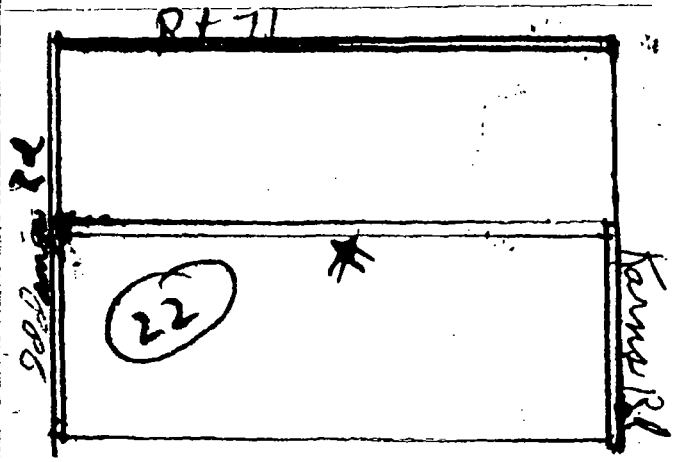
Static Level of Completed Well 7 from top ft.

## WELL LOG

| Formations | From | To |
|---|---|---|
| Dirt | 0 Feet | 6 Ft. |
| Limestone | 6 | 14 |
| Hard Blue Rock | 14 | 29 |
| Blue Clay | 29 | 31 |
| Hard Blue Rock | 31 | 43 |
| White Rock (Hard) | 43 | 66 |
| Soft Blue Rock | 66 | 71 |
| Blue Clay | 71 | 75 |
| Soft Blue Rock | 75 | 80 |
| Hard Blue Rock | 80 | 82 |

## MAP SHOWING LOCATION

Locate in reference to numbered State Highways, St. intersections




See Reverse Side for Instructions

Drilling Firm W C Tucker Date 2-17-53

Address Laura Ohio RR1

X = 1,773,100 E
Y = 717,200 S

LOCATED

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

No 114921

County Miami Township Union Section of Township or Lot Number 2 E 515

Owner Herman Strohm Address West Milton, Ohio

Location of property 6/10 Mi South 71 on Old Adling Rd - East of West Milton

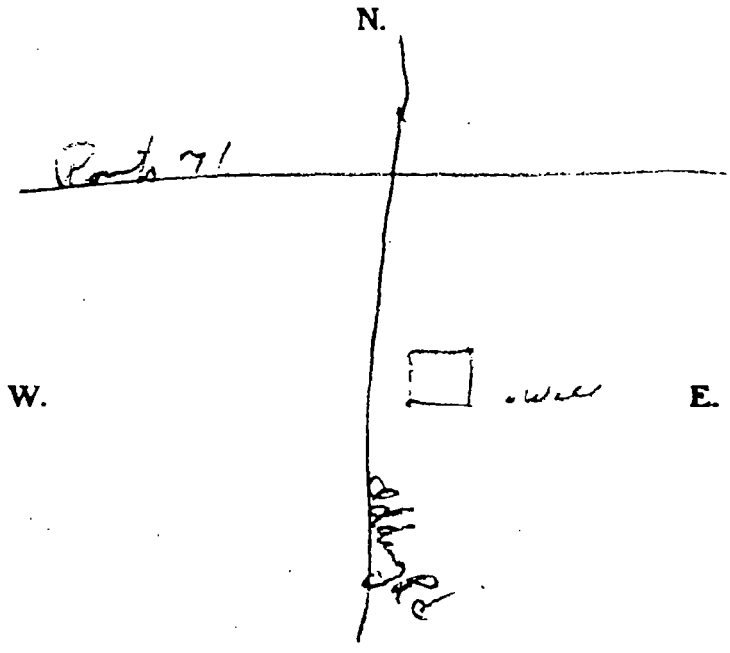
| CONSTRUCTION DETAILS | PUMPING TEST |
|---|---|
| Casing diameter 6" O.D Length of casing 13 ft | Pumping rate ..... G.P.M. Duration of test ..... hrs. |
| Type of screen ..... Length of screen ..... | Drawdown 37 ft. Date April 1 |
| Type of pump ..... | Developed capacity ..... |
| Capacity of pump ..... | Static level—depth to water 12 ft. |
| Depth of pump setting ..... | Pump installed by Hand pump |

WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Clay | 0 Feet | 3 Ft. |
| stone | 3 | 33 |
| B. Clay | 33 | 34 |
| Lime stone | 34 | 42 |
| Water 33 + 42' | | |

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm B. R. McCullough Date .....

Address Phillipsburg, Ohio Signed .....

# WELL LOG AND DRILLING REPORT

#516 LOC. ELEV 71 ORIGINAL (CONTOUR 920 - HAGGERTY) 9/10/59 R

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK. LOCATED

516 No. 231452

County Miami Township Union Section of Township 27 E

Owner Wilbur Minkner Address RR1 West Milton Ohio.

Location of property ½ Mile W of Karns Rd on Iddings Rd.

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 20-0

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping rate 14 G.P.M. Duration of test hrs.

Drawdown 10 ft. Date 6-24-59

Developed capacity 900-1200 GPH.

Static level—depth to water 58 ft.

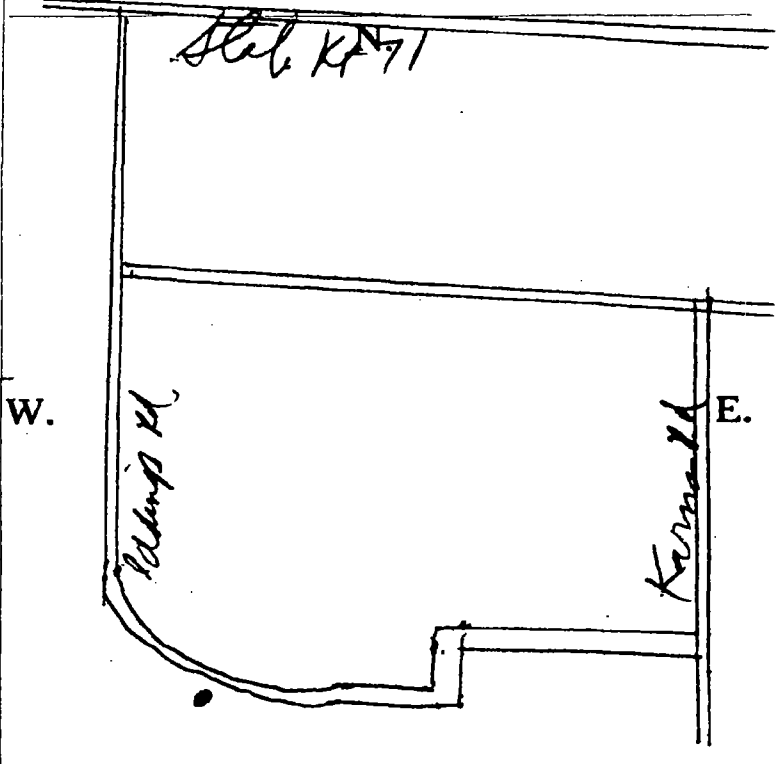
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 3 Ft. |
| Limestone | 3 | 40 |
| Grey shale Rock | 40 | 85 |
| Blue clay & Blue Rock | 85 | 106 |
| Hard Blue Rock | 106 | 108 |
| Porous formation | 35-40 | bad dry |
| Dry Hole at 80 ft. | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Loren C Snell Date 6-24-59

Address Laura Ohio RR1 705-J Signed Loren C Snell.

Bob Kraus

LOCATED

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

Nº 138988

County Miami Township Union Section of Township or Lot Number 26 E

Owner Don Neargarder Address RR1 W. Milton Ohio

Location of property 1 mile N. of Eldenings Rd on Karns Rd

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Polo + drive shoe Length of casing 72-0

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

## PUMPING TEST

Pumping rate G.P.M. Duration of test hrs.

Drawdown 90 ft. Date 9-10-55

Developed capacity 1½ gpm

Static level—depth to water ft.

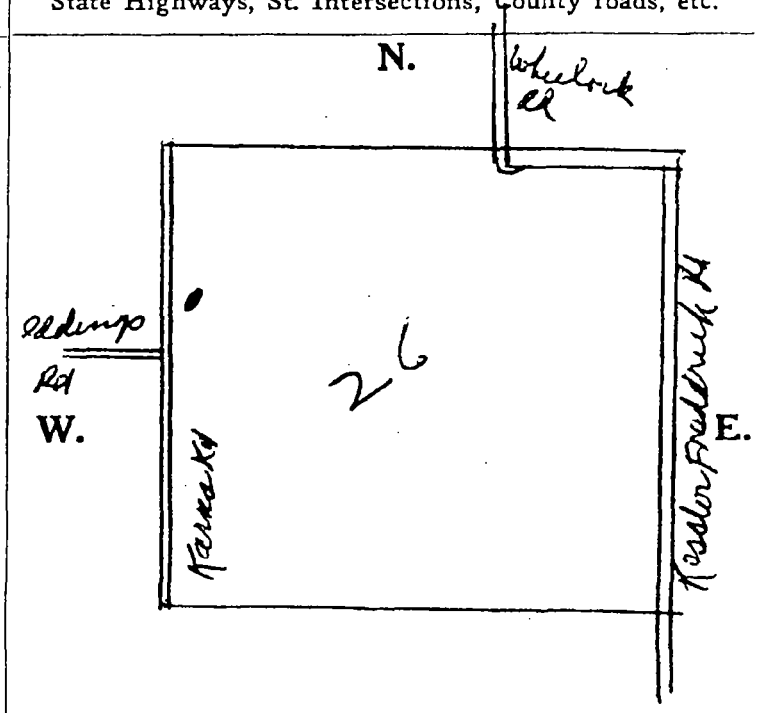
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Soil | 0 Feet | 5 Ft. |
| Brown clay | 5 | 61 |
| Layer of Sand & gravel at 32 ft - very little water | | |
| Sand & Brown Clay (water bearing) | 61 | 71 |
| Blue clay (some soft rock) | 71 | 90 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




S.

See reverse side for instructions

Drilling Firm Lorin C Snell

Address Laura Ohio RR1 Box 2 B

Date 9-10-55

Signed Lorin C Snell

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1500 Dublin Road
Columbus, Ohio

LOCATED

9/2/59 RT

No. 193815

County Miami Township Monroe Section of Township 28

Owner [illegible] Address BR Greenville

Location of property off 30 feet of 48 on Rieder Garland Pa

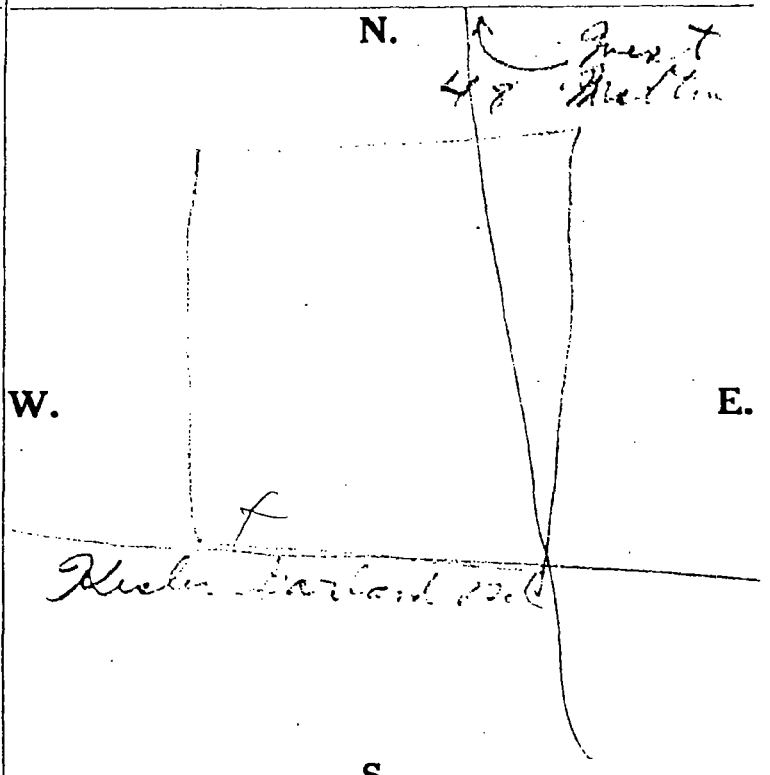
| CONSTRUCTION DETAILS | BAILING OR PUMPING TEST |
|---|---|
| Casing diameter 5 5/8 Length of casing 41 | Pumping rate ..... G.P.M. Duration of test ..... hrs. |
| Type of screen ..... Length of screen ..... | Drawdown ..... ft. Date ..... |
| Type of pump ..... | Bailer ~~Developed~~ capacity est 90 Gal Hr |
| Capacity of pump ..... | Static level—depth to water 2 ft. |
| Depth of pump setting ..... | Pump installed by ..... |
| Date of completion ..... | |

WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| | 0 Feet | 41 Ft. |
| Limestone | 11 | 41 |
| Dark shale | 41 | 45 |

SKETCH SHOWING LOCATION 41

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm [illegible] Date [illegible]

Address [illegible] Signed [illegible]

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

LOCATED

№ 138985

County Miami Township Union Section of Township or Lot Number 28

Owner Winston Klepinger Address RR1 West Milton O

Location of property 2nd house West of RR 48 on Garland Rd

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 11 1/2

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

## PUMPING TEST

Pumping rate 25 G.P.M. Duration of test hrs.

Drawdown ft. Date 8-24-55

Developed capacity 10 GPM

Static level—depth to water 9 ft.

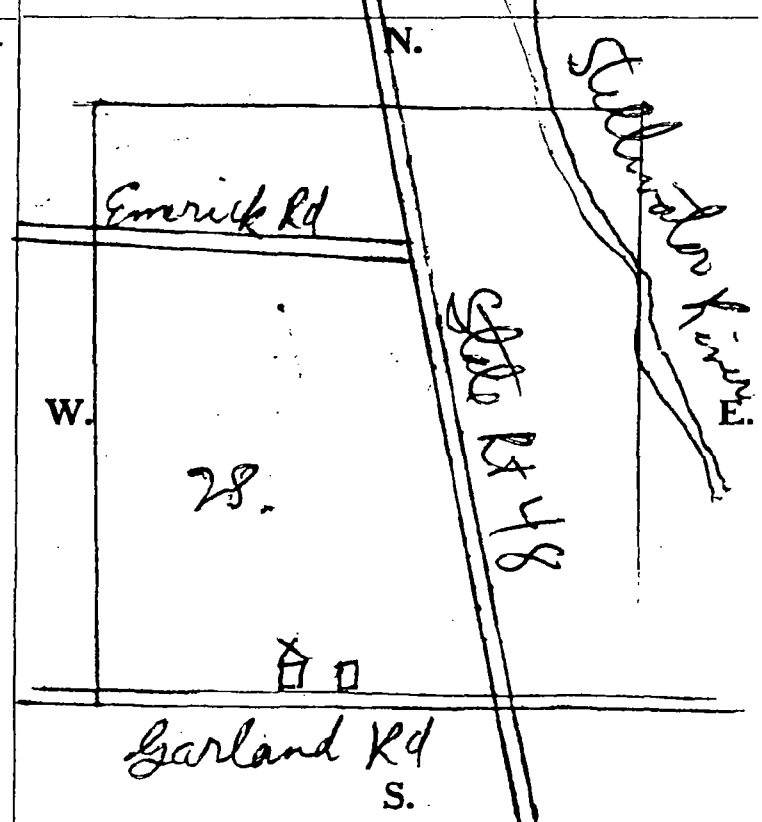
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 2 Ft. |
| Whitish Grey Rock | 2 | 18 |
| Whitish Grey Rock (Hard) | 18 | 34 |
| Blue Rock (Soft) | 34 | 45 |
| 2 GPM at 29 ft | | |
| 4 GPM at 35 ft | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Loren C Snell Date 8-24-55

Address Laura Ohio RR1 Box 284B Markley Rd Signed Loren C Snell

X = 1,491,600
Y = 707,400S

# WELL LOG AND DRILLING REPORT

(Can-Tex 900)
9/10/59 KI

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

LOCATED

No. 83384

County Miami Township Union Section of Township or Lot Number 33

Owner Chas T Pearson Address RR1 Union Ohio

Location of property S side of RR 48 at intersection of Baker Rd + West RR 48.

## CONSTRUCTION DETAILS

Casing diameter 2 1/4 5 5/8" galv Length of casing

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

## PUMPING TEST

Pumping rate G.P.M. Duration of test hrs.

Drawdown 55 ft. Date 6-21-54

Developed capacity 28 GPM.

Static level—depth to water 27 ft.

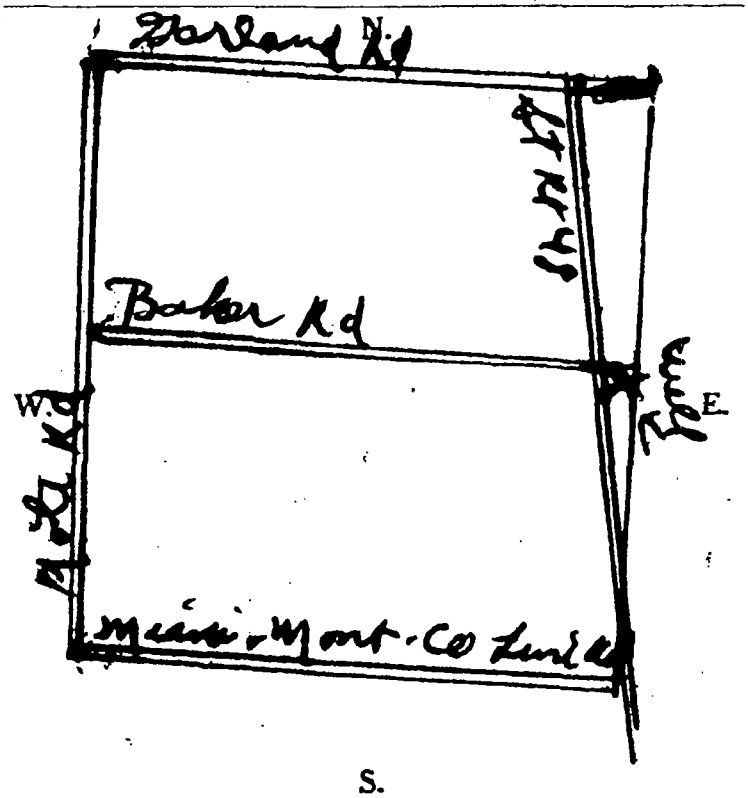
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 5 Ft. |
| Soft Limestone | 5 | 15 |
| Soft Blue Rock | 15 | 44 |
| Blue Clay | 44 | 75 |
| Hard Blue Rock | 75 | 85 |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Lee Shell Date 6-21-54

Address 30 N Mulberry Troy O. Signed Lee Shell

X= 1,486,500 ± 2,0001
Y= 714,000S

#551 LOC. ELEV. 920
(CONTOUR 920')
9/10/55 RT

STATE OF OHIO
OHIO WATER RESOURCES BOARD
DEPARTMENT OF PUBLIC WORKS
706 Ohio Depts. Bldg., Columbus, Ohio

LOCATED

No 13894

551

# WELL LOG AND DRILLING REPORT

County Miami Township Union Section of Township or Lot Number 25

Owner Orchard Springs Inc Address W. Milton Ohio

Location of Property 1/2 mi W of RT 48 on Emerick Rd

## CASING RECORD

Casing Diameter 5 5/8

Length of Casing 11 FT

Length of Screen

Type of Screen

Type of Pump

Capacity of Pump

Depth of Pump Setting

## PUMPING TEST

Date 8-5-53

Developed Capacity 5 GPM +

Duration of Test ... Hrs.

Pumping Rate 10 G.P.M.

Drawdown to 71 Ft.

Static Level of Completed Well 20 Ft.

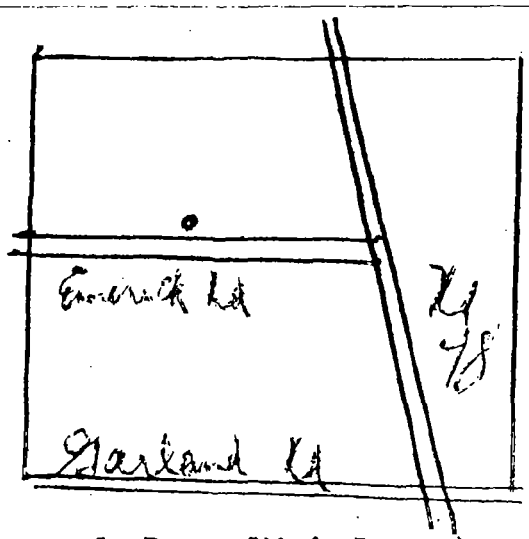
## WELL LOG

| Formations | From | To |
|---|---|---|
| Soil | 0 Feet | 9 Ft. |
| Limestone | 9 | 18 |
| Brown Limestone | 18 | 41 |
| Soft Blue Rock | 41 | 45 |
| Blue Clay | 45 | 51 |
| Hard Blue Rock | 51 | 65 |
| Soft Blue " | 65 | 71 |

## MAP SHOWING LOCATION

6

Locate in reference to numbered State Highways, St. intersections




See Reverse Side for Instructions

Drilling Firm S C Tucker Date 8-5-53

Address Laura Ohio

# WELL LOG AND DRILLING REPORT

# 533 [illegible] ORIGINAL

9/10/59

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

№ 138981

County Miami Township Union Section of Township or Lot Number 21

Owner Wilbur Beatley Address S. Main St W. Milton O

Location of property Residence on S. Main St in W. Milton O

## CONSTRUCTION DETAILS

Casing diameter 10 ft Length of casing 5 5/8

Type of screen ..... Length of screen .....

Type of pump 3 gpm - 50 ft

Capacity of pump 5 gpm 60 ft

Depth of pump setting 7 gpm 74½

## PUMPING TEST

Pumping rate 14 G.P.M. Duration of test ..... hrs.

Drawdown ..... ft. Date 7-28-55

Developed capacity 7 gpm

Static level—depth to water 13 ft.

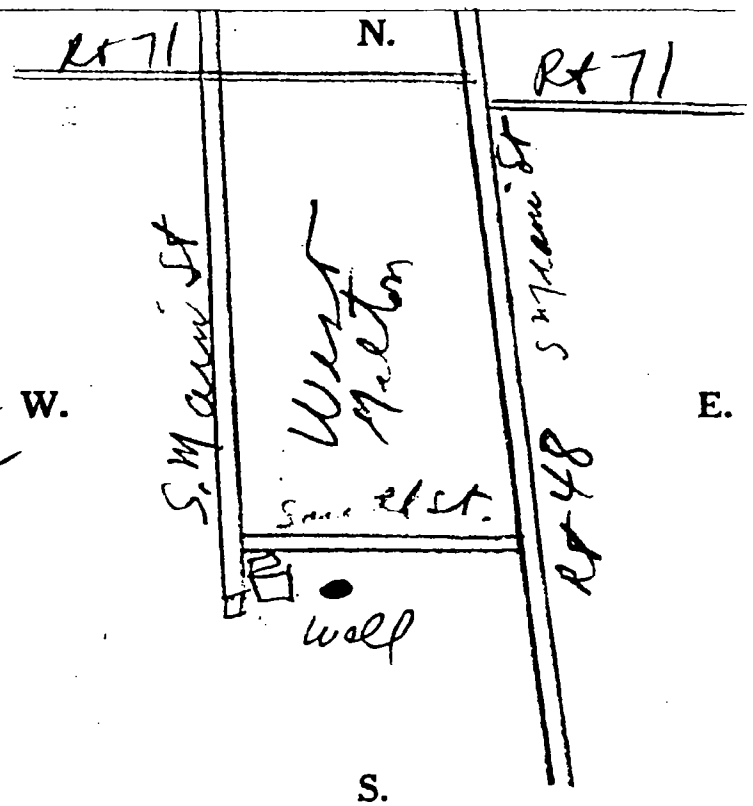
Pump installed by .....

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 5 Ft. |
| Limestone | 5 | 9 |
| White Blue Rock | 9 | 34 |
| Soft Blue Rock & Blue Clay | 34 | 46 |
| Hard Blue Rock | 46 | 65 |
| Soft Blue Rock | 65 | 72 |
| Blue Clay | 72 | 74½ |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm Lowe C Snell

Address Troy Ohio R 1 Box 124B

Date 7-28-55

Signed Lowe C Snell

# WEL LOG AND DRILLING REPORT

ORIGINAL

PLEASE USE PENCIL
OR TYPEWRITER
DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

Nº 294859

County Miami Township Union Section of Township

Owner Harold Osborn Address Wagon Wheel Farm RR1 Union Ohio

Location of property ½ mile No. Co Line Rd on Rt 48

## CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 32½

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 15 G.P.M. Duration of test hrs.

Drawdown ft. Date Aug 24 1963

Static level-depth to water 10 ft.

Quality (clear, cloudy, taste, odor)

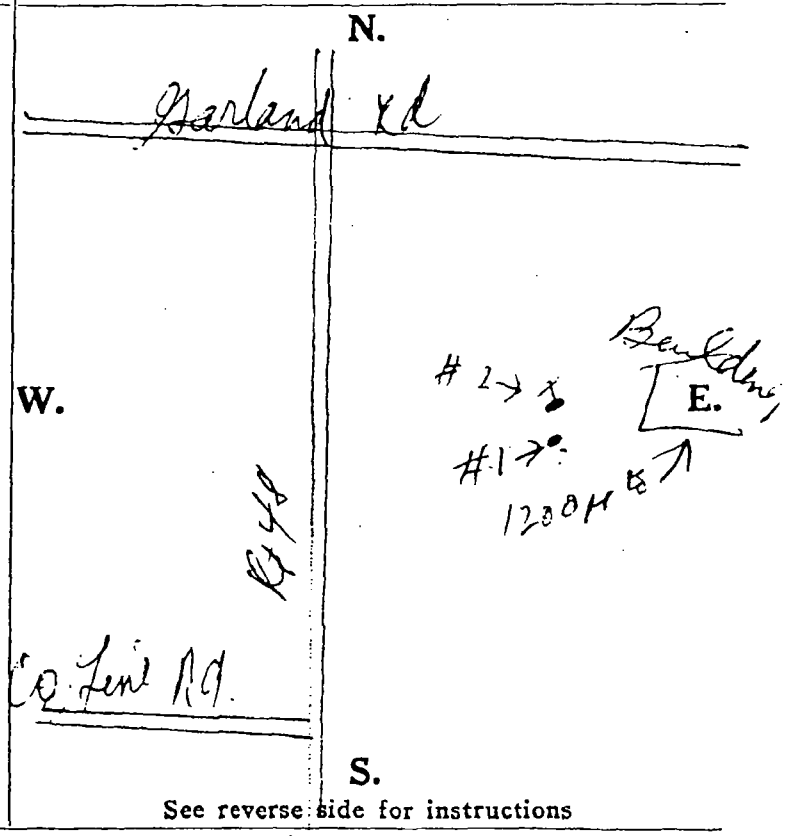
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Topsoil | 0 Feet | 6 Ft. |
| Yellow-clay | 6 | 15 |
| Sand & Gravel | 15 | 32 |
| Coarse Sand & Fine Gravel | | |
| Casing Perforated ~~to~~ ~~for~~ from Bottom 42' | | |
| well #2 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




See reverse side for instructions

Drilling Firm LORIN C. SNELL
WELL DRILLING PUMPS

Address LAURA, O. RR. #1-MARKLEY RD.-PH.

Date Aug 24 1963

Signed Lorin C. Snell

L108

# WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

Nº 294858

County Miami Township Union Section of Township

Owner Harold Ostrow Address Water Wheel Farm Union RR1

Location of property ½ mile north R Co Line Rd on Rt 48.

## CONSTRUCTION DETAILS

Casing diameter 4 7 Flow Length of casing 27½

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

## BAILING OR PUMPING TEST

Pumping Rate 40 G.P.M. Duration of test hrs.

Drawdown ft. Date Aug 21 1963

Static level-depth to water 10 ft.

Quality (clear, cloudy, taste, odor) Clear

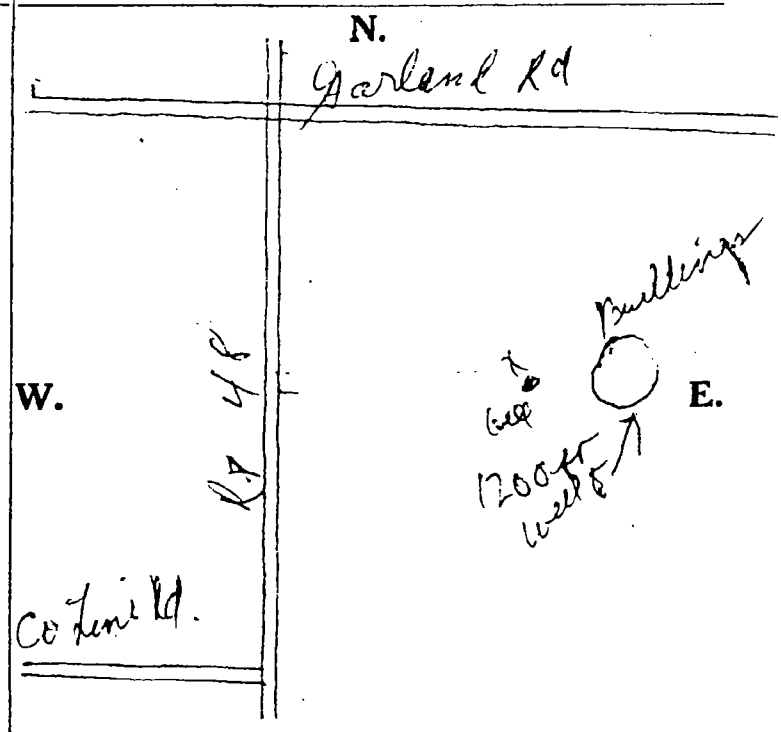
Pump installed by

## WELL LOG

| Formations Sandstone, shale, limestone, gravel and clay | From | To |
|---|---|---|
| Dirt | 0 Feet | 6 Ft. |
| Yellow clay | 6 | 15 |
| ~~Bar~~ Sand / Gravel Fine & medium gravel | 15 | 26½ |
| 5 gpm at 18½ | | |
| 10 gpm at 24½ | | |
| Test Pumped 40 gpm at 26½ | | |
| Well #1 | | |

## SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.




S.

See reverse side for instructions

Drilling Firm LORIN C. SMITH WELL DRILLING—PUMPS

Address LAURA, O. RR. #1-MARKLEY RD.-PH.

Date Aug 21 1963

Signed Lorin C Smith

1100

# WEL' LOG AND DRILLING REP^RT

ORIGINAL

35

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

496325

Permit # 103

COUNTY Miami TOWNSHIP Union SECTION OF TOWNSHIP OR LOT NUMBER

OWNER Ray Fogle, (836-5832) ADDRESS 401 Beechgrove Ave, Englewood, O.

LOCATION OF PROPERTY Intersection Kerns Rd and Frederick-Garland Rd

## CONSTRUCTION DETAILS

Casing diameter 5 5/8Galv & drive shoe Length of casing 88 ft

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

## BAILING OR PUMPING TEST
(specify one by circling)

Test rate 20 GPM gpm Duration of test 1 hrs

Drawdown to 60 ft ft Date May 3, '1977

Static level (depth to water) 40 ft

Quality (clear, cloudy, taste, odor) _____

Pump installed by _____

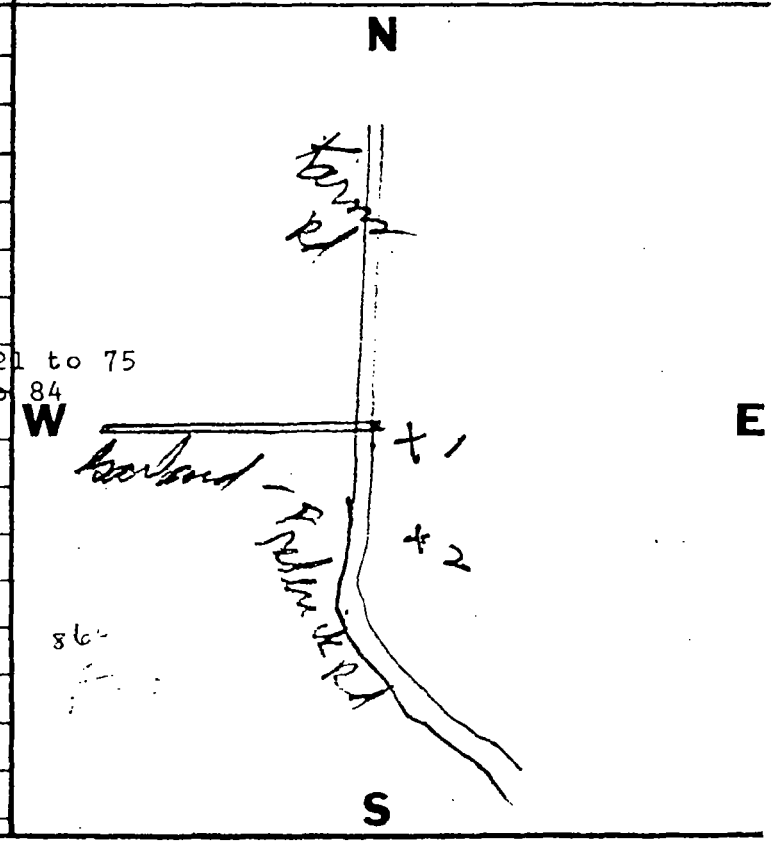
## WELL LOG*

| Formations: sandstone, shale, limestone, gravel, clay | From | To |
|---|---|---|
| WELL #1: Dirt | 0 ft | 3 ft |
| Yellow Clay | 3 | 15 |
| Brown Hardpan | 15 | 65 |
| Gravelly blue clay | 65 | 70 |
| Grey clay & rock | 70 | 79 |
| Hard blue shale rock | 79 | 100 |
| (DRY HOLE PULLED CASING) | | |
| WELL # 2: Dirt | 0 | 3 |
| Yellow clay | 3 | 21 |
| Silt, sand & water at 21 ft | | |
| Brown Hardpan (sandy & Gravelly at 21 to 75 | | |
| Very Sandy & Gravelly Hardpan 75 to 84 | | |
| Sand & Gravel | 84 | 88 |
| (hardpan below this) | | |

RECEIVED
MAY 05 1977
HEALTH DEPARTMENT
TROY, OHIO

## SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.




DRILLING FIRM Lorin C. Snell Well Drilling & Pump DATE _____

ADDRESS 9913 Markley Rd Lewis, Ohio 43337 Phone 648-4288 SIGNED _____

*If additional space is needed to complete well log, use next consecutive numbered form.

# APPENDIX D

# PHOTOGRAPHIC LOG

# Garland Road Landfill Photographic Log

**Photo #1:** Soil Sample SO-01 **Date:** 4/21/2003

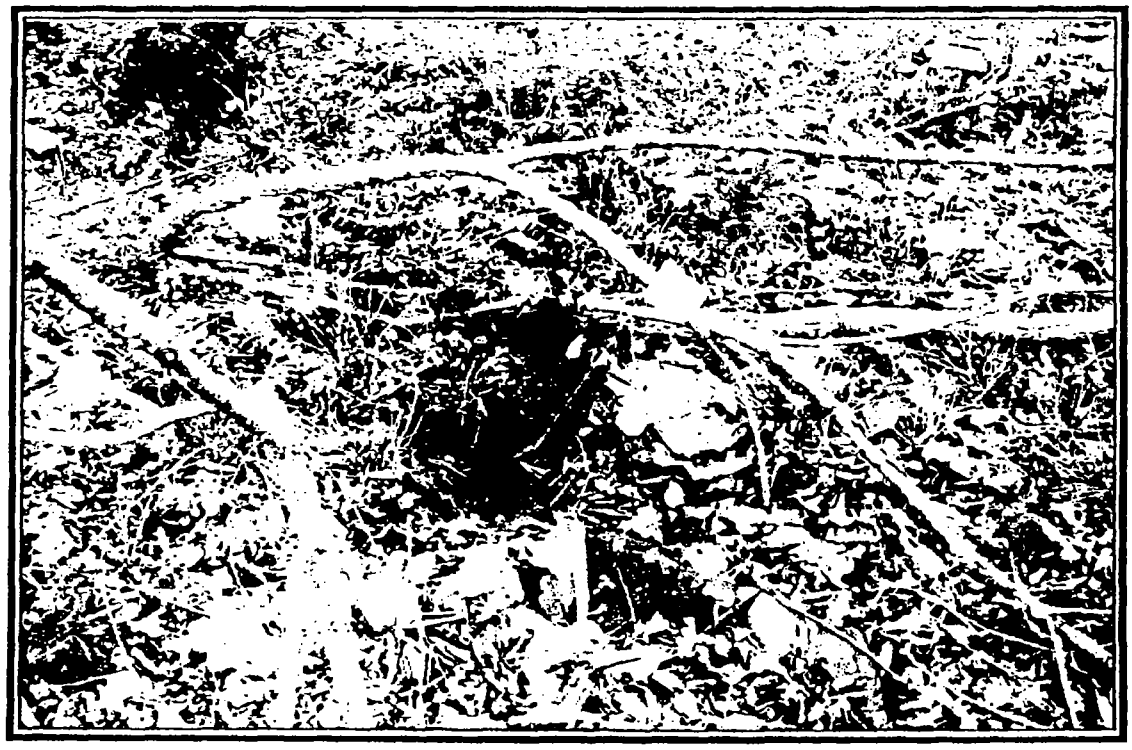


**Photo #2:** Soil Sample SO-02 **Date:** 4/21/2003

**Garland Road Landfill Photographic Log**

**Photo #3:** Soil sample SO-03 **Date:** 4/21/2003

**Photo #4:** Soil Sample SO-04 **Date:** 4/21/2003

## Garland Road Landfill Photographic Log

**Photo #5:** Soil Sample location SO-05 **Date:** 4/21/2003

**Photo #6:** Soil sampling location SO-06 **Date:** 4/21/2003

## Garland Road Landfill Photographic Log

**Photo #7:** Soil sampling location SO-07 **Date:** 4/21/2003

**Photo #8:** Soil sample SO-08 **Date:** April 21, 2003

**Garland Road Landfill Photographic Log**

**Photo #9:** Soil Sample location SO-09 **Date:** 4/21/2003

**Photo #10:** Soil Sample SO-10 **Date:** 4/21/2003

## Garland Road Landfill Photographic Log

**Photo #11:** Soil sample SO-11 **Date:** April 21, 2003

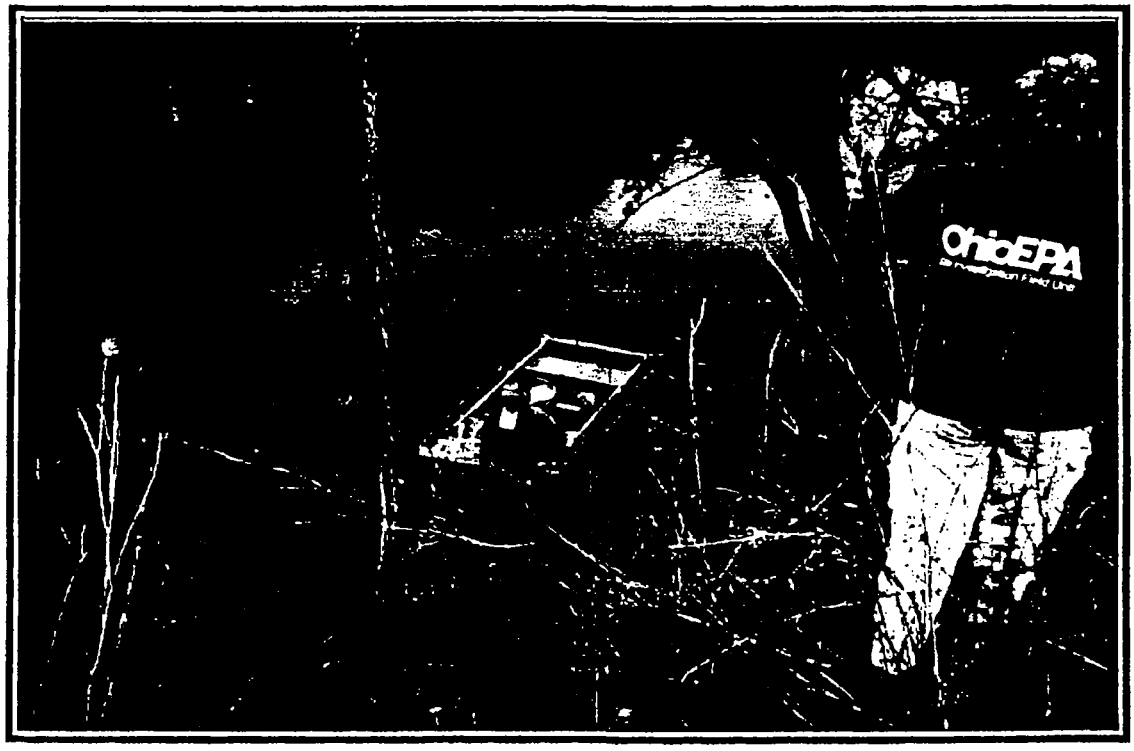



**Photo #12:** Stillwater River sediment sampling location at the landfill.
**Date:** April 21, 2003

# APPENDIX I

## *U.S. EPA SITE-SPECIFIC SRE*

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

**November 13, 1997**

de maximis, inc.

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REPLY TO THE ATTENTION OF:
SR-6J

Via Express Mail

Robert W. Rule
De Maximis, Inc.
301 Gallaher View Road
Suite 227
Knoxville, TN 37919

Re: Streamlined Risk Evaluation for the Garland Road Landfill Site
near West Milton, Miami County, Ohio

Dear Mr. Rule:

Thank you for the opportunity to discuss the Garland Road Landfill at the site on November 6, 1997. Your offer to provide a description of site geology and groundwater flow within two weeks after the meeting is also appreciated. As you know, the presumptive remedy for municipal landfills is containment. The United States Environmental Protection Agency (U.S. EPA) and the Ohio Environmental Protection Agency will utilize the information you are preparing in evaluating the containment alternatives proposed in the Engineering Evaluation/Cost Analysis (EE/CA) Report.

During the meeting, several participants expressed concern that the discussion of geology and groundwater flow may further delay progress at the site. U.S. EPA is also concerned about delays and believes the preparation of the EE/CA Report, while issues regarding geology and groundwater flow are resolved, is in the interest of all parties concerned. To prevent further delays in the EE/CA process, U.S. EPA is transmitting with this letter the Streamlined Risk Evaluation (SRE). Pursuant to the Consent Order (Docket No. V-W-95-C-296), U.S. EPA requests General Motors Corporation submit a draft EE/CA Report which incorporates the enclosed SRE within sixty (60) days of receipt.

If you have any questions regarding this matter, please feel free to call me at (312) 886-4442.

Sincerely,

Matthew J. Ohl

Matthew J. Ohl
Remedial Project Manager

enclosure

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KJ5102_R1

# STREAMLINED RISK EVALUATION
# FOR
# GARLAND ROAD LANDFILL
# WEST MILTON/MIAMI COUNTY/OHIO

**TDD: S05-9609-002**
**PAN: 6P0201TR**

**November 13, 1997**

**Prepared for:**

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
**Emergency and Enforcement Response Branch**
**77 West Jackson Boulevard**
**Chicago, Illinois 60604**

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# 1. INTRODUCTION

Ecology and Environment, Inc. (E & E) was tasked by the United States Environmental Protection Agency (U.S. EPA) under Technical Direction Document (TDD) No. S05-9609-002 to prepare a streamlined risk evaluation (SRE) for the Garland Road Landfill (GRL) site in West Milton, Miami County, Ohio (U.S. EPA 1996a). This SRE is prepared in support of an Engineering Evaluation/Cost Analysis EE/CA being conducted by the potentially responsible parties (PRPs) for the site. The purpose of the SRE is to evaluate the potential risks posed to human and environmental receptors from contamination at the site in the event that no further action is taken at the site.

The SRE has been prepared and organized in general accordance with U.S. EPA's *Risk Assessment Guidance for Superfund* (RAGS), *Volume I: Human Health Evaluation Manual* (U.S. EPA 1989a); *RAGS, Volume II. Environmental Evaluation Manual, EPA/540/1-89/001* (U.S. EPA 1989b); and other related guidance, including but not limited to, *Guidance for Conducting Non-Time Critical Removal Actions* (U.S. EPA 1993a), and *Presumptive Remedy for CERCLA Municipal Landfill Sites* (U.S. EPA 1993b). Descriptions of the site history, previous investigations, and the nature and extent of contamination are presented in the EE/CA work plan prepared by the PRP Contractor (Conestoga, Rovers, and Associates [CRA]), in previous reports prepared for the site by the Ohio Environmental Protection Agency (OEPA) and U.S. EPA, and in the EE/CA report (to be prepared by CRA). A brief discussion of these items is presented in Section 2.

## 1.1 Purpose and Scope of the Streamlined Risk Evaluation

EPA guidance on conducting non-time-critical removal actions (U.S. EPA 1993a) requires that a Streamlined Risk Evaluation (SRE) be included as a component of the EE/CA in order to assist in determining whether a removal action is required, and to identify the potential current and future exposures

that should be prevented. The SRE is intermediate in scope between the limited risk evaluation performed for a removal action and the conventional baseline risk assessment conducted for remedial actions. The SRE is intended to evaluate the existing and potential risks posed by the specific problem that the removal action is intended to address, and can be both qualitative and quantitative in nature (U.S. EPA 1993a).

The purpose of this SRE is to evaluate potential risks to humans and the environment as a result of exposure to contaminants present in groundwater and surface soil at the site. Due to the lack of analytical data for off-site media (soil, surface water, and groundwater), the SRE focuses on contaminants detected at the landfill, and thus is intended to evaluate on-site contamination relative to a presumptive remedy for a municipal landfill (U.S. EPA 1993b).

# 2. BACKGROUND

## 2.1 Site Description

The GRL site is a 15-acre property located along the west bank of the Stillwater River south of Frederick-Garland Road, just outside the city limits of West Milton, Miami County, Ohio (see Figure 2-1). The property is approximately 2,500 feet long and varies between 300 and 500 feet in width. The site is bounded on the north by Frederick-Garland Road, on the east by the Stillwater River, a State Scenic River, and on the south and west by farmland. The City of West Milton is located less than 1 mile northwest of the site. The City of Union is located approximately 2 miles to the south. The landfill covers most of the surface of the site, except for the southeast end. The site is located within the 100-year flood plain of the Stillwater River, and the southern portion of the site floods annually (FEMA 1983).

## 2.2 Site History

The GRL site was initially used as a landfill during the early 1960s, by then property owner Harold Ostrov. Landfill operations were interrupted for a brief period when Ostrov sold the property to B & W Realty in 1966, but resumed in 1967 under lease by B & W Landfill. Between 1967 and 1970, the landfill reportedly received large amounts of liquid and sludge wastes from General Motors Inland Division of Vandalia, Ohio. Wastes were reported to have been dumped into trenches 15 to 20 feet deep. It is not known if the trenches were lined. The landfill also received household waste. Operations ceased at the landfill in 1970, and B & W sold the property to the current owners, Paul and Martha Theis, in 1973.

Anonymous citizen complaints prompted an inspection by OEPA on March 21, 1991. OEPA noted numerous drums protruding from the ground surface and the river bank, and estimated that at least 400 drums were present at the site. A follow-up visit was conducted by OEPA on July 15, 1992, to collect samples of drum materials and surrounding soil for analysis. Results of the analysis of 4 drum and 4 soil

samples indicated the presence of chlorinated and non-chlorinated organic solvents, semi-volatile organic compounds, polychlorinated biphenyls (PCB), and heavy metals.

EPA's Field Investigation Team (FIT) conducted a site assessment on January 28, 1993 and collected six soil samples, four sediment samples, and one groundwater sample from a nearby residential well on April 7, 1993 (PRC Environmental Management, Inc. [PRC] 1993). On March 23, 1993, U.S. EPA's Technical Assistance Team (TAT) contractor collected samples of drum contents, and surface soil from the site. The results of analysis of samples collected during both the FIT and TAT assessments revealed the presence of organic solvents, metals, PCB, and semivolatile organic compounds in soil and waste samples.

EPA initiated a time-critical removal action at the site on November 8, 1993. Activities have included excavation of approximately 13,000 drums, and over 11,000 tons of soil and debris associated with the drum removal. Excavated soil has been stockpiled on site until final treatment options are determined. Debris containing vinyl chloride above TCLP regulatory limits was placed in an excavation pit (#P-9) on-site, and comes into direct contact with shallow groundwater at the site.

## 2.3 Summary of Nature And Extent of Contamination

This section summarizes the nature and extent of contamination detected at the GRL site based on investigations by OEPA, U.S. EPA, and CRA. Groundwater, surface soil, sediment, and fish sampling locations are shown in Figures 2-2 through 2-4. Summaries of analytical results are presented in Appendix A.

### On-Site Surface Soil

On-site surface soil samples were collected during investigations by OEPA and U.S. EPA prior to the removal action, and by CRA subsequent to the removal. Pre-removal soil samples were collected judgementally from areas next to drums, or other areas where contamination was suspected. Contaminants detected in surface soil on site include metals, PCBs, PAHs, pesticides, phthalates, and volatile organics.

Post-removal surface soil samples collected by CRA from soil borings and monitoring well borings indicate that residual surface soil contamination exists at the site. Contaminants detected in surface soil on site include metals (detected in all samples), Aroclor 1248 (one out of 12 samples), Aroclor 1254 (6 of 12 samples), PAHs, 4,4'-DDD (2 samples), dieldrin (4 of 12 samples), phthalates, and volatile organics. Due to the limited number of background samples, a statistical comparison could not be made between off-site

and on-site concentrations of inorganics and other compounds. Concentrations of metals detected off-site appear to be in the same general range as those detected on-site. Concentrations of arsenic, beryllium, cobalt, manganese, and vanadium were actually higher in the background samples than in the on-site samples. Dieldrin was also detected at a higher concentration in one of the background samples.

With the exception of the two background samples, analytical data are not available for off-site surface soil in the areas adjacent to the site. The south end of the site is often flooded, and a possibility exists that contaminants may migrate off-site to the farmland south of the site (which also experiences flooding).

**Groundwater**

A total of four rounds of monitoring well sampling were conducted at the GRL site between July 1995 and October 1996. The latest round of sampling, conducted during the summer of 1996, includes all 9 of the monitoring wells at the site. Analytical results from the latest sampling round reveal the presence of 10 inorganic compounds, as well as volatile organic compounds acetone, benzene, 1,2-dichloroethene, methyl-isobutyl ketone (MIBK), toluene, trichloroethene, and vinyl chloride. Bis(2-ethylhexyl)phthalate and three phenolic compounds were also detected in one well. Of the detected compounds, only calcium, and magnesium were detected in the well considered upgradient of the site. Previous rounds of groundwater sampling (July and December, 1995) also detected the presence of methyl ethyl ketone, chlorobenzene, 1,1-dichloroethene, ethylbenzene, 2-hexanone, methylene chloride, 4-methyl-2-pentanone, 1,1,2-trichlorobenzene, di-n-butylphthalate, and several PAHs in groundwater at the site. One residential well sample was collected at the Theis residence (located approximately 3,000 feet southwest of the landfill) by the U.S. EPA FIT team during the screening site inspection in 1993. Site related contamination was not detected in the well sample at that time; however, it should be noted that the well is hydraulically upgradient of the site.

**Stillwater River Sediment**

Sediment samples were collected from the Stillwater River by U.S. EPA (one upstream and three adjacent samples), OEPA (one upstream sample, one adjacent sample, and four downstream samples), and the PRP contractor (one upstream, one adjacent sample , and three downstream samples).

Results of analysis indicates the presence of metals, polycyclic aromatic hydrocarbons (PAHs), aldrin, Aroclor 1221, bis (2-ethylhexyl) phthalate, and methylene chloride in sediment upstream of the site.

Samples collected adjacent to the site were found to contain PAHs and metals. Downstream samples contained acetone, Aroclor 1221, PAHs, and metals.

Detected concentrations of acetone, Aroclor 1221, benzo(a)anthracene, bis(2-ethylhexyl)phthalate, chrysene, and fluorene were higher in samples upstream of the site than in adjacent and downstream samples, suggesting that an upgradient source of these compounds may exist.

**Stillwater River**

Surface water samples were not collected from the Stillwater River. A potential exists, however, that VOCs detected in sediment and groundwater are being released into surface water.

# 3. HUMAN HEALTH EVALUATION

This section describes the general approach used to evaluate the potential risks to human health at the GRL site. In accordance with U.S. EPA guidance for streamlined risk evaluation, a quantitative evaluation was not performed for every potential exposure pathway and receptor possible at the site. The focus of the quantitative evaluation is to assess potential risks to residual contamination in surface soils at the site, and to evaluate potential risk to recreational users of the Stillwater River. Risks associated with groundwater ingestion and fish consumption were evaluated by comparison of detected contaminant concentrations to federal health-based criteria. Exposure to soil excavated and stockpiled on site during the removal action was not assessed based on the assumption that the material will be treated or removed from the site. Risks associated with surface water also were not evaluated in this assessment.

The human health portion of the SRE is organized using the general approach outlined in RAGS Volume I. Section 3.1 reviews the data evaluation and selection of chemicals of potential concern (COPC) for quantitative evaluation of on-site surface soils and sediment in the Stillwater River. Section 3.2 assesses potential exposure of receptors to the COPC. Section 3.3 presents a qualitative comparison of chemicals detected in groundwater and fish to health-based levels. Section 3.4 presents values used in the quantitative exposure estimates. Toxicity assessments for the COPC at the site are presented in Section 3.5. Section 3.6 integrates the exposure and toxicity assessments from previous sections into an overall risk evaluation. A discussion of uncertainties associated with the risk assessment is presented in Section 3.7.

## 3.1 Identification of Chemicals of Potential Concern

Chemicals of potential concern (COPC) for groundwater, soil, sediment, and fish were selected based on a review of the existing data and site history, evaluation of the frequency and range of detection,

distribution of media-specific chemical concentrations, and toxicity screening. The COPC selection process and results are described below.

**Data Collection, Evaluation, and Validation**

The EE/CA sampling conducted by CRA consisted of one round of river sediment sampling, surface and subsurface soil sampling, and monitoring well installation, and sampling. Surface soil data collected by CRA from 8 soil borings and 4 monitoring well installation borings was used in the SRE to evaluate on-site surface soil. Historical soil data collected by OEPA and U.S. EPA were not used for quantitative evaluation because soil removal has occurred at the site since the collection of those samples, and the results are no longer representative of site conditions. Sediment data collected by U.S. EPA, OEPA, and CRA were used in the evaluation of sediment exposure. Fish samples collected by OEPA were also included in this assessment.

Data evaluation qualifiers were reviewed in order to determine if the data are appropriate for use in a quantitative risk evaluation. Data qualified as rejected ("R" qualifier) were not included in the SRE. Results for one fish tissue sample were rejected based on quality control criteria. Data qualified as estimated ("J") are considered acceptable for use in the risk evaluation. Bis(2-ethylhexyl)phthalate (a common laboratory artifact) was detected in laboratory blank samples. Consequently, bis(2-ethylhexyl)phthalate results with an associated "B" qualifier were considered to be lab artifacts if the concentrations were less than 10 times the blank concentration.

**Evaluation of Frequency of Detection of Chemicals**

Analytical data were segregated by environmental medium (i.e., surface soil and sediment) and evaluated for frequency of detection of chemicals. The frequency of detection for a chemical is the number of samples in which the chemical was positively detected divided by the total number of samples analyzed for that chemical. Chemicals are generally eliminated as COPC if they were positively detected in less than 5% of the total number of samples analyzed (for sample sets of 20 or more). None of the chemicals detected in groundwater, soil, and/or sediment samples collected from the site during the EE/CA support sampling were detected at a frequency below 5% (due to the limited number of samples for each of the environmental media) and, therefore, no detected chemicals were eliminated from consideration based on this criterion.

**Comparison to Background**

Concentrations of inorganic compounds detected in on-site soil are normally compared to background concentrations to determine if the concentrations detected on-site are similar to normal constituent concentrations for the area. As stated in Section 2, the limited number of background samples collected at the site are not sufficient to perform a statistical comparison; therefore, only a qualitative comparison can be made to detected concentrations of chemicals detected off-site. Consequently, compounds detected in surface soil were not eliminated from consideration in the SRE based on comparison to background.

For sediments, the mean concentrations of the upstream samples were used for a background comparison. If a chemical was not detected in one of the samples, one-half of the detection limit was used for the determination of the mean. Concentrations of acetone, Aroclor 1221, benzo(a)anthracene, bis(2-ethylhexyl)phthalate, chrysene, and fluorene were present in upstream samples at higher concentrations than downstream samples. Arsenic was detected at similar levels in upstream samples. These compounds were not excluded as COPC because they are also associated with on-site soils; however, the possibility exists that another source of these contaminants exists upstream of the site, or, in the case of arsenic, that concentrations detected adjacent to and downstream of the site are representative of local conditions.

**Toxicity Screen**

The next step in the COPC selection process was to compare the maximum concentrations of chemicals detected in surface soil and sediment to a risk-based concentration (RBC) in order to eliminate those chemicals from the quantitative risk evaluation that are unlikely to contribute significantly to overall risks. The analytical data were compared to RBCs generated by U.S. EPA Region 9 (U.S. EPA 1996b) for residential exposure to soil (via incidental ingestion). Although a residential exposure scenario is not anticipated for the GRL site, RBCs based on a residential exposure scenario were used as a health-protective screen. In general, chemicals classified as Group A or B carcinogens were not excluded based on toxicity screening because cancer risks are assessed cumulatively. Certain inorganic compounds considered to be essential nutrients, and/or toxic only at high concentrations were also excluded as COPC. Aluminum, iron, calcium, magnesium, cobalt, copper, selenium, sodium, and zinc were excluded based on this criteria. Tables 3-1 and 3-2 present the results of toxicity screening of COPC in soil and sediment with Risk Based Concentrations developed using U.S. EPA, Region 9 guidance (U.S. EPA 1996b).

### 3.1.2 Summary of Analytical Results and Chemicals of Potential Concern

COPC selected for surface soil and sediment are presented in Table 3-3. Based on the criteria discussed above, chemicals selected as COPC in surface soil at the GRL site include metals (arsenic, beryllium, lead, and mercury), PCBs (Aroclor 1248 and 1254), 7 PAH compounds, dieldrin, bis(2-ethylhexyl)phthalate, methylene chloride, and trichloroethene. COPC selected for sediment include arsenic, beryllium, lead, mercury, bis(2-ethylhexyl)phthalate, Aroclor 1221, and 3 PAH compounds. Chemicals detected in groundwater and fish will be retained as COPC for the qualitative evaluation.

## 3.2 Exposure Assessment

This section evaluates the potential for human contact with the COPC selected for the site. The routes, duration, frequency, and magnitude of these potential exposures are estimated in this section. Exposure scenarios evaluated for a site generally depend on the populations potentially exposed and the types of land use at the site.

The exposure assessment includes the following steps:

- Characterization of the exposure setting;
- Identification of potential exposure pathways;
- Identification of potentially complete exposure pathways; and
- Quantification of exposure.

The following subsections present the exposure assessment according to the above steps.

### 3.2.1 Characterization of the Exposure Setting

This section presents a brief description of the site setting as it relates to potential human exposure to COPC identified at the site. Descriptions of the site and the nature and extent of contamination are presented in Section 2 of this report.

The site is located in a rural area of Miami County, Ohio. PRC (1993) estimated that 164 persons reside within a one-mile radius of the site, and 3,938 persons reside within 2 miles of the site. Residences, all having private water supply wells, are located within one quarter-mile northeast and southwest of the site. These private wells are mostly developed in thin beds of shale and limestone bedrock. The residential well

sampled during the FIT investigation draws water from sand and gravel at approximately 32 feet below ground surface (BGS) (PRC 1993). Community wells for the City of Union are located along the west bank of the river, approximately 2.5 miles south of the site. Farmland surrounds the site to the south, west, and across Garland Road to the north. A six-foot fence topped with barbed wire surrounds the site, except for a section along the river. The entire site is located within the 100-year floodplain of the Stillwater River, and the site is also located in the flood control easement of the Miami Conservancy District (Brandewie 1996).

The Stillwater River (designated as a state scenic river) forms the eastern boundary of the GRL site, and is approximately 200 feet wide and relatively shallow in the area of the site. Recreational fishing occurs in the area of the site. The site topography slopes down from west to east towards the River. The center of the site is sparsely vegetated due to the drum excavation activities. Most of the river bank is steep and is heavily vegetated with trees and brush, except for a section where drums had been excavated from the bank. The south end of the site is also heavily vegetated and slopes down to the southwest towards an intermittent stream that runs through the adjacent field to the Stillwater River. Leaves and vegetation were observed lodged in the top of the six-foot high fence in the low lying southeast corner of the site as the result of flooding.

The climate of Miami County is continental and is marked by wide range of temperatures. Summers are relatively warm and humid, with an average daily maximum temperature of 85 degrees Fahrenheit (°F) in July, and an average daily minimum of 65°F. Winters are typically cold and cloudy, with an average daily maximum of 37°F in January and an average daily minimum of 22 F. Precipitation also varies, but is normally considerable and well-distributed throughout the year. The yearly precipitation average is approximately 36 inches, with the lowest amount of rainfall occurring in the Fall months. The average last spring freeze occurs on May 1st, and the average first Fall freeze occurs on October 15th (SCS 1978).

### 3.2.2 Potential Exposure Pathways

Figure 3-1 presents a schematic depiction of the conceptual model for the GRL site. Wastes deposited at the site have contaminated surface and subsurface soils, and groundwater at the site by migration of wastes to soil and subsequently to groundwater, and by direct contact with wastes and groundwater. Wastes in groundwater may potentially migrate into, beneath, and parallel to the Stillwater River. Under current conditions, persons trespassing at the site (hunters, teenagers) may be exposed to COPC in surface

soil via incidental ingestion, dermal contact, and inhalation of airborne dust or vapors. Off-site migration of COPC in surface soil may occur to adjacent farmlands, and possibly be absorbed by food crops. Off-site receptors may therefore be exposed to COPC in off-site soil by direct contact (i.e., ingestion and dermal contact), inhalation, or food crop consumption. People using the Stillwater River for fishing or wading may be exposed to COPC in sediment via dermal contact or incidental ingestion. Sport fishers and their families may consume fish from the river that have bioaccumulated COPC from surface water, sediment or food chain exposure. Although surface water data is not available, a possibility exists that COPC in sediment or groundwater may be released to surface water. Exposure to COPC in surface water could occur by incidental ingestion and dermal contact with water.

Current and future off-site residents using groundwater in the area may potentially be exposed to COPC via ingestion, dermal contact, and inhalation of vapors from groundwater; however, data is not currently available to assess these potential pathways.

In the future, the site area could potentially be used as a recreation area (e.g., a park). If the site is used as a recreation area, adults and children using the site may be exposed to COPC in soil via incidental ingestion, inhalation of vapors or dust, and dermal contact. Exposures to recreational users of Stillwater River are anticipated to remain the same as under the current scenario.

It is not anticipated that the site will be used in the future as a residential property. As stated earlier, the site is located in the 100-year flood plain of the Stillwater River, and also is located in the Miami Conservancy District flood control easement. In addition, wastes are still present in the landfill, making the land unstable for building construction.

### 3.2.3 Potentially Complete Exposure Pathways

The Stillwater River is utilized for canoeing and other recreational uses. U.S. EPA has observed men wading onto the island on the Stillwater River adjacent to the site, and sport fishing has been observed in the site area. The site is only partially fenced and trespassers could access the site by scaling the steep riverbank in the unfenced area. U.S. EPA encountered a trespasser who was on site to hunt in the early stages of the time-critical removal action. Evidence of game animals such as deer have also been found on-site. Most containment alternatives that may be considered for the site would reduce the potential exposure to game animals and subsequently to those that prey upon them. Therefore, consumption of game from the site was not assessed in the SRE.

Other evidence of trespassing included piles of beer and soft drink cans at the south end of the site and the apparent wear on barb wire strands on the top a gate at the southern end of the site. On a site visit during October 1996, a section of fence on the south end of the site appeared to have been pried up at the south end of the site.

Although a future on-site residential scenario is not anticipated, ingestion of COPC in groundwater at the site was qualitatively evaluated in the SRE in addition to the scenarios listed above by comparison of detected concentrations in groundwater to health-based criteria. This evaluation was conducted to evaluate potential risks from consumption of groundwater from the site. Currently available information for off-site wells is limited to one residential well located hydraulically upgradient of the site that is not impacted by COPCs from the site.

The exposure pathways discussed above were further evaluated to determine which pathways were most likely occurring and therefore potentially complete, and if analytical data are available to assess the pathway. These pathways will be further evaluated in the SRE. Potentially complete pathways evaluated in the SRE include:

- Direct contact with sediment and surface water in the Stillwater River by recreational users of the Stillwater River and fish consumption by anglers and their families using the Stillwater River for fishing.

- Direct contact (ingestion and dermal contact) with surface soil and inhalation of dust and vapors by site trespassers.

- Direct contact with surface soil and inhalation of dust and vapors by future recreational users of the site.

Off-site pathways identified as potentially complete were not assessed (with the exception of Stillwater river sediment) due to lack of analytical data.

### 3.3 Qualitative Evaluation of Groundwater and Fish Data

Groundwater and fish data were compared to federal health-based criteria established for drinking water and fish consumption in order to determine if potential risks exist for users of groundwater, and

recreational fishers using the Stillwater River in the vicinity of the site. Toxicity profiles of the chemicals of concern identified in groundwater and fish are presented in Section 3.5. A discussion of potential risks posed by the chemicals of concern in groundwater and fish is included in Section 3.6. Uncertainties associated with the potential risks are discussed in Section 3.7.

**Groundwater**

The latest round of groundwater data collected by CRA were compared to Maximum Contaminant Levels (MCLs), non-zero Maximum Contaminant Level Goals (MCLGs), or other health-based criteria in order to estimate potential risks posed to a hypothetical resident using groundwater from the site as a source of drinking water. The results of the comparison and chemicals of concern for groundwater from the September 1996 sampling event are presented in Table 3-4.

As shown in the table, concentrations of 1,2-dichloroethene, trichloroethene (TCE), vinyl chloride, and bis(2-ethylhexyl)phthalate exceed their respective MCLs. The highest detected concentration of 1,2-dichloroethene (total) is greater than 10 times the MCL for cis-1,2-dichloroethene, and more than 9 times greater than the MCL for trans-1,2-dichloroethene (an MCL is not listed for total 1,2-dichloroethene). The highest detected concentration of TCE is 10 times higher than the MCL. For vinyl chloride, the lowest detected concentration is 10 times the MCL, and the maximum detected value is 60 times higher than the MCL.

Benzene was not detected in the latest round of samples at concentrations above the MCL; however, it should be noted that the sample quantitation limits for non-detects ranged from one to ten times the MCL. Benzene was detected in well S-3 at 5.01 $\mu$g/l in the December 1995 sampling, which is slightly above the MCL of 5 $\mu$g/l. Although not detected in the latest round of sampling, 1,1-dichloroethene (in wells S-4, S-5, D-1, and D-2) and 4-methyl-2-pentanone (well S-5) were detected in the July and December 1995 sampling events at concentrations above MCLs (5 $\mu$g/l and 160 $\mu$g/l, respectively). Benzo(a)pyrene was also detected in well S-5 during the July 1995 sampling at a concentration of 7.6 J $\mu$g/l, which is above the MCL of 0.2 $\mu$g/l. MCLs have not been promulgated for the other PAH compounds detected.

**Fish**

Fish samples were collected by OEPA from locations upstream, adjacent to, and downstream from the site (see Figure 2-4). Information on fish exposure time in the area of concern was not provided. Results

of analysis of fish tissue were evaluated to assess potential food chain exposure to recreational fishers in the area. Mercury and several pesticides were detected in fish collected upstream, adjacent to, and downstream of the site. Given that the site is adjacent to farmland, and pesticides were detected in fish samples upstream, downstream, and adjacent to the site, pesticides detected in fish samples are believed to be associated with surface runoff from area farmlands to the Stillwater River, and are not considered attributable to the site. PCBs were not detected in any of the fish samples; however, E & E performed a screening calculation, using standard exposure parameters for recreational fish consumption, and the detection limit for Aroclor 1254 as the exposure point concentration in fish tissue in order to assess the adequacy of the detection limits for PCBs in fish. The results of the screening (presented in Table 3-5) show that adverse health effects are possible from consumption of fish containing PCBs at the detection limit by recreational fishermen and their families. Consequently, the detection limit for PCBs in fish tissue are not completely adequate for use in a quantitative risk assessment.

Mercury was detected in 16 of 17 fish samples collected from the Stillwater River. Mercury concentrations detected in fish fillets were compared to the FDA maximum level of methyl mercury in edible portions of seafood products (ATSDR 1994). Although the form of mercury (i.e., inorganic, or organic) detected in fish tissue was not reported, studies indicate that methyl mercury constitutes over 99% of the total mercury detected in fish muscle tissue (ATSDR 1994). One sample (channel catfish collected upstream at River Mile 23.4) contained mercury at 1.04 mg/kg, slightly above the FDA maximum level of 1 part per million (ppm). This sample was collected approximately 7 miles upstream of the site, and the mercury concentrations detected in the fish tissue can not be attributed to the site.

## 3.4 Quantification of Exposure

This section describes the rationale used to determine quantitative exposure estimates. First, the methodology for deriving exposure point concentrations is presented. Secondly, the exposure estimation equations are presented along with the rationale for the selection of input parameters for the equations.

### Exposure Point Calculations

The exposure media of concern for quantitative evaluation in this SRE are surface soil and sediment. Exposure point concentrations (EPCs) for surface soil and sediment were estimated directly from measured concentrations. The EPCs for surface soil were based on the maximum detected concentrations from 12

surface soil samples collected during the EE/CA support sampling. The EPCs for COPC in sediment were based on maximum detected values for 7 sediment samples for inorganics (12 for lead and 9 for mercury), 4 samples for volatile organics, and 12 samples for semivolatile organics collected by OEPA, U.S. EPA, and CRA. Maximum detected values were used due to the limited number of samples for each medium (small sample sets with few detections often lead to poor estimates of the 95% upper confidence level of the mean). The EPCs determined for COPC at the GRL site are presented in Table 3-6.

**Exposure Estimation Methods**

The exposure estimates described in this section combine the following:

- Estimates of exposure media contaminant concentrations developed in the previous section;
- Estimates of contact rate and frequency and duration of exposure that receptor populations are likely to experience; and
- Estimates of various physiological parameters (e.g., body weight and average life expectancy).

The equations used to estimate the exposure for each pathway and route of exposure evaluated in this SRE are presented in Tables 3-7 through 3-16. The parameter values used in the equations and the rationale for their selection are also provided.

The exposure scenarios quantitatively evaluated in the SRE are direct contact with soil and inhalation of vapors and dust for site trespassers and future recreational users of the site, and direct contact exposure to sediment for current recreational users. Exposure to surface water, was not evaluated due to the lack of actual chemical data. Uncertainties associated with the exclusion of the surface water exposure pathways will be discussed in Section 3.7.

Site trespassers are most likely a subset of the local adolescent population. The site is partially fenced and likely not a focal point for local recreational activities. However, open areas do exist which could attract adolescents and evidence of trespassing has been observed at the site.

Parameter values were selected to correspond to a reasonable maximum exposure (RME) that an individual in the receptor group might experience. In some cases standard default exposure factors from U.S. EPA's *Supplemental Guidance: Standard Default Exposure Factors* (U.S. EPA 1991a) or other U.S. EPA

guidance were used. Exposure factors not specified in guidance documents were based on professional judgment. A description of the parameters used in the exposure estimation is presented below. For the first exposure route, all of the parameters will be described and discussed in the text; for the subsequent routes only the key parameters for that route not previously mentioned will be discussed.

**Pathway 1: Incidental Ingestion of Soil and Sediment**

**Ingestion Rate of Soil**

The ingestion rate (IR) is the amount of soil a person might incidentally ingest through hand-to-mouth contact. The default value for age groups beyond 6 years old (100 mg/day) was used to assess adolescents between 8 and 16 years of age and adults (U.S. EPA 1991a). For children, the default value of 200 mg/day was used.

**Fraction of Soil Ingested From the Contaminated Source (FI)**

The FI is the estimated proportion of total soil ingested from the contaminated source. No default exposure factors exist for this variable. U.S. EPA (1991a) recommends that estimates of FI be made on site-specific information, or, in the absence of specific information, best professional judgment. For this assessment, E & E assumed that all of the soil ingested was from the contaminated source.

**Exposure Frequency**

For site trespassers, an exposure frequency (EF) of 48 days was used based on the assumption that adolescents visit the site two times per week during the summer months and once per week during the six nonwinter months when school is in session. For children exposed to the Stillwater River sediments, an exposure frequency of 72 days per year was used (4 days per week during Summer months and 2 days per week during the Spring and Fall months). Adults were assumed to frequent the site for 48 days per year (2 days per week during the non-winter months).

**Exposure Duration**

The exposure duration (ED) is the total number of years in which the exposure is expected to occur. An ED of 8 years was used in the exposure estimate to correspond to the age range assumed for a site trespasser (i.e., 8 to 16 years). The ED of 6 years for children corresponds to the duration of the childhood (0

to 6 years). An ED of 24 years for adults, corresponds to the adult portion of the 90th percentile amount of time spent living at one residence.

**Body Weight**

The body weight (BW) is the average body weight over the exposure period. An average body weight of 42 kilograms (kg) for young adult males (ages 8 to 16) was determined by averaging the mean body weights reported for those age groups (U.S. EPA 1989a). For current and future children and adults, the average body weights for children aged 1-6, and adults (15 kg and 70 kg, respectively) were used.

**Averaging Time**

The averaging time (AT) selected is dependent on the type of toxic effect being assessed. For chronic and subchronic noncarcinogenic effects, the AT is equal to the ED. For carcinogenic effects, the exposure is averaged over a lifetime (estimated 70 years) (U.S. EPA 1989a).

**Pathway 2: Dermal Contact with Soil and Sediment**

**Absorption Factor**

The absorption factor (ABS) is the rate of absorption of a chemical through the skin from the environmental medium. Limited data are available to assess this variable. An ABS of 1% was assumed for metals and 10% for organic compounds. A value of 6% was used for the ABS for PCBs (U.S. EPA 1992).

**Soil to Skin Adherence Factor**

The soil to skin adherence factor (AF) is the fraction of soil that will adhere to the skin surface following contact. The default upper-bound value of 1 milligram per square centimeter ($mg/cm^2$) per event (U.S. EPA 1992) was used as a health-protective estimate.

**Skin Surface Area**

For trespassers, the skin surface area (SA) available for contact was assumed to be 3,313 $cm^2$ per event. This assumes that 25% of the total skin area (head, hands, arms, and lower legs) of an average adolescent (age 8 to 16) will be exposed to soil or sediment (U.S. EPA 1992). The assumption that 25% of the total skin area would be available for contact with sediment was also used for children and adults to derive SA values of 1,750

and 5,000 $cm^2$, respectively.

**Pathway 3: Inhalation of Vapors and Particulates**

**Inhalation Rate**

The inhalation rate ($IR_{air}$) of 20 $m^3$/day is the default respiration rate for moderate to heavy outdoor activity (U.S. EPA 1991a).

**Particulate Emission Factor**

The particulate emission factor (PEF) relates the COPC concentration in soil with the concentration of respirable particles in the air due to fugitive dust emissions from sites with surface contamination (U.S. EPA 1991b). The equation and input parameters used in the calculation of the PEF are shown in Attachment B.

**Volatilization Factor**

The volatilization factor (VF) is a chemical-specific value used to define the relationship between concentrations of volatile COPC in soil and volatilized COPC in air (U.S. EPA 1991b). The equation and input parameters used in the calculation of the VF are shown in Attachment B.

**Exposure Frequency**

Because inhalation rates are expressed as cubic meters per day, the EF for inhalation exposures, was adjusted for the anticipated number of hours per day spent on site. A site trespasser was assumed to spend a maximum of 4 hours per day on site (16% of a 24-hour day). Children and adults under a future on-site recreational use scenario were assumed to spend up to 6 hours on site per visit (25% of a 24-hour day). The resulting proportions were multiplied by the EF assumed for each receptor to determine an equivalent number of days on site for inhalation exposure.

**Exposure Estimates**

The exposure estimates derived using the input parameters described above are given as lifetime average daily intakes (LADIs) for carcinogenic effects and as chronic daily intakes (CDIs) for noncarcinogenic effects for each exposure case. The exposure estimates are combined with toxicity estimates for the COPC discussed in Section 3.5 to obtain risk estimates.

### 3.5. Toxicity Assessment

The purpose of the toxicity assessment is to review toxicity and carcinogenicity data for the COPC, and to provide an estimate of the relationship between the extent of exposure to these contaminants and the likelihood and/or severity of adverse effects. The toxicity assessment is accomplished in two steps: hazard identification and dose-response assessment.

The hazard identification is a qualitative description of the potential toxic effects of the COPC. The toxicological profiles presented in the following section describe the toxic effects that have been observed in humans and/or animals following exposure to the COPC identified at the GRL site.

The dose-response evaluation is a process that results in a quantitative estimate or index of toxicity for each COPC at the site. For carcinogenic effects, the index is the slope factor (SF), and for noncarcinogenic effects, it is the reference dose (RfD). Practices and procedures used to develop quantitative indices of toxicity and to incorporate toxicological information into the risk estimation process, and the quantitative indices of toxicity are presented in Section 3.5.2.

#### 3.5.1. Health Effects Summaries

The health effects summaries describe the potential toxic properties of the COPC at the GRL site. For carcinogens, the weight-of-evidence category is also included (see Table 3-17 for a description of the U.S. EPA weight-of-evidence categories). In most cases, the information in the summaries has been drawn from the Public Health Statement in the Agency for Toxic Substances and Disease Registry's (ATSDR's) toxicological profile for the chemical.

**Arsenic**

Arsenic is a naturally occurring element and is usually found combined with one or more elements, such as oxygen, chlorine, or sulfur. This element is widely distributed in the environment from natural sources, but higher concentrations have been found to occur in association with chemical waste, smelting of copper and other metals, fossil fuel combustion, and pesticide use. The primary use of arsenic is as a wood preservative, but it is also used to make insect and weed killers and pharmaceutical.

All people are exposed to low levels of arsenic because it is naturally occurring, and low levels are present in food, water, soil, and air. Workers in several industries (nonferrous smelting, wood preservation,

arsenical pesticides) may be exposed to significantly higher levels. Arsenic has been recognized as a human poison since ancient times. Large oral doses are lethal. Chronic arsenic overexposure may cause many adverse health effects including body weight changes, changes in blood, and liver and kidney damage. The critical or most sensitive effects, based on chronic oral exposure to humans, are hyper-pigmentation, keratosis, and possible vascular complications.

Arsenic is considered a Group A human carcinogen by U.S. EPA. Epidemiological studies and case reports have found evidence that arsenic exposure is associated with increased risk of cancer of the skin, lungs, bladder, and kidneys. Workers exposed by the inhalation pathway demonstrate an increased risk of lung cancer. Oral exposure leads to an increased risk of skin cancer.

**Beryllium**

Pure beryllium is a hard gray metal. In nature it occurs as a chemical component of certain rocks. The minerals bertrandite and beryl are mined commercially for the recovery of beryllium.

Most beryllium ore mined is processed into pure metal, alloys, or beryllium oxide. Beryllium metal and alloys are used in electronics, aircraft and space craft structures, X-ray machines, nuclear weapons, and nuclear reactors. Beryllium oxide is used in the manufacture of specialty ceramics.

Although beryllium is released into the air by natural sources such as volcanic dust, the major emission source to the environment is the burning of fossil fuels. Beryllium compounds are naturally present in soils, but deposition of atmospheric beryllium and disposal of beryllium-containing wastes can increase the levels in localized areas. The general population is exposed to low levels of beryllium in air, food, and water. Beryllium occurs naturally in tobacco and can be inhaled in cigarette smoke.

Industrial workers have the highest exposure to beryllium in the mining, milling, and processing of beryllium to alloys or beryllium oxide. In general, the primary route of exposure to beryllium is inhalation, since relatively little beryllium is absorbed from the GI tract or through the skin.

The respiratory tract is the major target of inhalation exposure to beryllium. Short-term exposure can produce lung inflammation and pneumonia-like symptoms. Long-term exposure can cause berylliosis, an immune reaction characterized by noncancerous growths on the lungs. Similar growths can appear on the skin of sensitive individuals exposed by dermal contact.

Epidemiological studies have found that an increased risk of lung cancer may result from exposure to beryllium in industrial settings. In addition, laboratory studies have shown that breathing beryllium causes

lung cancer in animals. However, it is not clear what cancer risk, if any, is associated with ingestion of beryllium.

EPA has classified beryllium as a Group B2 probable human carcinogen based on limited human evidence and the animal data.

**Bis(2-ethylhexyl)phthalate (BEHP, DEHP)**

DEHP is a man-made liquid widely used to make plastics more flexible. Plastics may contain up to 40% DEHP and may be used in a variety of consumer products including food packaging material, rainwear, upholstery, and shower curtains. DEHP does not evaporate easily and does not dissolve easily in water. DEHP has been found in groundwater near waste landfills, but when DEHP is released to soil it usually does not migrate far from where it was released.

DEHP can enter the body following exposure by breathing air or eating food or water that contain DEHP. The most likely route of human exposure is through food. DEHP leaches into foods from plastics used in food processing and storage.

Most of what is known about the health effects of DEHP comes from studies of laboratory mice and rats. The very low levels to which humans may be routinely exposed have not been shown to cause adverse effects; however, liver disease and reproductive effects have been associated with DEHP exposure to laboratory animals.

DEHP has been shown to cause liver cancer in rats and mice. However, because there have been no studies of the carcinogenic effects of DEHP in humans, DEHP is classified as a Group B2 probable human carcinogen.

**1,2-Dichloroethene (1,2-DCE)**

1,2-DCE is a man-made flammable liquid with a sharp, harsh odor. 1,2-DCE is primarily used in the production of solvents and as an additive to dyes, lacquer solutions, perfumes, and thermoplastics. There are two forms of 1,2-DCE; cis-1,2-DCE, and trans-1,2-DCE, which may occur separately or as a mixture.

In the environment, 1,2-DCE evaporates rapidly. When 1,2-DCE is released to either surface soil or surface water, almost all of the chemical will evaporate into air. When 1,2-DCE occurs in the subsurface, such as in landfills and chemical waste sites, it can dissolve in water and migrate into groundwater. In groundwater,

1,2-DCE breaks down to vinyl chloride, which ultimately breaks down to water, carbon dioxide, and chloride ions. Vinyl chloride, the initial breakdown product, is more toxic than 1,2-DCE.

1,2-DCE can enter the body by drinking water, eating food, or breathing air that contains 1,2-DCE. Because 1,2-DCE evaporates readily, inhalation is the most likely route of human exposure. Inhalation of high levels of 1,2-DCE can cause nausea, drowsiness, dizziness, and may result in death. Liver, heart, and lung damage were observed in laboratory animals after short or long term exposure to 1,2-DCE in air. Liver and lung damage was reported in animals fed 1,2-DCE. Death can also occur in animals fed large amounts of 1,2-DCE. Changes in blood chemistry are the critical or most sensitive effect and serves as the basis for the RfD used in the SRE.

The long term health effects resulting from exposure to 1,2-DCE are not known. Increased risk of cancer has not been reported in humans or animals exposed to 1,2-DCE.

**Dieldrin**

Dieldrin was used extensively as an agricultural pesticide for over 20 years until the United States Department of Agriculture (USDA) suspended its use in 1970. The use of Dieldrin to control termites continued until 1987, when the manufacturer voluntarily canceled the registration.

Dieldrin persists in the environment and can be found tightly bound to soils and sediment. It is not expected to leach to groundwater. Plants can take up dieldrin from soil, and fish and livestock can accumulate high concentrations through the food chain. In animals, dieldrin accumulates in fat. Dieldrin can be absorbed into the body through skin contact, ingestion, and inhalation. The most likely route of human exposure to dieldrin is through eating contaminated food. Foods most likely to be contaminated include fish, shellfish, root crops, meat, and dairy products.

Human poisoning from dieldrin is characterized by major involuntary muscle convulsions or kidney damage that can be fatal. Other effects include lack of coordination, headache, dizziness, and gastrointestinal disturbances.

Animal studies show effects of dieldrin on the nervous system and kidneys to be similar to the effects in humans. In addition, exposure to dieldrin has resulted in increases in liver enzymes and liver weight, decreased immune response, and high mortality in nursing rat pups. Liver damage is the critical or most sensitive effect in animals according to U.S. EPA. It is unknown whether exposed humans have similar health effects.

Dieldrin is a carcinogen to mice, with the liver being the site of increased tumor incidence. However, it is not known if dieldrin is a human carcinogen. Dieldrin is classified as Group B2, probable human carcinogen, by U.S. EPA.

**Lead**

Lead is a naturally occurring metal that is used in the manufacture of storage batteries and the production of ammunition and miscellaneous metal products (e.g., sheet lead, solder, and pipes). Other uses for lead are in the manufacturing of lead compounds including gasoline additives and pigments. In recent years, the quantity of lead used in paints, gasoline additives, ammunition, and solder has been reduced due to its toxic effects.

Lead can enter the body via ingestion and inhalation. Although it may also enter the body through the skin, dermal absorption of inorganic lead compounds is less significant than absorption through other routes. Children appear to be the segment of the population at greatest risk from toxic effects of lead. Children absorb about 50% of ingested lead whereas adults absorb only 5% to 15%. Initially, lead travels in the blood to the soft tissues (heart, liver, kidney, brain, etc.), and then gradually redistributes to the bones and teeth where it tends to remain. Children retain a larger fraction of the absorbed lead, about 57%, in the blood and soft tissue compartments whereas in adults roughly 95% of the total body burden of lead is found in bones and teeth.

The most serious effects associated with markedly elevated blood lead levels include neurotoxic effects such as irreversible brain damage. Health effects are the same for inhaled and ingested lead. At blood lead levels of 40 to 100 micrograms per deciliter (μg/dL), children have exhibited nerve damage, permanent mental retardation, colic, anemia, brain damage, and death. Chronic kidney disease is also evident at these levels. For most adults, such damage does not occur until blood lead levels exceed 100 μg/dL to 120 μg/dL. At these levels, damage to the male reproductive system; miscarriages; anemia; severe digestive system symptoms; decreased reaction time; weakness in fingers, wrists, or ankles; and some increased risk of heart and circulatory system disease may be exhibited. Pregnant women are at increased risk from exposure to lead because of the inherent susceptibility of the fetus from transplacental transfer of maternal lead.

None of the epidemiology studies conducted to explore the relationship between lead exposure and increased cancer risk in humans found any relationship. However, animal studies have shown increased kidney cancer and central nervous system (CNS) cancer in rats and mice orally exposed to lead. U.S. EPA has classified lead as Group B2, probable human carcinogen.

**Mercury**

Mercury is a naturally occurring element that exists in three oxidation states - metallic mercury ($Hg^o$), mercurous mercury ($Hg_2^{++}$), and mercuric mercury ($Hg^{++}$) and a variety of chemical forms. The most important with respect to human exposure are compounds of methyl mercury, mercuric mercury, and elemental mercury vapor.

Uptake of inorganic mercury and methyl mercury compounds is primarily through ingestion, with the major source of human exposure to methyl mercury being through the consumption of fish and shellfish. Mercury can also readily enter the body through inhalation of mercury vapor.

All forms of mercury, once absorbed, are distributed to tissues throughout the body via the bloodstream. The critical, or most sensitive effect of inorganic mercury is kidney damage and CNS damage. Long-term exposure to all forms of mercury can permanently damage the brain, kidneys, and developing fetus. The form of mercury and route of exposure determine which health effects will be most severe. Mercury vapor and methyl mercury readily cross the blood-brain and placental barriers.

Prenatal life is very sensitive to methyl mercury poisoning, with effects in infants ranging from slowed mental and coordination development to a severe from of cerebral palsy. To date, these effects have been found to be irreversible. Depending upon the form, level of mercury taken in, and duration of exposure, effects on the adult nervous system can range from reversible feeling of burning, or pins and needles, and feeling "out of sorts"; to irreversible brain damage leading to permanent tremors and shakiness, and constriction of the visual field. Mercury has not been found to be carcinogenic in humans.

**Methylene Chloride (MC)**

MC is a man-made liquid chemical that is widely used as an industrial solvent and as a paint stripper. Because MC evaporates easily, most MC released into the environment will end up in the air, where it is broken down by sunlight. MC released to water or soil tends to volatilize to air, but may migrate to groundwater. MC is formed during water chlorination, and small amounts of MC may be found in public drinking water supplies.

Absorption into the body occurs readily following exposure by breathing vapors or accidental ingestion. Occupational exposure to MC in air has resulted in drowsiness, fatigue, lack of appetite, and light-headedness. Other effects include impaired reaction time and coordination, numbness or tingling of fingers

and toes, and intoxication. The critical, or most sensitive effect of MC exposure is liver damage observed in rats exposed to MC.

Chronic exposure of laboratory animals to high concentrations of MC by inhalation resulted in an increased incidence of liver and lung cancer in mice and rats. MC has not been shown to cause cancer in occupationally exposed humans. Based on the results from animal studies, MC is classified as a Group B2 probable human carcinogen. Uncertainties remain regarding the pharmacokinetics, pharmacodynamics, and mechanisms of carcinogenicity for MC.

**Polychlorinated Biphenyls (PCBs)**

PCBs are a class of compounds with varying degrees of chlorine substitution on two phenyl rings joined by a single bond between the 1 and 1' positions. Because of their thermal stability and resistance, low water solubility, and favorable dielectric properties, PCBs were widely used in hydraulic fluids, compressor lubricants, heat transfer fluids, paints, lacquers, and ink (U.S. EPA 1987a).

Commercial PCB products consist of various complex mixtures of many of the 209 possible individual PCB isomers and congeners and have been marketed under trade names that vary with manufacturer and country of origin. The term "Aroclor" is the trade name of a series of PCB products formerly manufactured by Monsanto in the United States. The various Aroclor products were identified by a four-digit number. The first two digits identified the type of compound and the last two digits indicated the average weight percentage of chlorine. The only exception is Aroclor 1016, which retained the 1016 designation by which it was known during development. The chlorine percentage in Aroclor 1016 is similar to that of Aroclor 1242.

The uptake, distribution, metabolism, excretion, and toxicity of the individual congeners are all affected to a greater or lesser degree by the number and position of chlorine substituents on the biphenyl molecule. In general, a greater degree of chlorination increases absorption, favors deposition in the body's lipid stores, and slows metabolism and excretion. Higher chlorinated biphenyls with chlorine substituents in the para- (4,4') and at least two meta- (3,3', 5,5') positions on the biphenyl nucleus, but lacking substituents in the ortho- (2,2', 6,6') positions (i.e. the "coplanar" PCBs), tend to be the most toxic. This group of congeners has been shown to bind specifically to the AH receptor protein (which also binds dioxin) and to mimic many of the toxic effects of dioxin.

PCB mixtures released to the environment change through partitioning, transformation, and bioaccumulation and differ considerably from commercial mixtures. Environmental mixtures are often

characterized as Aroclors. This can lead to qualitative and quantitative errors when interpreting gas chromatography/mass spectrometry (GC/MS) results. For environmentally altered mixtures, an absence of the characteristic Aroclor patterns can suggest the absence of Aroclors, even if some PCB congeners are present at high concentrations (U.S. EPA 1996c).

The liver is the target organ most frequently associated with the toxic effects of PCBs. Hepatic effects have been seen in rats, mice, guinea pigs, rabbits, dogs, and monkeys. The toxic manifestations typically include liver enlargement, fat deposition, enzyme induction, and tissue necrosis. Hepatic effects, including liver enlargement and increases in hepatic enzyme levels, have also been reported in humans occupationally exposed to PCBs (Maroni *et al.* 1981a, b; Fishbein 1985; Alvares *et al.* 1977).

Exposure to PCBs both by dermal contact and by oral exposure has led to skin lesions in animals. Exudative lesions have been seen in rats, and monkeys exhibit chloracne-like lesions (U.S. EPA 1988a). Various skin lesions, including rashes, burning sensations, acne, hyper-pigmentation of the skin, and other manifestations, have been seen in humans occupationally exposed to PCBs, and in victims of two accidental poisoning episodes in which PCBs were ingested (U.S. EPA 1988a).

Developmental effects have also been reported in humans following PCB exposures. In a series of studies (Fein *et al.* 1984a, 1984b; Jacobson *et al.* 1990a, 1990b), neuro-developmental effects were reported in children of women who consumed PCB-contaminated fish from Lake Michigan before and during pregnancy. Intrauterine exposure was associated with lower birth weight, deficits in visual recognition memory in infancy, and short-term memory deficits at age 4. Exposure to PCBs in breast milk was associated with reduced activity levels at age 4. As often occurs in epidemiological studies, methodologies including the validity of the exposure assessment, selection of the exposed and control samples, and comparability of the exposed and control samples have been criticized (Paneth 1991).

PCB exposure has resulted in decreased reproductive success and reproductive failure in mink, monkeys, and rats. Few studies on reproductive effects in humans have been conducted; however, the weight of evidence from animal studies suggests that PCBs cause adverse reproductive effects in humans.

A number of studies have found PCBs (specifically Aroclor 1260 and 1254, and Clophen A-30 and Clophen A-60) to be carcinogenic in rats and mice. In the animal studies, the carcinogenic effects were much more pronounced in females exposed to PCBs with higher levels of chlorination (Aroclor 1254 and 1260).

The possible carcinogenicity of PCBs in humans has been investigated in several epidemiological studies of individuals occupationally exposed to PCBs in the capacitor and electrical equipment manufacturing

industries (Brown and Jones 1981; Brown 1986; Bertazzi *et al.* 1987; and Gustavsson, Hogstedt, and Rappe 1986) and in individuals who accidentally ingested PCBs in Japan (Yusho incident) (Kuratsune *et al.* 1987). To date, the occupational studies have not shown a consistent tumorigenic effect due to PCB exposures. A statistically significant increase in liver cancers was found in victims of the Yusho incident, but only among individuals living in one prefecture. The PCBs ingested by these individuals also contained polychlorinated dibenzofurans (PCDFs) and polychlorinated quatraphenyls, which also could have been responsible for or contributed to the effects. The Yusho results are therefore inconclusive.

EPA's Carcinogen Assessment Group has classified PCBs in weight-of-evidence group B2: probable human carcinogen based on sufficient evidence in animals and insufficient evidence in humans.

**Polynuclear Aromatic Hydrocarbons (PAHs)**

PAHs contain only carbon and hydrogen and consist of two or more fused benzene rings in linear, angular, or cluster arrangements. PAHs are formed during the incomplete burning of fossil fuel, garbage, or any organic matter. PAHs produced by burning may be carried into the air on dust particles and distributed into water and soil. In general, PAHs do not evaporate easily, and do not dissolve in water.

Exposure to PAHs may occur by inhaling airborne particles, drinking water, or accidentally ingesting soil or dust containing PAHs. In addition, smoking tobacco or eating charcoal-broiled food are common routes of exposure to PAHs.

Some PAHs are known carcinogens, and potential health effects caused by PAHs are usually discussed in terms of an individual PAH compound's carcinogenic or noncarcinogenic effects. Little attention has been paid to non-cancer effects of PAHs. Rapidly growing tissues, such as the intestinal lining, bone marrow, lymphoid organs, blood cells, and testes seem to be especially susceptible targets to non-cancer effects. Concentrations of 150 mg/kg or more administered to laboratory animals have been shown to inhibit body growth.

Exposure to benzo(a)pyrene (B(a)P) and other carcinogenic PAHs can cause cancer at the point of exposure. However, only B(a)P has been assigned a slope factor (SF) by U.S. EPA. In the past, other group B2 carcinogenic PAHs were assumed to be equipotent to B(a)P; however, it has been shown in animal studies that some are less carcinogenic than B(a)P. U.S. EPA has adopted relative potency factors (RPFs) that account for differences in the carcinogenic potencies of individual PAHs relative to that of B(a)P (U.S. EPA 1993c). The RPFs are to be used only for the oral route of exposure. In this SRE, the oral SF for each carcinogenic

PAH has been estimated by multiplying the oral SF for B(a)P by the compound-specific RPF.

Animals exposed to high levels of B(a)P in air develop lung tumors; when exposed via the dietary route they develop stomach tumors; and when B(a)P is painted on skin, animals develop skin tumors. Although RfDs and SFs for dermal exposure to many chemicals are routinely extrapolated from oral route values, it is inappropriate to use the oral SF for B(a)P to evaluate carcinogenic risks from dermal exposure because direct dermal exposure to B(a)P can cause skin cancer at the point of contact.

**Trichloroethene (TCE)**

TCE is a man-made chemical widely used as a cleaning agent and solvent for degreasing operations. Most TCE released into surface water or surficial soil will rapidly evaporate into the air. In the subsurface, TCE is moderately to highly mobile and can migrate to groundwater. TCE biodegrades very slowly in subsurface soils and groundwater. Microbial degradation products include dichloroethylene and vinyl chloride.

Humans are most likely to be exposed to TCE in air. TCE also may occur in drinking water supplies and consumer products including metal cleaners, spot removers, rug cleaning fluids, paints, and paint removers. TCE may cause adverse health effects following exposure via inhalation, ingestion, or skin or eye contact. Exposure to high levels of TCE can cause central nervous system effects including drowsiness, dizziness, headache, blurred vision, lack of coordination, mental confusion, flushed skin, tremors, nausea, vomiting, fatigue, irregular heartbeat, and, in some cases, death. In the past, TCE was used as an anesthetic, but that use was discontinued when it was found to cause irregular heartbeats. Chronic exposure to TCE can cause liver damage and skin reactions, as well as central nervous system effects.

Exposure of laboratory animals to TCE has been associated with an increased incidence of a variety of tumors, including kidney, liver, and lung cancers. However, it is uncertain whether people exposed to TCE have a higher risk of cancer. TCE is considered a Group B2 probable human carcinogen.

**Vinyl Chloride (VC)**

VC, which is a gas or pressurized liquid at ambient temperature, is primarily used in the chemical manufacturing industry in the production of polymeric chemicals that are in turn used to manufacture a variety of plastic products. In addition, VC is a known degradation product of many chlorinated solvents including tetra-, tri-, and dichloro-ethenes. Most of the VC in the environment comes from the plastic industry's releases to air or water. In surface water or surface soil, VC evaporates readily. Once in the air, VC breaks down

rapidly to nonhazardous chemicals. VC can dissolve in water and migrate to groundwater. Once in the groundwater, VC can persist for many years.

People are most likely to be exposed to VC in the air, although it is also possible to be exposed to VC in drinking water. Levels of VC have not been detected in background air samples, but it has been detected in the air near some plastics factories, landfills, and chemical waste sites. VC has also been detected in tobacco smoke.

VC may cause adverse health effects following exposure by inhalation, ingestion, or dermal or eye contact. VC inhalation can cause dizziness or sleepiness. Breathing very high levels of VC can cause unconsciousness and in some cases, death. On skin, exposure to liquid VC can cause burns. Non cancer effects associated with long-term occupational VC exposure include hepatitis-like changes in the liver, immune reactions, and nerve damage.

VC has been shown to cause liver and lung cancer in rats, and liver cancer in workers occupationally exposed to air concentrations in the range of 25 parts per million (ppm) to greater than 200 ppm. Based on this evidence, U.S. EPA has classified VC as a Group A human carcinogen.

### 3.5.2 Quantitative Indices of Toxicity

Quantitative indices of toxicity from the dose-response assessment are used in estimating the relationship between the extent of exposure to a contaminant and the potential increased likelihood and/or severity of adverse effects. The methods for deriving indices of toxicity, the toxicity indices for the COPC, and the procedures for estimating potential adverse effects are presented below.

#### Categorization of Chemicals as Carcinogens or Noncarcinogens

For the purpose of risk assessment, chemicals are divided into two groups: known or suspected carcinogens, and noncarcinogens. The risks posed by these two groups are assessed differently because non-carcinogenic effects generally exhibit a threshold dose below which no adverse effects occur, whereas no such threshold has been shown to exist for carcinogenicity.

As used here, the term "carcinogen" means any chemical for which there is sufficient evidence that exposure may result in continuing uncontrolled cell division (cancer) in humans and/or animals. Chemicals are classified as carcinogens or noncarcinogens based on weight-of-evidence criteria assigned by U.S. EPA Guidelines for Carcinogenic Risk Assessment (U.S. EPA 1986a). Table 3-17 summarizes the five U.S. EPA

weight-of-evidence categories. According to these U.S. EPA guidelines, chemicals classified in Groups A and B (B1 and B2) are considered human carcinogens or probable human carcinogens based on sufficient evidence, and should be the subject of non-threshold carcinogenic risk estimation procedures. These classifications are dynamic; chemicals may be reclassified at any time as additional evidence becomes available that shifts the weight-of-evidence one way or the other.

**Assessment of Carcinogens**

In contrast to noncarcinogenic effects, for which thresholds are thought to exist, scientists generally have been unable to demonstrate experimentally a threshold for carcinogenic effects. This has led to the assumption by federal regulatory agencies (e.g., U.S. EPA, Food and Drug Administration [FDA], and Occupational Safety and Health Administration [OSHA]) that any exposure to a carcinogen theoretically entails some finite risk of cancer. However, depending on the potency of a specific carcinogen and the level of exposure, such a risk could be practically negligible.

Scientists have developed several mathematical models to estimate low-dose carcinogenic risks from observed high-dose risks. Consistent with current theories of carcinogenesis, U.S. EPA has selected the linearized multistage model based on prudent public health policy (U.S. EPA 1986a). In addition to using the linearized multistage model, U.S. EPA uses the upper 95th percentile confidence limit for doses or concentrations in animal or human studies to estimate a low-dose SF. By using these procedures, the regulatory agencies are unlikely to underestimate the actual SF (formerly called carcinogenic potency factor) for humans.

Using the SF, lifetime excess cancer risks can be estimated by:

$$\text{Risk} = \Sigma \text{LADI}_j \times \text{SF}_j$$

where:

$\text{LADI}_j$ = Exposure route-specific lifetime average daily intake; and

$\text{SF}_j$ = Route-specific slope factor.

Using the multistage model, the carcinogenic risks for the oral and dermal routes of exposure are calculated as follows:

$$Risk = LADI_o\ SF_o + LADI_d\ SF_o$$

where subscript "o" indicates the oral route, and subscript "d" the dermal route. SFs for the COPC are presented in Table 3-18. U.S. EPA's weight-of-evidence classification for the chemical and the type of cancer that may be associated with exposure to the chemical are also included in the table.

**Assessment of Noncarcinogens**

Risks associated with noncarcinogenic effects (e.g., organ damage, immunological effects, birth defects, skin irritation) are usually assessed by comparing the estimated average exposure to the acceptable daily dose, now called the reference dose (RfD) by U.S. EPA. The RfD is selected by identifying the lowest reliable no observed adverse effect level (NOAEL) or lowest observed adverse effect level (LOAEL) in the scientific literature, then applying a suitable uncertainty factor (usually ranging from 10 to 1,000) to allow for differences between the study conditions and the human exposure situation to which the RfD is to be applied. NOAELs and LOAELs can be derived from either human epidemiological studies or animal studies; however, they are usually based on laboratory experiments on animals in which relatively high doses are used. Consequently, uncertainty or safety factors are applied when deriving RfDs to compensate for data limitations inherent in the underlying experiments and for the lack of precision created by extrapolating from high doses in animals to lower doses in humans.

To calculate the RfD, the appropriate NOAEL or the LOAEL is divided by the product of all of the applicable uncertainty factors and the modifying factor. That is:

$$RfD = NOAEL \text{ or } LOAEL/(UF_1 \times UF_2 ... \times MF)$$

Oral RfDs are typically expressed as one significant figure in units of mg/kg-day.
The RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of the daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a portion of the lifetime, in the case of a subchronic RfD, or during the entire lifetime, in the case of a chronic RfD. The RfD is used as a reference point for gauging the potential effects of other exposures. Usually, exposures that are less than the RfD are not likely to be associated with health risks. As the frequency of exposures exceeding the RfD increases and as the size of the excess increases, the probability increases that

adverse health effects may be observed in a human population. Nonetheless, a clear distinction that would categorize all exposures below the RfD as "acceptable" (risk-free) and all exposures in excess of the RfD as "unacceptable" (causing adverse effects) cannot be made. Noncarcinogenic risks are usually assessed by calculating a hazard quotient, which is the ratio of the estimated exposure to the RfD as follows:

$$HQ = \frac{CDI}{RfD}$$

where:

HQ = Hazard Quotient;

CDI = Chronic Daily Intake (exposure); and

RfD = Reference Dose (acceptable daily intake).

A hazard quotient greater than 1 indicates that adverse effects may be possible, whereas a value less than 1 means that adverse effects would not be expected. The higher the hazard index is above 1, the more likely it is that adverse effects could occur. Table 3-19 summarizes the RfDs for COPC at the GRL site.

### 3.6. Risk Characterization

This section combines the information developed in the exposure and toxicity assessment sections to obtain estimates of the risks posed to human health by exposure to COPC at the GRL site.

According to U.S. EPA's policy for developing Superfund remedial alternatives (U.S. EPA 1991b), when the cumulative carcinogenic site risk to an individual, based on reasonable maximum exposure for both current and future land use, is less than $10^{-4}$, and the noncarcinogenic hazard quotient is less than 1, action is generally not warranted unless there are adverse environmental impacts; Maximum Contaminant Levels (MCLs) or non-zero Maximum Contaminant Level Guidelines (MCLGs) are exceeded; or unless certain site conditions lead the risk manager to determine that a baseline risk less than $10^{-4}$ is unacceptable. Other chemical-specific applicable, relevant and appropriate requirements (ARARs) (e.g., state or federal water quality standards based on a $10^{-5}$ risk) may also be used to determine whether a site warrants remediation. U.S. EPA uses the general $10^{-4}$ to $10^{-6}$ risk range as a "target range" within which the Agency strives to manage risks as part of a Superfund cleanup. Once a decision has been made to undertake an action at a site, the Agency has expressed a preference for cleanups achieving the more protective end of the range, although

strategies achieving reductions in site risks anywhere within the risk range may be deemed acceptable by the U.S. EPA risk manager.

The excess cancer risk and chronic hazard quotients were estimated for an RME case for the exposure scenarios identified in Section 3.2. Section 3.6.1 presents the risk estimates. Section 3.6.2 summarizes the risk estimation results and identifies the COPC and pathway(s) that account for the most significant risks at the GRL site. Uncertainties associated with the risk estimates are presented in Section 3.7.

### 3.6.1 Risk Estimates

Tables 3-20 and 3-21 summarize the total cancer risks and non-cancer hazard indices posed to potential receptors, and show which exposure pathway and which chemicals are responsible for the most risk. The calculations used in the risk estimates are presented in Appendix B. A summary discussion of the risk estimates is presented below.

#### Carcinogenic Risk Estimate

Potential carcinogenic risk is assessed by multiplying the estimated LADI of a carcinogen by its SF to obtain the estimated risk, expressed as a probability of that exposure resulting in an excess incidence of cancer (i.e., more cancers than would normally be expected in that population). The excess cancer risk for exposure to each chemical by each route of exposure, category of receptor, and exposure case is initially estimated separately. The risk estimates are then summed across chemicals and across all exposure routes and pathways applicable to the same population to obtain a total cancer risk for that population.

#### Site Trespasser

As shown in Table 3-20, a cancer risk of $3.9 \times 10^{-6}$ was estimated for an adolescent trespasser at the site. Dermal contact with soil accounted for 50.5% of the total risk, and incidental ingestion of soil accounted for 49.4%. PCBs were the only COPC with estimated risks greater than $1 \times 10^{-6}$, and were responsible for 61% of the estimated risks.

#### Current Recreational Users of Stillwater River

Risks estimated for a current user of Stillwater River exposed to sediment totaled $5 \times 10^{-6}$. Of this total, incidental ingestion of sediment accounted for 85% of the risk. Arsenic was responsible for 79% of the

estimated risk, and was the only COPC that had an estimated risk greater than $1 \times 10^{-6}$.

**Future On-Site Recreational Users**

Risks posed to future recreational users by on-site soil totaled $2.4 \times 10^{-5}$. Incidental ingestion of soil was the principal pathway of exposure (64.3% of total risk). The COPC accounting for the bulk of the risk were PCBs (56%), arsenic (24%), and benzo(a)pyrene (10%).

**Noncarcinogenic Risk Estimation**

The potential for adverse effects resulting from exposure to systemic toxicants (noncarcinogens) is assessed by comparing the estimated CDI of a substance to its chronic RfD. This comparison is performed by calculating the ratio of the CDI to its corresponding RfD, which is the HQ. HQs should be summed across chemicals that produce the same type of adverse effects (e.g., liver damage), but should be kept separate if their critical effects are different. However, for screening purposes, HQs are commonly summed across all chemicals, exposure routes, and pathways applicable to a given population to obtain an HI for that population.

For noncarcinogens, U.S. EPA defines acceptable exposure levels as those to which the human population, including sensitive subpopulations, may be exposed without adverse effects during a lifetime or part of a lifetime, incorporating an adequate margin of safety. This acceptable exposure level is approximately an HI of 1.0. If the HI is less than 1.0, adverse effects usually would not be expected. As the HI increases beyond 1.0, the possibility of adverse effects occurring also increases. HI estimated for the receptors at the GRL site are presented below.

**Site Trespasser**

The HI estimated for a site trespasser was below 1. Estimated HQ for a site trespasser did not exceed 1 for any of the COPC.

**Current Recreational Users of Stillwater River**

The HI estimated for a current user of Stillwater River exposed to sediment was below 1. None of the HQ calculated for adult or child receptors were greater than or equal to 1.

**Future On-Site Recreational Users**

The HI estimated for a potential child receptor totaled 1.1, with PCBs accounting for 93% of the total risk (HQ = 1.02). Incidental ingestion of soil (67.5%) and dermal contact (31.2%) accounted for the majority of the risk,. Risks estimated for an adult receptor were less than 1; however, an HI of 1.3 would result from lifetime (i.e., child and adult combined) exposure to soil at the site.

### 3.6.2 Summary Discussion of the Risk Characterization

**Nature of Potential Adverse Health Effects**

Potential cancer risks greater than $1 \times 10^{-6}$ are associated with current and future exposures to PCBs arsenic, and B(a)P in on-site soil, and arsenic in sediment adjacent to the site. As previously discussed, PCBs are classified as a Group B, probable human carcinogen, based on carcinogenicity in animals. Chronic exposures to arsenic in sediment via incidental ingestion may lead to an increased risk of skin, bladder, and kidney cancers. Chronic exposure to arsenic via inhalation of airborne particulates may cause an increased risk of developing lung cancer. Overexposure to B(a)P via incidental ingestion and dermal contact may increase the risk of developing stomach and skin cancers.

Chronic exposure to PCBs in soils are also associated with potential non-cancer health effects for future recreational users of the site. Long-term human exposures to PCBs may cause adverse hepatic, immunological, and reproductive effects.

Lead was also detected in soils above the risk-based concentration; however, the RBC for lead is based on residential exposure. Although exposure to soil at the site is not anticipated to be as great as for a residential receptor, concentrations of lead in soil may be of concern for exposure of sensitive receptors (i.e., children ) that visit the site on a frequent basis.

A qualitative evaluation of groundwater data from the site indicates that significant potential risks exist from ingestion of groundwater at the site, due to the presence of TCE, VC, 1,2-DCE, and DEHP at levels well above their respective MCLs. Persons ingesting groundwater from the site appear to be at an increased risk of developing several adverse health effects, including changes in blood chemistry (1,2-DCE), cancer of the liver (VC, TCE, and DEHP), liver damage (DEHP, TCE, and VC), immune reactions, and nerve damage (VC). TCE and DEHP are classified as Group B2 probable human carcinogens by U.S. EPA, and VC is classified as a Group A known human carcinogen. Although not detected in the most recent round of sampling, benzene and 1,1-dichloroethene were also detected at concentrations above health-based criteria in

earlier sampling rounds. A potential exists that contaminants in groundwater are migrating from the site; however, data is not available to assess off-site migration of COPC in groundwater.

**Major Factors Driving Risks**

The major factors driving the risks at the site are:

- The presence of PCBs, arsenic, and benzo(a)pyrene in surface soils on-site
- Arsenic in sediment of the Stillwater River adjacent to the site, and
- Volatile organic compounds present in site groundwater above MCLs

Exposures to COPC in soil could reasonably be expected for a site trespasser under current conditions, and for recreational users for future scenarios at the site. The health-protective assumptions used for COPC concentrations may overestimate actual exposures for a segment of the receptor population evaluated; however, it is possible that higher concentrations of the COPC are present at the site but were not sampled. In addition, arsenic levels detected in soil may be equal to area background concentrations (the limited number of background samples did not allow a statistical comparison).

No drinking water wells currently exist at the site. Available data for the one off-site well sampled (which is upgradient of the site) is not sufficient to determine whether site-related contamination is migrating off-site to nearby residential wells in the area.

### 3.7 Discussion of Uncertainty

In order to evaluate the meaning of a risk assessment, uncertainties in the assumptions made, the potential impact of quantitative changes in those assumptions on the risk estimates, and the relevance of the findings to the real world exposures and risks must be considered. Due to the number of assumptions, data points, and calculations, a degree of uncertainty is necessarily associated with the exposure values and numerical toxicity values used in any risk assessment. The following sections discuss the uncertainties associated with the exposure and toxicity assessments, and with the resultant risk characterization calculations.

### 3.7.1 Uncertainties Related to the Exposure Assessment

**Environmental Sampling and Analysis**

The EE/CA support sampling conducted at the site was designed to characterize the areas that present the highest potential risk at the site. The locations of the samples were selected in a directed fashion to investigate specific features of the site and to identify "hot spots" of contamination. A detailed characterization of the site is often not required for the EE/CA; however, due to the biased nature of the sampling locations, the resultant chemical concentrations used in the exposure and risk estimates most likely reflect high-end estimates of the actual exposure that may occur at the site. Maximum detected concentrations of the COPC were used in the exposure estimates. As discussed earlier, this health-protective assumption may lead to an overestimate of the true exposures occurring at the site and resultant risk. However, it should be noted that only 12 soil samples were collected to assess a 15-acre site. The limited number of samples may result in areas of higher contamination being missed, which would result in an underestimate of risk posed by the site. In addition, the characterization of PCBs as Aroclors may result in an underestimate of the actual PCB congeners at the site, due to the fact that environmentally altered mixtures may not be detected as Aroclors, even if PCB congeners are present. This could result in an underestimate of PCB concentrations and subsequently an underestimate of risks posed to receptors at the site.

Due to the focused nature of the SRE, chemicals at levels below risk-based screening criteria were not carried through the quantitative risk evaluation. The results of toxicity screening indicate that the chemicals that were not included in the SRE would not pose a significant risk to a residential receptor, which is not anticipated for the site; therefore, the impacts of not including these chemicals in the evaluation of risk for site trespassers and recreational users (whose anticipated exposure is much lower than that of a potential on-site resident) is anticipated to be insignificant.

The lack of analytical information for surface water, groundwater, and off-site soil precludes a quantitative assessment of risks posed to off-site receptors. Further characterization of conditions surrounding the site would be needed in order to identify contaminant migration pathways and potential off-site receptors.

**Exposure Scenarios**

As stated in guidance for conducting non-time-critical removal actions, the SRE is intended to address risks associated with the particular area that the removal action is intended to address, and may be quantitative or qualitative in nature. This SRE concentrated on quantitative evaluation of exposure for the populations that

are anticipated to be at the greatest risk of exposure to contamination on site. Potential off-site exposure pathways such as exposure to COPC in surface water, and off-site residential exposure to groundwater and contaminated soils from the site via surface run-off were not evaluated in this SRE due to lack of data. Further, more expanded investigations of the site area would be required in order to completely assess risks associated with these pathways.

**Exposure Estimation Calculations**

The primary uncertainty regarding the exposure estimation calculations is that associated with the selection of appropriate parameter values. Individual parameter values were selected so that the overall pathway exposure estimates would approximate high-end (RME) exposures, thereby overestimating rather than underestimating risks for the potentially exposed population.

### 3.7.2 Uncertainties Related to the Toxicity Assessment

**Evaluation of Carcinogenic Toxicity Assessment Assumptions**

SF for carcinogens are often estimated from high-dose animal studies using very conservative assumptions about the dose-response relationship for carcinogens. Although there are practical reasons for doing this, the procedures used to derive SFs tend to overestimate the actual cancer potency of a chemical at low doses.

Because the increased incidence of cancer from low doses of a carcinogen may be very small relative to the incidence in unexposed populations, and because the cancer may appear long after the exposure, there is usually not sufficient low-dose data from animal bioassay or human epidemiological studies to directly estimate SFs at low doses.

Therefore, by necessity, agencies such as U.S. EPA use carcinogenic extrapolation models for estimating low-dose SFs from the responses seen at high doses. Based upon prudent public policy, these agencies assume that there is no threshold dose below which carcinogenic risks will not occur. This is equivalent to the assumption that every dose above zero, no matter how low, carries with it a small but finite risk of cancer. They also assume that the dose-response relationship is linear at low doses. This differs from the approach used for non-cancer effects, for which thresholds are assumed to exist.

The current model favored by U.S. EPA and certain other federal regulatory agencies is the linearized multistage model. The agency uses the statistically derived upper 95th percentile confidence limit of the slope

of the dose-response curve, rather than a maximum likelihood value, for the SF. The agency has concluded, based on theoretical grounds consistent with human epidemiological and animal data, that cancer follows a series of discrete stages (i.e., initiation, promotion, and progression) that ultimately can result in the uncontrolled cell proliferation known as cancer. Consistent with this conclusion, the use of the linearized multistage model permits an estimation of SF that is not likely to be exceeded if the real slope could be measured.

**Evaluation of Noncarcinogenic Toxicity Assessment Assumptions**

Key assumptions used in assessing the likelihood of noncarcinogenic effects are that threshold doses exist below which various noncarcinogenic effects do not occur and that the occurrence or absence of noncarcinogenic effects can be extrapolated between species and occasionally between routes of exposure and over varying exposure durations. The threshold assumption appears to be sound for most noncarcinogens based on reasonably good fits of experimental data to the usual dose-response curves.

The other assumptions generally appear to be true to varying degrees. The effects observed in one species or by one route of exposure may not occur in another species or by another route, or they may occur at a higher or lower dose due to differences in the biokinetics of a compound in different species or when exposure occurs by different routes. The uncertainty in these assumptions is taken into account in the development of RfDs through the use of safety or uncertainty factors. These factors reflect uncertainty associated with species-to-species extrapolation and data limitations, and include safety factors to protect sensitive individuals. The uncertainty factors used by the U.S. EPA are health-protective in nature in that they tend to overestimate the uncertainties so that the RfDs obtained are unlikely to be too high. Use of the resulting RfDs tends to overestimate the potential for noncarcinogenic effects occurring at a given exposure level.

RfDs do not exist for some COPC (such as lead). The maximum lead concentration detected at the site is well above the level of concern for residential exposure. Although exposures at the site are anticipated to be lower than those of a residential receptor, the exclusion of risks associated with lead exposure results in an underestimate of potential risks posed by the site.

### 3.7.3 Uncertainty Associated with the Risk Characterization

The risk characterization combines and integrates the information developed in the exposure and

toxicity assessments; therefore, uncertainties associated with these assessments also affect the degree of confidence that can be placed in risk characterization results. The previous sections provide full discussions of the factors causing uncertainty in the exposure and toxicity assessments, respectively.

For the exposure assessment, the use of maximum detected concentrations for exposure point concentrations of COPC is likely to cause overestimation of the true exposures. The limited amount of analytical data and the use of average and default values in lieu of site-specific data for critical variables in the exposure assessment could lead to either overestimation or underestimation of the exposures, depending on actual conditions at the site.

The basic uncertainties underlying the assessment of the toxicity of a chemical include:

- Uncertainties arising from the design, execution, or relevance of the scientific studies that form the basis of the assessment; and
- Uncertainties involved in extrapolating from the underlying scientific studies to the exposure situation being evaluated, including variable responses to chemical exposures within human and animal populations and between species.

These basic uncertainties could result in a toxicity estimate, based directly on the underlying studies, that either under- or overestimates the true toxicity of a chemical in the circumstances of interest.

Several additional factors should be considered when discussing uncertainties associated with the overall risk characterization. These include the cumulative effect of using health-protective assumptions throughout the process, uncertainties associated with exclusion of COPC from the quantitative estimates due to lack of toxicity information, and the likelihood of the exposures postulated and estimated in the exposure assessment actually occurring.

### 3.7.4 Summary of Uncertainty

The cumulative effect of using health-protective assumptions throughout the risk estimation process is that the resulting estimates could overstate the true risks. RAGS recommends that individual parameter values be selected so that the overall estimate of exposure represents reasonable maximum exposures. The actual statistical distributions of exposure parameters used in the evaluation of the GRL site are not known. As a result, best professional judgment was used to select values that are sufficiently conservative to avoid underestimating the true risk, yet not so conservative that the resulting risk estimate turns out to be

unreasonably high. The postulated exposures presented in this SRE are very likely occurring to some degree at the GRL site. Overall, the parameters used in the SRE represent a reasonable maximum estimate of those exposures.

### 3.8 Conclusions

The lack of analytical information for surface water, groundwater, and off-site soil precludes a quantitative assessment of risks posed to off-site receptors. Further characterization of conditions surrounding the site would be needed in order to identify contaminant migration pathways and potential off-site receptors. However, in accordance with U.S. EPA guidance (U.S. EPA 1993b), it is not necessary to conduct a quantitative risk assessment that addresses all exposure pathways to determine whether a response action is needed when contaminant concentration levels exceed standards that are potential chemical-specific applicable or relevant and appropriate requirements (ARARs) for the action. Where established standards for one or more contaminants in a given medium are clearly exceeded, remedial action is generally warranted. In this case, both groundwater and soils at the site exhibit concentration levels that exceed potential ARARs and/or risk based criteria. Containment alternatives should be evaluated in the EE/CA Report. Some practical considerations in developing containment alternatives include the following: regular flooding of the site; inundation of source materials by shallow groundwater during high river stage; and the location of the site immediately adjacent to a designated State Scenic River.

# 4. STREAMLINED ECOLOGICAL RISK EVALUATION

The purpose of the streamlined ecological risk evaluation (SERE) for the GRL site is to identify the chemicals of concern associated with the site; to evaluate the pathways and the extent to which ecological receptors might be exposed to these chemicals; and to assess the environmental effects associated with exposures to the chemicals. The focus of this SERE is on the potential impacts of chemicals of concern from the GRL site on the ecology of the Stillwater River and the site itself.

## 4.1 Scope of the SERE

According to U.S. EPA guidance (U.S. EPA 1989b), the ecological risk assessment process is divided into five major components: problem formulation; ecological data acquisition and review; exposure assessment; ecological effects assessment; and risk characterization. Because this is a *streamlined* risk evaluation, not a complete baseline risk assessment, several components of the risk assessment process are treated in a combined fashion, and some process steps that are usually quantitative in nature are addressed qualitatively.

To satisfy the goals of the SERE, it was necessary to collect data beyond the scope of the ecological investigations that had previously been conducted at the site. START utilized existing sampling data and existing reports on the GRL site and the Stillwater River as part of this investigation. In addition, START reviewed wetlands maps, topographic quadrangles, soils maps, and state and federal lists and reviews of species of potential concern. START also conducted limited ecological field reconnaissance activities to confirm and supplement the findings of the literature review and previously obtained site information. The field activities conducted for the SERE at the GRL site included:

- Documentation of physical characteristics of habitats identified as potential receptors;
- Confirmation of identifiable resource boundaries;
- Observations of dominant vegetation and wildlife species or communities;
- Documentation of species of potential regulatory concern;

- Identification of surface water drainage patterns;
- Observation of general land use in the vicinity of the site; and
- Identification of potential sources of contamination not related to the site.

The environmental resources identified in the literature review and field reconnaissance are presented in Section 4.2. The potential risks to the environmental resources are presented in Section 4.3.

## 4.2 Environmental Resources Inventory

The literature review and limited field reconnaissance documented the following environmental resources at the GRL site and the adjacent Stillwater River:

- Surface Water Resources (river, wetlands, floodplain, and surface water drainage);
- Habitats;
- Species of Concern;
- Geology and Hydrogeology;
- Soils;
- Topography;
- Land use; and
- Climate.

### 4.2.1 Surface Water Resources

To assess the surface water resources on and adjacent to the site, START reviewed the following resources: United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map of West Milton, Ohio, quadrangle; the Ohio Environmental Protection Agency (OEPA) report entitled, *Biological and Sediment Quality Study of the Stillwater River, Garland Road Landfill, Miami and Montgomery Counties, Ohio* (OEPA 1995); and Ohio Department of Natural Resources (ODNR) memorandum entitled, Designation of the Stillwater River from Beamsville to Englewood Dam as a Scenic River (ODNR 1974). START also performed limited field reconnaissance activities to verify surface water resources and habitat types. Wetland types have been classified in accordance with *Classification of Wetlands and Deepwater Habitats* (Cowardin *et al.* 1979) and are described in Section 4.2.1.2.

#### 4.2.1.1 Stillwater River

The Stillwater River, designated as a state scenic river, forms the eastern boundary of the GRL site. The Stillwater River is approximately 67 miles in length and empties into the Great Miami River in Dayton. The total watershed of the Stillwater River is 673 square miles (ODNR 1974). The portion of the Stillwater River adjacent to the site is approximately 200 feet wide, is relatively shallow, and has an average flow of 450 cubic feet per second ($ft^3$/sec.)(PRC 1993). Pool habitats comprise the majority of the river within the area of the site but there are also short, well developed riffle and run habitats as well. The substrate is dominated by cobble, gravel, and sand. The Stillwater River is currently designated as Exceptional Warmwater Habitat for aquatic life use (OEPA 1995).

On August 1, 1995, the OEPA published a report entitled, *Biological and Sediment Quality Study of the Stillwater River, Garland Road Landfill, Miami and Montgomery Counties, Ohio*. The purpose of the study, and similar studies in 1982 and 1990 fish tissue, fish biomarker, and sediment sampling of the Stillwater River in the vicinity of the GRL site from August to November 1994 (OEPA 1995). A summary of OEPA's findings and conclusions is presented below:

- The stream and riparian zone were found to provide excellent physical habitat for aquatic life and were found to be capable of supporting Exceptional Warmwater Habitat stream fish communities (OEPA 1995).
- "Based upon the 1994 sampling results, the Garland Road Landfill was not impacting the macroinvertebrate communities of the Stillwater River" (OEPA 1995).
- With regard to sediment samples, the report states that, "all results are below the Lowest Effect Level" (OEPA 1995).
- "The Garland Road Landfill was not impacting the fish communities of the Stillwater River, based upon 1994 sampling results" (OEPA 1995).
- "Fish tissue results showed only mercury as being of concern...." (OEPA 1995).
- "A significant improvement in the fish communities occurred during 1994" and "... appears associated with reduced effluent loadings of ammonia-N [ammonia as nitrogen] and oxygen-demanding material from the West Milton WWTP [wastewater treatment plant]" (OEPA 1995)(see Section 4.3.8).

OEPA collected a high number of fish species at each sampling location, including significant numbers of pollution-sensitive Golden Redhorse (*Moxostoma erythrurum*), Black Redhorse (*Moxostoma duquesnei*), Shorthead Redhorse (*Moxostoma macrolepidotum*), Northern Hog Sucker (*Hypentelium*

*nigricans*), Smallmouth Bass (*Micropterus dolomieui*), and River Redhorse (*Moxostoma carinatum*), a species that is listed by ODNR as Special Interest. Pollution-intolerant fish represented approximately 10.5 percent of the total catch in the Stillwater River (OEPA 1995). A list of the 39 fish species and two hybrids collected in the Stillwater River by OEPA, as published in their 1995 report, is presented in Table 4-1.

The NWI map of West Milton, Ohio, quadrangle identifies the aquatic habitat of the Stillwater River main channel in the area adjacent to the site as Riverine Lower Perennial Unconsolidated Bottom Permanently Flooded (R2UBH). R2UBH wetlands consist of habitats that are contained within a channel and with a salinity less than 0.5 parts per thousand. R2UBH wetlands are bounded on the landward side by uplands or by wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. R2UBH wetlands have a low gradient and a slow water velocity. These wetland areas remain flooded throughout the year in all years. A well developed floodplain is also characteristic of this wetland type (Cowardin *et al.* 1979).

#### 4.2.1.2 Wetlands

The NWI map designates a total of six wetland areas on or in the vicinity of the GRL site: three wetland areas on the GRL site; one adjacent to the site within the Stillwater River; and two areas immediately downgradient of the site along the Stillwater River. As described below, START believes that jurisdictional wetlands, as defined by the United States Army Corps of Engineers (USACE 1987), do not exist on site. The wetlands and wetland types in the vicinity of the GRL site, as identified by the NWI map, are described below and are shown in Figure 4-1.

**GRL Site**

Approximately 0.7-acre or 5 percent of the 15-acre site in the southeastern corner of the site is designated on the NWI map as Palustrine Forested Broad-Leaved Deciduous Temporarily Flooded (PFO1A)(USFWS 1985). Palustrine wetland systems are nontidal wetland systems dominated by trees, shrubs, persistent emergents, and emergent mosses or lichens. Palustrine wetlands possess all of the following four characteristics: are less than 20 acres in size; lack active wave-formed or bedrock shoreline features; have a water depth in the deepest part of the basin less than 6 feet at low water; and have salinity due to ocean-derived salts less than 0.5 parts per thousand. PFO1A wetlands flood for less

than two weeks during the growing season most years and are usually dry by mid-growing season. They are characterized by woody vegetation that is 20 feet or taller. These wetlands normally possess an overstory of trees covering at least 30 percent of the ground, an understory of young trees or shrubs, and a herbaceous layer (Cowardin *et al.* 1979).

Two small wetland areas on the NWI map near the southwestern tip of the site are designated as Palustrine Unconsolidated Bottom Semipermanently Flooded Excavated (PUBFx). The total size of the two wetlands is approximately 0.3 acre or 2 percent of the 15-acre site, as determined from the NWI map. PUBFx wetlands are described as freshwater wetlands that are less than 20 acres in size and less than two meters deep at low water. These wetlands remain flooded throughout the growing season in most years and have been created or modified by excavation and removal of existing substrate (Cowardin *et al.* 1979).

NWI maps are prepared primarily by stereoscopic analysis of high altitude aerial photographs, and are generally not "ground-truthed". The wetlands designated on NWI maps are identified from photographs based on vegetation, visible hydrology, and geography. The identification of wetlands on an NWI map does not indicate the existence of jurisdictional wetlands (USFWS 1985). The USACE, which has authority over wetlands, defines wetlands in, *Wetlands Delineation Manual, Technical Report Y-87-1*. This manual defines regulated wetlands as having each of three characteristics:

1) a predominance of hydrophytic vegetation;
2) saturated soil conditions; and
3) inundated or saturated groundwater at or near the surface (USACE 1987).

Although START did not delineate boundaries or establish the jurisdictional or regulatory status of the habitats on site, START believes that jurisdictional wetlands do not exist on the GRL site based on the lack of visual evidence to support the presence of all three jurisdictional wetland characteristics. NWI maps categorize wetlands as areas having just one of the above characteristics.

**Off Site**

A relatively small island exists within the Stillwater River adjacent to the GRL site. The NWI map designates this island as PFO1A habitat. The NWI map also identified two PFO1A wetland areas on

either bank of the Stillwater River, approximately 350 feet downstream of the southern portion of the site (USFWS 1985).

#### 4.2.1.3 Floodplains

The 100-year floodplain is defined by state and local regulations as those areas mapped by the Federal Emergency Management Agency (FEMA) National Flood Insurance Program, Flood Insurance Rate Maps (FIRM). In general, FEMA maps identify all land within reach of a flood with a one percent probability of occurring in any given year; also referred to as the base flood (Kusler and Platt 1988). Floodplains occur in areas along or adjacent to a stream or body of water that are capable of storing or conveying floodwater.

The FEMA maps for Miami County, Ohio, designate the entire GRL site as Zone A, indicating that it is within the 100-year floodplain of the Stillwater River. The boundary between the Zone A floodplain and Zone C (areas of minimal flooding) is approximately 3,000 feet to the west of the GRL site. FEMA has not determined base flood elevations and flood hazards within the Zone A floodplain in this area (FEMA 1983).

Englewood dam is located approximately six miles south of the GRL site and was constructed in 1922 to protect Dayton and other cities to the south along the Great Miami River from flooding. The dam only stores water during flood events. The dam has stored water on 443 occasions since its construction was completed in 1922 (Rinehart 1996).

The spillway of Englewood dam is at elevation 876. Prior to constructing the dam, the Miami Conservancy District, which has authority over Englewood dam, acquired certain rights on all properties situated below the spillway elevation. One of these rights is to back water over all properties below the spillway elevation. The maximum elevation on the GRL site is approximately 824 feet above sea level, well below the elevation of the Englewood dam spillway (Rinehart 1996).

Evidence of flooding was observed on the site during reconnaissance activities on November 21, 1996. In the low-lying southeast corner of the site, leaves from vegetation were observed lodged into the entire height of the approximately 6-foot high fence along the Stillwater River. The steep slope of the river bank along the eastern side of the GRL site indicates that flooding of the Stillwater River happens relatively infrequently but with sharp peaks (Mitsch and Gosselink 1993), however, the southern portion of the site floods annually (FEMA 1993).

#### 4.2.1.4 Surface Water Drainage Patterns

Based on field observations and on topographic mapping of the site, START has estimated surface runoff patterns on and adjacent to the site (Figure 4-2). Surface water drainage on the site is generally west to east, towards the Stillwater River. At the southern end of the site, most of the surface water drainage flows into the center of the site and then to the southeast towards the Stillwater River. At the extreme southwestern tip of the site, surface water drains to the southwest towards an intermittent stream that runs through the adjacent agricultural field before entering the Stillwater River.

### 4.2.2 Habitats

Terrestrial habitats were identified based on field observations and have been classified according to *Eastern Forests* (Kricher and Morrison 1988). Figure 4-3 shows the locations of the habitat types on the site.

The major habitat types identified within and adjacent to the GRL site include:

- River
- Northern Riverine Forest
- Old Field
- Barren Land

The vegetation observed in each habitat is listed in Table 4-2. The birds, mammals, and reptiles and amphibians that may potentially exist on the site and their probable habitats are listed in Tables 4-3, 4-4, and 4-5, respectively.

#### 4.2.2.1 River

As discussed in Section 4.2.1.1, the Stillwater River flows adjacent to the site. In the vicinity of the site, the Stillwater River is designated as R2UBH (Cowardin *et al.* 1979).

Based on the findings of the Stillwater River study done by OEPA (1995), the Stillwater River habitat is considered to be of high ecological importance. The fish and benthic macroinvertebrate communities appear to be healthy upstream and downstream of the GRL site and sediment and biotic

contamination appear to be minimal (OEPA 1995).

#### 4.2.2.2 Northern Riverine Forest

On the site, a narrow strip of northern riverine forest habitat exists along the bank of the Stillwater River (Figure 4-3). This habitat comprises approximately two acres or 13 percent of the 15-acre site. The northern riverine forest is approximately 50 to 100 feet wide and exists on a steep slope between the landfill and the river. The topography of this habitat slopes down approximately 16 feet to the edge of the river.

Northern riverine forest communities are those that occupy moist sites along rivers and floodplains. Spring flooding is an annual occurrence in this type of community. Herbaceous cover is generally minimal (Kricher and Morrison 1988).

The vegetation in this community is comprised mostly of large, old trees with little understory. Heavy flooding tends to keep understory vegetation to a minimum. Tree leaves observed lodged in the top of the six-foot high site fence provide evidence of flooding of this habitat. Observations of the vegetation in this habitat during the ecological field reconnaissance included: Eastern Sycamore (*Platanus occidentalis*); Silver Maple (*Acer saccharinum*); Eastern Cottonwood (*Populus deltoides*); Black Willow (*Salix nigra*); Red Maple (*Acer rubrum*); Sugar Maple (*Acer saccharum*); Swamp White Oak (*Quercus bicolor*); and Northern Hackberry (*Celtis occidentalis*). Animals observed in this forest community included: Belted Kingfisher (*Ceryle alcyon*); Pileated Woodpecker (*Dryocopus pileatus*); and Downy Woodpecker (*Picoides pubescens*). In addition, START field personnel have observed several small (one inch diameter) burrow holes in this river bank soil.

This habitat is considered to be of high importance to the ecology of the Stillwater River and the local area. Although the northern riverine habitat on the site is not very large and is not capable of supporting a large number of plant and animal species, it does provide many important functions to the Stillwater River and to the surrounding terrestrial habitats.

This northern riverine forest habitat is the riparian zone of the Stillwater River. A riparian zone is the land adjacent to a body of water that is, at least periodically, influenced by flooding. The northern riverine forest habitat at the GRL site is at the interface between the aquatic ecosystem of the Stillwater River and the upland ecosystem of the majority of the site. Mitsch and Gosselink (1993) describe riparian ecosystems, such as this one, as being characterized by a combination of high species diversity,

high species densities, and high productivity. Diversity and abundance of species tend to be greatest at the ecotone between two distinct ecosystems such as a river and uplands. Riparian ecosystems are generally home to productive and diverse plant communities and are valuable for many animals that seek its bit erosion of the steep river bank slope at the GRL site. This habitat may also help to inhibit erosion of GRL site surface soils into the Stillwater River by trapping the runoff. The inhibition of erosion into the river likely helps to promote the existence of silt-sensitive fish and benthic macroinvertebrate organisms in the Stillwater River.

The northern riverine habitat is important for the stream-shading that the large trees provide. This stream shading provides important escape cover for fish. Stream shading also helps to keep important water quality parameters of rivers from changing drastically, such as temperature and dissolved oxygen. The clearance of streamside vegetation increases water temperature and, together with the loss of tree root habitat, can cause dramatic reductions and alterations in fish and benthic macroinvertebrate populations (Goldman and Horne, 1983). This riparian vegetation also provides coarse particulate organic matter (CPOM) to the Stillwater River this is important food to a portion of the benthic macroinvertebrate community (U.S. EPA 1989c).

Goldman and Horne (1983) state that it is a wise stream management practice to leave a buffer strip of original vegetation about 30 meters wide. Mitsch and Gosselink (1993) state that:

> "... the importance of the river to the floodplain and the floodplain to the river... cannot be overemphasized. If either is altered, the other will change over time because floodplains and their rivers are in a continuous dynamic balance..." (Mitsch an Gosselink 1993).

OEPA, in its 1995 report on the Stillwater River, made the following recommendation about the northern riverine forest habitat of the GRL site:

> "Every attempt should be made at the Garland Road landfill to preserve the mature trees lining the river bank to stabilize the stream bank and provide riparian habitat. It would take decades for newly planted trees to provide the same functions that the trees currently provide the aquatic community. Erosion controls and bank stabilization need to be of primary concern in all actions taken during remediation activities" (OEPA 1995).

#### 4.2.2.3 Old Field

Old field habitat comprises approximately 7.5 acres or 50 percent of the 15-acre site. Old field habitat exists at the southern and northern ends of the site (Figure 4-3).

An old field is defined as an abandoned field or disturbed terrestrial habitat that has a well-developed soil base. Old field succession begins soon after a field is abandoned or a disturbed terrestrial habitat is left alone. Many fields are abandoned with bare ground. When bare ground is available, it is quickly colonized by herbaceous plants whose seeds were present in the soil. The plants that originally colonize an area are called pioneer species, and develop quickly in the abundant sunlight available due to the removal of the overstory (Kricher and Morrison 1988).

Two types of successional old field habitats can be found on the GRL site: perennial herbaceous plant community and perennial herbaceous woody plant community. Each type is described in further detail below.

**Perennial Herbaceous Plant Community**

Fields that range in age from 3 to 10 years post-disturbance are usually dominated by perennial herbaceous plant communities. The majority of the southern end of the site can be characterized as a perennial herbaceous plant community. The perennial herbaceous plant community that is between 3 and 10 years post-disturbance has established in an old field. This community often has an abundance of perennial herbaceous and grass species. The goldenrods and asters that usually dominate a two to three year post-disturbance field no longer uniformly cover the field and seedlings of shrub and tree species begin to grow (Kricher and Morrison 1988).

Observations of the vegetation in this community on site included the following species: Common Mullein *(Verbascum thapsis)*; Goldenrods (*Solidago* species); Queen Anne's Lace (*Daucus carota*); Beggar Ticks (*Bidens frondosa*); Tree-of-Heaven (*Ailanthus altissima*); and various species of grasses. Animal species that were observed in this habitat included: American Crow (*Corvus brachyrhynchos*); Song Sparrow (*Melospiza melodia*); and Northern Cardinal (*Cardinalis cardinalis*). In addition, START personnel have noted Raccoon (*Procyon lotor*) tracks and several rodent burrows that were between six and eight inches in diameter within the old field habitat at the south end of the site.

**Perennial Herbaceous Woody Plant Community**

Fields that range in age from 10 to 60 years post-abandonment are usually dominated by perennial herbaceous woody plant communities. Much of the northeastern corner of the site can be characterized as a perennial herbaceous woody plant community. In these communities, herbs and grasses are much less obvious compared to the younger communities. Clumps of trees and shrubs shade the ground. Large patches of trees and shrubs are interrupted by areas of grass. The habitat is very patchy in appearance. Very old fields begin to look like woodlands, with dense clumps of slender trees (Kricher and Morrison 1988).

Observations of the vegetation in this community included the following species: Goldenrods; Beggar Ticks; Tartarian Honeysuckle (*Lonicera tatarica*); Eastern Redcedar (*Juniperus virginiana*); Eastern Sycamore; Red Maple; Sugar Maple; Flowering Dogwood (*Cornus florida*); Tree-of-Heaven; Eastern Cottonwood; Paper Birch (*Betula papyrifera*); and Black Willow (*Salix nigra*). Animals species observed in this habitat included: American Crow, Dark-eyed Junco (*Junco hyemalis*), Song Sparrow, Northern Cardinal, Northern Mockingbird (*Mimus polyglottos*), Tufted Titmouse (*Parus bicolor*), Rufous-sided Towhee (*Pipilo erythrophthalmus*), Purple Finch (*Carpodacus purpureus*), White-breasted Nuthatch (*Sitta carolinensis*), and Carolina Chickadee (*Parus carolinensis*).

Both types of old field habitats are considered to be of low ecological importance. Due to the fence surrounding the majority of the site, few mammals are potentially able to utilize this site habitat. Birds that are common to disturbed areas would likely find this habitat to be of moderate value for foraging and nesting. This site habitat is small in size and there are many other old field habitats available in the local area that are less disturbed than the GRL site.

**4.2.2.4 Barren Land**

Barren land on the site includes the driveway, the area in the northwestern corner of the site where the work trailers are set up, and the area in the center of the site where soil excavation has occurred (Figure 4-3). Barren land comprises approximately 5.5 acres or 37 percent of the 15-acre site.

Barren land areas are mostly devoid of habitat for ecological receptors. There are few, if any, plants and animals inhabiting these areas. There are a few grasses in the soil excavation area, but little else. If this area is left undisturbed, old field succession will begin shortly.

Due to the soil excavation, this area is not considered to be of ecological importance. This area is not considered to be suitable habitat for wildlife species. The barren land of the site is not considered to be an ecosystem of concern. Barren land areas may develop into habitats of low to moderate ecological importance if left undisturbed in the future. Barren lands often take 60 or more years to develop into forest communities (Kricher and Morrison 1988). As a forest community, this habitat would not rival the ecological importance of the northern riverine forest habitat.

### 4.2.3 Species of Potential Concern

To identify species of potential concern in the vicinity of the GRL site, START reviewed current lists of threatened and endangered plants and animals in the vicinity of the site from ODNR and USFWS. USFWS lists the Indiana Bat (*Myotis sodalis*) as the only federally endangered species existing in Miami County, Ohio (USFWS 1996). The Indiana Bat is discussed in further detail below. One species on the ODNR list of threatened and endangered species, the Dark-eyed Junco (*Junco hyemalis*), is also discussed in further detail below (ODNR 1992).

At the request of START, ODNR, Division of Natural Areas and Preserves, conducted a file search for an approximately seven square mile area (1.5-mile radius) surrounding the GRL site (see Attachment C). The results of the file search indicate the following:

- No records of rare species were found for the 1.5-mile radius area;
- There are no existing or proposed state nature preserves at the site; and
- The site is located along the Stillwater River, which is a designated component of the State Scenic River system.

Based on the habitat requirements of the identified species-of-concern and the disturbed nature of the majority of the site, no federal or state species-of-concern are likely to occur in these areas. The northern riverine forest habitat provides the most likely area for the potential existence of threatened or endangered species. No species-of-concern were observed during the November 1996 field reconnaissance, but their potential occurrence can not be ruled out at this time.

**Indiana Bat (*Myotis sodalis*)**

USFWS identified the Indiana Bat as the only federally endangered species known to be present within Miami County, Ohio. No federally threatened or proposed threatened species were identified by

USFWS as being present within Miami County (USFWS 1996).

START contracted 3D/Environmental of Cincinnati, Ohio, to assess the site for suitable Indiana Bat habitat. On August 11, 1995, 3D/Environmental submitted a report entitled, *Assessment of Garland Road Landfill for Suitable Indiana Bat Summer Habitat*. The study concentrated on the northern riverine forest habitat and found that the GRL site has no value for Indiana Bat roosting habitat and has minimal value for foraging habitat. The report concluded that the overall suitability of the habitat to the Indiana Bat was negligible.

**Dark-eyed Junco (*Junco hyemalis*)**

Between 40 and 50 dark-eyed juncos were observed on the GRL site during START's limited ecological assessment on November 21, 1996. The Dark-eyed Junco is listed as endangered by ODNR, Division of Wildlife (ODNR 1992). Debbie Woischke of ODNR, Division of Natural Areas and Preserves, stated in a telephone conversation that the Dark-eyed Junco is listed as endangered in the State of Ohio for nesting habitat only. She stated that there are many Dark-eyed Juncos that inhabit Ohio in the winter that are migrants and are not of concern (Woischke 1996b).

Dark-eyed Juncos prefer coniferous and mixed woodlands for nesting (National Geographic Society 1987). In winter, they inhabit open woods, undergrowth, woodsides, and brush (Peterson 1980). There are 17 records of nesting Dark-eyed Juncos during spring and summer in Ohio and all are in the northeast portion of the state within Cuyahoga, Lake, Geauga, and Ashtabula counties (Peterjohn and Rice 1991). Ms. Woischke also stated that the GRL site is not appropriate habitat for nesting of the Dark-eyed Junco (Woischke 1996b).

### 4.2.4 Geology and Hydrogeology

The following information is based on a general description of geologic conditions in the Stillwater River Basin (ODNR 1960). Site-specific descriptions of the geologic conditions at the site may be found in the EE/CA prepared by CRA. The landfill material in the area of the GRL site is underlain by glacial deposits covering shale and limestone bedrock. The glacial deposits are comprised largely of clay till, sand, and gravel. Groundwater at the site is generally encountered at about 10 feet below ground surface. Groundwater movement in the vicinity of the site is assumed to be southeast towards the Stillwater River.

### 4.2.5 Soils

The soils within Miami County, Ohio were mapped by the United States Department of Agriculture, Soil Conservation Service (SCS) in the *Soil Survey of Miami County, Ohio* (SCS 1978). The soils mapped by the SCS (Figure 4-4) identified the following five soil types within the site boundaries:

- Made Land
- Gravel Pits
- Eldean silt loam, 0 to 2 percent slopes
- Eldean loam, 2 to 6 percent slopes
- Genesee silt loam

None of these soil types are identified on the Miami County hydric soils list (SCS 1996). A description of each soil type is presented below.

**Made Land**

The majority of the site is mapped as made-land. Made-land consists mostly of former pits and depressions that have been filled or covered with trash, bricks and stones, cinders, industrial waste, and other non-soil material (SCS 1978).

**Gravel Pits**

A gravel pit area is mapped at the southern tip of the site. Gravel pits are open excavations where the soil material has been removed and the underlying sand and gravel has been mined (SCS 1978).

**Eldean silt loam, 0 to 2 percent slopes**

On the site, this soil type is found as a narrow strip along the western boundary. This soil is level to nearly level and is found on high stream terraces. Nearly all of the original surface layer remains, and there is little or no evidence of erosion (SCS 1978).

**Eldean loam, 2 to 6 percent slopes**

A small area of this soil type is mapped at the southern tip of the site. This soil type is gently

sloping and is found along drainageways, on stream terraces, and on gravelly knolls and ridges in uplands. Slopes are about 50 to 75 feet long and there is some evidence of erosion (SCS 1978).

Genesee silt loam

A small area of this soil type exists in the northeast corner of the site. This is a level to nearly-level soil found on broad floodplains (SCS 1978).

### 4.2.6 Topography

The general topography of the site slopes down from west to east towards the Stillwater River. The western boundary of the site has an elevation of approximately 824 feet above sea level. From west to east, elevations decrease slowly to a ridge that exists approximately 40 to 75 feet from the Stillwater River. From this ridge, elevations decrease rapidly down to the river. The elevation of the Stillwater River is approximately 800 feet above sea level.

At the southern end of the site, the topography slopes down into the center of the site and then slopes east/southeast towards the Stillwater River. At the extreme southern end of the site, the topography slopes down to the southwest towards an intermittent stream that runs through the adjacent agricultural field to the Stillwater River.

### 4.2.7 Land Use

Land use adjacent to the site was identified by observations made during visual field reconnaissance on November 21, 1996. Land-use types have been categorized according to *A Land Use and Land Cover Classification System For Use With Remote Sensor Data* (Anderson *et al.* 1976). The following land-use types were identified within the vicinity of the site and are shown in Figure 4-5:

- Open Space
- Agricultural Land
- Streams and Canals
- Transportation, Communications, and Utilities
- Forest Land

A description of each land-use type and the location of each is presented below.

**Open Space**

The entire 15-acre GRL site is characterized as open space. The site was used for industrial purposes in the past, but no longer has that land use. The site is surrounded by a 6-foot high fence that keeps it from being influenced by surrounding land uses. The site land use is not expected to change in the future.

**Agricultural Land**

Agricultural land is described as land used primarily for production of food and fiber (Anderson *et al.* 1976). The land surrounding the site to the west and south is agricultural land. At the time that field reconnaissance was performed, the agricultural land surrounding the site had been used for growing corn.

**Streams and Canals**

This category includes rivers, creeks, canals, and other linear water bodies (Anderson *et al.* 1976). The Stillwater River is categorized as this land use.

**Transportation, Communications, and Utilities**

This category includes highways, railways, and areas associated with these uses (Anderson *et al.* 1976). Frederick-Garland Road, which borders the site to the north, can be categorized as this land use.

**Forest Land**

Forest land has a tree-crown areal density of 10 percent or more, is stocked with trees capable of producing timber or other wood products, and exerts an influence on the climate or water regime (Anderson *et al.* 1976). Forest land exists south of the site, along the Stillwater River.

### 4.2.8 Non-Site Related Conditions of Potential Environmental Concern

This section describes conditions in the vicinity of the site that are not related to the site, but may have, or may have recently had, an impact on the physical characteristics or ecology of the Stillwater River. The sites listed below will need to be considered when evaluating current and/or past analytical results from the Stillwater River sampling data.

**Wastewater Treatment Plant**

The West Milton wastewater treatment plant (WWTP) is located on the Stillwater River, approximately two miles north and upstream of the site. According to OEPA (1995), Stillwater River loadings data showed a marked decrease in ammonia, total nonfilterables, and carbonaceous biochemical oxygen demand following a plant upgrade that was completed in November 1992. A marked improvement in the fish communities also appeared with the reduced effluent loadings from the West Milton WWTP (OEPA 1995).

**Agricultural Operations**

Agricultural fields exist adjacent to the west and south of the site and are prevalent along the Stillwater River upstream and downstream of the site. Runoff from these agricultural fields is a potential source of sediments, pesticides, herbicides, and fertilizers to the Stillwater River.

### 4.2.9 Climate

The climate of Miami County is continental and is marked by wide annual, daily, and day-to-day ranges of temperature. Summers are moderately warm and humid, and winters are reasonably cold and cloudy. The average daily maximum for July is 85 degrees Fahrenheit (°F) and the average daily minimum is 65°F. The average daily maximum for January is 37°F and the average daily minimum is 22°F. Precipitation varies widely from year to year but is normally abundant and well-distributed throughout the year. The yearly precipitation average is approximately 36 inches, with the least amount of precipitation occurring in the Fall months. The average length of the growing season is approximately 168 days, with the average last Spring freeze on May 1 and the average first Fall freeze on October 15 (SCS 1978).

## 4.3 Identification of Contaminants of Potential Ecological Concern

In this section, sampling results have been compared to media-specific screening criteria to determine the extent of potential ecological concern associated with contaminants at the GRL site. Ecological characteristics of the site and the Stillwater River described in Section 4.2 have been used in combination with screening criteria to determine overall ecological risk. Due to the small size of the site,

the relatively small number of samples collected, and the likelihood that soil particles from all portions of the site may potentially wash into the Stillwater River, the different habitats identified in Section 4.5 could not be evaluated separately.

On-site surface soils and Stillwater River sediments have been screened for contaminants of ecological concern. Groundwater samples were not screened for contaminants of ecological concern because direct contact with subsurface groundwater is likely to be minimal for ecological receptors. START was unable to screen Stillwater River surface water for contaminants of ecological concern because no surface water data was collected in site investigations. Surface water contamination, however, is believed to be much lower than sediment contamination.

### 4.3.1 Inorganic Contaminants

The eight surface soil samples (all taken within one foot of the surface) collected and analyzed at the GRL site have been compared to screening benchmark concentrations. Toxicological benchmarks were obtained from *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1995 Revision* (Will and Suter 1995; *Toxicological Benchmarks for Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process* (Will and Suter 1995); *Toxicological Benchmarks for Wildlife: 1995 Revision* (Opresko et al. 1995); and various other toxicological profiles.

**Sediments**

Stillwater River sediment sampling results from 1993, 1994, and 1996 were screened against inorganic ecotoxicity values for sediments. The ecotoxicity values used for screening purposes were taken from *Eco Update: Ecotox Thresholds* (U.S. EPA 1996g), when available, and suggested values from *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1994 Revision* (Hull and Suter 1994) for contaminants without screening benchmark values in the U.S. EPA document.

Background concentrations for inorganic analytes were determined by taking the mean of the three upstream sediment samples (one from each sampling event). In the event that an analyte was not detected in a given upstream sample, the value used for calculating the background concentration was one-half of the sample quantitation limit for that particular sampling event.

Table 4-6 lists the analytes detected in Stillwater River sediments, the range of detected concentrations, background concentrations, and the sediment screening benchmarks used. For the majority of the inorganic analytes, a total of seven sediment samples from the three sampling events were able to be screened to identify contaminants of potential ecological concern. No inorganic analytes exceeded both the sediment screening benchmark and three times the background level. Therefore, no inorganic contaminants of potential ecological concern were identified in the Stillwater River sediment samples.

**Surface Soils**

Eight surface soil samples (all taken within one foot of the surface) collected and analyzed at the GRL site have been compared to screening benchmark concentrations for the toxicity of chemicals to vegetation from *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1995 Revision* (Will and Suter 1995) and other various toxicological profiles.

Background levels for soils were obtained from, *Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States* (Shacklette and Boerngen 1984) and *Background Levels of Heavy Metals in Ohio Farm Soils* (Logan and Miller 1983). Background levels were taken from these sources because there were only two site-specific background samples available for comparison to site surface soil samples.

Table 4-7 lists the analytes detected in GRL site soils, the range of detected concentrations, background concentrations, and the ecological screening benchmark values. The following analytes were detected at levels greater than ecological screening benchmarks and greater than three times background: barium, cadmium, chromium, lead, mercury, nickel, and zinc. Calcium and magnesium were detected at concentrations greater than three times background but have been eliminated because they are considered essential nutrients. In addition, no background concentration or ecological screening level was available for cyanide.

### 4.3.2 Organic Contaminants

As with inorganic contaminants in soil, the eight surface soil samples that were collected and analyzed at the GRL site have been compared to screening benchmark concentrations taken from *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial*

*Plants; 1995 Revision* (Will and Suter 1995); *Toxicological Benchmarks for Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process* (Will and Suter 1995); *Toxicological Benchmarks for Wildlife: 1995 Revision* (Opresko et al. 1995); and various other toxicological profiles.

**Sediment**

As with inorganic contaminants, ecological screening values for organic contaminants in sediment were taken from *Eco Update: Ecotox Thresholds* (U.S. EPA 1996g), when available, and from *Toxicological Benchmarks For Screening Contaminants of Potential Concern For Effects On Sediment-Associated Biota: 1994 Revision* (Hull and Suter 1994) for contaminants without screening benchmark values in the U.S. EPA document.

Table 4-6 lists the analytes detected in Stillwater River sediments, the range of detected concentrations, background concentrations, and the sediment screening benchmarks used. All organic contaminants detected in sediment samples were below the sediment quality screening values, except benzo(a)anthracene. The sediment screening benchmark for benzo(a)anthracene is 108 micrograms per kilogram (ug/kg) and the maximum concentration detected in the sediment samples was estimated at 120 ug/kg.

**Surface Soils**

As with inorganic contaminants in soil, the eight surface soil samples (all taken within one foot of the surface) that were collected and analyzed at the GRL site have been compared to screening benchmark concentrations for the toxicity of chemicals to vegetation from *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1995 Revision* (Will and Suter 1995) and other various toxicological profiles.

Table 4-7 lists the analytes detected in GRL site soils, the range of detected concentrations, background concentrations, and the ecological screening benchmark values. The following organic analytes were detected at concentrations greater than ecological screening benchmarks: bis(2-ethylhexyl)phthalate, Aroclor 1248, and Aroclor 1254.

### 4.3.3 Summary of Contaminants of Potential Ecological Concern

Contamination of potential ecological concern in Stillwater River sediments includes only benzo(a)anthracene. Contamination of potential ecological concern in GRL site soils includes: barium, cadmium, chromium, cyanide, lead, mercury, nickel, zinc, bis(2-ethylhexyl)phthalate, Aroclor 1248, and Aroclor 1254.

### 4.3.4 Unavailable Screening Benchmark Values

Little data exists in literature on the threshold toxicity of organic compounds to ecological receptors in soils. As a consequence, no ecological screening benchmark values were able to be identified for the following organic compounds: acetone; 1,2-dichloroethene; acenaphthylene; benzoic acid; benzo(b)fluoranthene; benzo(k)fluoranthene; benzo(ghi)perylene; isophorone; and 2-methylnaphthalene. These analytes can not be ruled out or included as contaminants of concern without ecological screening criteria for comparisons. Where possible, toxicological information for some of these contaminants is provided in Section 4.4.3.

## 4.4 Ecological Significance of Contamination

### 4.4.1 Contaminant Source, Fate, and Transport

**Benzo(a)anthracene**

The major source of benzo(a)anthracene is natural and man-made combustion. It is very persistent in sediment. Benzo(a)anthracene has a low water solubility and has a high propensity for binding to particulate or organic matter. Sediment adsorption or biotic uptake are the primary transport processes for the removal of waterborne benzo(a)anthracene. Desorption into water from soil is very unlikely. Erosion of contaminated soils by surficial runoff is the most probable process for the transport of soil-bound benzo(a)anthracene to aquatic systems. The major fate of sediment-bound benzo(a)anthracene is most likely to be biodegradation. Many organisms metabolize and excrete PAHs rapidly, so bioaccumulation is a short-term process (U.S. EPA 1987b).

The surface soil contaminants of ecological concern are located in close proximity to and upgradient of the Stillwater River. Surface water flow from the site discharges to the Stillwater River. Consequently, there is a potential pathway for migration of these soil contaminants to the Stillwater River. Migration potential would be expected to increase during periods of heavy precipitation, during

snowmelt, and/or during flooding of the Stillwater River.

All contaminants of concern in soil (except bis(2-ethylhexyl)phthalate) are particle-reactive contaminants, it is expected that their transport would occur primarily in particulate form. They are naturally occurring in the earth's crust (except cyanide). Specific source, fate, and migration information is presented below for several of these contaminants.

**Chromium**

Man-made sources of chromium include coal and oil combustion, steel production, chemical manufacture, primary metal production, and chrome plating (U.S. EPA 1987c).

**Cyanide**

The major sources of cyanide in soil are disposal of cyanide wastes in landfills and the use of cyanide-containing road salts. In surface soils with a pH of less than 9.2, volatilization of HCN is expected to be an important loss mechanism for cyanides (U.S. EPA 1988b).

**Lead**

Atmospheric deposition is the largest source of lead in soils and solid waste disposal is the second largest source. Very little transport of lead occurs because it is strongly retained by soils (U.S. EPA 1988c).

**Nickel**

The primary man-made sources of nickel in soils is the application of nickel-containing sewage sludge, the use of certain fertilizers, and the deposition of aerosol particles. Nickel is extremely persistent in soils (U.S. EPA 1987d).

Although the potential pathway exists for migration of site soil contaminants of concern to the Stillwater River, sediment data for the Stillwater River does not appear to support this hypothesis. Fish and benthic macroinvertebrate studies of the Stillwater River also do not lend support to the hypothesis that site contaminants are currently impacting the Stillwater River.

### 4.4.2 Ecological Effects Assessment

This section presents a discussion of ecological effects associated with contaminants of potential concern.

**Chromium**

Chromium is usually found in biological materials in the +3 oxidation state, where it acts as an essential nutrient to mammals. Hexavalent chromium is more toxic than the +3 form due to its high oxidation potential and its ability to easily penetrate biological membranes (Steven *et al.* 1976; Taylor and Parr 1978; Langard and Norseth 1979). Absorbed chromium is excreted from the body rapidly. The target organs following high exposures to chromium include the kidneys, immune system, nervous system, and liver. Long-term exposure of animals to relatively low levels of chromium has not resulted in effects (U.S. EPA 1987c).

**Cadmium**

Cadmium, like many other metals, can adversely affect organisms as a result of its ability to bind with enzymes and other cellular proteins and render them ineffective. Toxic effects resulting from cadmium exposure in rats include testicular damage and teratogenic effects, anemia, ovarian damage, and fetal death. In other test animals, testicular hemorrhages, necrosis, and fetal facial development defects.

**Cyanide**

Cyanide is readily absorbed by animals by inhalation, oral, and dermal routes of exposure. Inhalation of hydrogen cyanide is the most dangerous. Following absorption, it is distributed throughout the body and the effects include neurotoxicity, cardiac/repiratory effects, and thyrotoxicity (U.S. EPA 1988b).

**Lead**

Bioaccumulation of lead has been demonstrated for a variety of organisms, with bioconcentration factors typically ranging from 42 to 1,700 (U.S. EPA 1988c). Lead bonds with amino acids contained in proteins (including enzymes) or polypeptides. This characteristic increases bioaccumulation and inhibits excretion. High levels of lead exposure can have neurobehavioral effects. Lead is readily absorbed by

plants and can be toxic (U.S. EPA 1988c).

**Mercury**

Mercury is strongly adsorbed to humic and clay soils. Mercury compounds are known to be readily taken up by plants (Kabata-Pendias and Pendias 1992).

**Nickel**

Nickel is rapidly and readily taken up by plants from soils, and until certain nickel concentrations in plant tissues are reached, the adsorption is positively correlated with the soil nickel concentrations. Nickel toxicity symptoms in plants include chlorosis, retarded nutrient absorption, retarded root development, and retarded metabolism (Kabata-Pendias and Pendias 1992). Nickel toxicity symptoms in animals include lung and reproductive effects. Nickel has a short half-life in the bodies of most animals and there is little evidence of tissue accumulation (U.S. EPA 1987d).

**Polychlorinated Biphenyls**

Polychlorinated biphenyls (PCBs), such as Aroclor 1248 and Aroclor 1254, are known to biomagnify through the food chain and have considerable effects upon higher trophic-level organisms such as fish-eating birds and carnivorous mammals. PCBs are lipophilic and, thus, are readily passed up the food chain. Numerous species of biota have been shown to be susceptible to the chronic and acute effects of PCB exposure (Eisler 1986). Relatively low levels of PCBs in the diet of a variety of wildlife species have been shown to cause reproductive impairment, behavioral changes, and mortality in sensitive species (Boucher 1993).

**Zinc**

Zinc is readily transported in most natural waters and is one of the most mobile of heavy metals. Zinc levels of 30 to 21,600 ug/L have been shown to reduce the growth of various plant species. Symptoms of zinc toxicity in animals include hypertrophy in the adrenal cortex, changes in the pancreatic islets and the pituitary gland, weight gain, gastrointestinal hemorrhages, brain damage, swollen joints, anemia, low levels of hemoglobin, low hematocrit values, decreased numbers of leukocytes, morphological changes in red blood cells, reduced fetal weight, hair loss, and copper deficiency

(Dadiiska *et al.* 1985).

**Benzo(a)anthracene**

Benzo(a)anthracene was detected above the ecological screening criteria in sediments. Benzo(a)anthracene is a polycyclic aromatic hydrocarbon (PAH). PAHs are readily accumulated by most aquatic species at low concentrations in the environment, although uptake of PAHs is highly species specific. For instance, uptake is much higher in algae, mollusks, and other species incapable of metabolizing PAHs.

In sediments, PAHs may be biotransformed and biodegraded by benthic macroinvertebrate organisms in an oxygen-rich environment such as the Stillwater River. PAHs usually remain close to sites of deposition in aquatic environments.

PAHs have been shown to capable of causing liver neoplasia, tumors, hyperplastic diseases, destruction of hematopoietic and lymphoid tissues, ovotoxicity, antispermatogonic effects, adrenal necrosis, and changes in intestinal and respiratory epithelia in aquatic organisms (U.S. EPA 1980; Lee and Grant 1981).

### 4.4.3 Ecological Effects Assessment for Contaminants Without Screening Values

This section presents a discussion of ecological effects associated with contaminants for which no screening benchmark values were identified.

**Polycyclic Aromatic Hydrocarbons**

Polycyclic aromatic hydrocarbons (PAHs) include the following contaminants for which no screening benchmarks were identified: acenaphthylene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, and 2-methylnaphthalene.

PAHs are persistent in the environment. PAHs are rapidly metabolized by most organisms and therefore do not biomagnify in food chains (Eisler 1987). Several species of organisms have been observed to have adverse biological effects on their survival, growth, metabolism, and tumor formation as a result of PAH exposure.

Plant leaves may absorb or assimilate PAHs, which can then enter the food chain. PAHs assimilated by plants may be translocated, metabolized, and possibly subjected to photodegradation

within a plant. In highly contaminated areas, assimilation can exceed metabolism and degradation, resulting in an accumulation in the plant tissues. Plants can also absorb PAHs from soils through their roots and translocate them to other parts of the plant such as developing shoots (Edwards 1983).

Inhalation, skin contact, and ingestion are all routes of exposure for PAHs into mammals. PAHs are poorly absorbed from the gastrointestinal tract. Elimination of PAHs and their metabolites is through the hepatobiliary system and the gastrointestinal tract (Simms and Overcash 1983). The cytochrome P-450-dependent mixed function oxidase system is responsible for initiating the metabolism of lipophilic organic compounds like PAHs. This enzyme is present in rodent tissues, human liver, skin, placenta, fetal liver, macrophages, lymphocytes, and monocytes and the intermediates it produces can be highly toxic, mutagenic, or carcinogenic to the host (Lo and Sandi 1978).

PAHs have been shown to be capable of causing tumors in the skin and most epithelial tissues of many animal species. Acute and chronic effects of PAH exposures include: destruction of hematopoietic and lymphoid tissues; ovotoxicity; antispermatogonic effects; adrenal necrosis; and changes in intestinal and respiratory epithelia (U.S. EPA 1980; Lee and Grant 1981).

### 4.4.4 Risk Characterization

The ecological risk associated with the low level of benzo(a)anthracene in sediment is likely low. The value detected in Stillwater River sediments (120 ug/kg) is only slightly above the ecological screening benchmark value of 108 ug/kg.

The levels of the inorganics, PCBs, and organic contaminant of ecological concern likely present a moderate risk to ecological receptors. While levels of these contaminants are high in certain areas on site, the greatest concentrations are believed to be associated with the barren land areas of the center of the site. These barren land areas are of little ecological importance, especially when compared to the adjacent northern riverine forest and Stillwater River. The greatest ecological risk associated with site soil contaminants is not contact with land receptors, but the potential migration of the contaminants to the Stillwater River where they may potentially impact its high-value ecological system. Many of the soil contaminants of ecological concern are particulate-bound and may migrate to the Stillwater River via runoff.

### 4.4.5 Uncertainty Assessment

There are several factors that contribute to the uncertainty related to the overall assessment of risk at the GRL site. These factors are discussed in detail below.

The surface water of the Stillwater River was not sampled and therefore, the pathway of site contaminants to surface water could not be evaluated in the SRE. based on the low levels of contaminants detected in sediment samples and the large volume of water in the Stillwater River, it is unlikely that high levels of COPC would be detected in surface water. However, the level of impact from the site to the Stillwater River can not be accurately assessed without actual sampling and analysis of surface water.

Nine of the COPC detected in surface soil samples do not have screening benchmark values available in literature. Therefore, the levels of these contaminants could not be screened to determine if the detected concentrations are above levels of ecological concern. This risk evaluation was unable to determine if these nine contaminants detected in soil are contaminants of ecological concern at the GRL site.

Only eight surface soil samples were collected on-site, and two background surface soil samples were collected in the vicinity of the site. The GRL site is approximately 15 acres. It is likely that the eight surface soil samples have not adequately characterized soil contamination at the site. As two site-specific background samples are not a sufficient number of samples to conduct statistical analysis, literature values were used for background comparisons of inorganic analytes. The values obtained from the literature apply to broad general areas, which introduces uncertainty. For most of the inorganic analytes, the general background values are lower than the site-specific values. Therefore, it is unlikely that the use of general background levels for inorganics in soil is less stringent than using the actual data from the two samples.

Future land use at the GRL site is not known, and, therefore, the future of site habitats is not known. It is possible that the old field and barren land areas could revert to habitats of moderate ecological value if left undisturbed for a long period of time.

## 4.5 Conclusions

Although several contaminants in soil are present above ecological concern levels, the low contaminant concentrations in sediments and the high quality fish and benthic macroinvertebrate analysis

results from the Stillwater River indicate that GRL site soil contaminants are not negatively impacting the ecology of the Stillwater River. The Stillwater River is an ecologically significant habitat and preventing site impacts to it should be made a top priority for the selection of remedial alternatives for the GRL site.

It is important to prevent the contaminants in soils from reaching the Stillwater River. Future actions at the site should take into account the ecological importance of the northern riverine forest as a crucial riparian zone to the Stillwater River and every effort should be made to limit the disturbance to this crucial habitat.

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# TABLES

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## Table 3-1

## CONTAMINANT SCREENING OF SURFACE SOILS
## STREAMLINED HUMAN HEALTH RISK EVALUATION
## GARLAND ROAD LANDFILL SITE

| Analyte | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits for Non-detects | Range of Detected Concentrations | Reported Off-Site Sample Concentrations | Risk-Based Concentration (RBC) | Number of Samples Exceeding RBC |
|---|---|---|---|---|---|---|---|
| Metals and Cyanide (mg/kg) | | | | | | | |
| Aluminum | 12/12 | 100 | -- | 3,500-14,000 | 11,300/13,000 | 77,000 | 0 |
| Arsenic | 12/12 | 100 | -- | 3.9-11 | 1.09/15.6 | 0.38 | 12 |
| Barium | 12/12 | 100 | -- | 41-2,400 | 72.5/80.2 | 5,300 | -- |
| Beryllium | 12/12 | 100 | -- | 0.19-0.67 | 0.77 B/0.74 B | 0.14 | 12 |
| Cadmium | 12/12 | 100 | -- | 0.33-14 | 2.8/2.0 | 38 | 0 |
| Calcium | 12/12 | 100 | -- | 24,000-130,000 | 1,850/3,260 | -- | -- |
| Chromium | 12/12 | 100 | -- | 6.1-79 | 14.4/15.5 | 210 | 0 |
| Cobalt | 12/12 | 100 | -- | 2.4-7.9 | 9.4 B/10.3 B | 4,600 | 0 |
| Copper | 12/12 | 100 | -- | 11-70 | ND/ND | 2,800 | 0 |
| Cyanide | 7/12 | 58 | 0.1 | 0.1-12 | NA | 1,300 | 0 |
| Iron | 12/12 | 100 | -- | 8,000-29,000 | 18,200/19,200 | -- | -- |
| Lead | 12/12 | 100 | -- | 15-1,100 | 29.8/35.3 | 400 | 8 |
| Magnesium | 12/12 | 100 | -- | 13,000-62,000 | 2,200/2,270 | -- | -- |
| Manganese | 12/12 | 100 | -- | 190-600 | 745/820 | 3,200 | 0 |
| Mercury | 4/12 | 33 | 0.10-0.20 | 0.19-0.66 | ND/ND | -- | -- |
| Nickel | 12/12 | 100 | -- | 11-190 | 17.1/17.4 | 1,500 | 0 |
| Potassium | 12/12 | 100 | -- | 500-2,100 | 844 B/977 B | -- | -- |
| Selenium | 3/12 | 25 | 0.28-0.54 | 0.36-0.56 | NA | 380 | 0 |

Key at end of table.

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**Table 3-1**

**CONTAMINANT SCREENING OF SURFACE SOILS**
**STREAMLINED HUMAN HEALTH RISK EVALUATION**
**GARLAND ROAD LANDFILL SITE**

| Analyte | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits for Non-detects | Range of Detected Concentrations | Reported Off-Site Sample Concentrations | Risk-Based Concentration (RBC) | Number of Samples Exceeding RBC |
|---|---|---|---|---|---|---|---|
| Sodium | 12/12 | 100 | -- | 110-230 | ND/133 B | -- | -- |
| Vanadium | 12/12 | 100 | -- | 7.3-27 | 28.4/33.2 | 540 | -- |
| Zinc | 12/12 | 100 | -- | 42-1,000 | 63.2 EJ/76.2 EJ | 23,000 | 0 |
| Volatile Organics (ug/kg) | | | | | | | |
| Acetone | 8/12 | 75 | 10 | 10,500-125,000 | ND/ND | 2,100,000 | 0 |
| 1,2-Dichloroethene (total) | 2/12 | 16 | 5-20 | 48.4-1,280 | ND/ND | 35,000 | 0 |
| Methylene chloride | 5/12 | 42 | 5 | 4.4-40 | ND/ND | 78,000 | 0 |
| Toluene | 2/12 | 16 | 5-20 | 2.9-3.4 | ND/ND | 7,900,000 | 0 |
| Trichloroethene | 6/12 | 50 | 5-20 | 2.9-51.0 | ND/ND | 32,000 | 0 |
| Semivolatile Organics (ug/kg) | | | | | | | |
| Acenaphthene | 1/12 | 8 | 330-3,300 | 280 | ND/ND | 1,100,000 | 0 |
| Acenaphthylene | 1/12 | 8 | 330-3,300 | 270 | ND/ND | -- | -- |
| Anthracene | 2/12 | 16 | 330-3,300 | 290-620 | ND/ND | 57,000 | 0 |
| Benzoic acid | 1/12 | 8 | 660-6,600 | 4,420 | ND/ND | 1,100,000 | 0 |
| Benzo(a)anthracene | 3/12 | 25 | 330-3,300 | 230J-1460 | ND/ND | 610 | 1 |
| Benzo(b)fluoranthene | 3/12 | 25 | 330-3,300 | 170-1,020 | ND/ND | 610 | 1 |
| Benzo(k)fluoranthene | 3/12 | 25 | 330-3,300 | 210-1,210 | ND/ND | 6,100 | 0 |
| Benzo(a)pyrene | 3/12 | 25 | 330-3,300 | 200-1,160 | ND/ND | 61 | 3 |

Key at end of table.



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## Table 3-1

## CONTAMINANT SCREENING OF SURFACE SOILS
## STREAMLINED HUMAN HEALTH RISK EVALUATION
## GARLAND ROAD LANDFILL SITE

| Analyte | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits for Non-detects | Range of Detected Concentrations | Reported Off-Site Sample Concentrations | Risk-Based Concentration (RBC) | Number of Samples Exceeding RBC |
|---|---|---|---|---|---|---|---|
| Benzo(ghi)perylene | 2/12 | 16 | 330-3,300 | 110-570 | ND/ND | -- | -- |
| Bis(2-ethylhexyl)phthalate | 7/12 | 58 | 330 | 310J-18,700 | ND/ND | 32,000 | 0 |
| Butyl benzylphthalate | 1/12 | 8 | 330-3,300 | 700 | ND/ND | 9,300,000 | 0 |
| Chrysene | 3/12 | 25 | 330-3,300 | 230J-1,540 | ND/ND | 72,000 | 0 |
| Di-n-butylphthalate | 5/12 | 42 | 330-3,300 | 450-4,620 | ND/ND | 6,500,000 | 0 |
| Fluoranthene | 3/12 | 25 | 330-3,300 | 490-3,610 | ND/ND | 2,600,000 | 0 |
| Fluorene | 1/12 | 8 | 330-3,300 | 280 | ND/ND | 900,000 | 0 |
| Indeno(1,2,3-cd) pyrene | 2/12 | 16 | 330-3,300 | 100J-560 | ND/ND | 610 | 0 |
| Isophorone | 1/12 | 8 | 330 | 9,140 | ND/ND | 470,000 | 0 |
| 2-Methylnaphthalene | 2/12 | 16 | 330-3,300 | 200-340 | ND/120J | 2,400,000[b] | 0 |
| Phenanthrene | 3/12 | 25 | 330-3,300 | 300J-2,630 | ND/ND | -- | -- |
| Pyrene | 5/12 | 42 | 330-3,300 | 110-3,330 | ND/ND | 100,000 | 0 |
| Pesticides/PCBs | | | | | | | |
| Aroclor 1248 | 1/12 | 8 | 80-400 | 6,100 | ND/ND | -- | -- |
| Aroclor 1254 | 6/12 | 50 | 80 | 110-5,000 | ND/ND | -- | -- |
| 4,4'-DDD | 2/12 | 16 | 8-40 | 48-90 | ND/12.5 | 1,900 | 0 |
| Dieldrin | 4/12 | 33 | 8-40 | 13-64 | ND/150 | 28 | 2 |

Key at end of table.

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[a] Reported off-site soil sample data are from samples collected by PRC during FIT investigation in 1993 (SS-05 and SS-06).

Key:

B = For inorganics, indicates that reported result is estimated. For organics, indicates that compound was also detected in blank sample.
mg/kg = Milligrams per kilogram.
ug/kg = Micrograms per kilogram.
ND = Not detected at method detection limit.
NA = Not analyzed.
PCB = Polychlorinated biphenyl.
-- = Not applicable
b = RBC for naphthalene used as a surrogate.

Key at end of table.



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## Table 3-2

## CONTAMINANT SCREENING OF RIVER SEDIMENT
## STREAMLINED HUMAN HEALTH RISK EVALUATION
## GARLAND ROAD LANDFILL SITE

| Analyte | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits for non-detects | Range of Detected Concentrations | Average Upstream Sample Concentration[a] | Risk-Based Concentration (RBC) | Number of Samples Exceeding RBC |
|---|---|---|---|---|---|---|---|
| Metals and Cyanide (mg/kg) | | | | | | | |
| Aluminum | 7/7 | 100 | -- | 1,250-11,000 | 8,220 | 77,000 | 0 |
| Arsenic | 7/7 | 100 | -- | 2.5-7.7 | 6.5 | 0.37 | 7 |
| Barium | 5/7 | 71 | 20.0 | 34.3-135 | 78 | 5,300 | 0 |
| Beryllium | 3/7 | 43 | 1 | 0.37-0.64 B | 0.33 | 0.14 | 3 |
| Cadmium | 2/7 | 29 | 0.5-1 | 0.58B-0.71B | 0.38 | 38 | 0 |
| Calcium | 7/7 | 100 | 1,000 | 38,000-81,700 | 37,700 | - | - |
| Chromium | 7/7 | 100 | 2 | 3-14.6 | 11.2 | 210 | 0 |
| Cobalt | 3/7 | 43 | 5-10 | 5.0 B-6.8 B | 3.1 | 4,600 | 0 |
| Copper | 6/7 | 86 | 2.5-5 | 2.8-28.0 | 15.1 | 2,800 | 0 |
| Cyanide | 3/7 | 43 | 0.50-10 | 26.7-80.1 | 40.1 | 1,300 | 0 |
| Iron | 7/7 | 100 | 20 | 3,410 B-16,600 | 12,295 | - | - |
| Lead | 12/12 | 100 | 0.6 | 2.2-34.3 | 11.6 | 400 | 0 |
| Magnesium | 7/7 | 100 | 1,000 | 10,000-35,600 | 12,100 | - | - |
| Manganese | 7/7 | 100 | 3 | 149-560 | 350 | 3,200 | 3 |
| Mercury | 1/9 | 11 | 0.08-0.1 | 0.08 | 0.045 | -- | -- |
| Nickel | 5/7 | 71 | 4.0-8 | 5.6-16.4 | 13.4 | 1,500 | 0 |
| Potassium | 4/7 | 57 | 500-1,000 | 508-1,560 | 1,057 | - | - |
| Silver | 3/7 | 43 | 1-2 | 0.7 B-1.2 B | 0.65 | 380 | 0 |

Key at end of table.

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## Table 3-2

## CONTAMINANT SCREENING OF RIVER SEDIMENT STREAMLINED HUMAN HEALTH RISK EVALUATION GARLAND ROAD LANDFILL SITE

| Analyte | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits for non-detects | Range of Detected Concentrations | Average Upstream Sample Concentration[a] | Risk-Based Concentration (RBC) | Number of Samples Exceeding RBC |
|---|---|---|---|---|---|---|---|
| Sodium | 3/7 | 43 | 500-1,000 | 235 B-277 B | 199 | - | - |
| Vanadium | 6/7 | 86 | 5-10 | 5.2-24.1 | 18.2 | 540 | 0 |
| Zinc | 7/7 | 100 | 4 | 13.6-66.3 | 51.7 | 23,000 | 0 |
| Volatile Organics (µg/kg) | | | | | | | |
| Acetone | 1/4 | 25 | 50 | 15 J | 25 | 2,100,000 | 0 |
| Semivolatile Organics (µg/kg) | | | | | | | |
| Benzo(a)anthracene | 1/12 | 8 | 330 | 120 J | 193 | 610 | 0 |
| Benzo(b)fluoranthene | 1/12 | 8 | 330 | 210 J | 153 | 610 | 0 |
| Bis(2-ethylhexyl)phthalate | 1/9 | 11 | 330 | 200 J | 217 | 32,000 | 0 |
| Chrysene | 1/12 | 8 | 330 | 110 J | 193 | 7,200 | 0 |
| Fluoranthene | 4/12 | 33 | 330 | 36 J-340 J | 172 | 2,600,000 | 0 |
| Fluorene | 1/12 | 8 | 330 | 150 J | 193 | 90,000 | 0 |
| Phenanthrene | 3/12 | 25 | 330 | 48 J-390 J | 193 | -- | -- |
| Pyrene | 4/12 | 33 | 330 | 35 J-380 J | 178 | 100,000 | 0 |
| Pesticides/PCBs (µg/kg) | | | | | | | |
| Aroclor 1221 | 1/9 | 11 | 33-66 | 36 | 42 | -- | 0 |

[a] Background values are expressed as the mean of the upstream samples from each of the three sets of data. For non-detects, half the quantitation limit was used.

Key at end of table.



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Key:

mg/kg = Milligrams per kilogram.
µg/kg = Micrograms per kilogram.
PCB = Polychlorinated biphenyl.
b = RBC for naphthalene used.

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Key at end of table.

**Table 3-3**

**CHEMICALS OF POTENTIAL CONCERN IN SOIL AND SEDIMENT**
**STREAMLINED HUMAN HEALTH RISK EVALUATION**
**GARLAND ROAD LANDFILL SITE**

| Chemical | Media | |
|---|---|---|
| | Surface Soil | Sediment |
| Aroclor 1221 | | X |
| Aroclor 1248 | X | |
| Aroclor 1254 | X | |
| Arsenic | X | X |
| Beryllium | X | X |
| Benzo(a)anthracene | X | X |
| Benzo(a)pyrene | X | |
| Benzo(b)fluoranthene | X | X |
| Benzo(k)fluoranthene | X | |
| Bis(2-ethylhexyl)phthalate | X | X |
| Benzo(g,h,i)perylene | X | |
| Dieldrin | X | |
| Indeno(1,2,3-cd)pyrene | X | |
| Lead | X | X |
| Mercury | X | X |
| Methylene Chloride | X | |
| Phenanthrene | X | X |
| Trichloroethene | X | |

## Table 3-4

## CONTAMINANT SCREENING OF GROUNDWATER
## STREAMLINED HUMAN HEALTH RISK EVALUATION
## GARLAND ROAD LANDFILL SITE

| Parameter | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits for Non-detects | Range of Detected Concentrations | Upgradient Well Concentration[a] | Health-Based Criteria for Drinking Water | Number of Samples Exceeding Criteria |
|---|---|---|---|---|---|---|---|
| Metals (mg/L) | | | | | | | |
| Arsenic | 1/9 | 11 | 0.10 | 0.0422 | ND | 0.05[b] | 0 |
| Barium | 2/9 | 22 | 0.20 | 0.69-0.78 | ND | 2[b] | 0 |
| Calcium | 9/9 | 100 | -- | 73.1-138 | 87 | -- | - |
| Iron | 2/9 | 22 | 0.10 | 4.9-23.5 | ND | -- | - |
| Magnesium | 9/9 | 100 | -- | 25.2-82.2 | 32.6 | -- | - |
| Manganese | 7/9 | 78 | 0.015 | 0.012-0.56 | ND | 0.2[c] | 2 |
| Nickel | 1/9 | 11 | 0.040 | 0.065 | ND | 0.10[b] | 0 |
| Potassium | 1/9 | 11 | 5.0 | 30.0 | ND | -- | - |
| Sodium | 8/9 | 89 | 5.0 | 5.1-44.9 | ND | -- | - |
| Zinc | 1/9 | 11 | 0.50 | 0.10 | ND | 3[e] | 0 |
| Volatile Organics (ug/L) | | | | | | | |
| Acetone | 2/9 | 22 | 50-500 | 27-31 | ND | 3,500[c] | 0 |
| Benzene | 1/9 | 11 | 5-50 | 3.3 | ND | 5[b] | 0 |
| 1,2-Dichloroethene (total) | 7/9 | 78 | 5.0 | 3.0-960 | ND | cis - 70[b]<br>trans - 100[b] | 4 |
| 4-Methyl-2-pentanone | 1/9 | 11 | 50-500 | 15 | ND | 160[f] | 0 |
| Toluene | 1/9 | 11 | 5-50 | 21 | ND | 1,000[b] | 0 |
| Trichloroethene | 6/9 | 67 | 5-10 | 11-500 | ND | 5[b] | 6 |
| Vinyl chloride | 3/9 | 33 | 57-120 | 27-120 | ND | 2[b] | 3 |
| Semivolatile Organics (ug/L) | | | | | | | |
| Bis(2-ethylhexyl)phthalate | 1/9 | 11 | 10 | 8.2 | ND | 4.8[b] | 1 |

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## Table 3-4

## CONTAMINANT SCREENING OF GROUNDWATER
## STREAMLINED HUMAN HEALTH RISK EVALUATION
## GARLAND ROAD LANDFILL SITE

| Parameter | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits for Non-detects | Range of Detected Concentrations | Upgradient Well Concentration[a] | Health-Based Criteria for Drinking Water | Number of Samples Exceeding Criteria |
|---|---|---|---|---|---|---|---|
| 2,4-Dimethylphenol | 1/9 | 11 | 10 | 4.6 | ND | 730[b] | 0 |
| 4-Methylphenol | 1/9 | 11 | 10 | 19 | ND | 180[b] | 0 |
| Phenol | 1/9 | 11 | 10 | 3.2 | ND | 6[e] | 0 |

a Upgradient well concentration taken from well S-1.

Key:

mg/L = Milligrams per liter.
ug/L = Micrograms per liter
b = Maximum Contaminant Level
c = Drinking Water Equivalent Level
d = Maximum Contaminant Level Goal
e = Longer-term Health Advisory (Child)
f = Risk Based Concentration (equivalent to $1 \times 10^{-6}$ cancer risk or hazard quotient of 1)

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## Table 3-5

## CANCER RISKS AND HAZARD INDICES CORRESPONDING TO SAMPLE QUANTITATION LIMIT FOR AROCLOR 1254 IN FISH TISSUE SAMPLES FROM THE STILLWATER RIVER

Intake Equation:

$$Intake\ (mg/kg\text{-}day) = \frac{Cf \times IR \times FI \times ED \times EF}{BW \times AT}$$

where:

Cf = Chemical concentration in fish (mg/kg)
IR = Ingestion Rate (kg/day) Average Daily Fish Consumption
FI = Fraction of fish consumption from contaminated source (unitless)
ED = Exposure duration (years)
EF = Exposure frequency (events/year)
BW = Body weight (kg)
AT = Averaging time (days)

| Variable | Receptor | Case | Value (Rationale/Source) |
|---|---|---|---|
| Cf | Child/Adult | RME | 0.049 mg/kg (sample quantitation limit for Aroclor 1254) |
| IR | Child/Adult | RME | 0.054 kg/day (Average daily consumption; EPA 1991a) |
| FI | Child/Adult | RME | 0.5 (assumed) |
| EF | Child/Adult | RME | 350 days/year (EPA 1991a) |
| ED | Child | RME | 6 years (entire duration of age group) |
| | Adult | RME | 24 years (adult portion of time spent at one residence) |
| BW | Child | RME | 15 kg (average body weight for age group; EPA 1989a) |
| | Adult | RME | 70 kg (average; EPA 1989a) |
| AT | Child/Adult | RME | Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED × 365 days/year) and 70-year lifetime for carcinogenic effects (i.e., 70 years × 365 days/year) (EPA 1989a) |
| Cancer Slope Factor (SF) | Child/Adult | -- | 2.0 (mg/kg-day) |
| Oral Reference Dose (RfD) | Child/Adult | -- | 2.0 E-5 (mg/kg-day) |
| Estimated Cancer Risk (Intake x SF) | Child<br>Adult<br>Cumulative | RME | **1.4 E-5**<br>**1.2 E-5**<br>**2.6 E-5** |
| Estimated Non-cancer Risk (Intake/RfD) | Child<br>Adult<br>Cumulative | RME | **4.2**<br>0.91<br>**5.11** |

Key:

EPA = United States Environmental Protection Agency.
RME = Reasonable maximum exposure.

**Table 3-6**

**EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN IN SOIL AND SEDIMENT**
**STREAMLINED HUMAN HEALTH RISK EVALUATION**
**GARLAND ROAD LANDFILL SITE**

| Chemical | EPC (mg/kg) | |
|---|---|---|
| | Surface Soil | Sediment |
| Aroclor 1221 | -- | 36 |
| Aroclor 1248 | 6.1 | -- |
| Aroclor 1254 | 5 | -- |
| Arsenic | 11 | 7.7 |
| Beryllium | 0.67 | 0.64 |
| Benzo(a)anthracene | 1.5 | 0.12 |
| Benzo(a)pyrene | 1.2 | -- |
| Benzo(b)fluoranthene | 1 | 0.21 |
| Benzo(k)fluoranthene | 1.2 | -- |
| Bis(2-ethylhexyl)phthalate | 19 | 0.21 |
| Benzo(g,h,i)perylene | 0.57 | -- |
| Dieldrin | 0.064 | -- |
| Indeno(1,2,3-cd)pyrene | 0.56 | -- |
| Lead | 1,100 | 34 |
| Mercury | 0.66 | 0.08 |
| Methylene Chloride | 0.04 | -- |
| Phenanthrene | 2.6 | 0.39 |
| Trichloroethene | 0.051 | -- |

Key:

-- = Not applicable.

## Table 3-7

## CURRENT TRESPASSER SCENARIO: INCIDENTAL INGESTION OF ON-SITE SOIL STREAMLINED HUMAN HEALTH RISK EVALUATION GARLAND ROAD LANDFILL SITE

Equation:

$$Intake\ (mg/kg\text{-}day) = \frac{CS \times IR \times CF \times FI \times ED \times EF}{BW \times AT}$$

where:

CS = Chemical concentration in soil (mg/kg)
CF = Conversion factor ($10^{-6}$ kg/mg)
IR = Ingestion Rate (mg soil/day)
FI = Fraction ingested from contaminated source (unitless)
EF = Exposure frequency (events/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (days)

| Variable | Receptor | Case | Value (Rationale/Source) |
|---|---|---|---|
| CS | Adolescent | RME | Exposure point concentration in soil. |
| IR | Adolescent | RME | 100 mg/day (age groups greater than 6 years old; EPA 1991a) |
| FI | Adolescent | RME | 1.0 (assumes all of ingested soil is from the site). |
| EF | Adolescent | RME | 48 days/year (see text) |
| ED | Adolescent | RME | 8 years (entire duration of age group; see text) |
| BW | Adolescent | RME | 42 kg (average body weight for age group; EPA 1989a) |
| AT | Adolescent | RME | Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED × 365 days/year) and 70-year lifetime for carcinogenic effects (i.e., 70 years × 365 days/year) (EPA 1989a) |

Key:

EPA = United States Environmental Protection Agency.
RME = Reasonable maximum exposure.

**Table 3-8**

**CURRENT TRESPASSER SCENARIO: DERMAL CONTACT WITH SOIL**
**STREAMLINED HUMAN HEALTH RISK EVALUATION**
**GARLAND ROAD LANDFILL SITE**

Equation:

$$Intake\ (mg/kg\text{-}day) = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

where:

CS = Chemical concentration in soil (mg/kg)
CF = Conversion factor ($10^{-6}$ kg/mg)
SA = Skin surface area available for contact ($cm^2$/event)
AF = Soil to skin adherence factor ($mg/cm^2$)
ABS = Absorption factor (unitless)
EF = Exposure frequency (events/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (days)

| Variable | Receptor | Case | Value (Rationale/Source) |
|---|---|---|---|
| CS | Adolescent | RME | Exposure point concentration in soil |
| SA | Adolescent | RME | 3,313 (average total skin area for males ages 8-16, × 25%; EPA 1992) |
| AF | Adolescent | RME | 1.0 $mg/cm^2$ (EPA 1992) |
| ABS | Adolescent | RME | Chemical-specific value (see text) (EPA 1992) |
| EF | Adolescent | RME | 48 days/year (see text) |
| ED | Adolescent | RME | 8 years (entire duration of age group; see text) |
| BW | Adolescent | RME | 42 kg (average body weight for age group; EPA 1989a) |
| AT | Adolescent | RME | Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED × 365 days/year) and 70-year lifetime for carcinogenic effects (i.e., 70 years × 365 days/year) (EPA 1989a) |

Key:

EPA = United States Environmental Protection Agency.
RME = Reasonable maximum exposure.

## Table 3-9

## CURRENT TRESPASSER SCENARIO: INHALATION OF PARTICULATES FROM SOIL STREAMLINED HUMAN HEALTH RISK EVALUATION GARLAND ROAD LANDFILL SITE

Equation:

$$Intake\ (mg/kg\text{-}day) = \frac{CS \times ED \times EF \times IR_{air} \times (1/PEF)}{BW \times AT}$$

where:

CS = Chemical concentration in soil (mg/kg)
CF = Conversion factor ($10^{-6}$ kg/mg)
EF = Exposure frequency (events/year)
ED = Exposure duration (years)
$IR_{air}$ = Inhalation rate ($m^3$/day)
PEF = Particulate Emission Factor ($mg^3$/kg)
BW = Body weight (kg)
AT = Averaging time (days)

| Variable | Receptor | Case | Value (Rationale/Source) |
|---|---|---|---|
| CS | Adolescent | RME | Chemical concentration in soil |
| $IR_{air}$ | Adolescent | RME | 20 $m^3$/day (EPA 1991a) |
| PEF | Adolescent | RME | $1.3 \times 10^{-9}$ $m^3$/kg (calculated; EPA 1991b) |
| EF | Adolescent | RME | 8 days/year (48 days per year adjusted for portion of day spent on site [16%] see text) |
| ED | Adolescent | RME | 8 years (entire duration of age group; see text) |
| BW | Adolescent | RME | 42 kg (average body weight for age group; EPA 1989a) |
| AT | Adolescent | RME | Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED × 365 days/year) and 70-year lifetime for carcinogenic effects (i.e., 70 years × 365 days/year) (EPA 1989a) |

Key:

EPA = United States Environmental Protection Agency.
RME = Reasonable maximum exposure.

**Table 3-10**

**CURRENT TRESPASSER SCENARIO: INHALATION OF VAPORS FROM SOIL STREAMLINED HUMAN HEALTH RISK EVALUATION GARLAND ROAD LANDFILL SITE**

Equation:

$$Intake\ (mg/kg\text{-}day) = \frac{CS \times ED \times EF \times IR_{air} \times (1/VF)}{BW \times AT}$$

where:

CS = Chemical concentration in soil (mg/kg)
CF = Conversion factor ($10^{-6}$ kg/mg)
EF = Exposure frequency (events/year)
ED = Exposure duration (years)
$IR_{air}$ = Inhalation rate ($m^3$/day)
VF = Soil-to-Air volatilization factor ($mg^3$/kg)
BW = Body weight (kg)
AT = Averaging time (days)

| Variable | Receptor | Case | Value (Rationale/Source) |
|---|---|---|---|
| CS | Adolescent | RME | Chemical concentration in soil |
| $IR_{air}$ | Adolescent | RME | 20 $m^3$/day (EPA 1991a) |
| VF | Adolescent | RME | Chemical specific |
| EF | Adolescent | RME | 8 days/year (48 days per year adjusted for portion of day spent on site [16%] see text) |
| ED | Adolescent | RME | 8 years (entire duration of age group; see text) |
| BW | Adolescent | RME | 42 kg (average body weight for age group; EPA 1989a) |
| AT | Adolescent | RME | Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED × 365 days/year) and 70-year lifetime for carcinogenic effects (i.e., 70 years × 365 days/year) (EPA 1989a) |

Key:

EPA = United States Environmental Protection Agency.
RME = Reasonable maximum exposure.

**Table 3-11**

**CURRENT RECREATIONAL SCENARIO: INCIDENTAL INGESTION OF SEDIMENT STREAMLINED HUMAN HEALTH RISK EVALUATION GARLAND ROAD LANDFILL SITE**

Equation:

$$Intake\ (mg/kg\text{-}day) = \frac{CS \times IR \times CF \times FI \times ED \times EF}{BW \times AT}$$

where:

CS = Chemical concentration in sediment (mg/kg)
CF = Conversion factor ($10^{-6}$ kg/mg)
IR = Ingestion Rate (mg soil/day)
FI = Fraction ingested from contaminated source (unitless)
EF = Exposure frequency (events/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (days)

| Variable | Receptor | Case | Value (Rationale/Source) |
|---|---|---|---|
| CS | Child/Adult | RME | Exposure point concentration in sediment. |
| IR | Child | RME | 200 mg/day (children 0-6 years old; EPA 1991a) |
| | Adult | RME | 100 mg/day (age groups greater than 6 years old; EPA 1991a) |
| FI | Child/Adult | RME | 1.0 (assumes all of ingested sediment is from the site). |
| EF | Child | RME | 72 days/year (see text) |
| | Adult | RME | 48 days/year |
| ED | Child | RME | 6 years (entire duration of age group; see text) |
| | Adult | RME | 24 years (adult portion of time spent at one residence) |
| BW | Child | RME | 15 kg (average body weight for age group; EPA 1989a) |
| | Adult | RME | 70 kg (average; EPA 1989a) |
| AT | Child/Adult | RME | Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED × 365 days/year) and 70-year lifetime for carcinogenic effects (i.e., 70 years × 365 days/year) (EPA 1989a) |

Key:

EPA = United States Environmental Protection Agency.
RME = Reasonable maximum exposure.

**Table 3-12**

**CURRENT RECREATIONAL SCENARIO: DERMAL CONTACT WITH SEDIMENT**
**STREAMLINED HUMAN HEALTH RISK EVALUATION**
**GARLAND ROAD LANDFILL SITE**

Equation:

$$Intake\ (mg/kg\text{-}day) = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

where:

CS = Chemical concentration in sediment (mg/kg)
CF = Conversion factor ($10^{-6}$ kg/mg)
SA = Skin surface area available for contact ($cm^2$/event)
AF = Soil to skin adherence factor ($mg/cm^2$)
ABS = Absorption factor (unitless)
EF = Exposure frequency (events/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (days)

| Variable | Receptor | Case | Value (Rationale/Source) |
|---|---|---|---|
| CS | Child/Adult | RME | Exposure point concentration in sediment |
| SA | Child | RME | 1,750 $cm^2$ (average total skin area for child ages 2-6, × 25%; EPA 1992) |
| | Adult | | 5,000 $cm^2$ (average total skin area for an adult, × 25%; EPA 1992) |
| AF | Child/Adult | RME | 1.0 $mg/cm^2$ (EPA 1992) |
| ABS | Child/Adult | RME | Chemical-specific value (see text) (EPA 1992) |
| EF | Child | RME | 72 days/year (see text) |
| | Adult | | 48 days/year |
| ED | Child | RME | 6 years (entire duration of age group; see text) |
| | Adult | RME | 24 years (adult portion of time spent at one residence) |
| BW | Child | RME | 15 kg (average body weight for age group; EPA 1989a) |
| | Adult | RME | 70 kg (average; EPA 1989a) |
| AT | Child/Adult | RME | Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED × 365 days/year) and 70-year lifetime for carcinogenic effects (i.e., 70 years × 365 days/year) (EPA 1989a) |

Key:

EPA = United States Environmental Protection Agency.
RME = Reasonable maximum exposure.

**Table 3-13**

**FUTURE RECREATIONAL USE SCENARIO: INCIDENTAL INGESTION OF ON-SITE SOIL STREAMLINED HUMAN HEALTH RISK EVALUATION GARLAND ROAD LANDFILL SITE**

Equation:

$$Intake\ (mg/kg\text{-}day) = \frac{CS \times IR \times CF \times FI \times ED \times EF}{BW \times AT}$$

where:

CS = Chemical concentration in soil (mg/kg)
CF = Conversion factor ($10^{-6}$ kg/mg)
IR = Ingestion Rate (mg soil/day)
FI = Fraction ingested from contaminated source (unitless)
EF = Exposure frequency (events/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (days)

| Variable | Receptor | Case | Value (Rationale/Source) |
|---|---|---|---|
| CS | Child/Adult | RME | Exposure point concentration in soil. |
| IR | Child | RME | 200 mg/day (children 0 to 6 years old; EPA 1991a) |
| | Adult | RME | 100 mg/day (age groups greater than 6 years old; EPA 1991a) |
| FI | Child/Adult | RME | 1.0 (assumes all of ingested soil is from the source). |
| EF | Child | RME | 72 days/year (see text) |
| | Adult | RME | 48 days/year |
| ED | Child | RME | 6 years (entire duration of age group; see text) |
| | Adult | | 24 years (adult portion of time spent at one residence) |
| BW | Child | RME | 15 kg (average body weight for age group; EPA 1989a) |
| | Adult | RME | 70 kg (average; EPA 1989a) |
| AT | Child/Adult | RME | Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED × 365 days/year) and 70-year lifetime for carcinogenic effects (i.e., 70 years × 365 days/year) (EPA 1989a) |

Key:

EPA = United States Environmental Protection Agency.
RME = Reasonable maximum exposure.

**Table 3-14**

**FUTURE RECREATIONAL USE SCENARIO: DERMAL CONTACT WITH SOIL**
**STREAMLINED HUMAN HEALTH RISK EVALUATION**
**GARLAND ROAD LANDFILL SITE**

Equation:

$$Intake\ (mg/kg\text{-}day) = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

where:

CS = Chemical concentration in soil (mg/kg)
CF = Conversion factor ($10^{-6}$ kg/mg)
SA = Skin surface area available for contact ($cm^2$/event)
AF = Soil to skin adherence factor ($mg/cm^2$)
ABS = Absorption factor (unitless)
EF = Exposure frequency (events/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (days)

| Variable | Receptor | Case | Value (Rationale/Source) |
|---|---|---|---|
| CS | Child/Adult | RME | Exposure point concentration in soil |
| SA | Child | RME | 1,750 $cm^2$ (average total skin area for child ages 2-6, × 25%; EPA 1992) |
| | Adult | RME | 5,000 $cm^2$ (average total skin area for an adult, × 25%; EPA 1992) |
| AF | Child/Adult | RME | 1.0 $mg/cm^2$ (EPA 1992) |
| ABS | Child Adult | RME | Chemical-specific value (see text) (EPA 1992) |
| EF | Child | RME | 72 days/year (see text) |
| | Adult | RME | 48 days/year |
| ED | Child | RME | 6 years (entire duration of age group; see text) |
| | Adult | RME | 24 years (adult portion of time spent at one residence) |
| BW | Child | RME | 15 kg (average body weight for age group; EPA 1989a) |
| | Adult | RME | 70 kg (average; EPA 1989a) |
| AT | Child/Adult | RME | Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED × 365 days/year) and 70-year lifetime for carcinogenic effects (i.e., 70 years × 365 days/year) (EPA 1989a) |

Key:

EPA = United States Environmental Protection Agency.
RME = Reasonable maximum exposure.

**Table 3-15**

**FUTURE RECREATIONAL USE SCENARIO:**
**INHALATION OF PARTICULATES FROM SOIL**
**STREAMLINED HUMAN HEALTH RISK EVALUATION**
**GARLAND ROAD LANDFILL SITE**

Equation:

$$Intake\ (mg/kg\text{-}day) = \frac{CS \times ED \times EF \times IR_{air} \times (1/PEF)}{BW \times AT}$$

where:

CS = Chemical concentration in soil (mg/kg)
CF = Conversion factor ($10^{-6}$ kg/mg)
EF = Exposure frequency (events/year)
ED = Exposure duration (years)
$IR_{air}$ = Inhalation rate ($m^3$/day)
PEF = Particulate Emission Factor ($mg^3$/kg)
BW = Body weight (kg)
AT = Averaging time (days)

| Variable | Receptor | Case | Value (Rationale/Source) |
|---|---|---|---|
| CS | Child/Adult | RME | Chemical concentration in soil |
| $IR_{air}$ | Child/Adult | RME | 20 $m^3$/day (EPA 1991a) |
| PEF | Child/Adult | RME | $1.3 \times 10^{-9}$ $m^3$/kg (calculated) |
| EF | Child | RME | 18 days/year (see text) |
| | Adult | RME | 12 days/year |
| ED | Child | RME | 6 years (entire duration of age group; see text) |
| | Adult | RME | 24 years (adult portion of time spent at one residence) |
| BW | Child | RME | 15 kg (average body weight for age group; EPA 1989a) |
| | Adult | RME | 70 kg (average; EPA 1989a) |
| AT | Child/Adult | RME | Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED × 365 days/year) and 70-year lifetime for carcinogenic effects (i.e., 70 years × 365 days/year) (EPA 1989a) |

Key:

EPA = United States Environmental Protection Agency.
RME = Reasonable maximum exposure.

**Table 3-16**

**FUTURE RECREATIONAL USE SCENARIO: INHALATION OF VAPORS FROM SOIL STREAMLINED HUMAN HEALTH RISK EVALUATION GARLAND ROAD LANDFILL SITE**

Equation:

$$Intake\ (mg/kg\text{-}day) = \frac{CS \times ED \times EF \times IR_{air} \times (1/VF)}{BW \times AT}$$

where:

CS = Chemical concentration in soil (mg/kg)
CF = Conversion factor ($10^{-6}$ kg/mg)
EF = Exposure frequency (events/year)
ED = Exposure duration (years)
$IR_{air}$ = Inhalation rate ($m^3$/day)
VF = Soil-to-Air volatilization factor ($mg^3$/kg)
BW = Body weight (kg)
AT = Averaging time (days)

| Variable | Receptor | Case | Value (Rationale/Source) |
|---|---|---|---|
| CS | Child/Adult | RME | Chemical concentration in soil |
| $IR_{air}$ | Child/Adult | RME | 20 $m^3$/day (EPA 1991a) |
| VF | Child/Adult | RME | Chemical specific |
| EF | Child<br>Adult | RME | 18 days/year (see text)<br>12 days/year |
| ED | Child<br>Adult | RME | 6 years (entire duration of age group)<br>24 years (adult portion of time spent a t one residence) |
| BW | Child<br>Adult | RME | 15 kg (average body weight for age group; EPA 1989a)<br>70 kg (average body weight; EPA 1989a) |
| AT | Child/Adult | RME | Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED × 365 days/year) and 70-year lifetime for carcinogenic effects (i.e., 70 years × 365 days/year) (EPA 1989a) |

Key:

EPA = United States Environmental Protection Agency.
RME = Reasonable maximum exposure.

**Table 3-17**

**WEIGHT-OF-EVIDENCE CATEGORIES FOR CHEMICAL CARCINOGENICITY STREAMLINED HUMAN HEALTH RISK EVALUATION GARLAND ROAD LANDFILL SITE**

| Group | Description |
|---|---|
| A | Human Carcinogen |
| B | Probable Human Carcinogen:<br>B1: Limited human data are available.<br>B2: Sufficient evidence in animals or no evidence in humans. |
| C | Possible Human Carcinogen |
| D | Not Classifiable |
| E | Evidence of Noncarcinogenicity for Humans |

Source: EPA 1986c.

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## Table 3-18

## SUMMARY OF TOXICITY INFORMATION FOR CARCINOGENS STREAMLINED HUMAN HEALTH RISK ASSESSMENT GARLAND ROAD LANDFILL SITE

| Chemical | Carcinogenicity Classification | Route | Slope Factor (mg/kg/day) | Target Organ | Tumor Type | Species | Exposure Route | Source |
|---|---|---|---|---|---|---|---|---|
| PCBs | B2 | Oral/Inhalation | 2.0 E+0[a]<br>4.0 E-1[b] | Liver | Tubercular carcinomas | Rat | Diet | IRIS |
| Arsenic | A | Oral | 1.5 E+0 | Skin | Tumors | Human | Drinking water | IRIS |
| | | Inhalation | 1.5 E+1 | Lung | Lung cancer | | Inhalation | |
| Beryllium | B2 | Inhalation | 8.4 E+0 | Lung | Lung tumors gross-all sites | Human | Inhalation | IRIS |
| | | Oral | 4.3 E+0 | Whole body | | Rat | Drinking water | IRIS |
| Benzo(b)fluoranthene | B2 | Inhalation | 6.1 E+0 | -- | -- | -- | -- | HEAST |
| | | Oral | 7.3 E-1 | -- | -- | -- | -- | NCEA |
| Benzo(k)fluoranthene | B2 | Inhalation | 6.1 E+0 | -- | -- | -- | -- | HEAST |
| | | Oral | 7.3 E-2 | -- | -- | -- | -- | NCEA |
| Benzo(a)pyrene | B2 | Inhalation | 6.1 E+0 | Respiratory Tract | -- | Hamster | Inhalation | HEAST |
| | | Oral | 7.3 E+0 | Forestomach | Squamous cell carcinoma | Mice | Diet | IRIS |
| Bis(2-ethylhexyl)phthalate | B2 | Inhalation | 1.4 E-2 | -- | -- | Mouse | -- | Oral SF |
| | | Oral | 1.4 E-2 | Liver | hepatocellular carcinoma and adenoma | Mouse | Diet | IRIS |

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## Table 3-18

## SUMMARY OF TOXICITY INFORMATION FOR CARCINOGENS
## STREAMLINED HUMAN HEALTH RISK ASSESSMENT
## GARLAND ROAD LANDFILL SITE

| Chemical | Carcinogenicity Classification | Route | Slope Factor (mg/kg/day) | Target Organ | Tumor Type | Species | Exposure Route | Source |
|---|---|---|---|---|---|---|---|---|
| Dieldrin | B2 | Inhalation | 1.6 E+1 | Liver | -- | -- | -- | IRIS |
| | | Oral | 1.6 E+1 | Liver | Carcinoma | Mouse | Diet | IRIS |
| Indeno(1,2,3-cd)pyrene | B2 | Inhalation | 6.1 E+0 | -- | -- | -- | -- | NCEA |
| | | Oral | 7.3 E-1 | -- | -- | -- | -- | NCEA |
| Methylene Chloride | B2 | Inhalation | 1.6 E-3 | Lung | -- | Rat | Inhalation | IRIS |
| | | Oral | 7.5 E-3 | Liver | -- | Rat | Diet | IRIS |
| Trichloroethene | B2 | Inhalation | 6.0 E-3 | Lung | -- | Rat | Inhalation | NCEA |
| | | Oral | 1.1 E-2 | Liver, Kidney | -- | Rat | Diet | NCEA |

[a] Upper end SF used for soil, sediment, and food chain exposure, and dermal contact (when absorption factors are used).
[b] SF used for inhalation exposures, ingestion of water soluble congeners, or dermal exposure when no absorption factor is used.

Key:

IRIS = United States Environmental Protection Agency, Integrated Risk Information System, entries on line as of July 1995.
HEAST = EPA's Health Effects Assessment Summary Tables
NCEA = EPA's National Center for Environmental Assessment
mg/kg/day = Milligrams per kilogram per day.

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## Table 3-19

## SUMMARY OF TOXICITY INFORMATION FOR NONCARCINOGENS
## STREAMLINED HUMAN HEALTH RISK ASSESSMENT
## GARLAND ROAD LANDFILL SITE

| Chemical | Route | RfD Type | RfD (mg/kg/day) | Uncertainty Factor | Modifying Factor | Confidence Level | Target Organ | Critical Effect | Source |
|---|---|---|---|---|---|---|---|---|---|
| Aroclor 1254 | Inhalation | Chronic | 2.0 E-05 | -- | -- | -- | -- | Decreased antibody response | Oral RfD |
| | Oral | | 2.0 E-05 | 300 | 1 | Medium | -- | Decreased antibody response | IRIS |
| Arsenic | Inhalation | Chronic | 3.0 E-04 | -- | -- | -- | Skin | Hyperpigmentation, keratosis, and possible vascular complications | Oral RfD |
| | Oral | | 3.0 E-04 | 3 | 1 | Medium | Skin | | IRIS |
| Beryllium | Inhalation | Chronic | 5.0 E-3 | -- | -- | -- | -- | No adverse effects | Oral RfD |
| | Oral | Chronic | 5.0 E-3 | 100 | 1 | Low | -- | No adverse effects | IRIS |
| Bis(2-ethylhexyl) phthalate | Inhalation | Chronic | 5.7 E-2 | 100 | -- | Low | Fetus | Developmental toxicity | NCEA |
| | Oral | Chronic | 2 E-2 | 1000 | 1 | Medium | Liver | Increased liver weight | IRIS |
| 1,2-Dichloro ethene | Inhalation | Chronic | 9.0 E-3 | -- | -- | -- | Liver | Lesions | Oral RfD |
| | Oral | Chronic | 9.0 E-3 | 1000 | -- | -- | Liver | Lesions | HEAST |
| Dieldrin | Inhalation | Chronic | 5.0 E-5 | -- | -- | -- | Liver | Lesions | Oral RfD |
| | Oral | Chronic | 5.0 E-5 | 100 | 1 | Medium | Liver | Lesions | IRIS |
| Manganese | Inhalation | Chronic | 1.4 E-5 | 1000 | 1 | Medium | -- | Impairment of neurobehavioral function | IRIS |
| | Oral | Chronic | 1.4 E-1 | 1 | 1 | Medium | -- | CNS effects | IRIS |

Key:

— = Information not available.
DI = Data insufficient.
RfD = Reference dose.
IRIS = United States Environmental Protection Agency, Integrated Risk Information System, entries on line as of September 1995.
HEAST = United States Environmental Protection Agency, Health Effects Assessment Summary Tables, Annual Update, FY 1994.



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**Table 3-20**

**SUMMARY OF ESTIMATED EXCESS CANCER RISKS**
**STREAMLINED HUMAN HEALTH RISK EVALUATION**
**GARLAND ROAD LANDFILL SITE**

| Receptor | Total Risk | Exposure Medium | Risk Contribution by Exposure Route | Significant Risk Contribution by Chemical |
|---|---|---|---|---|
| Site Trespasser | $3.9 \times 10^{-6}$ | Surface Soil | Incidental ingestion - 49.4%<br>Dermal contact - 50.5%<br>Inhalation - 0.1% | Aroclor 1248 - 34%<br>Aroclor 1254 - 27% |
| Current Recreational User | $5.0 \times 10^{-6}$ | Sediment | Incidental ingestion - 85%<br>Dermal contact - 15% | Arsenic - 79% |
| Future Recreational User | $2.4 \times 10^{-5}$ | Surface Soil | Incidental ingestion - 64.3%<br>Dermal contact - 35.6%<br>Inhalation - 0.1% | Arsenic - 24%<br>Aroclor 1248 - 31%<br>Aroclor 1254 - 25%<br>Benzo(a)Pyrene - 10% |

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**Table 3-21**

**SUMMARY OF ESTIMATED HAZARD INDICES FOR NONCARCINOGENIC EFFECTS**
**STREAMLINED HUMAN HEALTH RISK EVALUATION**
**GARLAND ROAD LANDFILL SITE**

| Receptor | Total Hazard Index | Hazard Quotients Greater than 1 by Chemical | Risk Contribution by Exposure Route | Significant Risk Contribution by Medium |
|---|---|---|---|---|
| Site Trespasser | 0.25 | None | Incidental ingestion - 35.7%<br>Dermal contact - 63.8%<br>Inhalation - 0.4% | Surface Soil - 100% |
| Current Recreational User (child) | 0.07 | None | Incidental ingestion - 92%<br>Dermal contact - 8% | Sediment - 100% |
| Current Recreational User (adult) | 0.01 | None | Incidental ingestion - 67%<br>Dermal contact - 33% | Sediment - 100% |
| Future Recreational User (child) | 1.1 | Aroclor 1254 - 1.02 | Incidental ingestion - 67.5%<br>Dermal contact - 31.9%<br>Inhalation - 0.6% | Surface Soil - 100% |
| Future Recreational User (adult) | 0.2 | None | Incidental ingestion - 26.9%<br>Dermal contact - 72.6%<br>Inhalation - 0.5% | Surface Soil - 100% |

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**Table 4-1**

**FISH REPORTED IN THE STILLWATER RIVER IN THE VICINITY OF THE GARLAND ROAD LANDFILL SITE BY OHIO ENVIRONMENTAL PROTECTION AGENCY (OEPA)**

| Common Name | Scientific Name |
|---|---|
| Gizzard Shad | *Dorosoma cepedianum* |
| Quillback Carpsucker | *Carpiodes cyprinus* |
| Black Redhorse | *Moxostoma duquesnei* |
| Golden Redhorse | *Moxostoma erythrurum* |
| Shorthead Redhorse | *Moxostoma macrolepidotum* |
| River Redhorse | *Moxostoma carinatum* |
| Northern Hog Sucker | *Hypentelium nigricans* |
| White Sucker | *Catostomus commersoni* |
| Spotted Sucker | *Minytrema melanops* |
| Common Carp | *Cyprinus carpio* |
| Golden Shiner | *Notemigonus crysoleucas* |
| River Chub | *Nocomis micropogon* |
| Creek Chub | *Semotilus thoreauianus* |
| Silver Shiner | *Notropis shumardi* |
| Rosyface Shiner | *Notropis rubellus* |
| Striped Shiner | *Luxulus chrysocephalus* |
| Spotfin Shiner | *Notropis spilopterus* |
| Sand Shiner | *Notropis stramineus* |
| Bluntnose Minnow | *Pimephales notatus* |
| Central Stoneroller | *Campostoma anomalum* |
| Channel Catfish | *Ictalurus punctatus* |
| Yellow Bullhead | *Ictalurus natalis* |
| Brown Bullhead | *Ictalurus nebulosus* |
| Black Bullhead | *Ictalurus melas* |
| Stonecat Madtom | *Notorus flavus* |
| White Crappie | *Pomoxis annularis* |
| Rock Bass | *Ambloplites rupestris* |
| Smallmouth Bass | *Micropterus dolomieui* |

**Table 4-1**

**FISH REPORTED IN THE STILLWATER RIVER IN THE VICINITY OF THE GARLAND ROAD LANDFILL SITE BY OHIO ENVIRONMENTAL PROTECTION AGENCY (OEPA)**

| Common Name | Scientific Name |
|---|---|
| Largemouth Bass | *Micropterus salmoides* |
| Green Sunfish | *Lepomis cyanellus* |
| Bluegill Sunfish | *Lepomis macrochirus* |
| Orangespotted Sunfish | *Lepomis humilis* |
| Longear Sunfish | *Lepomis megalotis* |
| Green Sunfish X Bluegill | *Lepomis cyanellus X macrochirus* |
| Longear Sunfish X Bluegill | *Lepomis meggalotis X macrochirus* |
| Blackside Darter | *Percina maculata* |
| Logperch | *Percina caprodes* |
| Johnny Darter | *Etheostoma nigrum* |
| Greenside Darter | *Etheostoma blennioides* |
| Banded Darter | *Etheostoma zonale* |
| Rainbow Darter | *Etheostoma caeruleum* |

Source: OEPA 1995

**Table 4-2**

**VEGETATION OBSERVED AT THE GARLAND ROAD LANDFILL SITE**

| Common Name | Scientific Name | Habitat |
|---|---|---|
| Eastern Sycamore | *Platanus occidentalis* | OF,NRF |
| Common Mullein | *Verbascum thapsis* | OF |
| Sugar Maple | *Acer saccharum* | OF,NRF |
| Red Maple | *Acer rubrum* | OF,NRF |
| Silver Maple | *Acer saccharinum* | NRF |
| Goldenrod species | *Solidago* spp. | OF |
| Flowering Dogwood | *Cornus florida* | OF |
| Tree-of-Heaven | *Ailanthus altissima* | OF |
| Eastern Cottonwood | *Populus deltoides* | OF,NRF |
| Queen Anne's Lace | *Daucus carota* | OF |
| Paper Birch | *Betula papyrifera* | OF |
| Eastern Redcedar | *Juniperus virginiana* | OF |
| Tartarian Honeysuckle | *Lonicera tatarica* | OF |
| Black Willow | *Salix nigra* | OF,NRF |
| Beggar Ticks | *Bidens frondosa* | OF |
| Swamp White Oak | *Quercus bicolor* | NRF |
| Northern Hackberry | *Celtis occidentalis* | NRF |

Key:

OF = Old Field
NRF = Northern Riverine Forest

**Table 4-3**

**BIRDS OBSERVED OR POTENTIALLY EXISTING AT THE GARLAND ROAD LANDFILL SITE**

| Common Name | Scientific Name | Habitat | Season | Observed |
|---|---|---|---|---|
| American Crow | *Corvus brachyrhynchos* | OF,NRF | Y | X |
| Dark-eyed Junco | *Junco hyemalis* | OF | W | X |
| Song Sparrow | *Melospiza melodia* | OF | Y | X |
| Northern Cardinal | *Cardinalis cardinalis* | OF | Y | X |
| Downy Woodpecker | *Picoides pubescens* | OF,NRF | Y | X |
| Northern Mockingbird | *Mimus polyglottos* | OF,NRF | Y | X |
| Pileated Woodpecker | *Dryocopus pileatus* | NRF | Y | X |
| Belted Kingfisher | *Ceryle alcyon* | NRF,SR | Y | X |
| Tufted Titmouse | *Parus bicolor* | OF | Y | X |
| Rufous-sided Towhee | *Pipilo erythrophthalmus* | OF,NRF | Y | X |
| Purple Finch | *Carpodacus purpureus* | OF | W | X |
| White-breasted Nuthatch | *Sitta carolinensis* | OF | Y | X |
| Carolina Chickadee | *Parus carolinensis* | OF | Y | X |
| Turkey Vulture | *Cathartes aura* | OF | S | X |
| Mallard | *Anas platyrhynchos* | SR | Y | |
| Canada Goose | *Branta canadensis* | SR | Y | |
| Great Blue Heron | *Ardea herodias* | SR | S | |
| Green-backed Heron | *Butorides striatus* | NRF | S | |
| Mourning Dove | *Zenaida macroura* | OF | Y | |
| Wood Duck | *Aix sponsa* | SR | S | |
| Spotted Sandpiper | *Actitis macularia* | SR | S | |
| Killdeer | *Charadrius vociferus* | OF | Y | |
| Red-tailed Hawk | *Buteo jamaicensis* | OF,NRF | Y | |
| Brown-headed Cowbird | *Molothrus ater* | OF | Y | |
| Chipping Sparrow | *Spizella passerina* | OF,NRF | S | |
| Field Sparrow | *Spizella pusilla* | OF | Y | |
| Common Grackle | *Quiscalus quiscula* | OF | Y | |
| Eastern Meadowlark | *Sturnella magna* | OF | Y | |

**Table 4-3**

**BIRDS OBSERVED OR POTENTIALLY EXISTING AT THE GARLAND ROAD LANDFILL SITE**

| Common Name | Scientific Name | Habitat | Season | Observed |
|---|---|---|---|---|
| Gray Catbird | *Dumetella carolinensis* | OF | S | |
| Brown Thrasher | *Toxostoma rufum* | OF | S | |
| American Robin | *Turdus migratorius* | OF | S | |
| Blue-gray Gnatcatcher | *Polioptila caerulea* | OF,NRF | S | |
| Hairy Woodpecker | *Picoides villosus* | OF,NRF | Y | |
| Red-bellied Woodpecker | *Melanerpes carolinus* | NRF | Y | |
| European Starling | *Sturnus vulgaris* | OF | Y | |
| Great-crested Flycatcher | *Myiarchus crinitus* | OF,NRF | S | |
| Northern Flicker | *Colaptes auratus* | NRF | Y | |
| Golden-crowned Kinglet | *Regulus satrapa* | OF,NRF | W | |
| Eastern Bluebird | *Sialia sialis* | OF,NRF | Y | |
| Red-eyed Vireo | *Vireo olivaceus* | OF,NRF | S | |
| American Redstart | *Setophaga ruticilla* | OF,NRF | S | |
| Scarlet Tanager | *Piranga olivacea* | OF,NRF | S | |
| Indigo Bunting | *Passerina cyanea* | OF,NRF | S | |
| Orchard Oriole | *Icterus spurius* | OF,NRF | S | |
| Northern Oriole | *Icterus galbula* | OF,NRF | S | |
| American Kestrel | *Falco sparverius* | OF | Y | |
| Eastern Kingbird | *Tyrannus tyrannus* | OF | S | |
| Horned Lark | *Eremophila alpestris* | OF | Y | |
| American Goldfinch | *Carduelis tristis* | OF | Y | |
| Eastern Phoebe | *Sayornis phoebe* | OF,NRF | S | |
| Tree Swallow | *Tachycineta bicolor* | OF,NRF | S | |
| Common Yellowthroat | *Geothlypis trichas* | OF,NRF | S | |
| House Wren | *Troglodytes aedon* | OF,NRF | S | |
| Carolina Wren | *Thryothorus ludovicianus* | OF | Y | |
| Chimney Swift | *Chaetura pelagica* | OF | S | |
| Yellow-billed Cuckoo | *Coccyzus americanus* | OF | S | |
| Prothonotary Warbler | *Protonotaria citrea* | OF,NRF | S | |

**Table 4-3**

**BIRDS OBSERVED OR POTENTIALLY EXISTING AT THE GARLAND ROAD LANDFILL SITE**

| Common Name | Scientific Name | Habitat | Season | Observed |
|---|---|---|---|---|
| Blue-winged Warbler | *Vermivora pinus* | OF,NRF | S | |
| Cerulean Warbler | *Dendroica cerulea* | OF,NRF | S | |
| Yellow Warbler | *Dendroica petechia* | OF,NRF | S | |
| Kentucky Warbler | *Oporornis formosus* | OF,NRF | S | |
| Hooded Warbler | *Wilsonia citrina* | OF,NRF | S | |
| Grasshopper Sparrow | *Ammodramus savannarum* | OF | S | |
| Vesper Sparrow | *Pooecetes gramineus* | OF | S | |
| Savannah Sparrow | *Passerculus sandwichensis* | OF | S | |
| White-throated Sparrow | *Zonotrichia albicollis* | OF | W | |
| Red-winged Blackbird | *Agelaius phoeniceus* | OF,NRF | Y | |
| Cedar Waxwing | *Bombycilla cedrorum* | OF | Y | |
| Wood Thrush | *Hylocichla mustelina* | NRF | S | |
| Blue Jay | *Cyanocitta cristata* | OF,NRF | Y | |
| Eastern Wood-pewee | *Contopus virens* | NRF | S | |
| Yellow-breasted Chat | *Icteria virens* | OF | S | |
| White-eyed Vireo | *Vireo griseus* | OF,NRF | S | |

Key:

OF = Old Field
NRF = Northern Riverine Forest
SR = Stillwater River
Y = Year-round resident
S = Summer resident only
W = Winter resident only
X = Species was observed on November 21, 1996

**Table 4-4**

**MAMMALS POTENTIALLY EXISTING AT GARLAND ROAD LANDFILL SITE**

| Common Name | Scientific Name | Habitat |
|---|---|---|
| Shorttail Shrew | *Blarina brevicauda* | OF,NRF |
| Least Shrew | *Cryptotis parva* | OF,NRF |
| Opossum | *Didelphis marsupialis* | OF,NRF |
| Big Brown Bat | *Eptesicus fuscus* | NRF |
| Southern Flying Squirrel | *Glaucomys volans* | NRF |
| Silver-haired Bat | *Lasionycteris noctivagans* | NRF |
| Red Bat | *Lasiurus borealis* | NRF |
| Hoary Bat | *Lasiurus cinereus* | NRF |
| Woodchuck | *Marmota monax* | NRF |
| Striped Skunk | *Mephitis mephitis* | OF,NRF |
| Meadow Vole | *Microtus pennsylvanicus* | OF,NRF |
| Mink | *Mustela vison* | NRF,SR |
| Keen's Bat | *Myotis keeni* | NRF |
| Little Brown Bat | *Myotis lucifugus* | NRF |
| Evening Bat | *Nycticeius humeralis* | NRF |
| Muskrat | *Ondatra zibethica* | NRF |
| White-footed Mouse | *Peromyscus leucopus* | OF |
| Eastern Pipistrel | *Pipistrellus subflavus* | NRF |
| Raccoon | *Procyon lotor* | OF, NRF |
| Eastern Mole | *Scalopus aquaticus* | OF, NRF |
| Eastern Gray Squirrel | *Sciurus carolinensis* | NRF |
| Eastern Cottontail | *Sylvilagus floridanus* | OF, NRF |
| Eastern Chipmunk | *Tamias striatus* | OF, NRF |
| Red Squirrel | *Tamiasciurus hudsonicus* | NRF |
| Meadow Jumping Mouse | *Zapus hudsonius* | OF, NRF |
| Deer Mouse | *Peromyscus maniculatus* | OF, NRF |
| Prairie Vole | *Microtus ochrogaster* | OF, NRF |
| Whitetail Deer | *Odocoileus virginianus* | OF, NRF |

Key:

OF = Old Field
NRF = Northern Riverine Forest
SR = Stillwater River

**Table 4-5**

**REPTILES AND AMPHIBIANS POTENTIALLY EXISTING AT THE GARLAND ROAD LANDFILL SITE**

| Common Name | Scientific Name | Habitat |
|---|---|---|
| Snapping Turtle | *Chelydra serpentina serpentina* | SR |
| Common Musk Turtle | *Sternotherus odoratus* | SR |
| Common Map Turtle | *Graptemys geographica* | SR |
| Midland Painted Turtle | *Chrysemys picta marginata* | SR |
| Eastern Box Turtle | *Terrapene carolina carolina* | OF,NRF |
| Eastern Spiny Softshell | *Apalone spinifera spinifera* | SR |
| Five-lined Skink | *Eumeces fasciatus* | SR |
| Midland Water Snake | *Nerodia sipedon pleuralis* | SR |
| Queen Snake | *Regina septemvittata* | SR,NRF |
| Eastern Garter Snake | *Thamnophis sirtalis sirtalis* | OF,NRF |
| Northern Brown Snake | *Storeria dekayi dekayi* | SR,NRF |
| Blue Racer | *Coluber constrictor foxii* | OF |
| Black Rat Snake | *Elaphe obsoleta obsoleta* | OF,NRF |
| Eastern Milk Snake | *Lampropeltis triangulum triangulum* | OF,NRF |
| Mudpuppy | *Necturus maculosus maculosus* | SR |
| Red-spotted Newt | *Notophthalmus viridescens viridescens* | SR |
| Smallmouth Salamander | *Ambystoma texanum* | SR |
| Eastern Tiger Salamander | *Ambystoma tigrinum tigrinum* | SR |
| Jefferson Salamander | *Ambystoma jeffersonianum* | SR |
| Spotted Salamander | *Ambystoma maculatum* | SR |
| Redback Salamander | *Plethodon cinereus* | SR |
| Ravine Salamander | *Plethodon richmondi* | SR |
| Southern Two-lined Salamander | *Eurycea cirrigera* | SR |
| Longtail Salamander | *Eurycea longicauda longicauda* | SR |
| American Toad | *Bufo americanus* | OF,NRF,SR |
| Fowler's Toad | *Bufo woodhousii fowleri* | SR,NRF |
| Gray Treefrog | *Hyla versicolor* | SR,NRF |
| Western Chorus Frog | *Pseudacris triseriata triseriata* | SR,NRF,OF |
| Northern Spring Peeper | *Pseudacris crucifer crucifer* | SR,NRF,OF |

**Table 4-5**

**REPTILES AND AMPHIBIANS POTENTIALLY EXISTING AT THE GARLAND ROAD LANDFILL SITE**

| Common Name | Scientific Name | Habitat |
|---|---|---|
| Blanchard's Cricket Frog | *Acris crepitans blanchardi* | SR,NRF |
| Green Frog | *Rana clamitans melanota* | SR,NRF |
| Bullfrog | *Rana catesbeiana* | SR,NRF |
| Northern Leopard Frog | *Rana pipiens* | OF,NRF,SR |
| Pickerel Frog | *Rana palustris* | OF,NRF,SR |
| Wood Frog | *Rana sylvatica* | OF,NRF,SR |

Key:

OF = Old Field
NRF = Northern Riverine Forest
SR = Stillwater River

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## Table 4-6

## CONTAMINANT SCREENING OF STILLWATER RIVER SEDIMENT
## ECOLOGICAL RISK EVALUATION
## GARLAND ROAD LANDFILL SITE

| Analyte | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits | Range of Detected Concentrations | Background Concentration[a] | Number of Samples Exceeding Background | Sediment Screening Benchmark[b] | Number of Samples Exceeding Benchmark |
|---|---|---|---|---|---|---|---|---|
| Metals and Cyanide (mg/kg) | | | | | | | | |
| Aluminum | 7/7 | 100 | | 1,250-11,000 | 8,220 | 2 | 460[g] | 8 |
| Arsenic | 7/7 | 100 | | 2.5-7.7 | 6.5 | 3 | 8.2[h] | 0 |
| Barium | 5/7 | 71 | 20.0 | 34.3-135 | 78 | 3 | 5,800[g] | 0 |
| Beryllium | 3/7 | 43 | 1 | 0.37-0.64 B | 0.33 | 3 | 5.3[g] | 0 |
| Cadmium | 2/7 | 29 | 0.5-1 | 0.58B-0.71B | 0.38 | 2 | 0.6[f] | 1 |
| Calcium | 7/7 | 100 | 1,000 | 38,000-81,700 | 37,700 | 7 | 116,000[g] | 0 |
| Chromium | 7/7 | 100 | 2 | 3-14.6 | 11.2 | 2 | 81[h] | 0 |
| Cobalt | 3/7 | 43 | 5-10 | 5.0 B-6.8 B | 3.1 | 3 | 5.1[g] | 2 |
| Copper | 6/7 | 86 | 2.5-5 | 2.8-28.0 | 15.1 | 3 | 34[h] | 0 |
| Cyanide | 3/7 | 43 | 0.50-10 | 26.7-80.1 | 40.1 | 2 | 0.10[h] | 3 |
| Iron | 7/7 | 100 | 20 | 3,410 MBB-16,600 | 12,295 | 3 | 30,000[f] | 0 |
| Lead | 12/12 | 100 | 0.6 | 2.2-34.3 | 11.6 | 1 | 46.7[h] | 0 |
| Magnesium | 7/7 | 100 | 1,000 | 10,000-35,600 | 12,100 | 5 | 82,000[g] | 0 |
| Manganese | 7/7 | 100 | 3 | 149-560 | 350 | 3 | 460[f] | 2 |
| Mercury | 1/9 | 11 | 0.08-0.1 | 0.08 | 0.045 | 1 | 0.15[h] | 0 |
| Nickel | 5/7 | 71 | 4.0-8 | 5.6-16.4 | 13.4 | 2 | 21[h] | 0 |
| Potassium | 4/7 | 57 | 500-1,000 | 508-1,560 | 1,057 | 2 | 53,000[g] | 0 |

Key at end of table.

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## Table 4-6

## CONTAMINANT SCREENING OF STILLWATER RIVER SEDIMENT ECOLOGICAL RISK EVALUATION GARLAND ROAD LANDFILL SITE

| Analyte | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits | Range of Detected Concentrations | Background Concentration[a] | Number of Samples Exceeding Background | Sediment Screening Benchmark[b] | Number of Samples Exceeding Benchmark |
|---|---|---|---|---|---|---|---|---|
| Silver | 3/7 | 43 | 1-2 | 0.7 B-1.2 B | 0.65 | 3 | 1[d] | 2 |
| Sodium | 3/7 | 43 | 500-1,000 | 235 B-277 B | 199 | 3 | 680,000[g] | 0 |
| Vanadium | 6/7 | 86 | 5-10 | 5.2-24.1 | 18.2 | 1 | 80[g] | 0 |
| Zinc | 7/7 | 100 | 4 | 13.6-66.3 | 51.7 | 1 | 150[h] | 0 |
| Volatile Organics (ug/kg) | | | | | | | | |
| Acetone | 1/4 | 25 | 50 | 15 J | 64[c] | 0 | 64 | 0 |
| Semivolatile Organics (ug/kg) | | | | | | | | |
| Benzo(a)anthracene | 1/12 | 8 | 330 | 120 J | 108[c] | 1 | 108 | 1 |
| Benzo(b)fluoranthene | 1/12 | 8 | 330 | 210 J | 240[c] | 0 | 240 | 0 |
| Bis(2-ethylhexyl) phthalate | 1/9 | 11 | 330 | 200 J | 8.9E+08[c] | 0 | 8.9E +08 | 0 |
| Chrysene | 1/12 | 8 | 330 | 110 J | 340[c] | 0 | 340 | 0 |
| Fluoranthene | 4/12 | 33 | 330 | 36 J-340 J | 2,900[h] | 0 | 2,900 | 0 |
| Fluorene | 1/12 | 8 | 330 | 150 J | 540[h] | 0 | 540 | 0 |
| Phenanthrene | 3/12 | 25 | 330 | 48 J-390 J | 850[h] | 0 | 850 | 0 |
| Pyrene | 4/12 | 33 | 330 | 35 J-380 J | 660[h] | 0 | 660 | 0 |
| Pesticides/PCBs | | | | | | | | |
| Aroclor 1221 | 1/9 | 11 | 33-66 | 36 | 28,270[c] | 0 | 28,270 | 0 |

[a] Background values are expressed as the mean of the upstream samples from each of the three sets of data. For non-detects, half the quantitation limit was used.

Key at end of table.

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Sources:


b Geisy, J.P., and R.A. Hoke, 1990, "Freshwater Sediment Quality Criteria: Toxicity Bioassessment", pp. 265-348 in sediments: Chemistry and Toxicity of In-Place Pollutants, Lewis Publishers, Inc., Chelsea, Michigan.

c Hull, B.W., and G.W. Suter II, 1994, Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1994 Revision, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ES/ER/TH-95/R1.

d Long, E.R., and L.G. Morgan, 1991, The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program, National Oceanic and Atmospheric Administration Technical Memorandum MOS OHA 52.

e Persuad, D., R. Jaagumagi, and A. Hayton, August 1993, Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario, Ontario Ministry of the Environment

f Persuad, D., R. Jaagumagi, and A. Hayton, October 1990, The Provincial Sediment Quality Guidelines, Ontario Ministry of the Environment.

g Suter II, G.W., and J.B. Mabrey, July 1994, Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1994 Revision, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ES/ER/TH-96/R1.

h U.S. Environmental Protection Agency, 1996, ECO Update: Ecotox Thresholds, Office of Solid Waste and Emergency Response, Intermittent Bulletin, Vol. 3, No. 2, EPA/540/F-95/038.


Key:

mg/kg = Milligrams per kilogram.
ug/kg = Micrograms per kilogram.
PCB = Polychlorinated biphenyl.
Bold = Chemical of potential concern (COPC).

Key at end of table.



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## Table 4-7

## CONTAMINANT SCREENING OF SURFACE SOILS
## ECOLOGICAL RISK EVALUATION
## GARLAND ROAD LANDFILL SITE

| Analyte | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits | Range of Detected Concentrations | Background Concentration[a] | Number of Samples Exceeding Background | Ecological Screening Benchmark[b] | Number of Samples Exceeding Benchmark |
|---|---|---|---|---|---|---|---|---|
| Metals and Cyanide (mg/kg) | | | | | | | | |
| Aluminum | 8/8 | 100 | | 3,500-14,000 | 33,000 | 0 | 50[j] | 8 |
| Arsenic | 8/8 | 100 | | 3.9-7.3 | 4.8 | 6 | 10[j] | 0 |
| **Barium** | 8/8 | 100 | | 130-2,400 | 290 | 4 | 500[j] | 3 |
| Beryllium | 8/8 | 100 | | 0.19-0.67 | 0.55 | 1 | 10[j] | 0 |
| **Cadmium** | 8/8 | 100 | | 0.44-14 | 0.2 | 8 | 3[j] | 1 |
| Calcium | 8/8 | 100 | | 24,000-130,000 | 3,400 | 8 | - | - |
| **Chromium** | 8/8 | 100 | | 9-79 | 12 | 5 | 1[i] | 8 |
| Cobalt | 8/8 | 100 | | 2.8-7.9 | 19 | 0 | 20[j] | 0 |
| Copper | 8/8 | 100 | | 13-70 | 13 | 7 | 100[j] | 0 |
| **Cyanide** | 5/8 | 63 | 0.1 | 0.2-12 | - | 5 | 128.9[f] | 0 |
| Iron | 8/8 | 100 | | 8,000-29,000 | 14,000 | 4 | 200[j] | 8 |
| **Lead** | 8/8 | 100 | | 46-1,100 | 19 | 8 | 50[j] | 7 |
| Magnesium | 8/8 | 100 | | 13,000-62,000 | 2,100 | 8 | - | - |
| Manganese | 8/8 | 100 | | 190-490 | 260 | 6 | 100[j] | 8 |
| **Mercury** | 3/8 | 38 | 0.11-0.20 | 0.19-0.66 | 0.081 | 3 | 0.1[i] | 3 |
| **Nickel** | 8/8 | 100 | | 11-190 | 18 | 5 | 30[j] | 3 |
| Potassium | 8/8 | 100 | | 500-2,100 | 6,300 | 0 | - | - |

Key at end of table.

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## Table 4-7

## CONTAMINANT SCREENING OF SURFACE SOILS
## ECOLOGICAL RISK EVALUATION
## GARLAND ROAD LANDFILL SITE

| Analyte | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits | Range of Detected Concentrations | Background Concentration[a] | Number of Samples Exceeding Background | Ecological Screening Benchmark[b] | Number of Samples Exceeding Benchmark |
|---|---|---|---|---|---|---|---|---|
| Selenium | 2/8 | 25 | 0.42-0.54 | 0.55-0.56 | 0.30 | 2 | 1[j] | 0 |
| Sodium | 8/8 | 100 | | 110-230 | 2,500 | 0 | - | - |
| Vanadium | 8/8 | 100 | | 7.3-27 | 43 | 0 | 2[j] | 8 |
| Zinc | 8/8 | 100 | | 48-1,000 | 75 | 5 | 50[j] | 7 |
| Volatile Organics (ug/kg) | | | | | | | | |
| Acetone | 6/8 | 75 | 10 | 54.5-10,500 | ND/ND | 6 | 20,000[f] | 0 |
| 1,2-Dichloroethene (total) | 2/8 | 25 | 5-20 | 48.4-1,280 | ND/ND | 2 | 48,000[f] | 0 |
| Methylene chloride | 5/8 | 63 | 5 | 4.4-40 | ND/ND | 5 | 11,700[f] | 0 |
| Toluene | 2/8 | 25 | 5-20 | 2.9-3.4 | ND/ND | 2 | 28,100[f] | 0 |
| Trichloroethene | 4/8 | 50 | 5-20 | 2.9-51.0 | ND/ND | 4 | 756[f] | 0 |
| Semivolatile Organics (ug/kg) | | | | | | | | |
| Acenaphthene | 1/8 | 13 | 330-3,300 | 280 | ND/ND | 1 | 20,000[j] | 0 |
| Acenaphthylene | 1/8 | 13 | 330-3,300 | 270 | ND/ND | 1 | - | - |
| Anthracene | 2/8 | 25 | 330-3,300 | 290-620 | ND/ND | 2 | 1,000,000[g] | 0 |
| Benzoic Acid | 1/8 | 13 | 660-6,600 | 4,420 | ND/ND | 1 | - | - |
| Benzo(a)anthracene | 2/8 | 25 | 330-3,300 | 320-1,460 | ND/ND | 2 | 1,150,000[d] | 0 |
| Benzo(b)fluoranthene | 2/8 | 25 | 330-3,300 | 420-1,020 | ND/ND | 2 | - | - |
| Benzo(k)fluoranthene | 2/8 | 25 | 330-3,300 | 440-1,210 | ND/ND | 2 | - | - |

Key at end of table.



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## Table 4-7

## CONTAMINANT SCREENING OF SURFACE SOILS
## ECOLOGICAL RISK EVALUATION
## GARLAND ROAD LANDFILL SITE

| Analyte | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits | Range of Detected Concentrations | Background Concentration[a] | Number of Samples Exceeding Background | Ecological Screening Benchmark[b] | Number of Samples Exceeding Benchmark |
|---|---|---|---|---|---|---|---|---|
| Benzo(a)pyrene | 2/8 | 25 | 330-3,300 | 280-1,160 | ND/ND | 2 | 10,000[c] | 0 |
| Benzo(g,h,i)perylene | 1/8 | 13 | 330-3,300 | 570 | ND/ND | 1 | - | - |
| **Bis(2-ethylhexyl) phthalate** | 6/8 | 75 | 330 | 380-18,700 | ND/ND | 6 | 13,000[c] | 1 |
| Butyl benzylphthalate | 1/8 | 13 | 330-3,300 | 700 | ND/ND | 1 | 159,000[h] | 0 |
| Chrysene | 2/8 | 25 | 330-3,300 | 520-1,540 | ND/ND | 2 | - | - |
| Di-n-butylphthalate | 5/8 | 63 | 330-3,300 | 450-4,620 | ND/ND | 5 | 200,000[j] | 0 |
| Fluoranthene | 2/8 | 25 | 330-3,300 | 880-3,610 | ND/ND | 2 | 125,000[h] | 0 |
| Fluorene | 1/8 | 13 | 330-3,300 | 280 | ND/ND | 1 | 30,000[l] | 0 |
| Indeno(1,2,3-cd) pyrene | 1/8 | 13 | 330-3,300 | 560 | ND/ND | 1 | - | - |
| Isophorone | 1/8 | 13 | 330 | 9,140 | ND/ND | 1 | - | - |
| 2-Methylnaphthalene | 2/8 | 25 | 330-3,300 | 200-340 | ND/ND | 2 | - | - |
| Phenanthrene | 2/8 | 25 | 330-3,300 | 760-2,630 | ND/ND | 2 | - | - |
| Pyrene | 4/8 | 50 | 330-3,300 | 110-3,330 | ND/ND | 4 | 75,000[h] | 0 |
| Pesticides/PCBs | | | | | | | | |
| **Aroclor 1248** | 1/8 | 13 | 80-400 | 6,100 | ND/ND | 1 | 39[f] | 1 |
| **Aroclor 1254** | 6/8 | 75 | 80 | 110-5,000 | ND/ND | 6 | 61[f] | 6 |
| 4,4'-DDD | 2/8 | 25 | 8-40 | 48-90 | ND/8.5 | 2 | 107,000[b] | 0 |

Key at end of table.

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## Table 4-7

## CONTAMINANT SCREENING OF SURFACE SOILS
## ECOLOGICAL RISK EVALUATION
## GARLAND ROAD LANDFILL SITE

| Analyte | Frequency of Detection | Percent Detected | Range of Sample Quantitation Limits | Range of Detected Concentrations | Background Concentration[a] | Number of Samples Exceeding Background | Ecological Screening Benchmark[b] | Number of Samples Exceeding Benchmark |
|---|---|---|---|---|---|---|---|---|
| Dieldrin | 4/8 | 50 | 8-40 | 13-64 | ND/150 | 0 | 5,000[h] | 0 |

[a] Background values for inorganics were obtained from literature values (see text). For organic compounds, the reported off-site concentrations are listed.

Sources:

b Agency for Toxic Substances and Disease Registry, 1994, Toxicological Profile for 4,4'-DDD, U.S. Public Health Service (USPHS), Washington, D.C.

c _____, 1993, Toxicological Profile for bis(2-ethylhexyl)phthalate, USPHS, Washington, D.C.

d _____, 1989, Toxicological Profile for Benzo(a)anthracene, USPHS, Washington, D.C.

e _____, 1989, Toxicological Profile for Benzo(a)pyrene, USPHS, Washington, D.C.

f Opresko, D.M., B.E. Sample and G.W. Suter II, 1995, Toxicological Benchmarks for Wildlife: 1995 Revision, Oak Ridge National Laboratory, Oak Ridge Tennessee, ES/ER/TH-B6/R2.

g U.S. Environmental Protection Agency, 1994, Health Effects Assessment Summary Tables (HEAST).

h U.S. Environmental Protection Agency, 1994, Integrated Risk Information System (IRIS).

i Will, M.E., and G.W. Suter II, September 1995, Toxicological Benchmarks for Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ES/ER/TH-86/R2.

j Will, M.E., and G.W. Suter II, September 1995, Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1995 Revision, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ES/ER/TH-86/R2

Key:

mg/kg = Milligrams per kilogram.
ug/kg = Micrograms per kilogram.
PCB = Polychlorinated biphenyl.
Bold = Chemical of potential concern (COPC).
- = No benchmark available for this chemical.

Key at end of table.



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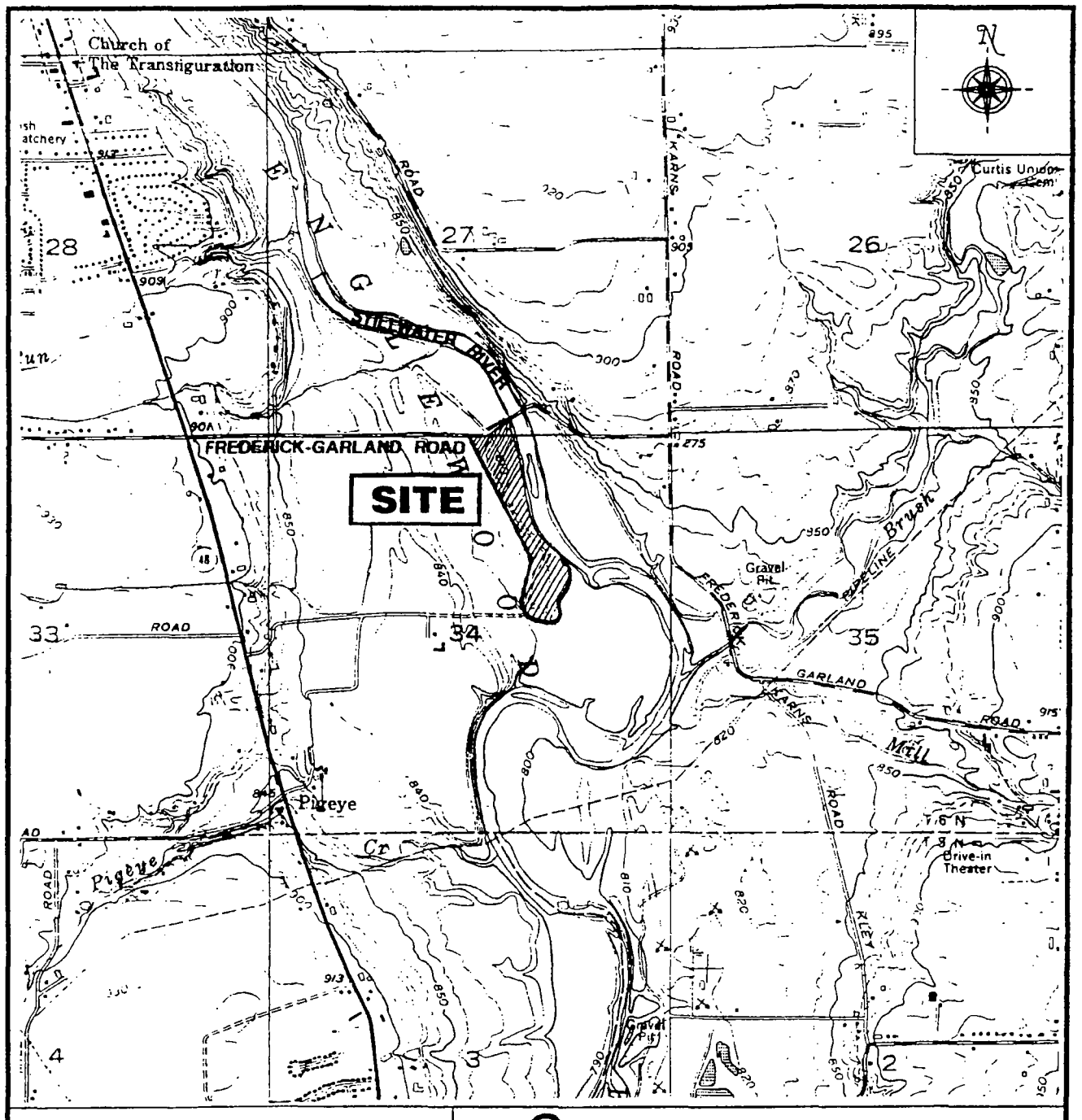
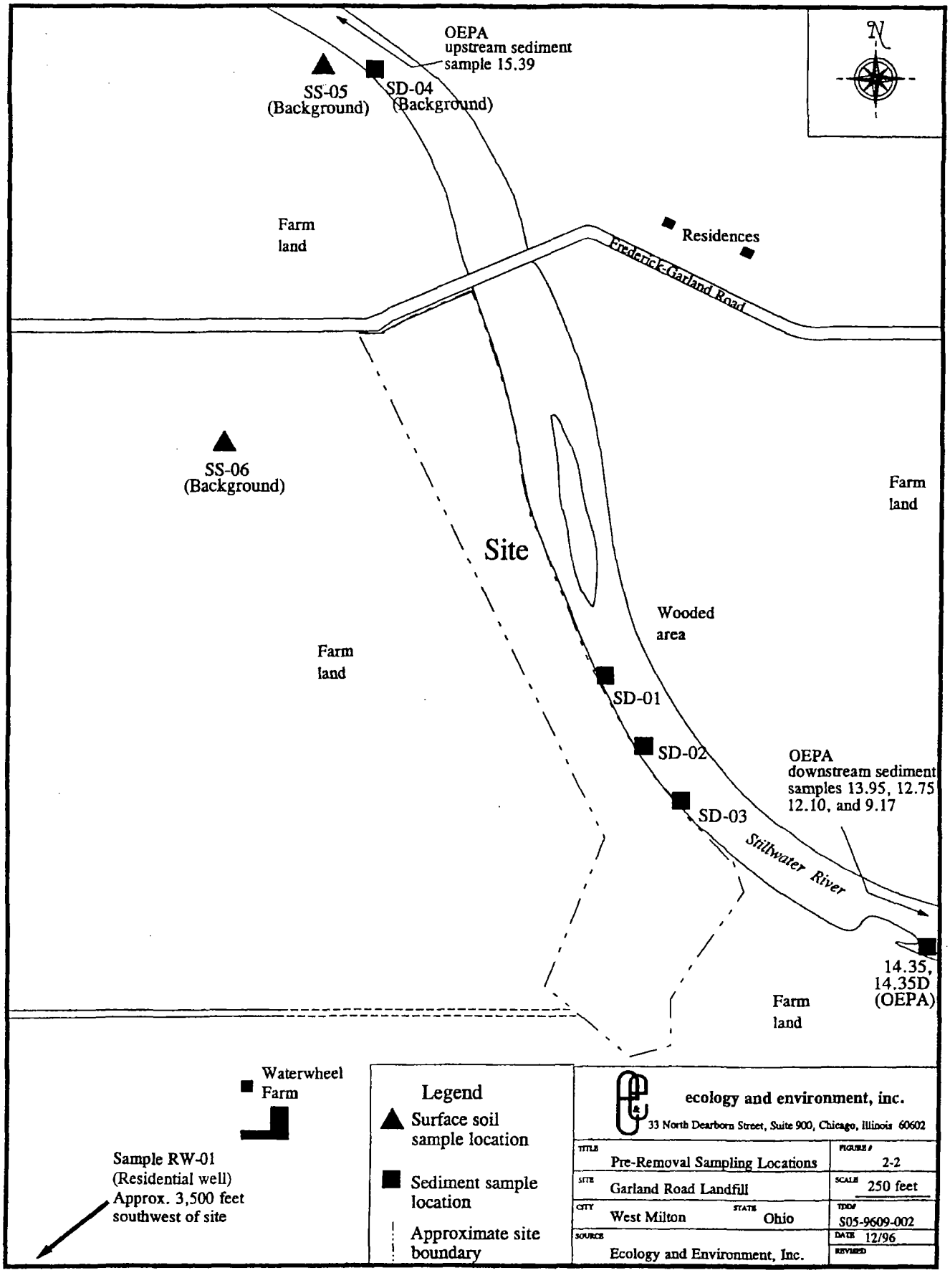
# FIGURES

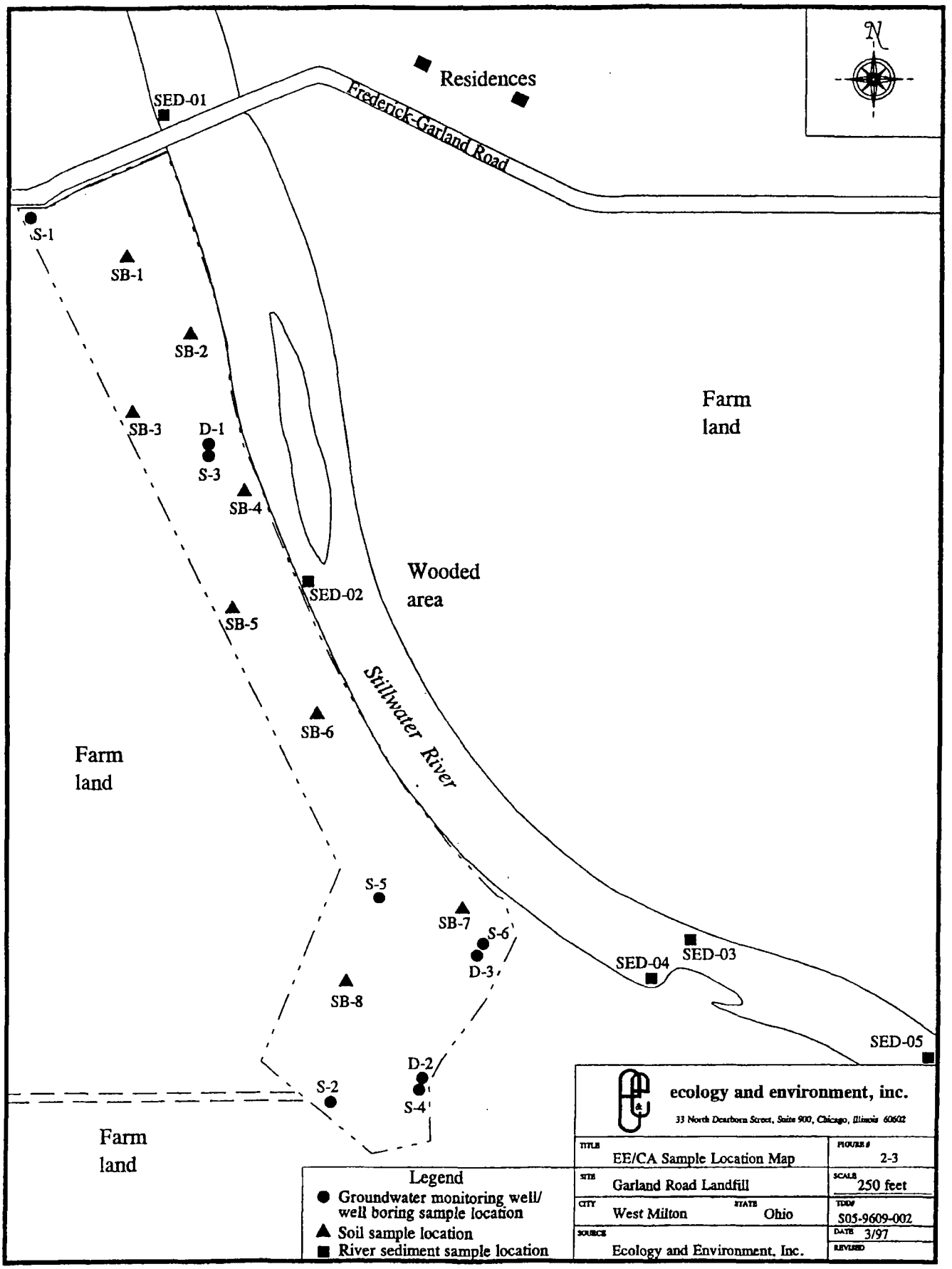


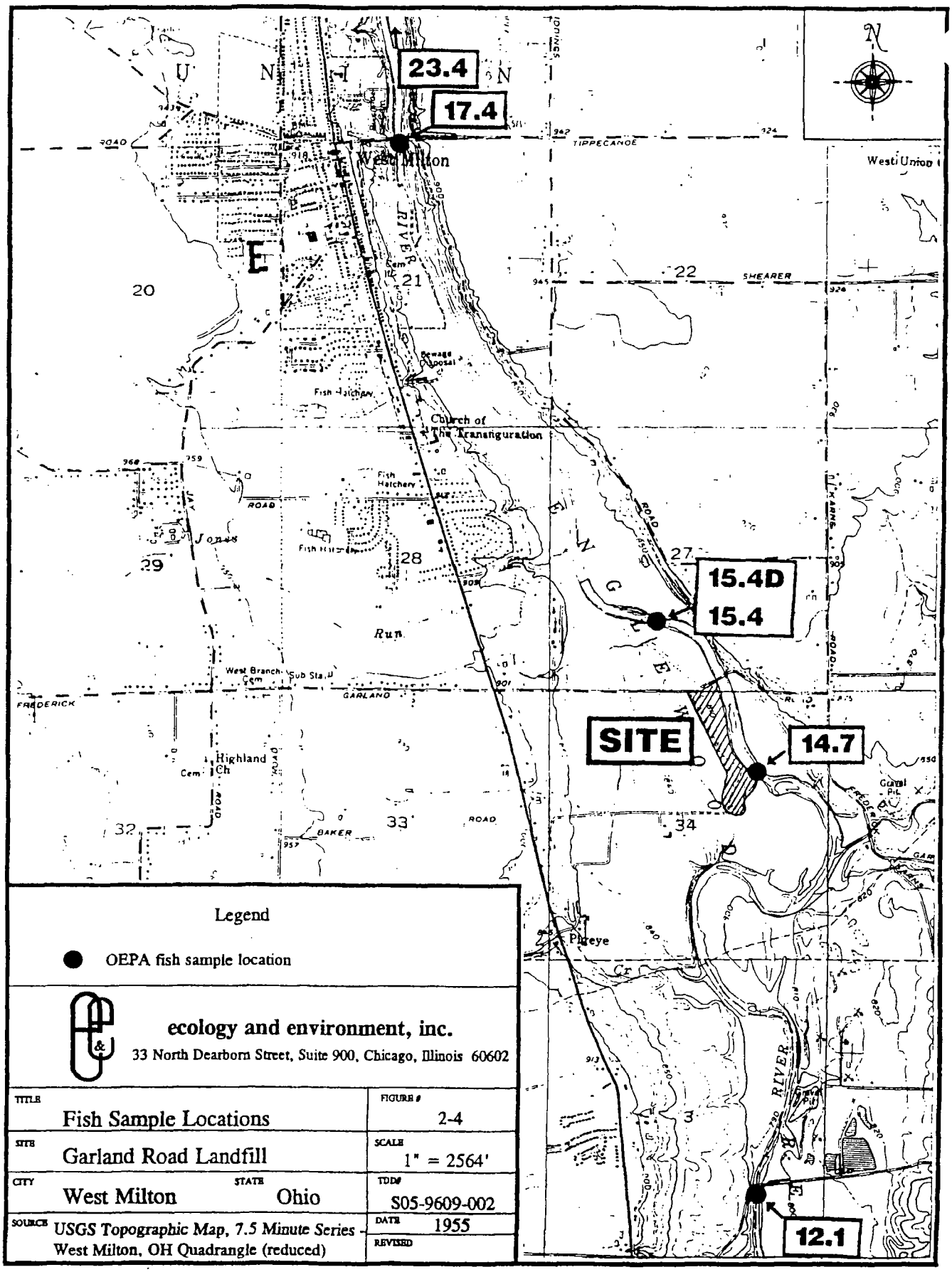
Quadrangle Location

ecology and environment, inc.
33 North Dearborn Street, Suite 900, Chicago, Illinois 60602

| | |
|---|---|
| TITLE: Site Features Map | FIGURE #: 2-1 |
| SITE: Garland Road Landfill | SCALE: 1:24,000 |
| CITY: West Milton STATE: Ohio | TDD#: S05-9609-002 |
| SOURCE: USGS Topographic Map, 7.5 Minute Series - West Milton, OH Quadrangle | DATE: 1955 REVISED: |


OEPA
upstream sediment
sample 15.39
SS-05
(Background)
SD-04
(Background)
N
Farm
land
Residences
Frederick-Garland Road
SS-06
(Background)
Farm
land
Site
Wooded
area
Farm
land
SD-01
SD-02
SD-03
OEPA
downstream sediment
samples 13.95, 12.75
12.10, and 9.17
Stillwater River
14.35,
14.35D
(OEPA)
Farm
land
Waterwheel
Farm
Sample RW-01
(Residential well)
Approx. 3,500 feet
southwest of site
Legend
Surface soil
sample location
Sediment sample
location
Approximate site
boundary
ecology and environment, inc.
33 North Dearborn Street, Suite 900, Chicago, Illinois 60602
TITLE
Pre-Removal Sampling Locations
FIGURE #
2-2
SITE
Garland Road Landfill
SCALE
250 feet
CITY
West Milton
STATE
Ohio
TDD#
S05-9609-002
SOURCE
Ecology and Environment, Inc.
DATE
12/96
REVISED


N
Residences
Frederick-Garland Road
SED-01
S-1
SB-1
SB-2
SB-3
D-1
S-3
SB-4
SED-02
SB-5
SB-6
Wooded area
Farm land
Stillwater River
Farm land
S-5
SB-7
S-6
D-3
SB-8
SED-04
SED-03
SED-05
D-2
S-2
S-4
Farm land
Legend
Groundwater monitoring well/ well boring sample location
Soil sample location
River sediment sample location
ecology and environment, inc.
33 North Dearborn Street, Suite 900, Chicago, Illinois 60602
TITLE EE/CA Sample Location Map
FIGURE # 2-3
SITE Garland Road Landfill
SCALE 250 feet
CITY West Milton
STATE Ohio
TDD# S05-9609-002
SOURCE Ecology and Environment, Inc.
DATE 3/97
REVISED




Legend

● OEPA fish sample location

**ecology and environment, inc.**
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| | |
|---|---|
| TITLE Fish Sample Locations | FIGURE # 2-4 |
| SITE Garland Road Landfill | SCALE 1" = 2564' |
| CITY West Milton STATE Ohio | TDD# S05-9609-002 |
| SOURCE USGS Topographic Map, 7.5 Minute Series - West Milton, OH Quadrangle (reduced) | DATE 1955 |
| | REVISED |

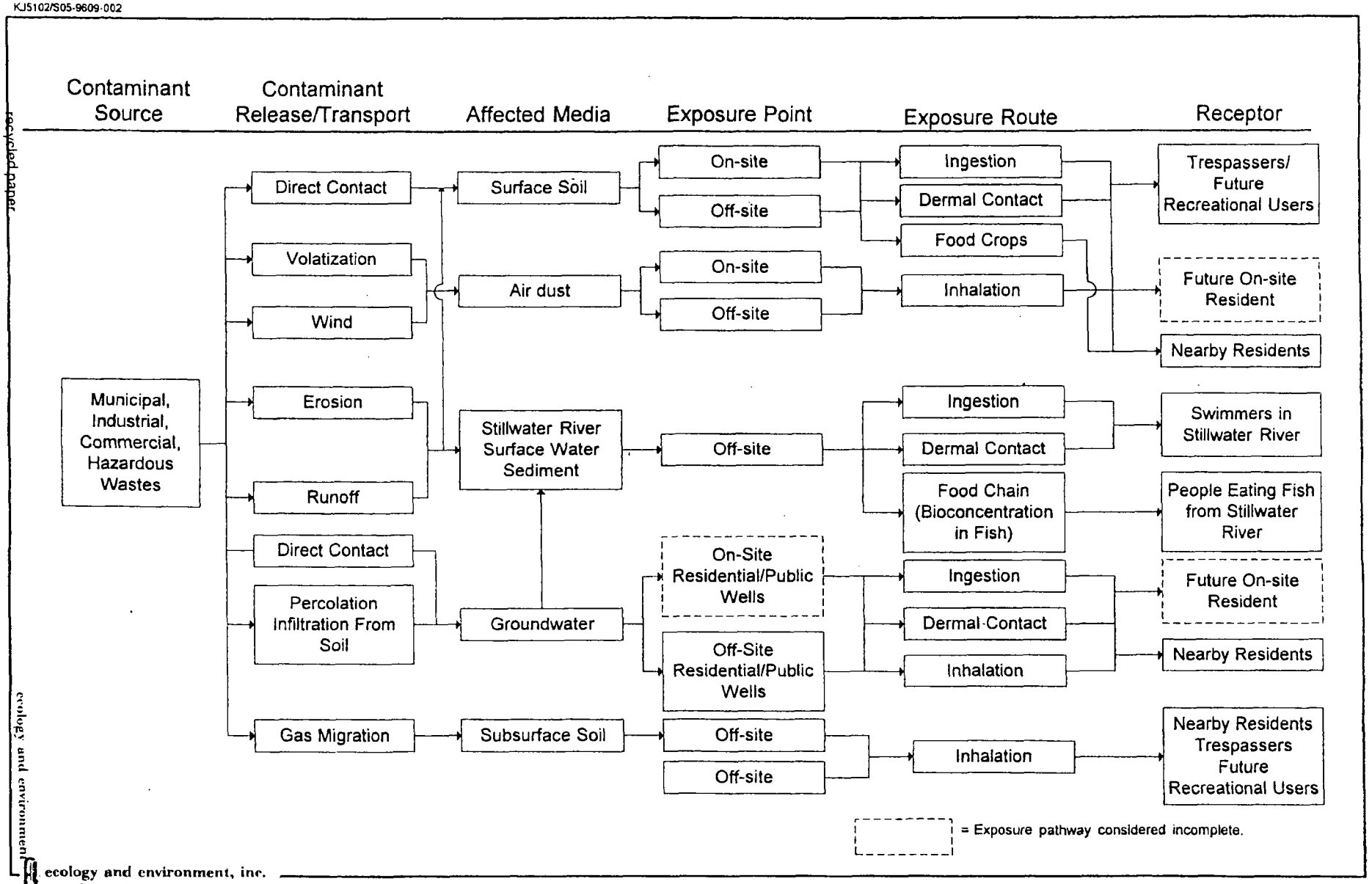


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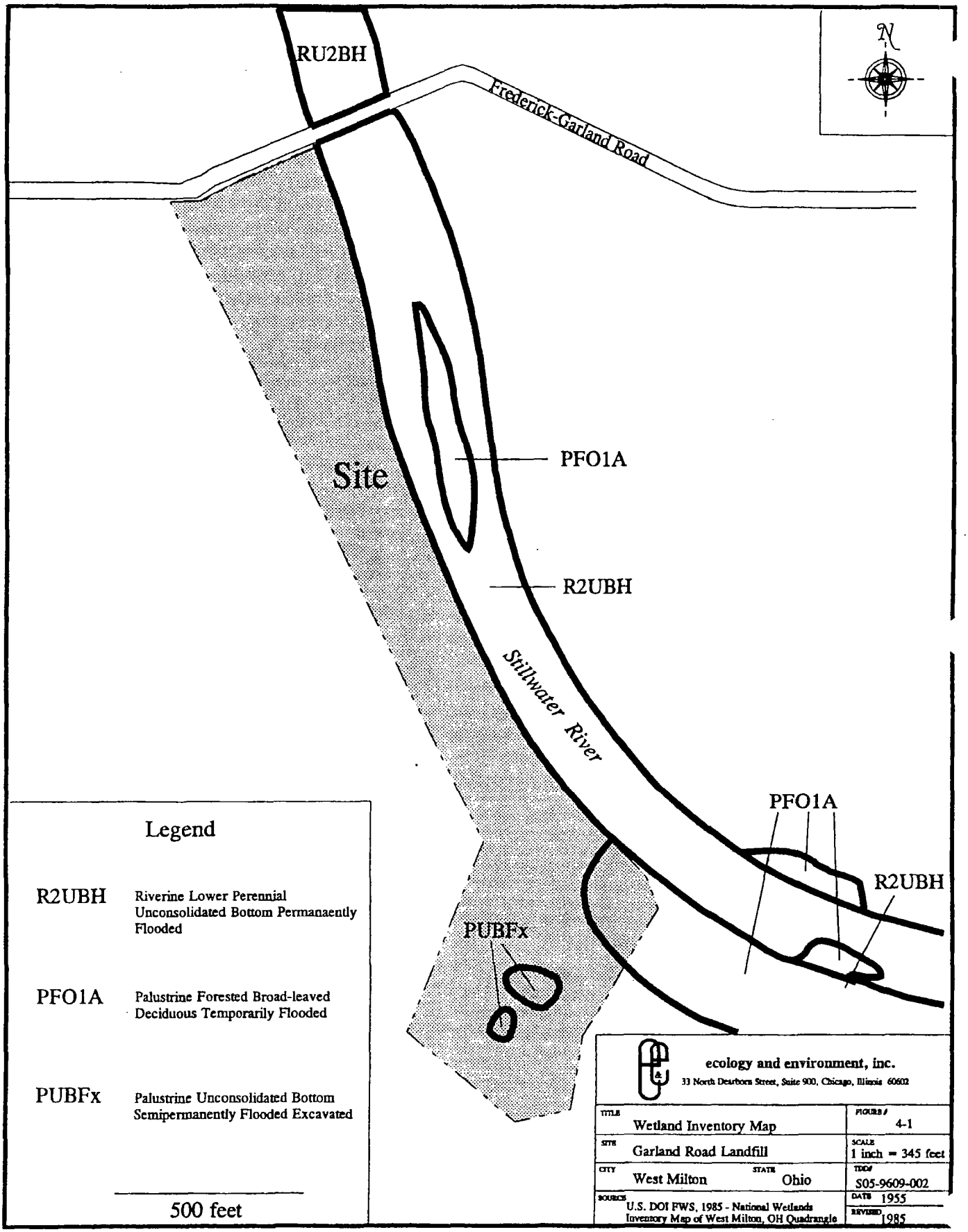
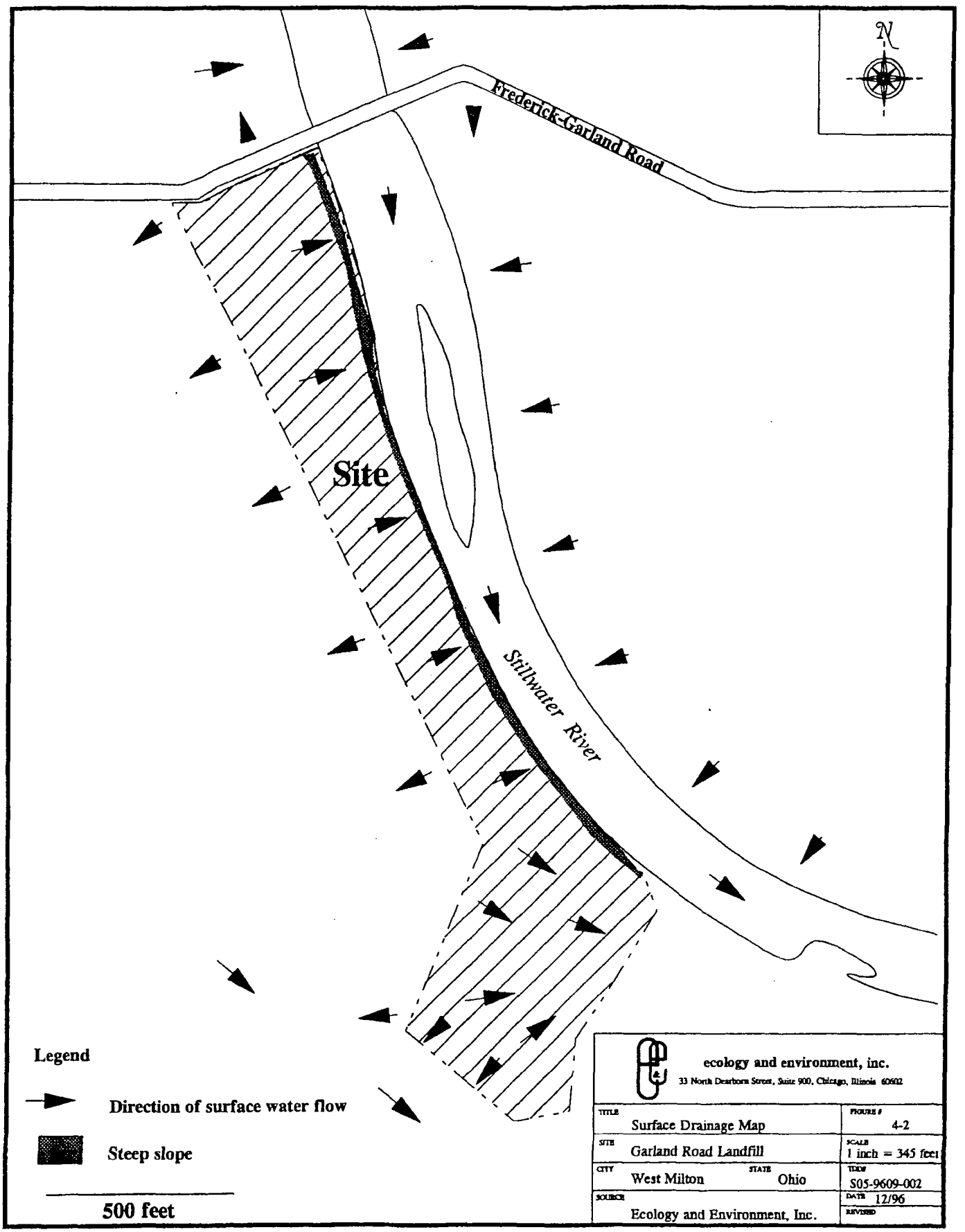
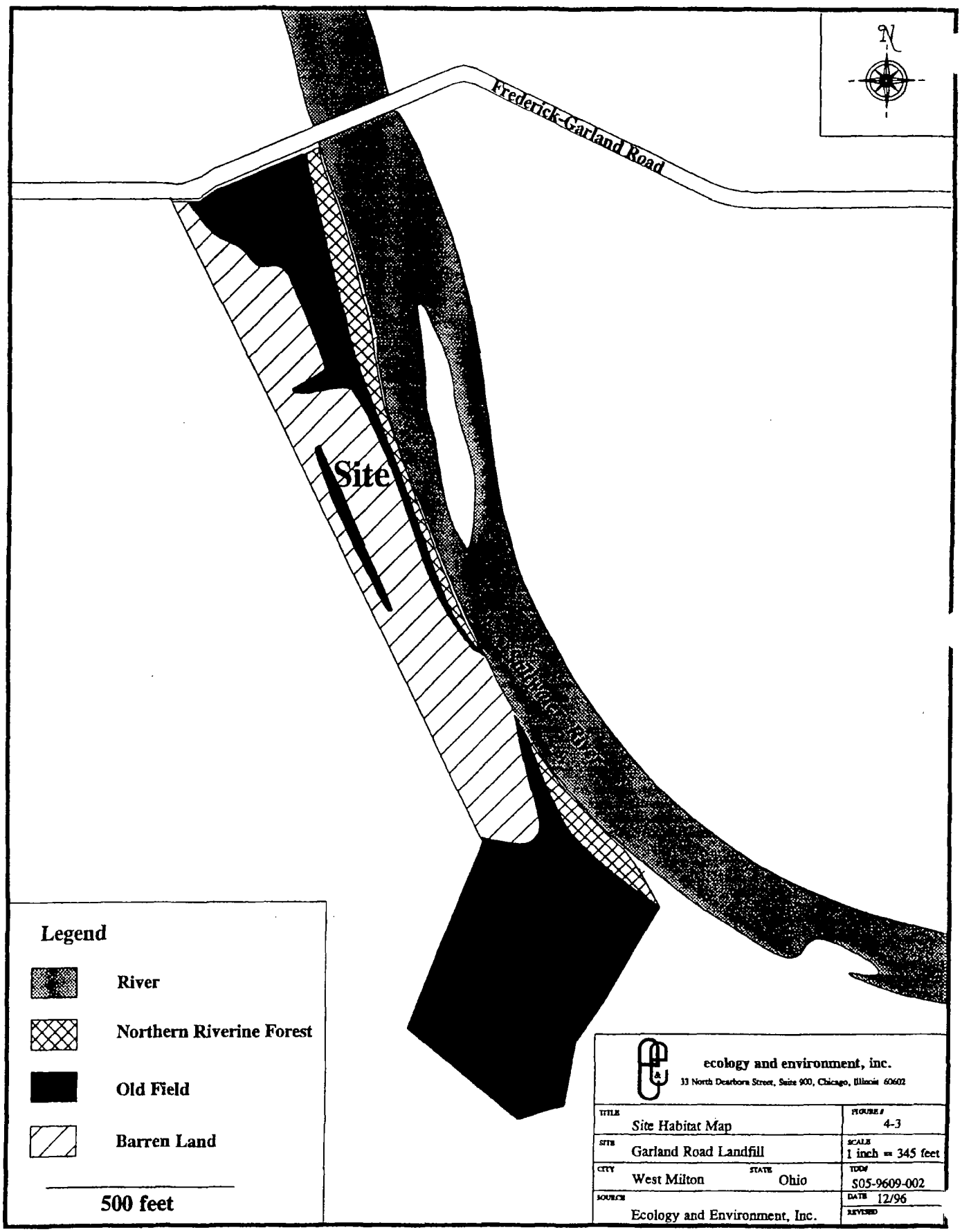
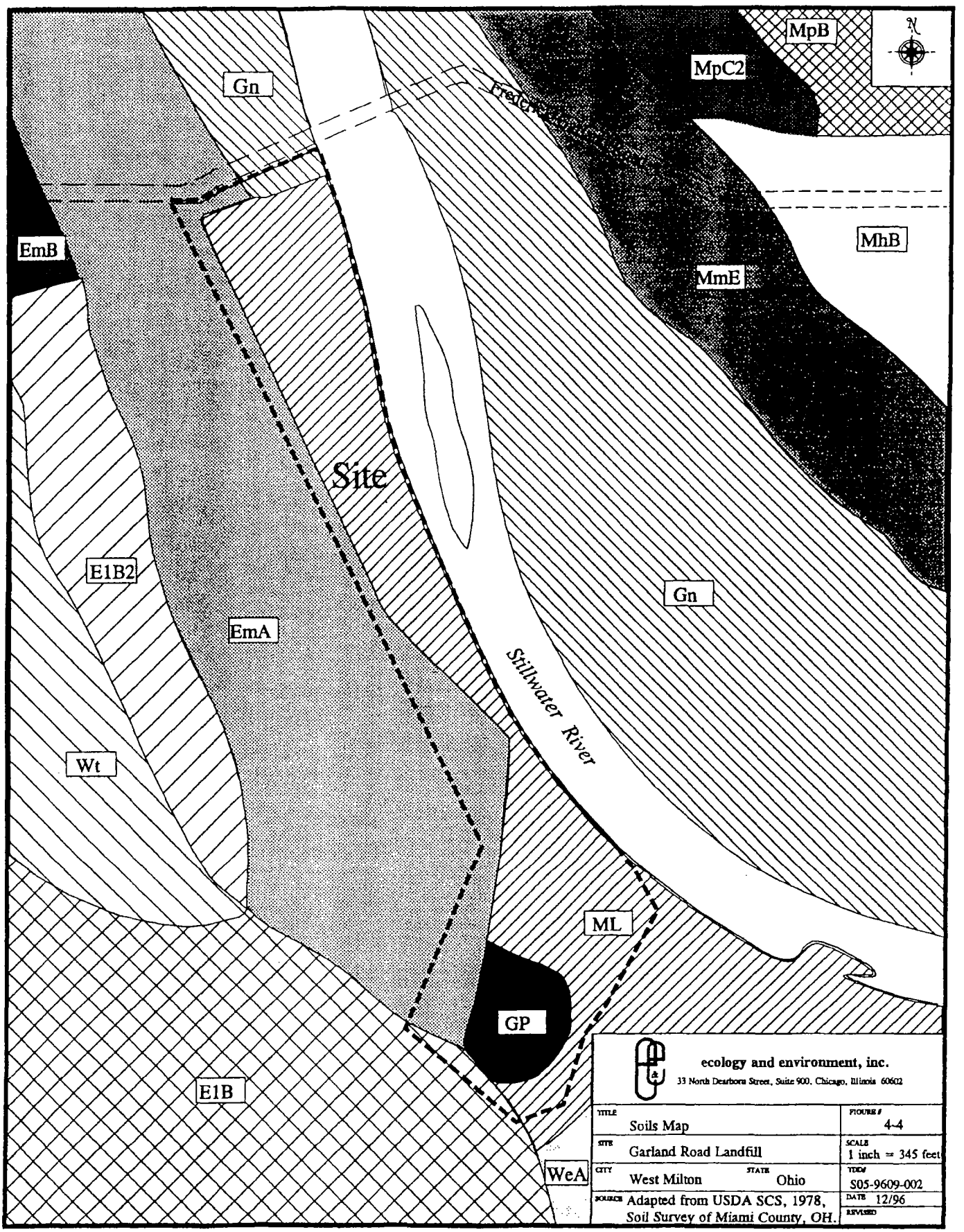
Figure 3-1
GARLAND ROAD LANDFILL STREAMLINED HUMAN HEALTH RISK EVALUATION
CONCEPTUAL SITE MODEL


RU2BH
Frederick-Garland Road
N
Site
PFO1A
R2UBH
Stillwater River
PFO1A
R2UBH
PUBFx
Legend
R2UBH Riverine Lower Perennial Unconsolidated Bottom Permanaently Flooded
PFO1A Palustrine Forested Broad-leaved Deciduous Temporarily Flooded
PUBFx Palustrine Unconsolidated Bottom Semipermanently Flooded Excavated
500 feet
ecology and environment, inc.
33 North Dearborn Street, Suite 900, Chicago, Illinois 60602
TITLE Wetland Inventory Map
FIGURE # 4-1
SITE Garland Road Landfill
SCALE 1 inch = 345 feet
CITY West Milton
STATE Ohio
TDD# S05-9609-002
SOURCE U.S. DOI FWS, 1985 - National Wetlands Inventory Map of West Milton, OH Quadrangle
DATE 1955
REVISED 1985

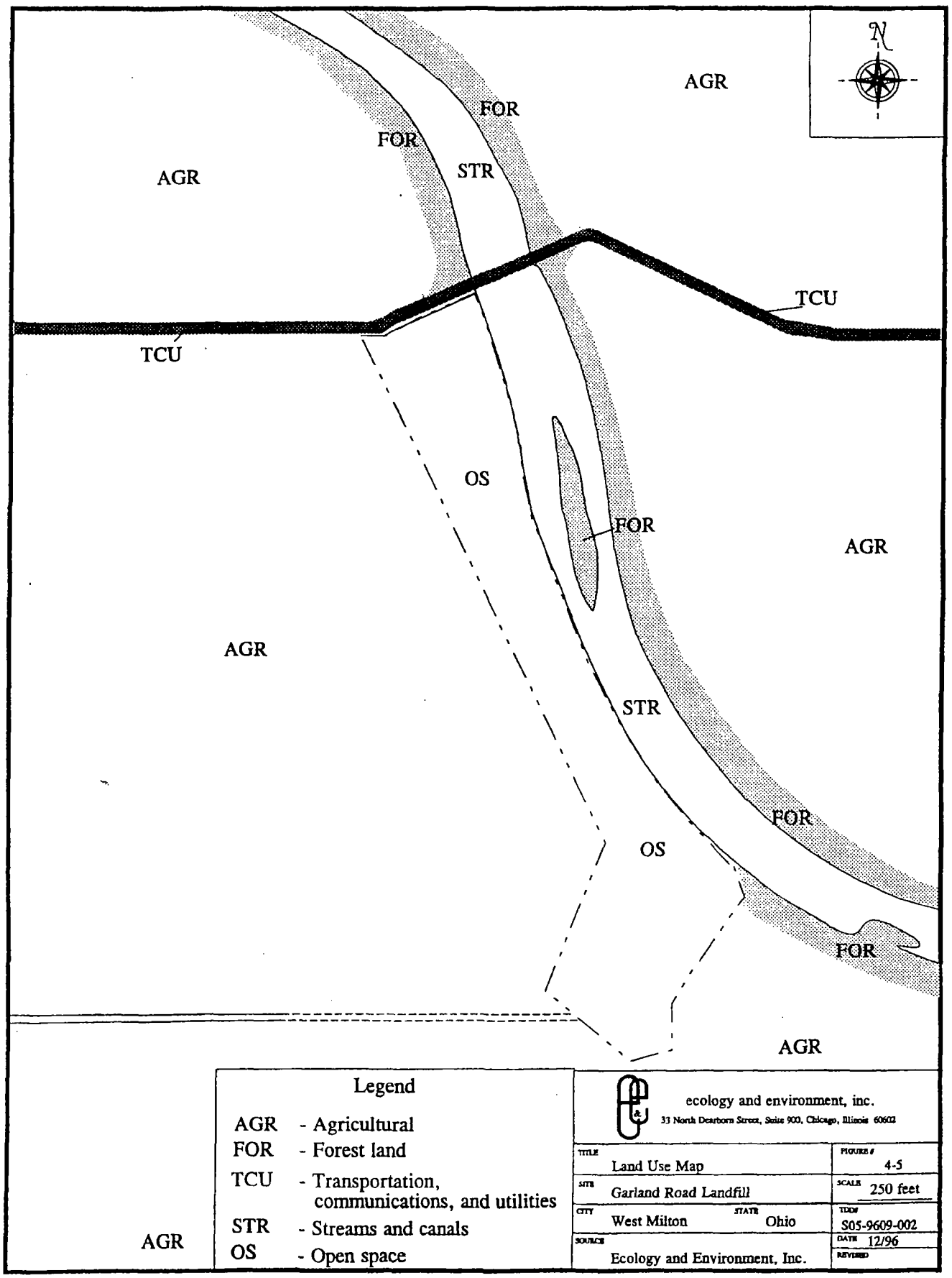

N
Frederick-Garland Road
Site
Stillwater River
Legend
Direction of surface water flow
Steep slope
500 feet
ecology and environment, inc.
33 North Dearborn Street, Suite 900, Chicago, Illinois 60602
TITLE
Surface Drainage Map
FIGURE #
4-2
SITE
Garland Road Landfill
SCALE
1 inch = 345 feet
CITY
West Milton
STATE
Ohio
TEDF
S05-9609-002
SOURCE
Ecology and Environment, Inc.
DATE
12/96
REVISED


N
Frederick-Garland Road
Site
Legend
River
Northern Riverine Forest
Old Field
Barren Land
500 feet
ecology and environment, inc.
33 North Dearborn Street, Suite 900, Chicago, Illinois 60602
TITLE
Site Habitat Map
FIGURE #
4-3
SITE
Garland Road Landfill
SCALE
1 inch = 345 feet
CITY
West Milton
STATE
Ohio
TDD#
S05-9609-002
SOURCE
Ecology and Environment, Inc.
DATE
12/96
REVISED


MpB
MpC2
Gn
EmB
MhB
MmE
Site
E1B2
EmA
Gn
Stillwater River
Wt
ML
GP
E1B
WeA
ecology and environment, inc.
33 North Dearborn Street, Suite 900, Chicago, Illinois 60602
TITLE Soils Map
FIGURE # 4-4
SITE Garland Road Landfill
SCALE 1 inch = 345 feet
CITY West Milton
STATE Ohio
TDD# S05-9609-002
SOURCE Adapted from USDA SCS, 1978, Soil Survey of Miami County, OH.
DATE 12/96
REVISED

## Legend

| | |
|---|---|
| Gn | - Genesee silt loam |
| ML | - Made land |
| EmA | - Eldean silt loam, 0 to 2 percent slopes |
| EmB | - Eldean silt loam, 2 to 6 percent slopes |
| E1B | - Eldean loam, 2 to 6 percent slopes |
| E1B2 | - Eldean loam, 2 to 6 percent slopes, moderately eroded |
| WeA | - Wea silt loam, 0 to 2 percent slopes |
| Wt | - Westland silty clay loam |
| MpB | - Milton silt loam, 2 to 6 percent slopes |
| MpC2 | - Milton silt loam, 6 to 12 percent slopes, moderately eroded |
| GP | - Gravel pit |
| MhB | - Miamian silt loam, 2 to 6 percent slopes |
| MmE | - Miamian and Hennepin silt loams, 18 to 25 percent slopes |
| ------ | - Approximate site boundary |




Legend

| | |
|---|---|
| AGR | - Agricultural |
| FOR | - Forest land |
| TCU | - Transportation, communications, and utilities |
| STR | - Streams and canals |
| OS | - Open space |

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| | |
|---|---|
| TITLE Land Use Map | FIGURE # 4-5 |
| SITE Garland Road Landfill | SCALE 250 feet |
| CITY West Milton STATE Ohio | TDD# S05-9609-002 |
| SOURCE Ecology and Environment, Inc. | DATE 12/96 |
| | REVISED |

# ATTACHMENT A
# ANALYTICAL DATA SUMMARIES



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Table 2



Summary of Analytical Results for Soil Samples
July 1996
Garland Road Landfill Site

| | | | |
|---|---|---|---|
| Location: | D-3 | D-3 | D-3 |
| Depth: | 0-1.0 ft. | 4.0-6.0 ft. | 10.0-12.0 ft. |
| Sample ID: | S-MK-001 | S-MK-002 | S-MK-004 |
| Sample Date: | 7/23/96 | 7/23/96 | 7/23/96 |

| Parameter | CHEM_GRP | Units | S-MK-001 | Q | S-MK-002 | Q | S-MK-004 | Q |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| 1,1,2,2-TETRACHLOROETHANE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| 1,1,2-TRICHLOROETHANE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| 1,1-DICHLOROETHANE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| 1,1-DICHLOROETHENE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| 1,2-DICHLOROETHANE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| 1,2-DICHLOROETHENE (TOTAL) | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| 1,2-DICHLOROPROPANE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| 2-BUTANONE | Volatile Organics | ug/kg | 50 | U | 50 | U | 50 | U |
| 2-HEXANONE | Volatile Organics | ug/kg | 50 | U | 50 | U | 50 | U |
| 4-METHYL-2-PENTANONE | Volatile Organics | ug/kg | 50 | U | 50 | U | 50 | U |
| ACETONE | Volatile Organics | ug/kg | 50 | U | 50 | U | 46 | J |
| BENZENE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| BROMODICHLOROMETHANE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| BROMOFORM | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| BROMOMETHANE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| CARBON DISULFIDE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| CARBON TETRACHLORIDE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| CHLOROBENZENE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| CHLOROETHANE | Volatile Organics | ug/kg | 10 | U | 10 | U | 10 | U |
| CHLOROFORM | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| CHLOROMETHANE | Volatile Organics | ug/kg | 10 | U | 10 | U | 10 | U |
| CIS-1,3-DICHLOROPROPENE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| DIBROMOCHLOROMETHANE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| ETHYLBENZENE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| METHYLENE CHLORIDE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| STYRENE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| TETRACHLOROETHENE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| TOLUENE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| TRANS-1,3-DICHLOROPROPENE | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| TRICHLOROETHENE | Volatile Organics | ug/kg | 5 | U | 5 | U | 2.1 | J |
| VINYL CHLORIDE | Volatile Organics | ug/kg | 10 | U | 10 | U | 10 | U |
| XYLENES (TOTAL) | Volatile Organics | ug/kg | 5 | U | 5 | U | 5 | U |
| 1,2,4-TRICHLOROBENZENE | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 1,2-DICHLOROBENZENE | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 1,3-DICHLOROBENZENE | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 1,4-DICHLOROBENZENE | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 2,2'-OXYBIS(1-CHLOROPROPANE) | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 2,4,5-TRICHLOROPHENOL | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 2,4,6-TRICHLOROPHENOL | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 2,4-DICHLOROPHENOL | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 2,4-DIMETHYLPHENOL | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 2,4-DINITROPHENOL | Semi-volatile Organi | ug/kg | 1600 | U | 1600 | U | 1600 | U |
| 2,4-DINITROTOLUENE | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 2,6-DINITROTOLUENE | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 2-CHLORONAPHTHALENE | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 2-CHLOROPHENOL | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 2-METHYLNAPHTHALENE | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 2-METHYLPHENOL | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 2-NITROANILINE | Semi-volatile Organi | ug/kg | 1600 | U | 1600 | U | 1600 | U |
| 2-NITROPHENOL | Semi-volatile Organi | ug/kg | 330 | U | 330 | U | 330 | U |
| 3,3'-DICHLOROBENZIDINE | Semi-volatile Organi | ug/kg | 1600 | U | 1600 | U | 1600 | U |
| 3-NITROANILINE | Semi-volatile Organi | ug/kg | 1600 | U | 1600 | U | 1600 | U |
| 4,6-DINITRO-2-METHYLPHENOL | Semi-volatile Organi | ug/kg | 1600 | U | 1600 | U | 1600 | U |

| | | | | | |
|---|---|---|---|---|---|
| 4-BROMOPHENYL PHENYL ETHER | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| 4-CHLORO-3-METHYLPHENOL | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| 4-CHLOROANILINE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| 4-CHLOROPHENYL PHENYL ETHER | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| 4-METHYLPHENOL | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| 4-NITROANILINE | Semi-volatile Organi | ug/kg | 1600 U | 1600 U | 1600 U |
| 4-NITROPHENOL | Semi-volatile Organi | ug/kg | 1600 U | 1600 U | 1600 U |
| ACENAPHTHENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| ACENAPHTHYLENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| ANTHRACENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| BENZO(A)ANTHRACENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| BENZO(A)PYRENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| BENZO(B)FLUORANTHENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| BENZO(GHI)PERYLENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| BENZO(K)FLUORANTHENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| BIS(2-CHLOROETHOXY)METHANE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| BIS(2-CHLOROETHYL) ETHER | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| BIS(2-ETHYLHEXYL) PHTHALATE | Semi-volatile Organi | ug/kg | 230 J | 230 J | 230 J |
| BUTYL BENZYL PHTHALATE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| CARBAZOLE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| CHRYSENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| DI-N-BUTYL PHTHALATE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| DI-N-OCTYL PHTHALATE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| DIBENZ(A,H)ANTHRACENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| DIBENZOFURAN | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| DIETHYL PHTHALATE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| DIMETHYL PHTHALATE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| FLUORANTHENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| FLUORENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| HEXACHLOROBENZENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| HEXACHLOROBUTADIENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| HEXACHLOROCYCLOPENTADIENE | Semi-volatile Organi | ug/kg | 1600 U | 1600 U | 1600 U |
| HEXACHLOROETHANE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| INDENO(1,2,3-CD)PYRENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| ISOPHORONE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| N-NITROSODI-N-PROPYLAMINE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| N-NITROSODIPHENYLAMINE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| NAPHTHALENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| NITROBENZENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| PENTACHLOROPHENOL | Semi-volatile Organi | ug/kg | 1600 U | 1600 U | 1600 U |
| PHENANTHRENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| PHENOL | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| PYRENE | Semi-volatile Organi | ug/kg | 330 U | 330 U | 330 U |
| 4,4'-DDD | Pesticides | ug/kg | 3.3 U | 3.3 U | 3.3 U |
| 4,4'-DDE | Pesticides | ug/kg | 3.3 U | 3.3 U | 3.3 U |
| 4,4'-DDT | Pesticides | ug/kg | 3.3 U | 3.3 U | 3.3 U |
| ALDRIN | Pesticides | ug/kg | 1.7 U | 1.7 U | 1.7 U |
| ALPHA-BHC | Pesticides | ug/kg | 1.7 U | 1.7 U | 1.7 U |
| ALPHA-CHLORDANE | Pesticides | ug/kg | 1.7 U | 1.7 U | 1.7 U |
| BETA-BHC | Pesticides | ug/kg | 1.7 U | 1.7 U | 1.7 U |
| DELTA-BHC | Pesticides | ug/kg | 1.7 U | 1.7 U | 1.7 U |
| DIELDRIN | Pesticides | ug/kg | 3.3 U | 3.3 U | 3.3 U |
| ENDOSULFAN I | Pesticides | ug/kg | 1.7 U | 1.7 U | 1.7 U |
| ENDOSULFAN II | Pesticides | ug/kg | 3.3 U | 3.3 U | 3.3 U |
| ENDOSULFAN SULFATE | Pesticides | ug/kg | 3.3 U | 3.3 U | 3.3 U |
| ENDRIN | Pesticides | ug/kg | 3.3 U | 3.3 U | 3.3 U |
| ENDRIN ALDEHYDE | Pesticides | ug/kg | 3.3 U | 3.3 U | 3.3 U |
| ENDRIN KETONE | Pesticides | ug/kg | 3.3 U | 3.3 U | 3.3 U |
| GAMMA-BHC (LINDANE) | Pesticides | ug/kg | 1.7 U | 1.7 U | 1.7 U |
| GAMMA-CHLORDANE | Pesticides | ug/kg | 1.7 U | 1.7 U | 1.7 U |
| HEPTACHLOR | Pesticides | ug/kg | 1.7 U | 1.7 U | 1.7 U |
| HEPTACHLOR EPOXIDE | Pesticides | ug/kg | 1.7 U | 1.7 U | 1.7 U |
| METHOXYCHLOR | Pesticides | ug/kg | 17 U | 17 U | 17 U |
| TOXAPHENE | Pesticides | ug/kg | 83 U | 83 U | 83 U |
| AROCLOR 1016 | PCBs | ug/kg | 33 U | 33 U | 33 U |
| AROCLOR 1221 | PCBs | ug/kg | 33 U | 33 U | 33 U |
| AROCLOR 1232 | PCBs | ug/kg | 33 U | 33 U | 33 U |
| AROCLOR 1242 | PCBs | ug/kg | 33 U | 33 U | 33 U |
| AROCLOR 1248 | PCBs | ug/kg | 33 U | 33 U | 33 U |
| AROCLOR 1254 | PCBs | ug/kg | 33 U | 33 U | 33 U |
| AROCLOR 1260 | PCBs | ug/kg | 33 U | 33 U | 33 U |
| ALUMINUM | Metals | mg/kg | 6010 | 2890 | 1820 |

| | | | | | |
|---|---|---|---|---|---|
| ANTIMONY | Metals | mg/kg | 6 U | 6 U | 6 U |
| ARSENIC | Metals | mg/kg | 4 | 5 | 3 |
| BARIUM | Metals | mg/kg | 53.2 | 20 U | 20 U |
| BERYLLIUM | Metals | mg/kg | 0.5 U | 0.5 U | 0.5 U |
| CADMIUM | Metals | mg/kg | 0.5 U | 0.5 U | 0.5 U |
| CALCIUM | Metals | mg/kg | 58300 | 125000 | 131000 |
| CHROMIUM | Metals | mg/kg | 11.4 | 4.6 | 4.8 |
| COBALT | Metals | mg/kg | 5 | 5 | 5 |
| COPPER | Metals | mg/kg | 8.1 | 9.2 | 6.1 |
| IRON | Metals | mg/kg | 10200 | 7830 | 5310 |
| LEAD | Metals | mg/kg | 6.8 | 4.7 | 2.8 |
| MAGNESIUM | Metals | mg/kg | 17300 | 56700 | 54800 |
| MANGANESE | Metals | mg/kg | 290 | 362 | 217 |
| MERCURY | Metals | mg/kg | 0.1 U | 0.1 U | 0.1 U |
| NICKEL | Metals | mg/kg | 10.6 | 8.1 | 4.6 |
| POTASSIUM | Metals | mg/kg | 843 | 688 | 500 U |
| SELENIUM | Metals | mg/kg | 0.5 U | 0.5 U | 0.5 U |
| SILVER | Metals | mg/kg | 1 U | 1 U | 1 U |
| SODIUM | Metals | mg/kg | 500 U | 500 U | 500 U |
| THALLIUM | Metals | mg/kg | 1 U | 1 U | 1 U |
| VANADIUM | Metals | mg/kg | 15.7 | 12 | 6.4 |
| ZINC | Metals | mg/kg | 27.7 | 28.3 | 12.8 |
| TOTAL CYANIDE | General Chemistry | mg/kg | 0.5 UJ | 0.5 UJ | 0.5 U |
| TOTAL SOLIDS (RESIDUE) | General Chemistry | % | 85.5 | 85.6 | 90.6 |

4\4U:\DBASEGRP\CHEM\7000\7043\Table 2 - Summary of Analytical R

| | |
|---|---|
| U | Not detected. |
| – | Not analyzed. |
| J | Estimated result. Result is less than RL and greater than or equal to the MDL. |
| UJ | Not detected. Associated detection limit is estimated. |

Table 4



Summary of Analytical Results for Sediment Samples
August 1996
Garland Road Landfill Site

| Location: | | SED-01 | SED-02 | SED-03 | SED-04 | SED-05 |
|---|---|---|---|---|---|---|
| Sample ID: | | S-MT-019 | S-MT-018 | S-MT-017 | S-MT-016 | S-MT-015 |
| Sample Date: | | 8/6/96 | 8/6/96 | 8/6/96 | 8/6/96 | 8/6/96 |
| Parameter | Units | | | | | |
| Volatile Organics | | | | | | |
| 1,1,1-TRICHLOROETHANE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,1,2,2-TETRACHLOROETHANE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,1,2-TRICHLOROETHANE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,1-DICHLOROETHANE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,1-DICHLOROETHENE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,2-DICHLOROETHANE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,2-DICHLOROETHENE (TOTAL) | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,2-DICHLOROPROPANE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 2-BUTANONE | ug/kg | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| 2-HEXANONE | ug/kg | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| 4-METHYL-2-PENTANONE | ug/kg | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| ACETONE | ug/kg | ND(50) | ND(50) | ND(50) | ND(50) | 15 J |
| BENZENE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| BROMODICHLOROMETHANE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| BROMOFORM | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| BROMOMETHANE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| CARBON DISULFIDE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| CARBON TETRACHLORIDE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| CHLOROBENZENE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| CHLOROETHANE | ug/kg | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| CHLOROFORM | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| CHLOROMETHANE | ug/kg | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| CIS-1,3-DICHLOROPROPENE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| DIBROMOCHLOROMETHANE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| ETHYLBENZENE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| METHYLENE CHLORIDE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| STYRENE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| TETRACHLOROETHENE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| TOLUENE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| TRANS-1,3-DICHLOROPROPENE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| TRICHLOROETHENE | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| VINYL CHLORIDE | ug/kg | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| XYLENES (TOTAL) | ug/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| Semi-volatile Organics | | | | | | |
| 1,2,4-TRICHLOROBENZENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 1,2-DICHLOROBENZENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 1,3-DICHLOROBENZENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 1,4-DICHLOROBENZENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 2,2'-OXYBIS(1-CHLOROPROPANE) | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 2,4,5-TRICHLOROPHENOL | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 2,4,6-TRICHLOROPHENOL | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 2,4-DICHLOROPHENOL | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 2,4-DIMETHYLPHENOL | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |



Table 4



Summary of Analytical Results for Sediment Samples
August 1996
Garland Road Landfill Site

| Location: | | SED-01 | SED-02 | SED-03 | SED-04 | SED-05 |
|---|---|---|---|---|---|---|
| Sample ID: | | S-MT-019 | S-MT-018 | S-MT-017 | S-MT-016 | S-MT-015 |
| Sample Date: | | 8/6/96 | 8/6/96 | 8/6/96 | 8/6/96 | 8/6/96 |
| Parameter | Units | | | | | |
| Semi-volatile Organics (Cont'd) | | | | | | |
| 2,4-DINITROPHENOL | ug/kg | ND(2400) UJ | ND(1600) | ND(1600) | ND(1600) | ND(1600) |
| 2,4-DINITROTOLUENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 2,6-DINITROTOLUENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 2-CHLORONAPHTHALENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2-CHLOROPHENOL | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 2-METHYLNAPHTHALENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 2-METHYLPHENOL | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 2-NITROANILINE | ug/kg | ND(2400) UJ | ND(1600) | ND(1600) | ND(1600) | ND(1600) |
| 2-NITROPHENOL | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 3,3'-DICHLOROBENZIDINE | ug/kg | ND(2400) UJ | ND(1600) | ND(1600) | ND(1600) | ND(1600) |
| 3-NITROANILINE | ug/kg | ND(2400) UJ | ND(1600) | ND(1600) | ND(1600) | ND(1600) |
| 4,6-DINITRO-2-METHYLPHENOL | ug/kg | ND(2400) UJ | ND(1600) | ND(1600) | ND(1600) | ND(1600) |
| 4-BROMOPHENYL PHENYL ETHER | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 4-CHLORO-3-METHYLPHENOL | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 4-CHLOROANILINE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 4-CHLOROPHENYL PHENYL ETHER | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 4-METHYLPHENOL | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| 4-NITROANILINE | ug/kg | ND(2400) UJ | ND(1600) | ND(1600) | ND(1600) | ND(1600) |
| 4-NITROPHENOL | ug/kg | ND(2400) UJ | ND(1600) | ND(1600) | ND(1600) | ND(1600) |
| ACENAPHTHENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| ACENAPHTHYLENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| ANTHRACENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| BENZO(A)ANTHRACENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| BENZO(A)PYRENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| BENZO(B)FLUORANTHENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| BENZO(GHI)PERYLENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| BENZO(K)FLUORANTHENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| BIS(2-CHLOROETHOXY)METHANE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| BIS(2-CHLOROETHYL) ETHER | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| BIS(2-ETHYLHEXYL) PHTHALATE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | 200 J |
| BUTYL BENZYL PHTHALATE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| CARBAZOLE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| CHRYSENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| DI-N-BUTYL PHTHALATE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| DI-N-OCTYL PHTHALATE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| DIBENZ(A,H)ANTHRACENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| DIBENZOFURAN | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| DIETHYL PHTHALATE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| DIMETHYL PHTHALATE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| FLUORANTHENE | ug/kg | ND(500) UJ | 57 J | 36 J | ND(330) | 72 J |
| FLUORENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| HEXACHLOROBENZENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| HEXACHLOROBUTADIENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| HEXACHLOROCYCLOPENTADIENE | ug/kg | ND(2400) UJ | ND(1600) | ND(1600) | ND(1600) | ND(1600) |
| HEXACHLOROETHANE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |

2\2V:\DBASEGRP\CHEM\7000\7043\Table 4 - Summary of Analytical R
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Table 4


Date Printed: October 3, 1996
Time Printed: 5 01 pm

Summary of Analytical Results for Sediment Samples
August 1996
Garland Road Landfill Site

| Location: | | SED-01 | SED-02 | SED-03 | SED-04 | SED-05 |
|---|---|---|---|---|---|---|
| Sample ID: | | S-MT-019 | S-MT-018 | S-MT-017 | S-MT-016 | S-MT-015 |
| Sample Date: | | 8/6/96 | 8/6/96 | 8/6/96 | 8/6/96 | 8/6/96 |
| Parameter | Units | | | | | |
| Semi-volatile Organics (Cont'd) | | | | | | |
| INDENO(1,2,3-CD)PYRENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| ISOPHORONE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| N-NITROSODI-N-PROPYLAMINE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| N-NITROSODIPHENYLAMINE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| NAPHTHALENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| NITROBENZENE | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| PENTACHLOROPHENOL | ug/kg | ND(2400) R | ND(1600) R | ND(1600) R | ND(1600) R | ND(1600) R |
| PHENANTHRENE | ug/kg | ND(500) UJ | 52 J | ND(330) | ND(330) | 48 J |
| PHENOL | ug/kg | ND(500) UJ | ND(330) | ND(330) | ND(330) | ND(330) |
| PYRENE | ug/kg | ND(500) UJ | ND(330) | 35 J | ND(330) | 94 J |
| Pesticides | | | | | | |
| 4,4'-DDD | ug/kg | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| 4,4'-DDE | ug/kg | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3 3) |
| 4,4'-DDT | ug/kg | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| ALDRIN | ug/kg | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1 7) |
| ALPHA-BHC | ug/kg | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| ALPHA-CHLORDANE | ug/kg | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| BETA-BHC | ug/kg | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| DELTA-BHC | ug/kg | ND(1.7) | ND(1.7) | ND(1 7) | ND(1 7) | ND(1.7) |
| DIELDRIN | ug/kg | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| ENDOSULFAN I | ug/kg | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| ENDOSULFAN II | ug/kg | ND(3.3) | ND(3.3) | ND(3 3) | ND(3.3) | ND(3.3) |
| ENDOSULFAN SULFATE | ug/kg | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |

| | | | | | | |
|---|---|---|---|---|---|---|
| ENDRIN | ug/kg | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| ENDRIN ALDEHYDE | ug/kg | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| ENDRIN KETONE | ug/kg | ND(3 3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3 3) |
| GAMMA-BHC (LINDANE) | ug/kg | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| GAMMA-CHLORDANE | ug/kg | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| HEPTACHLOR | ug/kg | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1:7) |
| HEPTACHLOR EPOXIDE | ug/kg | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| METHOXYCHLOR | ug/kg | ND(17) | ND(17) | ND(17) | ND(17) | ND(17) |
| TOXAPHENE | ug/kg | ND(83) | ND(83) | ND(83) | ND(83) | ND(83) |
| PCBs | | | | | | |
| AROCLOR 1016 | ug/kg | ND(33) | ND(33) | ND(33) | ND(33) | ND(33) |
| AROCLOR 1221 | ug/kg | 51 PF | ND(33) | ND(33) | 36 | ND(33) |
| AROCLOR 1232 | ug/kg | ND(33) | ND(33) | ND(33) | ND(33) | ND(33) |
| AROCLOR 1242 | ug/kg | ND(33) | ND(33) | ND(33) | ND(33) | ND(33) |
| AROCLOR 1248 | ug/kg | ND(33) | ND(33) | ND(33) | ND(33) | ND(33) |
| AROCLOR 1254 | ug/kg | ND(33) | ND(33) | ND(33) | ND(33) | ND(33) |
| AROCLOR 1260 | ug/kg | ND(33) | ND(33) | ND(33) | ND(33) | ND(33) |

J:\3\U:\DBASEGRP\CHEM\7000\7043\Table 4 - Summary of Analytical R

Table 4

Page 1 (d)
Date Printed: October 3, 1996
Time Printed: 5:01 pm

Summary of Analytical Results for Sediment Samples
August 1996
Garland Road Landfill Site

| Location: | | SED-01 | SED-02 | SED-03 | SED-04 | SED-05 |
|---|---|---|---|---|---|---|
| Sample ID: | | S-MT-019 | S-MT-018 | S-MT-017 | S-MT-016 | S-MT-015 |
| Sample Date: | | 8/6/96 | 8/6/96 | 8/6/96 | 8/6/96 | 8/6/96 |
| Parameter | Units | | | | | |
| Metals | | | | | | |
| ALUMINUM | mg/kg | 3640 | 3540 | 1330 | 1250 | 3040 |
| ANTIMONY | mg/kg | ND(6.0) | ND(6.0) | ND(6.0) | ND(6 0) | ND(6.0) |
| ARSENIC | mg/kg | 3.1 | 3.3 | 2.5 | 2.5 | 2.6 |
| BARIUM | mg/kg | 41.7 | 40 3 | ND(20.0) | ND(20.0) | 34.3 |
| BERYLLIUM | mg/kg | ND(0.50) | ND(0.50) | ND(0.50) | ND(0.50) | ND(0.50) |
| CADMIUM | mg/kg | ND(0.50) | ND(0.50) | ND(0.50) | ND(0.50) | ND(0.50) |
| CALCIUM | mg/kg | 34800 | 38900 | 72800 | 81700 | 38000 |
| CHROMIUM | mg/kg | 5.7 | 5.7 | 3.2 | 3 | 6.3 |
| COBALT | mg/kg | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| COPPER | mg/kg | 7.6 | 6.7 | ND(2.5) | 2.8 | 6.1 |
| IRON | mg/kg | 6590 MBB | 6800 MBB | 3810 MBB | 3410 MBB | 5390 MBB |
| LEAD | mg/kg | 6.6 | 6.2 | 3 | 4.7 | 9 5 |
| MAGNESIUM | mg/kg | 9800 | 11300 | 35600 | 21600 | 10000 |
| MANGANESE | mg/kg | 179 | 183 | 165 | 144 | 149 |
| MERCURY | mg/kg | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) |
| NICKEL | mg/kg | 6.7 | 6 8 | ND(4 0) | ND(4.0) | 5.6 |
| POTASSIUM | mg/kg | 524 | 508 | ND(500) | ND(500) | ND(500) |
| SELENIUM | mg/kg | ND(0.50) | ND(0.50) | ND(0.50) | ND(0.50) | ND(0 50) |
| SILVER | mg/kg | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| SODIUM | mg/kg | ND(500) | ND(500) | ND(500) | ND(500) | ND(500) |
| THALLIUM | mg/kg | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| VANADIUM | mg/kg | 9 | 9.7 | 5 2 | ND(5.0) | 8.5 |
| ZINC | mg/kg | 31.2 | 29.9 | 13.6 | 15.5 L | 29.6 |
| General Chemistry | | | | | | |
| TOTAL CYANIDE | mg/kg | ND(0.50) | ND(0.50) | ND(0.50) | ND(0.50) | ND(0.50) |
| TOTAL ORGANIC CARBON | mg/kg | 14000 | 9300 | 2300 | 4100 | 14000 |
| TOTAL SOLIDS (RESIDUE) | % | 67 | 77 7 | 80 3 | 84 7 | 63.9 |

| | |
|---|---|
| ND | Not detected. |
| -- | Not analyzed. |
| MBB | This analyte is present at a reportable level in the associated method blank but is less than 5% of the sample amount. |
| PF | The parent difference between the original and confirmation analyses is greater than 50%. |
| J | Estimated result. Result is less than RL and greater than or equal to the MDL. |
| R | Rejected data. The absence of the analyte cannot be verified. |
| UJ | Not detect □ |

Table 5

Summary of Analytical Results for Groundwater Samples
August/September 1996
Garland Road Landfill Site


Date Printed: October 3, 1996
Time Printed: 4

| Location: | | D-1 | D-2 | D-3 | D-3 | D-3 | S-1 | S-2 | S-3 |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID: | | W-MT-028 | W-MT-021 | W-MT-012 | W-MT-013 | W-MK-030 | W-MT-024 | W-MT-025 | W-MT-026 |
| Sample Date: | | 8/8/96 | 8/7/96 | 8/6/96 | 8/6/96 | 9/12/96 | 8/7/96 | 8/7/96 | 8/7/96 |
| | | | | | Dupl. | | | | |
| Parameter | Units | | | | | | | | |
| Volatile Organics | | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,1,2,2-TETRACHLOROETHANE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,1,2-TRICHLOROETHANE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,1-DICHLOROETHANE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,1-DICHLOROETHENE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,2-DICHLOROETHANE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,2-DICHLOROETHENE (TOTAL) | ug/L | 780 | 350 | 5 | 4.6 J | 7.5 | ND(5.0) | ND(5.0) | 43 |
| 1,2-DICHLOROPROPANE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| 2-BUTANONE | ug/L | ND(250) | ND(500) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| 2-HEXANONE | ug/L | ND(250) | ND(500) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| 4-METHYL-2-PENTANONE | ug/L | ND(250) | ND(500) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| ACETONE | ug/L | ND(250) | ND(500) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | 31 J |
| BENZENE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | 3.3 J |
| BROMODICHLOROMETHANE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| BROMOFORM | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| BROMOMETHANE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| CARBON DISULFIDE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| CARBON TETRACHLORIDE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| CHLOROBENZENE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| CHLOROETHANE | ug/L | ND(50) | ND(100) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| CHLOROFORM | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| CHLOROMETHANE | ug/L | ND(50) | ND(100) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| CIS-1,3-DICHLOROPROPENE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| DIBROMOCHLOROMETHANE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| ETHYLBENZENE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| METHYLENE CHLORIDE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| STYRENE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| TETRACHLOROETHENE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| TOLUENE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| TRANS-1,3-DICHLOROPROPENE | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| TRICHLOROETHENE | ug/L | 200 | 500 | 30 | 29 | 29 | ND(5.0) | 11 | ND(5.0) |
| VINYL CHLORIDE | ug/L | ND(50) | ND(100) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | 120 |
| XYLENES (TOTAL) | ug/L | ND(25) | ND(50) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |



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Semi-volatile Organics

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 1,2-DICHLOROBENZENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 1,3-DICHLOROBENZENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 1,4-DICHLOROBENZENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 2,2'-OXYBIS(1-CHLOROPROPANE) | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 2,4,5-TRICHLOROPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 2,4,6-TRICHLOROPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 2,4-DICHLOROPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 2,4-DIMETHYLPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 2,4-DINITROPHENOL | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) UJ |
| 2,4-DINITROTOLUENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |

I\1\J:\DBASEGRP\CHEM\7000\7043\Table 5 - Summary of Analytical R

Table 5

Page 1 (b)
Date Printed: October 3, 1996
Time Printed: 4:59 pm

Summary of Analytical Results for Groundwater Samples
August/September 1996
Garland Road Landfill Site

| Location: | | D-1 | D-2 | D-3 | D-3 | D-3 | S-1 | S-2 | S-3 |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID: | | W-MT-028 | W-MT-021 | W-MT-012 | W-MT-013 | W-MK-030 | W-MT-024 | W-MT-025 | W-MT-026 |
| Sample Date: | | 8/8/96 | 8/7/96 | 8/6/96 | 8/6/96 | 9/12/96 | 8/7/96 | 8/7/96 | 8/7/96 |
| | | | | | Dupl. | | | | |
| Parameter | Units | | | | | | | | |
| Semi-volatile Organics (Cont'd) | | | | | | | | | |
| 2,6-DINITROTOLUENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 2-CHLORONAPHTHALENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 2-CHLOROPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 2-METHYLNAPHTHALENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 2-METHYLPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 2-NITROANILINE | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) UJ |
| 2-NITROPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 3,3'-DICHLOROBENZIDINE | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) UJ |
| 3-NITROANILINE | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) UJ |
| 4,6-DINITRO-2-METHYLPHENOL | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) UJ |
| 4-BROMOPHENYL PHENYL ETHER | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 4-CHLORO-3-METHYLPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 4-CHLOROANILINE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 4-CHLOROPHENYL PHENYL ETHER | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 4-METHYLPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| 4-NITROANILINE | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) UJ |
| 4-NITROPHENOL | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) UJ |



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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ACENAPHTHENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| ACENAPHTHYLENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| ANTHRACENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| BENZO(A)ANTHRACENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| BENZO(A)PYRENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| BENZO(B)FLUORANTHENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| BENZO(GHI)PERYLENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| BENZO(K)FLUORANTHENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| BIS(2-CHLOROETHOXY)METHANE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| BIS(2-CHLOROETHYL) ETHER | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| BIS(2-ETHYLHEXYL) PHTHALATE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | 8.2 J B |
| BUTYL BENZYL PHTHALATE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| CARBAZOLE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| CHRYSENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| DI-N-BUTYL PHTHALATE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| DI-N-OCTYL PHTHALATE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| DIBENZ(A,H)ANTHRACENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| DIBENZOFURAN | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| DIETHYL PHTHALATE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| DIMETHYL PHTHALATE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| FLUORANTHENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| FLUORENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| HEXACHLOROBENZENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| HEXACHLOROBUTADIENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| HEXACHLOROCYCLOPENTADIENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| HEXACHLOROETHANE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| INDENO(1,2,3-CD)PYRENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| ISOPHORONE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| N-NITROSODI-N-PROPYLAMINE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| N-NITROSODIPHENYLAMINE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |

2\2\U:\DBASEGRP\CHEM\7000\7043\Table 5 - Summary of Analytical R

Table 5

Page 1 (c)
Date Printed: October 3, 1996
Time Printed: 4:59 pm

Summary of Analytical Results for Groundwater Samples
August/September 1996
Garland Road Landfill Site

| Location: | | D-1 | D-2 | D-3 | D-3 | D-3 | S-1 | S-2 | S-3 |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID: | | W-MT-028 | W-MT-021 | W-MT-012 | W-MT-013 | W-MK-030 | W-MT-024 | W-MT-025 | W-MT-026 |
| Sample Date: | | 8/8/96 | 8/7/96 | 8/6/96 | 8/6/96 | 9/12/96 | 8/7/96 | 8/7/96 | 8/7/96 |
| | | | | | Dupl. | | | | |
| Parameter | Units | | | | | | | | |
| Semi-volatile Organics (Cont'd) | | | | | | | | | |
| NAPHTHALENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |



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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NITROBENZENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| PENTACHLOROPHENOL | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) UJ |
| PHENANTHRENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| PHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| PYRENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) UJ |
| Pesticides | | | | | | | | | |
| 4,4'-DDD | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| 4,4'-DDE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| 4,4'-DDT | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| ALDRIN | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| ALPHA-BHC | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| ALPHA-CHLORDANE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| BETA-BHC | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| DELTA-BHC | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| DIELDRIN | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| ENDOSULFAN I | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| ENDOSULFAN II | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| ENDOSULFAN SULFATE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| ENDRIN | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| ENDRIN ALDEHYDE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| ENDRIN KETONE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| GAMMA-BHC (LINDANE) | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| GAMMA-CHLORDANE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| HEPTACHLOR | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| HEPTACHLOR EPOXIDE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ |
| METHOXYCHLOR | ug/L | ND(0.25) UJ | ND(0.25) UJ | ND(0.25) UJ | ND(0.25) UJ | ND(0.25) UJ | ND(0.25) UJ | ND(0.25) UJ | ND(0.25) UJ |
| TOXAPHENE | ug/L | ND(2.0) UJ | ND(2.0) UJ | ND(2.0) UJ | ND(2.0) UJ | ND(2.0) UJ | ND(2.0) UJ | ND(2.0) UJ | ND(2.0) UJ |
| PCBs | | | | | | | | | |
| AROCLOR 1016 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ |
| AROCLOR 1221 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ |
| AROCLOR 1232 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ |
| AROCLOR 1242 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ |
| AROCLOR 1248 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ |
| AROCLOR 1254 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ |
| AROCLOR 1260 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ |
| Metals | | | | | | | | | |
| ALUMINUM -DISS | mg/L | ND(0.20) | ND(0.20) | ND(0.20) | ND(0.20) | ND(0.20) | ND(0.20) | ND(0.20) | ND(0.20) |
| ANTIMONY -DISS | mg/L | ND(0.060) | ND(0.060) | ND(0.060) | ND(0.060) | ND(0.060) | ND(0.060) | ND(0.060) | ND(0.060) |
| ARSENIC -DISS | mg/L | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | 0.042 |
| BARIUM -DISS | mg/L | ND(0.20) | ND(0.20) | ND(0.20) | ND(0.20) | ND(0.20) | ND(0.20) | ND(0.20) | 0.69 |

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Table 5

Summary of Analytical Results for Groundwater Samples
August/September 1996
Garland Road Landfill Site


Date Printed: October 3, 1996
Time Printed: 4:59 pm

| Location: | | D-1 | D-2 | D-3 | D-3 | D-3 | S-1 | S-2 | S-3 |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID: | | W-MT-028 | W-MT-021 | W-MT-012 | W-MT-013 | W-MK-030 | W-MT-024 | W-MT-025 | W-MT-026 |
| Sample Date: | | 8/8/96 | 8/7/96 | 8/6/96 | 8/6/96 | 9/12/96 | 8/7/96 | 8/7/96 | 8/7/96 |
| | | | | | Dupl. | | | | |
| Parameter | Units | | | | | | | | |
| Metals (Cont'd) | | | | | | | | | |
| BERYLLIUM -DISS | mg/L | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| CADMIUM -DISS | mg/L | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| CALCIUM -DISS | mg/L | 108 | 88.5 | 84.6 | 85.4 | 79 | 87 | 87.1 | 88.6 |
| CHROMIUM -DISS | mg/L | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) |
| COBALT -DISS | mg/L | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) |
| COPPER -DISS | mg/L | ND(0.025) | ND(0.025) | ND(0.025) | ND(0.025) | ND(0.025) | ND(0.025) | ND(0.025) | ND(0.025) |
| IRON -DISS | mg/L | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | 4.9 |
| LEAD -DISS | mg/L | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) |
| MAGNESIUM -DISS | mg/L | 37.9 | 43.9 | 30.4 | 30.1 | 26.3 | 32.6 | 34.7 | 82.2 |
| MANGANESE -DISS | mg/L | 0.023 | 0.088 | ND(0.015) | ND(0.015) | ND(0.015) | ND(0.015) | 0.028 | 0.088 |
| MERCURY -DISS | mg/L | ND(0.00020) | ND(0.00020) | ND(0.00020) | ND(0.00020) | ND(0.00020) | ND(0.00020) | ND(0.00020) | ND(0.00020) |
| NICKEL -DISS | mg/L | ND(0.040) | ND(0.040) | ND(0.040) | ND(0.040) | ND(0.040) | ND(0.040) | 0.065 | ND(0.040) |
| POTASSIUM -DISS | mg/L | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | 30 |
| SELENIUM -DISS | mg/L | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| SILVER -DISS | mg/L | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) |
| SODIUM -DISS | mg/L | 7.6 | 6.1 | 6.7 | 6.5 | 5.5 | ND(5.0) | 6.7 | 44.9 |
| THALLIUM -DISS | mg/L | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) |
| VANADIUM -DISS | mg/L | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) |
| ZINC -DISS | mg/L | ND(0.050) | ND(0.050) | 0.18 | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) |
| General Chemistry | | | | | | | | | |
| TOTAL CYANIDE | mg/L | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) |

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4\4\J:\DBASEGRP\CHEM\7000\7043\Table 5 - Summary of Analytical R

Table 5



Summary of Analytical Results for Groundwater Samples
August/September 1996
Garland Road Landfill Site

| Location: | | S-4 | S-5 | S-6 | S-6 | S-6 |
|---|---|---|---|---|---|---|
| Sample ID: | | W-MT-022 | W-MT-023 | W-MT-014 | W-MK-031 | W-MK-032 |
| Sample Date: | | 8/7/96 | 8/7/96 | 8/6/96 | 9/12/96 | 9/12/96 Dupl. |
| Parameter | Units | | | | | |
| Volatile Organics | | | | | | |
| 1,1,1-TRICHLOROETHANE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,1,2,2-TETRACHLOROETHANE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,1,2-TRICHLOROETHANE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,1-DICHLOROETHANE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,1-DICHLOROETHENE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,2-DICHLOROETHANE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| 1,2-DICHLOROETHENE (TOTAL) | ug/L | 960 | 130 | 5.2 | 3.0 J | 3.8 J |
| 1,2-DICHLOROPROPANE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| 2-BUTANONE | ug/L | ND(500) | ND(100) | ND(50) | ND(50) | ND(50) |
| 2-HEXANONE | ug/L | ND(500) | ND(100) | ND(50) | ND(50) | ND(50) |
| 4-METHYL-2-PENTANONE | ug/L | ND(500) | 15 J | ND(50) | ND(50) | ND(50) |
| ACETONE | ug/L | ND(500) | ND(100) | 27 J | ND(50) | ND(50) |
| BENZENE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| BROMODICHLOROMETHANE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| BROMOFORM | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| BROMOMETHANE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| CARBON DISULFIDE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| CARBON TETRACHLORIDE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |



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| | | | | | | |
|---|---|---|---|---|---|---|
| CHLOROBENZENE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| CHLOROETHANE | ug/L | ND(100) | ND(20) | ND(10) | ND(10) | ND(10) |
| CHLOROFORM | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| CHLOROMETHANE | ug/L | ND(100) | ND(20) | ND(10) | ND(10) | ND(10) |
| CIS-1,3-DICHLOROPROPENE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| DIBROMOCHLOROMETHANE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| ETHYLBENZENE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| METHYLENE CHLORIDE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| STYRENE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| TETRACHLOROETHENE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| TOLUENE | ug/L | ND(50) | | 21 ND(5.0) | ND(5.0) | ND(5.0) |
| TRANS-1,3-DICHLOROPROPENE | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| TRICHLOROETHENE | ug/L | | 450 ND(10) | | 23 | 23 27 |
| VINYL CHLORIDE | ug/L | 63 J | | 57 ND(10) | ND(10) | ND(10) |
| XYLENES (TOTAL) | ug/L | ND(50) | ND(10) | ND(5.0) | ND(5.0) | ND(5.0) |
| Semi-volatile Organics | | | | | | |
| 1,2,4-TRICHLOROBENZENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 1,2-DICHLOROBENZENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 1,3-DICHLOROBENZENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 1,4-DICHLOROBENZENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 2,2'-OXYBIS(1-CHLOROPROPANE) | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 2,4,5-TRICHLOROPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 2,4,6-TRICHLOROPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 2,4-DICHLOROPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 2,4-DIMETHYLPHENOL | ug/L | ND(10) | 4.6 J | ND(10) | ND(10) | ND(10) |
| 2,4-DINITROPHENOL | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| 2,4-DINITROTOLUENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |

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Table 5

Page 2 (b)
Date Printed: October 3, 1996
Time Printed: 5:00 pm

Summary of Analytical Results for Groundwater Samples
August/September 1996
Garland Road Landfill Site

| Location: | | S-4 | S-5 | S-6 | S-6 | S-6 |
|---|---|---|---|---|---|---|
| Sample ID: | | W-MT-022 | W-MT-023 | W-MT-014 | W-MK-031 | W-MK-032 |
| Sample Date: | | 8/7/96 | 8/7/96 | 8/6/96 | 9/12/96 | 9/12/96 |
| | | | | | | Dupl. |
| Parameter | Units | | | | | |
| Semi-volatile Organics (Cont'd) | | | | | | |
| 2,6-DINITROTOLUENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 2-CHLORONAPHTHALENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |



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| | | | | | | |
|---|---|---|---|---|---|---|
| 2-CHLOROPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 2-METHYLNAPHTHALENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 2-METHYLPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 2-NITROANILINE | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| 2-NITROPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 3,3'-DICHLOROBENZIDINE | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| 3-NITROANILINE | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| 4,6-DINITRO-2-METHYLPHENOL | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| 4-BROMOPHENYL PHENYL ETHER | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 4-CHLORO-3-METHYLPHENOL | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 4-CHLOROANILINE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 4-CHLOROPHENYL PHENYL ETHER | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| 4-METHYLPHENOL | ug/L | ND(10) | | 19 ND(10) | ND(10) | ND(10) |
| 4-NITROANILINE | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| 4-NITROPHENOL | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| ACENAPHTHENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| ACENAPHTHYLENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| ANTHRACENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| BENZO(A)ANTHRACENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| BENZO(A)PYRENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| BENZO(B)FLUORANTHENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| BENZO(GHI)PERYLENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| BENZO(K)FLUORANTHENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| BIS(2-CHLOROETHOXY)METHANE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| BIS(2-CHLOROETHYL) ETHER | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| BIS(2-ETHYLHEXYL) PHTHALATE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| BUTYL BENZYL PHTHALATE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| CARBAZOLE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| CHRYSENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| DI-N-BUTYL PHTHALATE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| DI-N-OCTYL PHTHALATE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| DIBENZ(A,H)ANTHRACENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| DIBENZOFURAN | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| DIETHYL PHTHALATE | ug/L | ND(10) | ND(10) | 1.9 U | ND(10) | ND(10) |
| DIMETHYL PHTHALATE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| FLUORANTHENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| FLUORENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| HEXACHLOROBENZENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| HEXACHLOROBUTADIENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| HEXACHLOROCYCLOPENTADIENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| HEXACHLOROETHANE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| INDENO(1,2,3-CD)PYRENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| ISOPHORONE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| N-NITROSODI-N-PROPYLAMINE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| N-NITROSODIPHENYLAMINE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |

6\6U:\DBASEGRP\CHEM\7000\7043\Table 5 - Summary of Analytical R



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Table 5


Date Printed: October 3, 1996
Time Printed: 5:00 pm

*Summary of Analytical Results for Groundwater Samples*
August/September 1996
Garland Road Landfill Site

| Location: | | S-4 | S-5 | S-6 | S-6 | S-6 |
|---|---|---|---|---|---|---|
| Sample ID: | | W-MT-022 | W-MT-023 | W-MT-014 | W-MK-031 | W-MK-032 |
| Sample Date: | | 8/7/96 | 8/7/96 | 8/6/96 | 9/12/96 | 9/12/96 |
| | | | | | | Dupl. |
| Parameter | Units | | | | | |
| Semi-volatile Organics (Cont'd) | | | | | | |
| NAPHTHALENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| NITROBENZENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| PENTACHLOROPHENOL | ug/L | ND(50) | ND(50) | ND(50) | ND(50) | ND(50) |
| PHENANTHRENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| PHENOL | ug/L | ND(10) | 3.2 J | ND(10) | ND(10) | ND(10) |
| PYRENE | ug/L | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) |
| Pesticides | | | | | | |
| 4,4'-DDD | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| 4,4'-DDE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| 4,4'-DDT | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| ALDRIN | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| ALPHA-BHC | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| ALPHA-CHLORDANE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| BETA-BHC | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| DELTA-BHC | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| DIELDRIN | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| ENDOSULFAN I | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| ENDOSULFAN II | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| ENDOSULFAN SULFATE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| ENDRIN | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| ENDRIN ALDEHYDE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| ENDRIN KETONE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| GAMMA-BHC (LINDANE) | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| GAMMA-CHLORDANE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| HEPTACHLOR | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| HEPTACHLOR EPOXIDE | ug/L | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) UJ | ND(0.050) R | ND(0.050) R |
| METHOXYCHLOR | ug/L | ND(0.25) UJ | ND(0.25) UJ | ND(0.25) UJ | ND(0.25) R | ND(0.25) R |
| TOXAPHENE | ug/L | ND(2.0) UJ | ND(2.0) UJ | ND(2.0) UJ | ND(2.0) R | ND(2.0) R |
| PCBs | | | | | | |
| AROCLOR 1016 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) R | ND(1.0) R |
| AROCLOR 1221 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) R | ND(1.0) R |



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| | | | | | | |
|---|---|---|---|---|---|---|
| AROCLOR 1232 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) R | ND(1.0) R |
| AROCLOR 1242 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) R | ND(1.0) R |
| AROCLOR 1248 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) R | ND(1.0) R |
| AROCLOR 1254 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) R | ND(1.0) R |
| AROCLOR 1260 | ug/L | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) UJ | ND(1.0) R | ND(1.0) R |
| Metals | | | | | | |
| ALUMINUM -DISS | mg/L | ND(0.20) | ND(0.20) | ND(0.20) | ND(0.20) | ND(0.20) |
| ANTIMONY -DISS | mg/L | ND(0.060) | ND(0.060) | ND(0.060) | ND(0.060) | ND(0.060) |
| ARSENIC -DISS | mg/L | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) |
| BARIUM -DISS | mg/L | ND(0.20) | 0.78 | ND(0.20) | ND(0.20) | ND(0.20) |

7\7J:\DBASEGRP\CHEM\7000\7043\Table 5 - Summary of Analytical R

Table 5


Date Printed: October 3, 1996
Time Printed: 5:00 pm

Summary of Analytical Results for Groundwater Samples
August/September 1996
Garland Road Landfill Site

| Location: | | S-4 | S-5 | S-6 | S-6 | S-6 |
|---|---|---|---|---|---|---|
| Sample ID: | | W-MT-022 | W-MT-023 | W-MT-014 | W-MK-031 | W-MK-032 |
| Sample Date: | | 8/7/96 | 8/7/96 | 8/6/96 | 9/12/96 | 9/12/96 |
| | | | | | | Dupl. |
| Parameter | Units | | | | | |
| Metals (Cont'd) | | | | | | |
| BERYLLIUM -DISS | mg/L | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| CADMIUM -DISS | mg/L | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| CALCIUM -DISS | mg/L | 97.9 | 138 | 91.1 | 77.4 | 68.8 |
| CHROMIUM -DISS | mg/L | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) |
| COBALT -DISS | mg/L | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) |
| COPPER -DISS | mg/L | ND(0.025) | ND(0.025) | ND(0.025) | ND(0.025) | ND(0.025) |
| IRON -DISS | mg/L | ND(0.10) | 23.5 | ND(0.10) | ND(0.10) | ND(0.10) |
| LEAD -DISS | mg/L | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) |
| MAGNESIUM -DISS | mg/L | 45.6 | 41.5 | 33.6 | 27 | 23.3 |
| MANGANESE -DISS | mg/L | 0.56 | 0.53 | 0.045 | ND(0.015) | 0.016 |
| MERCURY -DISS | mg/L | ND(0.00020) | ND(0.00020) | ND(0.00020) | ND(0.00020) | ND(0.00020) |
| NICKEL -DISS | mg/L | ND(0.040) | ND(0.040) | ND(0.040) | ND(0.040) | ND(0.040) |
| POTASSIUM -DISS | mg/L | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) | ND(5.0) |
| SELENIUM -DISS | mg/L | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| SILVER -DISS | mg/L | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) |
| SODIUM -DISS | mg/L | 6.4 | 5.4 | 7.6 | 5.2 | ND(5.0) |
| THALLIUM -DISS | mg/L | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) |
| VANADIUM -DISS | mg/L | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) |
| ZINC -DISS | mg/L | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) | ND(0.050) |



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| | | | | | | |
|---|---|---|---|---|---|---|
| General Chemistry | | | | | | |
| TOTAL CYANIDE | mg/L | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) | ND(0.010) |

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| | |
|---|---|
| ND | Not detected. |
| – | Not analyzed. |
| J | Estimated result. Result is less than RL and greater than or equal to the MDL. |
| B | Method blank contamination. The associated method blank contains the target analyte at a reportable level. |
| U | Qualified as not detected at the associated value. |
| UJ | Not detected. Associated detection limit is estimated. |
| R | Rejected. The absence of the analyte cannot be verified. |

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| Chemicals Detected in Fish Tissue Collected from the Stillwater River Study Area, 1994 by OEPA | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Sampling Location - By River Mile | | | | | | |
| | 23.4 | 23.4 | 23.4 | 17.4 | 17.4 | 17.4 | 17.4 |
| Parameter | Channel Catfish SFFC | Large Mouth Bass SOF | Common Carp SOFC | Common Carp WBC | Common Carp SOFC | Small-mouth Bass SOFC | Channel Catfish SFF |
| Metals (mg/kg) | | | | | | | |
| Mercury | 1.04 | 0.20 | 0.22 | <0.08 | 0.19 | 0.23 | 0.18 |

| Chemicals Detected in Fish Tissue Collected from the Stillwater River Study Area, 1994 by OEPA | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Sampling Location - By River Mile | | | | | | |
| | 15.4 | 15.4 | 15.4 | 14.7 | 14.7 | 14.7 | 12.1 |
| Parameter | Channel Catfish SFF | Small Mouth Bass SOF | Common Carp WBC | Channel Catfish SFFC | Small-mouth Bass SOFC | Common Carp WBC | Small-mouth Bass SOFC |
| **Pesticides (µg/kg)** | | | | | | | |
| Heptachlor Epoxide | 3.1 | <1.6 | 3.4 | 2.6 | <1.7 | 3.9 | <1.6 |
| 4,4'-DDE | 22 | <3.3 | 27 | 18 | <3.3 | 32 | 3.8 |
| Dieldrin | 24 | 7.5 | 25 | 25 | <3.3 | 27 | 7.1 |
| 4,4'-DDD | 4.3 | <3.3 | 7.5 | 18 | <3.3 | 8.8 | <3.3 |
| 4,4'-DDT | 3.6 | <3.3 | <3.2 | 12 | <3.3 | 7.5 | <3.3 |
| Endosulfan Sulfate | 5.6 | <3.3 | 11 | <3.3 | <3.3 | <3.3 | <3.3 |
| **Metals (mg/kg)** | | | | | | | |
| Mercury | 0.21 | 0.55 | 0.10 | 0.28 | 0.32 | 0.16 | 0.21 |

| Chemicals Detected in Fish Tissue Collected from the Stillwater River Study Area, 1994 by OEPA | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Sampling Location - By River Mile | | | | | | |
| | 12.1 | 12.1 | 15.4 D | | | | |
| Parameter | Small Mouth Bass SOF | Common Carp WBC | Common Carp WBC | | | | |
| **Pesticides (µg/kg)** | | | | | | | |
| Heptachlor Epoxide | <1.7 | 2.8 | 4.6 | | | | |
| 4,4'-DDE | <3.3 | 25 | 32 | | | | |
| Dieldrin | 4.9 | 12 | 29 | | | | |
| 4,4'-DDD | <3.3 | 4.3 | 9.9 | | | | |
| Endrin Aldehyde | <3.3 | <3.3 | 5.2 | | | | |
| Endosulfan Sulfate | <3.3 | <3.3 | 11 | | | | |
| Methoxy-chlor | <17 | <16 | 21 | | | | |
| **Metals (mg/kg)** | | | | | | | |
| Mercury | 0.44 | 0.11 | 0.13 | | | | |

# ATTACHMENT B
# RISK CALCULATION SPREADSHEETS



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Site Name: Garland Road Landfill Site

Exposure Point Concentrations

| Soil | |
|---|---|
| Chemical | Conc. (mg/kg) |
| Arsenic | 1.1E+1 |
| Aroclor 1248 | 6.1E+0 |
| Aroclor 1254 | 5.0E+0 |
| Beryllium | 6.7E-1 |
| Benzo(a)anthracene | 1.5E+0 |
| Benzo(b)fluroanthene | 1.0E+0 |
| Benzo(k)fluroanthene | 1.2E+0 |
| Benzo(a)pyrene | 1.2E+0 |
| Benzo(g,h,i)perylene | 5.7E-1 |
| Bis(2-ethylhexyl)phthalate | 1.9E+1 |
| Dieldrin | 6.4E-2 |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 |
| Lead | 1.1E+3 |
| Mercury | 6.6E-1 |
| Methylene Chloride | 4.0E-2 |
| Phenanthrene | 2.6E+0 |
| Trichloroethene | 5.1E-2 |

| Sediment | |
|---|---|
| Chemical | Concentration (mg/kg) |
| Arsenic | 7.7E+0 |
| Aroclor 1221 | 3.6E-2 |
| Benzo(a)anthracene | 1.2E-1 |
| Benzo(b)fluoranthene | 2.1E-1 |
| Beryllium | 6.4E-1 |
| Bis(2-ethylhexyl)phthalate | 2.0E-1 |
| Lead | 3.4E+1 |
| Mercury | 8.0E-2 |
| Phenanthrene | 3.9E-1 |

| Fish | |
|---|---|
| Chemical | Conc. mg/kg |
| Aroclor 1254 | 4.9E-2 |

| Air Factors | | |
|---|---|---|
| Chemical | ($mg^3/kg$) | |
| | VF | PEF |
| Arsenic | NA | 1.3E+9 |
| Aroclor 1248 | 1.2E+6 | 1.3E+9 |
| Aroclor 1254 | 2.5E+6 | 1.3E+9 |
| Beryllium | NA | 1.3E+9 |
| Benzo(a)anthracene | NA | 1.3E+9 |
| Benzo(a)anthracene | NA | 1.3E+9 |
| Benzo(b)fluroanthene | NA | 1.3E+9 |
| Benzo(k)fluroanthene | 1.4E+9 | 1.3E+9 |
| Benzo(a)pyrene | NA | 1.3E+9 |
| Benzo(g,h,i)perylene | 5.7E+8 | 1.3E+9 |
| Bis(2-ethylhexyl)phthalate | NA | 1.3E+9 |
| Indeno(1,2,3-cd)pyrene | NA | 1.3E+9 |
| Lead | NA | 1.3E+9 |
| Mercury | NA | 1.3E+9 |
| Methylene Chloride | 4.1E+4 | 1.3E+9 |
| Phenanthrene | 2.5E+6 | 1.3E+9 |
| Trichloroethene | 3.5E+3 | 1.3E+9 |

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Particulate Emission Factor

**PEF Equation:**

$$PEF = Q/C \times \frac{3600\ s/h}{0.036 \times (1 - V) \times (U_m/U_t)^3 \times F(x)}$$

| Where: | | Defaults | Actual |
|---|---|---|---|
| PEF | Particulate emission factor ($m^3$/kg) | 1.316E+09 | 1.316E+09 |
| Q/C | Inv. of the mean conc. at the ctr. of a 0.5-acre$^2$ source (g/$m^2$-s per kg/$m^3$) | 90.8 | 90.8 |
| V | Fraction of vegetative cover (unitless) | 0.5 | 0.5 |
| $U_m$ | Mean annual windspeed (m/s) | 4.69 | 4.69 |
| $U_t$ | Equivalent threshold value of windspeed at 7 m (m/s) | 11.32 | 11.32 |
| F(x) | Function dependent on Um/Ut derived using Cowherd (1985) (unitless) | 0.194 | 0.194 |

Source: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, (Part B, Development of Risk-Based Preliminary Remediation Goals) Interm, Publication 9285.7-01B

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## Soil-to-Air Volatilization Model

$$VF = \frac{LS * V * DH * SQRT(3.14 * \alpha * T)}{2 * AR * D_{ei} * E * K_{as} * 0.001}$$

and

$$\alpha = (D_{ei} * E) / (E + P_s * (1-E)/K_{as})$$

where:

| | | | |
|---|---|---|---|
| VF | volatilization factor | Ps | soil density (g/cm$^3$) |
| LS | length of area (m) | T | exposure time (s) |
| V | wind speed (m/s) | Di | molecular diffusivity (cm$^2$/s) |
| DH | diffusion height (m) | H | Henry's Law constant (atm-m$^3$/mol) |
| AR | area (cm$^2$) | $K_d$ | soil-water coefficient (cm$^3$/g) = $K_{oc}$ * OC |
| $D_{ei}$ | effective diffusivity (cm$^2$/s) = Di*E$^{0.33}$ | $K_{oc}$ | organic carbon coefficient (cm$^3$/g) |
| E | soil porosity | OC | organic carbon of soil (fractional) |
| $K_{as}$ | soil/air partition coefficient (g soil/cm$^3$ air) = H/41 $K_d$ | | |

| Chemical | D$_i$ cm$^2$/s | H atm-m$^3$/mol | $K_{oc}$ cm$^3$/g (c) | V m/s | LS m | DH m | AR cm$^2$ | $D_{ei}$ cm$^2$/s | E | $P_s$ g/cm$^3$ | T s | $K_d$ cm$^3$/g | $K_{as}$ g/cm$^3$ | OC fraction | α cm$^2$/s | VF m$^3$/kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | | | | 2.25 | 45 | 2 | 2.0E+07 | 0.0E+00 | 0.35 | 2.65 | 7.9E+08 | 0 | 0.0E+00 | 0.02 | 0.0E+00 | -- |
| Aroclor 1248 | 5.0E-02 | 2.8E-03 | 56200 | 2.25 | 45 | 2 | 2.0E+07 | 3.5E-02 | 0.35 | 2.65 | 7.9E+08 | 57324 | 2.0E-06 | 1.02 | 1.4E-08 | 1.2E+06 |
| Aroclor 1254 | 5.0E-02 | 2.0E-03 | 81800 | 2.25 | 45 | 2 | 2.0E+07 | 3.5E-02 | 0.35 | 2.65 | 7.9E+08 | 165236 | 5.0E-07 | 2.02 | 3.6E-09 | 2.5E+06 |
| Beryllium | | | | 2.25 | 45 | 2 | 2.0E+07 | 0.0E+00 | 0.35 | 2.65 | 7.9E+08 | 0 | 0.0E+00 | 3.02 | 0.0E+00 | -- |
| Benzo(a)anthracene | | | | 2.25 | 45 | 2 | 2.0E+07 | 0.0E+00 | 0.35 | 2.65 | 7.9E+08 | 0 | 0.0E+00 | 4.02 | 0.0E+00 | -- |
| Benzo(b)fluroanthene | | | | 2.25 | 45 | 2 | 2.0E+07 | 0.0E+00 | 0.35 | 2.65 | 7.9E+08 | 0 | 0.0E+00 | 5.02 | 0.0E+00 | -- |
| Benzo(k)fluroanthene | | | | 2.25 | 45 | 2 | 2.0E+07 | 0.0E+00 | 0.35 | 2.65 | 7.9E+08 | 0 | 0.0E+00 | 6.02 | 0.0E+00 | -- |
| Benzo(a)pyrene | 4.8E-02 | 1.6E-06 | 5500000 | 2.25 | 45 | 2 | 2.0E+07 | 3.4E-02 | 0.35 | 2.65 | 7.9E+08 | 38610000 | 1.6E-12 | 7.02 | 1.1E-14 | 1.4E+09 |
| Benzo(g,h,i)perylene | | | | 2.25 | 45 | 2 | 2.0E+07 | 0.0E+00 | 0.35 | 2.65 | 7.9E+08 | 0 | 0.0E+00 | 8.02 | 0.0E+00 | -- |
| Bis(2-ethylhexyl)phthalate | 3.9E-02 | 1.1E-05 | 4180000 | 2.25 | 45 | 2 | 2.0E+07 | 2.7E-02 | 0.35 | 2.65 | 7.9E+08 | 37703600 | 1.2E-11 | 9.02 | 6.7E-14 | 5.7E+08 |
| Dieldrin | | | | 2.25 | 45 | 2 | 2.0E+07 | 0.0E+00 | 0.35 | 2.65 | 7.9E+08 | 0 | 0.0E+00 | 10.02 | 0.0E+00 | -- |
| Indeno(1,2,3-cd)pyrene | | | | 2.25 | 45 | 2 | 2.0E+07 | 0.0E+00 | 0.35 | 2.65 | 7.9E+08 | 0 | 0.0E+00 | 11.02 | 0.0E+00 | -- |
| Lead | | | | 2.25 | 45 | 2 | 2.0E+07 | 0.0E+00 | 0.35 | 2.65 | 7.9E+08 | 0 | 0.0E+00 | 12.02 | 0.0E+00 | -- |
| Mercury | | | | 2.25 | 45 | 2 | 2.0E+07 | 0.0E+00 | 0.35 | 2.65 | 7.9E+08 | 0 | 0.0E+00 | 13.02 | 0.0E+00 | -- |
| Methylene Chloride | 1.0E-01 | 2.6E-03 | 8.8 | 2.25 | 45 | 2 | 2.0E+07 | 7.1E-02 | 0.35 | 2.65 | 7.9E+08 | 123.376 | 8.6E-04 | 14.02 | 1.3E-05 | 4.1E+04 |
| Phenanthrene | 7.5E-02 | 1.6E-04 | 1400 | 2.25 | 45 | 2 | 2.0E+07 | 5.3E-02 | 0.35 | 2.65 | 7.9E+08 | 21028 | 3.1E-07 | 15.02 | 3.3E-09 | 2.5E+06 |
| Trichloroethene | 8.1E-02 | 8.9E-03 | 125.89 | 2.25 | 45 | 2 | 2.0E+07 | 5.7E-02 | 0.35 | 2.65 | 7.9E+08 | 2.51785 | 1.4E-01 | 0.02 | 1.6E-03 | 3.5E+03 |

Source: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, (Part B, Development of Risk-Based Preliminary Remediation Goals) Interim, Publication 9285.7-01B

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*Table B-1*

# Garland Road Landfill Site

## Ingestion of Recreationally Caught Fish - RME Case - Child

***Exposure Equation:***

$$\text{Intake} = \frac{C_f \times IR \times FI \times ED \times EF}{BW \times AT}$$

where,

| | |
|---|---|
| $C_f$: chemical concentration in soil | BW bodyweight |
| IR: ingestion rate | AT: averaging time |
| ED: exposure duration | |
| EF: exposure frequency | |
| FI: fraction ingested | |

***Exposure Factors:***

| | | |
|---|---|---|
| $C_f$* | -- | (mg/kg) |
| IR | 0.054 | (kg/meal) |
| ED | 6 | (years) |
| EF | 350 | (days/year) |
| FI | 0.5 | (unitless) |
| BW | 15 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 2,190 | (days) noncancer |

* - Chemical specific value

| | | Carcinogenic Effects | | | Noncarcinogenic Effects | | |
|---|---|---|---|---|---|---|---|
| Chemical | Fish Concentration (mg/kg) | LADI (mg/kg-day) | Oral SF (mg/kg-day)-1 | Cancer Risk | ADI (mg/kg-day) | Oral RfD (mg/kg-day) | Hazard Quotient |
| Aroclor 1254 | 4.9E-2 | 7.2E-6 | 2.00E+0 | 1.4E-5 | 8.5E-5 | 2.0E-5 | 4.2E+0 |
| | **TOTAL** | -- | -- | **1.4E-5** | -- | -- | **4.2E+0** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncarcer)
NA : Toxicity criterion not available.

*Filename:* *GARLAN~1.XLS*
*Date:* *3/26/97*



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## Table B-2
# Garland Road Landfill Site
## Ingestion of Recreationally Caught Fish - RME Case - Adult

***Exposure Equation:***

$$\text{Intake} = \frac{C_f \times IR \times FI \times ED \times EF}{BW \times AT}$$

where,

| | |
|---|---|
| $C_f$: chemical concentration in fish | BW: bodyweight |
| IR: ingestion rate | AT: averaging time |
| ED: exposure duration | |
| EF: exposure frequency | |
| FI: fraction ingested | |

***Exposure Factors:***

| | | |
|---|---|---|
| $C_f$* | – | (mg/kg) |
| IR | 0.054 | (kg/meal) |
| ED | 24 | (years) |
| EF | 350 | (days/year) |
| FI | 0.5 | (unitless) |
| BW | 70 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 8,760 | (days) noncancer |

* - Chemical specific value

| | | Carcinogenic Effects | | | Noncarcinogenic Effects | | |
|---|---|---|---|---|---|---|---|
| Chemical | Fish Concentration (mg/kg) | LADI (mg/kg-day) | Oral SF (mg/kg-day)-1 | Cancer Risk | ADI (mg/kg-day) | Oral RfD (mg/kg-day) | Hazard Quotient |
| Aroclor 1254 | 4.9E-2 | 6.2E-6 | 2.00E+0 | 1.2E-5 | 1.8E-5 | 2.0E-5 | 9.1E-1 |
| **TOTAL** | | -- | -- | **1.2E-5** | -- | -- | **9.1E-1** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncarcer)
NA : Toxicity criterion not available.



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## Table B-3
# Garland Road Landfill Site
## Soil Ingestion - RME Case - Adolescent Trespasser

***Exposure Equation:***

$$\text{Intake} = \frac{CS \times IR \times CF \times FI \times ED \times EF}{BW \times AT}$$

where,

| | |
|---|---|
| CS: chemical concentration in soil | CF: conversion factor |
| IR: ingestion rate | BW: bodyweight |
| ED: exposure duration | AT: averaging time |
| EF: exposure frequency | |
| FI: fraction ingested | |

***Exposure Factors:***

| | | |
|---|---|---|
| CS* | -- | (mg/kg) |
| IR | 100 | (mg/day) |
| ED | 8 | (years) |
| EF | 48 | (days/year) |
| FI | 1 | (unitless) |
| CF | 1E-6 | (kg/mg) |
| BW | 42 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 2,920 | (days) noncancer |

* - Chemical specific value

| | | Carcinogenic Effects | | | Noncarcinogenic Effects | | |
|---|---|---|---|---|---|---|---|
| Chemical | Soil Concentration (mg/kg) | LADI (mg/kg-day) | Oral SF (mg/kg-day)-1 | Cancer Risk | ADI (mg/kg-day) | Oral RfD (mg/kg-day) | Hazard Quotient |
| Arsenic | 1.1E+1 | 3.9E-7 | 1.50E+0 | 5.9E-7 | 3.4E-6 | 3.0E-4 | 1.1E-2 |
| Aroclor 1248 | 6.1E+0 | 2.2E-7 | 2.00E+0 | 4.4E-7 | 1.9E-6 | NA | |
| Aroclor 1254 | 5.0E+0 | 1.8E-7 | 2.00E+0 | 3.6E-7 | 1.6E-6 | 2.0E-5 | 7.8E-2 |
| Beryllium | 6.7E-1 | 2.4E-8 | 4.30E+0 | 1.0E-7 | 2.1E-7 | 5.0E-3 | 4.2E-5 |
| Benzo(a)anthracene | 1.5E+0 | 5.2E-8 | 7.30E-1 | 3.8E-8 | 4.6E-7 | NA | |
| Benzo(b)fluroanthene | 1.0E+0 | 3.6E-8 | 7.30E-1 | 2.7E-8 | 3.2E-7 | NA | |
| Benzo(k)fluroanthene | 1.2E+0 | 4.3E-8 | 7.30E-2 | 3.2E-9 | 3.8E-7 | NA | |
| Benzo(a)pyrene | 1.2E+0 | 4.2E-8 | 7.30E+0 | 3.0E-7 | 3.6E-7 | NA | |
| Benzo(g,h,i)perylene | 5.7E-1 | 2.0E-8 | NA | | 1.8E-7 | NA | |
| Bis(2-ethylhexyl)phthalate | 1.9E+1 | 6.7E-7 | 1.40E-2 | 9.4E-9 | 5.9E-6 | 2.0E-2 | 2.9E-4 |
| Dieldrin | 6.4E-2 | 2.3E-9 | 1.60E+1 | 3.7E-8 | 2.0E-8 | 5.0E-5 | 4.0E-4 |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 | 2.0E-8 | 7.30E-1 | 1.5E-8 | 1.8E-7 | NA | |
| Lead | 1.1E+3 | 3.9E-5 | NA | | 3.4E-4 | NA | |
| Mercury | 6.6E-1 | 2.4E-8 | NA | | 2.1E-7 | NA | |
| Methylene Chloride | 4.0E-2 | 1.4E-9 | 7.50E-3 | 1.1E-11 | 1.3E-8 | 6.0E-2 | 2.1E-7 |
| Phenanthrene | 2.6E+0 | 9.4E-8 | NA | | 8.2E-7 | NA | |
| Trichloroethene | 5.1E-2 | 1.8E-9 | 1.10E-2 | 2.0E-11 | 1.6E-8 | 6.0E-3 | 2.7E-6 |
| | TOTAL | -- | -- | **1.9E-6** | -- | -- | **9.0E-2** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncancer)
NA : Toxicity criterion not available

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## Table B-4
# Garland Road Landfill Site
## Dermal Contact with Soil - RME Case - Adolescent Trespasser

***Exposure Equation:***

$$\text{Intake} = \frac{CS \times ABS \times CF \times SA \times AF \times ED \times EF}{BW \times AT}$$

where,

| | |
|---|---|
| CS: chemical concentration in si | ED: exposure duration |
| ABS: absorption factor | EF: exposure frequency |
| CF: conversion factor | BW: bodyweight |
| SA: skin surface area | AT: averaging time |
| AF: adherence factor | |

***Exposure Factors:***

| | | |
|---|---|---|
| CS* | – | (mg/kg) |
| ABS | – | (unitless) |
| AF | 1 | (mg/cm2) |
| SA | 3313 | (cm2/event) |
| ED | 8 | (years) |
| EF | 48 | (days/year) |
| CF | 1E-6 | (kg/mg) |
| BW | 42 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 2,920 | (days) noncancer |

* - Chemical specific value

| | | | Carcinogenic Effects | | | Noncarcinogenic Effects | | |
|---|---|---|---|---|---|---|---|---|
| Chemical | Soil Concentration (mg/kg) | ABS | LADI (mg/kg-day) | Oral SF (mg/kg-day)-1 | Cancer Risk | ADI (mg/kg-day) | Oral RfD (mg/kg-day) | Hazard Quotient |
| Arsenic | 1.1E+1 | 1.0E-2 | 1.3E-7 | 1.50E+0 | 2.0E-7 | 1.1E-6 | 3.0E-4 | 3.8E-3 |
| Aroclor 1248 | 6.1E+0 | 6.0E-2 | 4.3E-7 | 2.00E+0 | 8.7E-7 | 3.8E-6 | NA | |
| Aroclor 1254 | 5.0E+0 | 6.0E-2 | 3.6E-7 | 2.00E+0 | 7.1E-7 | 3.1E-6 | 2.0E-5 | 1.6E-1 |
| Beryllium | 6.7E-1 | 1.0E-2 | 7.9E-9 | 4.30E+0 | 3.4E-8 | 7.0E-8 | 5.0E-3 | 1.4E-5 |
| Benzo(a)anthracene | 1.5E+0 | 1.0E-1 | 1.7E-7 | NA | | 1.5E-6 | NA | |
| Benzo(b)fluroanthene | 1.0E+0 | 1.0E-1 | 1.2E-7 | NA | | 1.1E-6 | NA | |
| Benzo(k)fluroanthene | 1.2E+0 | 1.0E-1 | 1.4E-7 | NA | | 1.3E-6 | NA | |
| Benzo(a)pyrene | 1.2E+0 | 1.0E-1 | 1.4E-7 | NA | | 1.2E-6 | NA | |
| Benzo(g,h,i)perylene | 5.7E-1 | 1.0E-1 | 6.8E-8 | NA | | 5.9E-7 | NA | |
| Bis(2-ethylhexyl)phthalate | 1.9E+1 | 1.0E-1 | 2.2E-6 | 1.40E-2 | 3.1E-8 | 1.9E-5 | 2.0E-2 | 9.7E-4 |
| Dieldrin | 6.4E-2 | 1.0E-1 | 7.6E-9 | 1.60E+1 | 1.2E-7 | 6.6E-8 | 5.0E-5 | 1.3E-3 |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 | 1.0E-1 | 6.6E-8 | NA | | 5.8E-7 | NA | |
| Lead | 1.1E+3 | 1.0E-2 | 1.3E-5 | NA | | 1.1E-4 | NA | |
| Mercury | 6.6E-1 | 1.0E-2 | 7.8E-9 | NA | | 6.8E-8 | NA | |
| Methylene Chloride | 4.0E-2 | 1.0E-1 | 4.7E-9 | 7.50E-3 | 3.6E-11 | 4.1E-8 | 6.0E-2 | 6.9E-7 |
| Phenanthrene | 2.6E+0 | 1.0E-1 | 3.1E-7 | NA | | 2.7E-6 | NA | |
| Trichloroethene | 5.1E-2 | 1.0E-1 | 6.0E-9 | 1.10E-2 | 6.7E-11 | 5.3E-8 | 6.0E-3 | 8.8E-6 |
| | **TOTAL** | | -- | -- | **2.0E-6** | -- | -- | **1.6E-1** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncarcer)

NA - Toxicity criterion not available.

*Filename:* GARLAN-1.XLS
*Date:* 3/26/97



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## Table B-5
# Garland Road Landfill Site
## Inhalation from Air - Dust - RME Case - Adolescent Trespasser

***Exposure Equation:***

$$\text{Intake} = \frac{Cs \times ED \times EF \times IR_{air} \times (1/PEF)}{BW \times AT}$$

where,

| | |
|---|---|
| Cs: chemical conc in soil | ED: exposure duration |
| IR: inhalation rate | BW bodyweight |
| ET: exposure time | AT: averaging time |
| EF: exposure frequency | PEF = Particulate Emission Factor |

***Exposure Factors:***

| | | |
|---|---|---|
| Cs* | – | (mg/m3) |
| IR | 20 | (m3/day) |
| ET | 4 | (hours/day) |
| ED | 8 | (years) |
| EF | 8 | (days/year) |
| BW | 42 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 2,920 | (days) noncancer |
| Days at Site | 48 | days/year |

* - Chemical specific value

| Chemical | Soil Concentration (mg/m3) | PEF (m3/kg) | Carcinogenic Effects: LADI (mg/kg-day) | Carcinogenic Effects: Inhalation SF (mg/kg-day)-1 | Carcinogenic Effects: Cancer Risk | Noncarcinogenic Effects: ADI (mg/kg-day) | Noncarcinogenic Effects: Inhalation RfD (mg/kg-day) | Noncarcinogenic Effects: Hazard Quotient |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 1.1E+1 | 1.3E+9 | 1.0E-11 | 1.50E+1 | 1.5E-10 | 8.7E-11 | 3.0E-4 | 2.9E-7 |
| Aroclor 1248 | 6.1E+0 | 1.3E+9 | 5.5E-12 | 2.00E+0 | 1.1E-11 | 4.8E-11 | NA | |
| Aroclor 1254 | 5.0E+0 | 1.3E+9 | 4.5E-12 | 2.00E+0 | 9.1E-12 | 4.0E-11 | 2.0E-5 | 2.0E-6 |
| Beryllium | 6.7E-1 | 1.3E+9 | 6.1E-13 | 8.40E+0 | 5.1E-12 | 5.3E-12 | 5.0E-3 | 1.1E-9 |
| Benzo(a)anthracene | 1.5E+0 | 1.3E+9 | 1.3E-12 | NA | | 1.2E-11 | NA | |
| Benzo(b)fluroanthene | 1.0E+0 | 1.3E+9 | 9.2E-13 | 6.10E+0 | 5.6E-12 | 8.1E-12 | NA | |
| Benzo(k)fluroanthene | 1.2E+0 | 1.3E+9 | 1.1E-12 | 6.10E+0 | 6.7E-12 | 9.6E-12 | NA | |
| Benzo(a)pyrene | 1.2E+0 | 1.3E+9 | 1.1E-12 | 6.10E+0 | 6.4E-12 | 9.2E-12 | NA | |
| Benzo(g,h,i)perylene | 5.7E-1 | 1.3E+9 | 5.2E-13 | NA | | 4.5E-12 | NA | |
| Bis(2-ethyihexyl)phthalate | 1.9E+1 | 1.3E+9 | 1.7E-11 | 1.40E-2 | 2.4E-13 | 1.5E-10 | 5.7E-2 | 2.6E-9 |
| Dieldrin | 6.4E-2 | 1.3E+9 | 5.8E-14 | 1.60E+1 | 9.3E-13 | 5.1E-13 | 5.0E-5 | 1.0E-8 |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 | 1.3E+9 | 5.1E-13 | 6.10E+0 | 3.1E-12 | 4.4E-12 | NA | |
| Lead | 1.1E+3 | 1.3E+9 | 1.0E-9 | NA | | 8.7E-9 | NA | |
| Mercury | 6.6E-1 | 1.3E+9 | 6.0E-13 | NA | | 5.2E-12 | 8.6E-5 | 6.1E-8 |
| Methylene Chloride | 4.0E-2 | 1.3E+9 | 3.6E-14 | 1.60E-3 | 5.8E-17 | 3.2E-13 | 8.6E-1 | 3.7E-13 |
| Phenanthrene | 2.6E+0 | 1.3E+9 | 2.4E-12 | NA | | 2.1E-11 | NA | |
| Trichloroethene | 5.1E-2 | 1.3E+9 | 4.6E-14 | 6.00E-3 | 2.8E-16 | 4.0E-13 | 6.0E-3 | 6.7E-11 |
| **TOTAL** | | | -- | -- | **2.0E-10** | -- | -- | **2.3E-6** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncancer)

NA - Toxicity criterion not available.

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## Table B-6
# Garland Road Landfill Site
## Inhalation of Vapors from Soil - RME Case - Adolescent Trespasser

***Exposure Equation:***

$$\text{Intake} = \frac{Cs \times ED \times EF \times IR_{air} \times (1/VF)}{BW \times AT}$$

where,

| | |
|---|---|
| Cs: chemical conc. in soil | ED: exposure duration |
| IR: inhalation rate | BW: bodyweight |
| ET: exposure time | AT: averaging time |
| EF: exposure frequency | VF = Volatilization Factor |

***Exposure Factors:***

| | | |
|---|---|---|
| Cs* | -- | (mg/m3) |
| IR | 20 | (m3/day) |
| ET | 4 | (hours/day) |
| ED | 8 | (years) |
| EF | 8 | (days/year) |
| BW | 42 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 2,920 | (days) noncancer |
| Days at Site | 48 | days/year |

* - Chemical specific value

| Chemical | Soil Concentration (mg/m3) | VF ($m^3$/kg | Carcinogenic Effects: LADI (mg/kg-day) | Inhalation SF (mg/kg-day)-1 | Cancer Risk | Noncarcinogenic Effects: ADI (mg/kg-day) | Inhalation RfD (mg/kg-day) | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 1.1E+1 | NA | NA | 1.50E+1 | | NA | 3.0E-4 | |
| Aroclor 1248 | 6.1E+0 | 1.2E+6 | 6.0E-9 | 4.00E-1 | 2.4E-8 | 5.2E-8 | NA | |
| Aroclor 1254 | 5.0E+0 | 2.5E+6 | 2.4E-9 | 4.00E-1 | 9.7E-10 | 2.1E-8 | 2.0E-5 | 1.1E-3 |
| Beryllium | 6.7E-1 | NA | NA | 8.40E+0 | | NA | 5.0E-3 | |
| Benzo(a)anthracene | 1.5E+0 | NA | NA | NA | | NA | NA | |
| Benzo(b)fluroanthene | 1.0E+0 | NA | NA | 6.10E+0 | | NA | NA | |
| Benzo(k)fluroanthene | 1.2E+0 | NA | NA | 6.10E+0 | | NA | NA | |
| Benzo(a)pyrene | 1.2E+0 | 1.4E+9 | 1.0E-12 | 6.10E+0 | 6.2E-12 | 8.8E-12 | NA | |
| Benzo(g,h,i)perylene | 5.7E-1 | NA | NA | NA | | NA | NA | |
| Bis(2-ethylhexyl)phthalate | 1.9E+1 | 5.7E+8 | 3.9E-11 | 1.40E-2 | 5.5E-13 | 3.4E-10 | 5.7E-2 | 6.0E-9 |
| Dieldrin | 6.4E-2 | NA | NA | 1.60E+1 | | NA | 5.0E-5 | |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 | NA | NA | 6.10E+0 | | NA | NA | |
| Lead | 1.1E+3 | NA | NA | NA | | NA | NA | |
| Mercury | 6.6E-1 | NA | NA | NA | | NA | 8.6E-5 | |
| Methylene Chloride | 4.0E-2 | 4.1E+4 | 1.2E-9 | 1.60E-3 | 1.8E-12 | 1.0E-8 | 8.6E-1 | 1.2E-8 |
| Phenanthrene | 2.6E+0 | 2.5E+6 | 1.2E-9 | NA | | 1.1E-8 | NA | |
| Trichloroethene | 5.1E-2 | 3.5E+3 | 1.7E-8 | 6.00E-3 | 1.0E-10 | 1.5E-7 | 6.0E-3 | 2.5E-5 |
| **TOTAL** | | | -- | -- | **3.5E-9** | -- | -- | **1.1E-3** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncancer)

NA - Toxicity criterion not available

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## Table B-7
# Garland Road Landfill Site
## Sediment Ingestion - RME Case - Child

***Exposure Equation:***

$$\text{Intake} = \frac{CS \times IR \times CF \times FI \times ED \times EF}{BW \times AT}$$

where,

| | |
|---|---|
| CS: chemical concentration in soil | CF: conversion factor |
| IR: ingestion rate | BW: bodyweight |
| ED: exposure duration | AT: averaging time |
| EF: exposure frequency | |
| FI: fraction ingested | |

***Exposure Factors:***

| | | |
|---|---|---|
| CS* | -- | (mg/kg) |
| IR | 200 | (mg/day) |
| ED | 6 | (years) |
| EF | 72 | (days/year) |
| FI | 1 | (unitless) |
| CF | 1E-6 | (kg/mg) |
| BW | 15 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 2,190 | (days) noncancer |

* - Chemical specific value

| | | Carcinogenic Effects | | | Noncarcinogenic Effects | | |
|---|---|---|---|---|---|---|---|
| Chemical | Sediment Concentration (mg/kg) | LADI (mg/kg-day) | Oral SF (mg/kg-day)-1 | Cancer Risk | ADI (mg/kg-day) | Oral RfD (mg/kg-day) | Hazard Quotient |
| Arsenic | 7.7E+0 | 1.7E-6 | 1.50E+0 | 2.6E-6 | 2.0E-5 | 3.0E-4 | 6.8E-2 |
| Aroclor 1221 | 3.6E-2 | 8.1E-9 | 2.00E+0 | 1.6E-8 | 9.5E-8 | NA | |
| Benzo(a)anthracene | 1.2E-1 | 2.7E-8 | 7.30E-1 | 2.0E-8 | 3.2E-7 | NA | |
| Benzo(b)fluoranthene | 2.1E-1 | 4.7E-8 | 7.30E-1 | 3.5E-8 | 5.5E-7 | NA | |
| Beryllium | 6.4E-1 | 1.4E-7 | 4.30E+0 | 6.2E-7 | 1.7E-6 | 5.0E-3 | 3.4E-4 |
| Bis(2-ethylhexyl)phthalate | 2.0E-1 | 4.5E-8 | 1.40E-2 | 6.3E-10 | 5.3E-7 | 2.0E-2 | 2.6E-5 |
| Lead | 3.4E+1 | 7.7E-6 | NA | | 9.0E-5 | NA | |
| Mercury | 8.0E-2 | 1.8E-8 | NA | | 2.1E-7 | NA | |
| Phenanthrene | 3.9E-1 | 8.8E-8 | NA | | 1.0E-6 | NA | |
| **TOTAL** | | -- | -- | **3.3E-6** | -- | -- | **0.068** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncarcer)
NA : Toxicity criterion not available.

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*Date:* 3/26/97



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## Table B-8
# Garland Road Landfill Site
## Sediment Ingestion - RME Case - Adult

***Exposure Equation:***

$$\text{Intake} = \frac{CS \times IR \times CF \times FI \times ED \times EF}{BW \times AT}$$

where,

| | |
|---|---|
| CS: chemical concentration in soil | CF: conversion factor |
| IR: ingestion rate | BW: bodyweight |
| ED: exposure duration | AT: averaging time |
| EF: exposure frequency | |
| FI: fraction ingested | |

***Exposure Factors:***

| | | |
|---|---|---|
| CS* | – | (mg/kg) |
| IR | 100 | (mg/day) |
| ED | 24 | (years) |
| EF | 48 | (days/year) |
| FI | 1 | (unitless) |
| CF | 1E-6 | (kg/mg) |
| BW | 70 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 8,760 | (days) noncancer |

* - Chemical specific value

| Chemical | Sediment Concentration (mg/kg) | Carcinogenic Effects: LADI (mg/kg-day) | Carcinogenic Effects: Oral SF (mg/kg-day)-1 | Carcinogenic Effects: Cancer Risk | Noncarcinogenic Effects: ADI (mg/kg-day) | Noncarcinogenic Effects: Oral RfD (mg/kg-day) | Noncarcinogenic Effects: Hazard Quotient |
|---|---|---|---|---|---|---|---|
| Arsenic | 7.7E+0 | 5.0E-7 | 1.50E+0 | 7.4E-7 | 1.4E-6 | 3.0E-4 | 4.8E-3 |
| Aroclor 1221 | 3.6E-2 | 2.3E-9 | 2.00E+0 | 4.6E-9 | 6.8E-9 | NA | |
| Benzo(a)anthracene | 1.2E-1 | 7.7E-9 | 7.30E-1 | 5.6E-9 | 2.3E-8 | NA | |
| Benzo(b)fluoranthene | 2.1E-1 | 1.4E-8 | 7.30E-1 | 9.9E-9 | 3.9E-8 | NA | |
| Beryllium | 6.4E-1 | 4.1E-8 | 4.30E+0 | 1.8E-7 | 1.2E-7 | 5.0E-3 | 2.4E-5 |
| Bis(2-ethylhexyl)phthalate | 2.0E-1 | 1.3E-8 | 1.40E-2 | 1.8E-10 | 3.8E-8 | 2.0E-2 | 1.9E-6 |
| Lead | 3.4E+1 | 2.2E-6 | NA | | 6.4E-6 | NA | |
| Mercury | 8.0E-2 | 5.2E-9 | NA | | 1.5E-8 | NA | |
| Phenanthrene | 3.9E-1 | 2.5E-8 | NA | | 7.3E-8 | NA | |
| **TOTAL** | | -- | -- | **9.4E-7** | -- | -- | **0.005** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncancer)
NA : Toxicity criterion not available.



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## Table B-9
# Garland Road Landfill Site
## Dermal Contact with Sediment - RME Case - Child

***Exposure Equation:***

$$\text{Intake} = \frac{CS \times ABS \times CF \times SA \times AF \times ED \times EF}{BW \times AT}$$

where,

| | |
|---|---|
| CS: chemical concentration in soil | ED: exposure duration |
| ABS: absorption factor | EF: exposure frequency |
| CF: conversion factor | BW: bodyweight |
| SA: skin surface area | AT: averaging time |
| AF: adherence factor | |

***Exposure Factors:***

| | | |
|---|---|---|
| CS* | -- | (mg/kg) |
| ABS | -- | (unitless) |
| AF | 1 | (mg/cm2) |
| SA | 1750 | (cm2/event) |
| ED | 6 | (years) |
| EF | 72 | (days/year) |
| CF | 1E-6 | (kg/mg) |
| BW | 15 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 2,190 | (days) noncancer |

* - Chemical specific value

| | | | Carcinogenic Effects | | | Noncarcinogenic Effects | | |
|---|---|---|---|---|---|---|---|---|
| Chemical | Sediment Concentration (mg/kg) | ABS | LADI (mg/kg-day) | Oral SF (mg/kg-day)-1 | Cancer Risk | ADI (mg/kg-day) | Oral RfD (mg/kg-day) | Hazard Quotient |
| Arsenic | 7.7E+0 | 1.0E-2 | 1.5E-7 | 1.50E+0 | 2.3E-7 | 1.8E-6 | 3.0E-4 | 5.9E-3 |
| Aroclor 1221 | 3.6E-2 | 6.0E-2 | 4.3E-9 | 2.00E+0 | 8.5E-9 | 5.0E-8 | NA | |
| Benzo(a)anthracene | 1.2E-1 | 1.0E-1 | 2.4E-8 | NA | | 2.8E-7 | NA | |
| Benzo(b)fluoranthene | 2.1E-1 | 1.0E-1 | 4.1E-8 | NA | | 4.8E-7 | NA | |
| Beryllium | 6.4E-1 | 1.0E-2 | 1.3E-8 | 4.30E+0 | 5.4E-8 | 1.5E-7 | 5.0E-3 | 2.9E-5 |
| Bis(2-ethylhexyl)phthalate | 2.0E-1 | 1.0E-1 | 3.9E-8 | 1.40E-2 | 5.5E-10 | 4.6E-7 | 2.0E-2 | 2.3E-5 |
| Lead | 3.4E+1 | 1.0E-2 | 6.8E-7 | NA | | 7.9E-6 | NA | |
| Mercury | 8.0E-2 | 1.0E-2 | 1.6E-9 | NA | | 1.8E-8 | NA | |
| Phenanthrene | 3.9E-1 | 1.0E-1 | 7.7E-8 | NA | | 9.0E-7 | NA | |
| TOTAL | | | -- | -- | 2.9E-7 | -- | -- | 0.01 |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncancer)

NA - Toxicity criterion not available.

*Filename: GARLAN~1 XLS*
*Date: 3/26/97*



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## Table B-10
# Garland Road Landfill Site
## Dermal Contact with Sediment - RME Case - Adult

***Exposure Equation:***

$$\text{Intake} = \frac{CS \times ABS \times CF \times SA \times AF \times ED \times EF}{BW \times AT}$$

where,

| | |
|---|---|
| CS: chemical concentration in sed. | ED: exposure duration |
| ABS: absorption factor | EF: exposure frequency |
| CF: conversion factor | BW: bodyweight |
| SA: skin surface area | AT: averaging time |
| AF: adherence factor | |

***Exposure Factors:***

| | | |
|---|---|---|
| CS* | -- | (mg/kg) |
| ABS | -- | (unitless) |
| AF | 1 | (mg/cm2) |
| SA | 5000 | (cm2/event) |
| ED | 24 | (years) |
| EF | 48 | (days/year) |
| CF | 1E-6 | (kg/mg) |
| BW | 70 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 8,760 | (days) noncancer |

* - Chemical specific value

| Chemical | Sediment Concentration (mg/kg) | ABS | Carcinogenic Effects: LADI (mg/kg-day) | Oral SF (mg/kg-day)-1 | Cancer Risk | Noncarcinogenic Effects: ADI (mg/kg-day) | Oral RfD (mg/kg-day) | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 7.7E+0 | 1.0E-2 | 2.5E-7 | 1.50E+0 | 3.7E-7 | 7.2E-7 | 3.0E-4 | 2.4E-3 |
| Aroclor 1221 | 3.6E-2 | 6.0E-2 | 7.0E-9 | 2.00E+0 | 1.4E-8 | 2.0E-8 | NA | |
| Benzo(a)anthracene | 1.2E-1 | 1.0E-1 | 3.9E-8 | NA | | 1.1E-7 | NA | |
| Benzo(b)fluoranthene | 2.1E-1 | 1.0E-1 | 6.8E-8 | NA | | 2.0E-7 | NA | |
| Beryllium | 6.4E-1 | 1.0E-2 | 2.1E-8 | 4.30E+0 | 8.9E-8 | 6.0E-8 | 5.0E-3 | 1.2E-5 |
| Bis(2-ethylhexyl)phthalate | 2.0E-1 | 1.0E-1 | 6.4E-8 | 1.40E-2 | 9.0E-10 | 1.9E-7 | 2.0E-2 | 9.4E-6 |
| Lead | 3.4E+1 | 1.0E-2 | 1.1E-6 | NA | | 3.2E-6 | NA | |
| Mercury | 8.0E-2 | 1.0E-2 | 2.6E-9 | NA | | 7.5E-9 | NA | |
| Phenanthrene | 3.9E-1 | 1.0E-1 | 1.3E-7 | NA | | 3.7E-7 | NA | |
| **TOTAL** | | | -- | -- | **4.8E-7** | -- | -- | **0.002** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncarcer)

NA - Toxicity criterion not available.

*Filename: GARLAN-1.XLS*
*Date: 3/26/97*



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## Table B-11
# Garland Road Landfill Site
## Soil Ingestion - RME Case - Child Recreational User

***Exposure Equation:***

$$\text{Intake} = \frac{CS \times IR \times CF \times FI \times ED \times EF}{BW \times AT}$$

where,

| | |
|---|---|
| CS: chemical concentration in soil | CF: conversion factor |
| IR: ingestion rate | BW: bodyweight |
| ED: exposure duration | AT: averaging time |
| EF: exposure frequency | |
| FI: fraction ingested | |

***Exposure Factors:***

| | | |
|---|---|---|
| CS* | – | (mg/kg) |
| IR | 200 | (mg/day) |
| ED | 6 | (years) |
| EF | 72 | (days/year) |
| FI | 1 | (unitless) |
| CF | 1E-6 | (kg/mg) |
| BW | 15 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 2,190 | (days) noncancer |

* - Chemical specific value

| | | Carcinogenic Effects | | | Noncarcinogenic Effects | | |
|---|---|---|---|---|---|---|---|
| Chemical | Soil Concentration (mg/kg) | LADI (mg/kg-day) | Oral SF (mg/kg-day)-1 | Cancer Risk | ADI (mg/kg-day) | Oral RfD (mg/kg-day) | Hazard Quotient |
| Arsenic | 1.1E+1 | 2.5E-6 | 1.50E+0 | 3.7E-6 | 2.9E-5 | 3.0E-4 | 9.6E-2 |
| Aroclor 1248 | 6.1E+0 | 1.4E-6 | 2.00E+0 | 2.8E-6 | 1.6E-5 | NA | |
| Aroclor 1254 | 5.0E+0 | 1.1E-6 | 2.00E+0 | 2.3E-6 | 1.3E-5 | 2.0E-5 | 6.6E-1 |
| Beryllium | 6.7E-1 | 1.5E-7 | 4.30E+0 | 6.5E-7 | 1.8E-6 | 5.0E-3 | 3.5E-4 |
| Benzo(a)anthracene | 1.5E+0 | 3.3E-7 | 7.30E-1 | 2.4E-7 | 3.8E-6 | NA | |
| Benzo(b)fluroanthene | 1.0E+0 | 2.3E-7 | 7.30E-1 | 1.7E-7 | 2.7E-6 | NA | |
| Benzo(k)fluroanthene | 1.2E+0 | 2.7E-7 | 7.30E-2 | 2.0E-8 | 3.2E-6 | NA | |
| Benzo(a)pyrene | 1.2E+0 | 2.6E-7 | 7.30E+0 | 1.9E-6 | 3.1E-6 | NA | |
| Benzo(g,h,i)perylene | 5.7E-1 | 1.3E-7 | NA | | 1.5E-6 | NA | |
| Bis(2-ethylhexyl)phthalate | 1.9E+1 | 4.2E-6 | 1.40E-2 | 5.9E-8 | 4.9E-5 | 2.0E-2 | 2.5E-3 |
| Dieldrin | 6.4E-2 | 1.4E-8 | 1.60E+1 | 2.3E-7 | 1.7E-7 | 5.0E-5 | 3.4E-3 |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 | 1.3E-7 | 7.30E-1 | 9.2E-8 | 1.5E-6 | NA | |
| Lead | 1.1E+3 | 2.5E-4 | NA | | 2.9E-3 | NA | |
| Mercury | 6.6E-1 | 1.5E-7 | NA | | 1.7E-6 | NA | |
| Methylene Chloride | 4.0E-2 | 9.0E-9 | 7.50E-3 | 6.8E-11 | 1.1E-7 | 6.0E-2 | 1.8E-6 |
| Phenanthrene | 2.6E+0 | 5.9E-7 | NA | | 6.9E-6 | NA | |
| Trichloroethene | 5.1E-2 | 1.1E-8 | 1.10E-2 | 1.3E-10 | 1.3E-7 | 6.0E-3 | 2.2E-5 |
| | **TOTAL** | -- | -- | **1.2E-5** | -- | -- | **7.6E-1** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncarcer)
NA : Toxicity criterion not available.

*Filename*: GARLAN~1.XLS
*Date*: 3/26/97



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## Table B-12
# Garland Road Landfill Site
## Soil Ingestion - RME Case - Adult Recreational User

***Exposure Equation:***

$$\text{Intake} = \frac{CS \times IR \times CF \times FI \times ED \times EF}{BW \times AT}$$

where,

| | |
|---|---|
| CS: chemical concentration in soil | CF: conversion factor |
| IR: ingestion rate | BW: bodyweight |
| ED: exposure duration | AT: averaging time |
| EF: exposure frequency | |
| FI: fraction ingested | |

***Exposure Factors:***

| | | |
|---|---|---|
| CS* | -- | (mg/kg) |
| IR | 100 | (mg/day) |
| ED | 24 | (years) |
| EF | 48 | (days/year) |
| FI | 1 | (unitless) |
| CF | 1E-6 | (kg/mg) |
| BW | 70 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 8,760 | (days) noncancer |

* - Chemical specific value

| | | Carcinogenic Effects | | | Noncarcinogenic Effects | | |
|---|---|---|---|---|---|---|---|
| Chemical | Soil Concentration (mg/kg) | LADI (mg/kg-day) | Oral SF (mg/kg-day)-1 | Cancer Risk | ADI (mg/kg-day) | Oral RfD (mg/kg-day) | Hazard Quotient |
| Arsenic | 1.1E+1 | 7.1E-7 | 1.50E+0 | 1.1E-6 | 2.1E-6 | 3.0E-4 | 6.9E-3 |
| Aroclor 1248 | 6.1E+0 | 3.9E-7 | 2.00E+0 | 7.9E-7 | 1.1E-6 | NA | |
| Aroclor 1254 | 5.0E+0 | 3.2E-7 | 2.00E+0 | 6.4E-7 | 9.4E-7 | 2.0E-5 | 4.7E-2 |
| Beryllium | 6.7E-1 | 4.3E-8 | 4.30E+0 | 1.9E-7 | 1.3E-7 | 5.0E-3 | 2.5E-5 |
| Benzo(a)anthracene | 1.5E+0 | 9.4E-8 | 7.30E-1 | 6.9E-8 | 2.7E-7 | NA | |
| Benzo(b)fluroanthene | 1.0E+0 | 6.6E-8 | 7.30E-1 | 4.8E-8 | 1.9E-7 | NA | |
| Benzo(k)fluroanthene | 1.2E+0 | 7.8E-8 | 7.30E-2 | 5.7E-9 | 2.3E-7 | NA | |
| Benzo(a)pyrene | 1.2E+0 | 7.5E-8 | 7.30E+0 | 5.5E-7 | 2.2E-7 | NA | |
| Benzo(g,h,i)perylene | 5.7E-1 | 3.7E-8 | NA | | 1.1E-7 | NA | |
| Bis(2-ethylhexyl)phthalate | 1.9E+1 | 1.2E-6 | 1.40E-2 | 1.7E-8 | 3.5E-6 | 2.0E-2 | 1.8E-4 |
| Dieldrin | 6.4E-2 | 4.1E-9 | 1.60E+1 | 6.6E-8 | 1.2E-8 | 5.0E-5 | 2.4E-4 |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 | 3.6E-8 | 7.30E-1 | 2.6E-8 | 1.1E-7 | NA | |
| Lead | 1.1E+3 | 7.1E-5 | NA | | 2.1E-4 | NA | |
| Mercury | 6.6E-1 | 4.3E-8 | NA | | 1.2E-7 | NA | |
| Methylene Chloride | 4.0E-2 | 2.6E-9 | 7.50E-3 | 1.9E-11 | 7.5E-9 | 6.0E-2 | 1.3E-7 |
| Phenanthrene | 2.6E+0 | 1.7E-7 | NA | | 4.9E-7 | NA | |
| Trichloroethene | 5.1E-2 | 3.3E-9 | 1.10E-2 | 3.6E-11 | 9.6E-9 | 6.0E-3 | 1.6E-6 |
| | TOTAL | -- | -- | **3.5E-6** | -- | -- | **5.4E-2** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncancer)
NA : Toxicity criterion not available.

*Filename*: GARLAN~1.XLS
*Date:* 3/26/97



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## Table B-14
# Garland Road Landfill Site
## Dermal Contact with Soil - RME Case - Adult Recreational User

***Exposure Equation:***

$$\text{Intake} = \frac{CS \times ABS \times CF \times SA \times AF \times ED \times EF}{BW \times AT}$$

where,

| | |
|---|---|
| CS: chemical concentration in soil | ED: exposure duration |
| ABS: absorption factor | EF: exposure frequency |
| CF: conversion factor | BW: bodyweight |
| SA: skin surface area | AT: averaging time |
| AF: adherence factor | |

***Exposure Factors:***

| | | |
|---|---|---|
| CS* | – | (mg/kg) |
| ABS | – | (unitless) |
| AF | 1 | (mg/cm2) |
| SA | 5000 | (cm2/event) |
| ED | 24 | (years) |
| EF | 48 | (days/year) |
| CF | 1E-6 | (kg/mg) |
| BW | 70 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 8,760 | (days) noncancer |

* - Chemical specific value

| | | | Carcinogenic Effects | | | Noncarcinogenic Effects | | |
|---|---|---|---|---|---|---|---|---|
| Chemical | Soil Concentration (mg/kg) | ABS | LADI (mg/kg-day) | Oral SF (mg/kg-day)-1 | Cancer Risk | ADI (mg/kg-day) | Oral RfD (mg/kg-day) | Hazard Quotient |
| Arsenic | 1.1E+1 | 1.0E-2 | 3.5E-7 | 1.50E+0 | 5.3E-7 | 1.0E-6 | 3.0E-4 | 3.4E-3 |
| Aroclor 1248 | 6.1E+0 | 6.0E-2 | 1.2E-6 | 2.00E+0 | 2.4E-6 | 3.4E-6 | NA | |
| Aroclor 1254 | 5.0E+0 | 6.0E-2 | 9.7E-7 | 2.00E+0 | 1.9E-6 | 2.8E-6 | 2.0E-5 | 1.4E-1 |
| Beryllium | 6.7E-1 | 1.0E-2 | 2.2E-8 | 4.30E+0 | 9.3E-8 | 6.3E-8 | 5.0E-3 | 1.3E-5 |
| Benzo(a)anthracene | 1.5E+0 | 1.0E-1 | 4.7E-7 | NA | | 1.4E-6 | NA | |
| Benzo(b)fluroanthene | 1.0E+0 | 1.0E-1 | 3.3E-7 | NA | | 9.6E-7 | NA | |
| Benzo(k)fluroanthene | 1.2E+0 | 1.0E-1 | 3.9E-7 | NA | | 1.1E-6 | NA | |
| Benzo(a)pyrene | 1.2E+0 | 1.0E-1 | 3.7E-7 | NA | | 1.1E-6 | NA | |
| Benzo(g,h,i)perylene | 5.7E-1 | 1.0E-1 | 1.8E-7 | NA | | 5.4E-7 | NA | |
| Bis(2-ethylhexyl)phthalate | 1.9E+1 | 1.0E-1 | 6.0E-6 | 1.40E-2 | 8.4E-8 | 1.8E-5 | 2.0E-2 | 8.8E-4 |
| Dieldrin | 6.4E-2 | 1.0E-1 | 2.1E-8 | 1.60E+1 | 3.3E-7 | 6.0E-8 | 5.0E-5 | 1.2E-3 |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 | 1.0E-1 | 1.8E-7 | NA | | 5.3E-7 | NA | |
| Lead | 1.1E+3 | 1.0E-2 | 3.5E-5 | NA | | 1.0E-4 | NA | |
| Mercury | 6.6E-1 | 1.0E-2 | 2.1E-8 | NA | | 6.2E-8 | NA | |
| Methylene Chloride | 4.0E-2 | 1.0E-1 | 1.3E-8 | 7.50E-3 | 9.7E-11 | 3.8E-8 | 6.0E-2 | 6.3E-7 |
| Phenanthrene | 2.6E+0 | 1.0E-1 | 8.5E-7 | NA | | 2.5E-6 | NA | |
| Trichloroethene | 5.1E-2 | 1.0E-1 | 1.6E-8 | 1.10E-2 | 1.8E-10 | 4.8E-8 | 6.0E-3 | 8.0E-6 |
| | TOTAL | | -- | -- | **5.3E-6** | -- | -- | **1.5E-1** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncarcer)

NA - Toxicity criterion not available.

*Filename:* GARLAN~1.XLS
*Date:* 3/26/97



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## Table B-13
# Garland Road Landfill Site
## Dermal Contact with Soil - RME Case - Child Recreational User

***Exposure Equation:***

$$\text{Intake} = \frac{CS \times ABS \times CF \times SA \times AF \times ED \times EF}{BW \times AT}$$

where,

| | |
|---|---|
| CS: chemical concentration in soil | ED: exposure duration |
| ABS: absorption factor | EF: exposure frequency |
| CF: conversion factor | BW: bodyweight |
| SA: skin surface area | AT: averaging time |
| AF: adherence factor | |

***Exposure Factors:***

| | | |
|---|---|---|
| CS* | – | (mg/kg) |
| ABS | – | (unitless) |
| AF | 1 | (mg/cm2) |
| SA | 1750 | (cm2/event) |
| ED | 6 | (years) |
| EF | 72 | (days/year) |
| CF | 1E-6 | (kg/mg) |
| BW | 15 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 2,190 | (days) noncancer |

* - Chemical specific value

| | | | Carcinogenic Effects | | | Noncarcinogenic Effects | | |
|---|---|---|---|---|---|---|---|---|
| Chemical | Soil Concentration (mg/kg) | ABS | LADI (mg/kg-day) | Oral SF (mg/kg-day)-1 | Cancer Risk | ADI (mg/kg-day) | Oral RfD (mg/kg-day) | Hazard Quotient |
| Arsenic | 1.1E+1 | 1.0E-2 | 2.2E-7 | 1.50E+0 | 3.3E-7 | 2.5E-6 | 3.0E-4 | 8.4E-3 |
| Aroclor 1248 | 6.1E+0 | 6.0E-2 | 7.2E-7 | 2.00E+0 | 1.4E-6 | 8.4E-6 | NA | |
| Aroclor 1254 | 5.0E+0 | 6.0E-2 | 5.9E-7 | 2.00E+0 | 1.2E-6 | 6.9E-6 | 2.0E-5 | 3.5E-1 |
| Beryllium | 6.7E-1 | 1.0E-2 | 1.3E-8 | 4.30E+0 | 5.7E-8 | 1.5E-7 | 5.0E-3 | 3.1E-5 |
| Benzo(a)anthracene | 1.5E+0 | 1.0E-1 | 2.9E-7 | NA | | 3.4E-6 | NA | |
| Benzo(b)fluroanthene | 1.0E+0 | 1.0E-1 | 2.0E-7 | NA | | 2.3E-6 | NA | |
| Benzo(k)fluroanthene | 1.2E+0 | 1.0E-1 | 2.4E-7 | NA | | 2.8E-6 | NA | |
| Benzo(a)pyrene | 1.2E+0 | 1.0E-1 | 2.3E-7 | NA | | 2.7E-6 | NA | |
| Benzo(g,h,i)perylene | 5.7E-1 | 1.0E-1 | 1.1E-7 | NA | | 1.3E-6 | NA | |
| Bis(2-ethylhexyl)phthalate | 1.9E+1 | 1.0E-1 | 3.7E-6 | 1.40E-2 | 5.2E-8 | 4.3E-5 | 2.0E-2 | 2.2E-3 |
| Dieldrin | 6.4E-2 | 1.0E-1 | 1.3E-8 | 1.60E+1 | 2.0E-7 | 1.5E-7 | 5.0E-5 | 2.9E-3 |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 | 1.0E-1 | 1.1E-7 | NA | | 1.3E-6 | NA | |
| Lead | 1.1E+3 | 1.0E-2 | 2.2E-5 | NA | | 2.5E-4 | NA | |
| Mercury | 6.6E-1 | 1.0E-2 | 1.3E-8 | NA | | 1.5E-7 | NA | |
| Methylene Chloride | 4.0E-2 | 1.0E-1 | 7.9E-9 | 7.50E-3 | 5.9E-11 | 9.2E-8 | 6.0E-2 | 1.5E-6 |
| Phenanthrene | 2.6E+0 | 1.0E-1 | 5.2E-7 | NA | | 6.1E-6 | NA | |
| Trichloroethene | 5.1E-2 | 1.0E-1 | 1.0E-8 | 1.10E-2 | 1.1E-10 | 1.2E-7 | 6.0E-3 | 2.0E-5 |
| **TOTAL** | | | -- | -- | **3.3E-6** | -- | -- | **3.6E-1** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncancer)

NA - Toxicity criterion not available.

*Filename:* GARLAN~1 XLS
*Date:* 3/26/97



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## Table B-18
# Garland Road Landfill Site
### Inhalation of Vapors from Soil - RME Case - Adult Recreational User

***Exposure Equation:***

$$\text{Intake} = \frac{Cs \times ED \times EF \times IR_{air} \times (1/VF)}{BW \times AT}$$

where,

| | |
|---|---|
| Cs: chemical conc. in soil | ED: exposure duration |
| IR: inhalation rate | BW: bodyweight |
| ET: exposure time | AT: averaging time |
| EF: exposure frequency | VF = Volatilization Factor |

***Exposure Factors:***

| | | |
|---|---|---|
| Cs* | – | (mg/m3) |
| IR | 20 | (m3/day) |
| ET | 6 | (hours/day) |
| ED | 24 | (years) |
| EF | 12 | (days/year) |
| BW | 70 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 8,760 | (days) noncancer |
| Days at Site | 48 | days/year |

* - Chemical specific value

| Chemical | Soil Concentration (mg/m3) | VF $m^3$/kg | Carcinogenic Effects: LADI (mg/kg-day) | Carcinogenic Effects: Inhalation SF (mg/kg-day)-1 | Carcinogenic Effects: Cancer Risk | Noncarcinogenic Effects: ADI (mg/kg-day) | Noncarcinogenic Effects: Inhalation RfD (mg/kg-day) | Noncarcinogenic Effects: Hazard Quotient |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 1.1E+1 | NA | NA | 1.50E+1 | | NA | 3.0E-4 | |
| Aroclor 1248 | 6.1E+0 | 1.2E+6 | 1.6E-8 | 4.00E-1 | 6.4E-9 | 4.7E-8 | NA | |
| Aroclor 1254 | 5.0E+0 | 2.5E+6 | 6.6E-9 | 4.00E-1 | 2.6E-9 | 1.9E-8 | 2.0E-5 | 9.6E-4 |
| Beryllium | 6.7E-1 | NA | NA | 8.40E+0 | | NA | 5.0E-3 | |
| Benzo(a)anthracene | 1.5E+0 | NA | NA | NA | | NA | NA | |
| Benzo(b)fluroanthene | 1.0E+0 | NA | NA | 6.10E+0 | | NA | NA | |
| Benzo(k)fluroanthene | 1.2E+0 | NA | NA | 6.10E+0 | | NA | NA | |
| Benzo(a)pyrene | 1.2E+0 | 1.4E+9 | 2.7E-12 | 6.10E+0 | 1.7E-11 | 7.9E-12 | NA | |
| Benzo(g,h,i)perylene | 5.7E-1 | NA | NA | NA | | NA | NA | |
| Bis(2-ethylhexyl)phthalate | 1.9E+1 | 5.7E+8 | 1.1E-10 | 1.40E-2 | 1.5E-12 | 3.1E-10 | 5.7E-2 | 5.4E-9 |
| Dieldrin | 6.4E-2 | NA | NA | 1.60E+1 | | NA | 5.0E-5 | |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 | NA | NA | 6.10E+0 | | NA | NA | |
| Lead | 1.1E+3 | NA | NA | NA | | NA | NA | |
| Mercury | 6.6E-1 | NA | NA | NA | | NA | 8.6E-5 | |
| Methylene Chloride | 4.0E-2 | 4.1E+4 | 3.1E-9 | 1.60E-3 | 5.0E-12 | 9.1E-9 | 8.6E-1 | 1.1E-8 |
| Phenanthrene | 2.6E+0 | 2.5E+6 | 3.3E-9 | NA | | 9.8E-9 | NA | |
| Trichloroethene | 5.1E-2 | 3.5E+3 | 4.7E-8 | 6.00E-3 | 2.8E-10 | 1.4E-7 | 6.0E-3 | 2.3E-5 |
| **TOTAL** | | | -- | -- | **9.4E-9** | -- | -- | **9.8E-4** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncarcer)

NA - Toxicity criterion not available.

*Filename:* GARLAN~1.XLS
*Date:* 3/28/97



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## Table B-15
# Garland Road Landfill Site
## Inhalation of Vapors from Soil - RME Case - Child Recreational User

***Exposure Equation:***

$$\text{Intake} = \frac{Cs \times ED \times EF \times IR_{air} \times (1/VF)}{BW \times AT}$$

where,

| | |
|---|---|
| Cs: chemical conc. in soil | ED: exposure duration |
| IR: inhalation rate | BW: bodyweight |
| ET: exposure time | AT: averaging time |
| EF: exposure frequency | VF = Volatilization Factor |

***Exposure Factors:***

| | | |
|---|---|---|
| Cs* | -- | (mg/m3) |
| IR | 20 | (m3/day) |
| ET | 6 | (hours/day) |
| ED | 6 | (years) |
| EF | 18 | (days/year) |
| BW | 15 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 2,190 | (days) noncancer |
| Days at Site | 72 | days/year |

* - Chemical specific value

| Chemical | Soil Concentration (mg/m3) | VF $m^3$/kg | Carcinogenic Effects: LADI (mg/kg-day) | Carcinogenic Effects: Inhalation SF (mg/kg-day)-1 | Carcinogenic Effects: Cancer Risk | Noncarcinogenic Effects: ADI (mg/kg-day) | Noncarcinogenic Effects: Inhalation RfD (mg/kg-day) | Noncarcinogenic Effects: Hazard Quotient |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 1.1E+1 | NA | NA | 1.50E+1 | | NA | 3.0E-4 | |
| Aroclor 1248 | 6.1E+0 | 1.2E+6 | 2.8E-8 | 4.00E-1 | 1.1E-8 | 3.3E-7 | NA | |
| Aroclor 1254 | 5.0E+0 | 2.5E+6 | 1.1E-8 | 4.00E-1 | 4.6E-9 | 1.3E-7 | 2.0E-5 | 6.7E-3 |
| Beryllium | 6.7E-1 | NA | NA | 8.40E+0 | | NA | 5.0E-3 | |
| Benzo(a)anthracene | 1.5E+0 | NA | NA | NA | | NA | NA | |
| Benzo(b)fluroanthene | 1.0E+0 | NA | NA | 6.10E+0 | | NA | NA | |
| Benzo(k)fluroanthene | 1.2E+0 | NA | NA | 6.10E+0 | | NA | NA | |
| Benzo(a)pyrene | 1.2E+0 | 1.4E+9 | 4.8E-12 | 6.10E+0 | 2.9E-11 | 5.6E-11 | NA | |
| Benzo(g,h,i)perylene | 5.7E-1 | NA | NA | NA | | NA | NA | |
| Bis(2-ethylhexyl)phthalate | 1.9E+1 | 5.7E+8 | 1.9E-10 | 1.40E-2 | 2.6E-12 | 2.2E-9 | 5.7E-2 | 3.8E-8 |
| Dieldrin | 6.4E-2 | NA | NA | 1.60E+1 | | NA | 5.0E-5 | |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 | NA | NA | 6.10E+0 | | NA | NA | |
| Lead | 1.1E+3 | NA | NA | NA | | NA | NA | |
| Mercury | 6.6E-1 | NA | NA | NA | | NA | 8.6E-5 | |
| Methylene Chloride | 4.0E-2 | 4.1E+4 | 5.5E-9 | 1.60E-3 | 8.7E-12 | 6.4E-8 | 8.6E-1 | 7.4E-8 |
| Phenanthrene | 2.6E+0 | 2.5E+6 | 5.9E-9 | NA | | 6.8E-8 | NA | |
| Trichloroethene | 5.1E-2 | 3.5E+3 | 8.2E-8 | 6.00E-3 | 4.9E-10 | 9.5E-7 | 6.0E-3 | 1.6E-4 |
| | | | | | | 0.0E+0 | | |
| **TOTAL** | | | -- | -- | **1.6E-8** | -- | -- | **6.9E-3** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncarcer)

NA - Toxicity criterion not available.

*Filename:* GARLAN~1.XLS
*Date:* 3/26/97



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## Table B-18
# Garland Road Landfill Site
### Inhalation from Air - Dust - RME Case - Adult Recreational User

***Exposure Equation:***

$$\text{Intake} = \frac{Cs \times ED \times EF \times IR_{air} \times (1/PEF)}{BW \times AT}$$

where,

| | |
|---|---|
| Cs: chemical conc. in soil | ED: exposure duration |
| IR: inhalation rate | BW: bodyweight |
| ET: exposure time | AT: averaging time |
| EF: exposure frequency | PEF = Particulate Emission Factor |

***Exposure Factors:***

| | | |
|---|---|---|
| Cs* | – | (mg/m3) |
| IR | 20 | (m3/day) |
| ET | 6 | (hours/day) |
| ED | 24 | (years) |
| EF | 12 | (days/year) |
| BW | 70 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 8,760 | (days) noncancer |
| Days at Site | 48 | days/year |

* - Chemical specific value

| Chemical | Soil Concentration (mg/m3) | PEF (m3/kg) | Carcinogenic Effects: LADI (mg/kg-day) | Carcinogenic Effects: Inhalation SF (mg/kg-day)-1 | Carcinogenic Effects: Cancer Risk | Noncarcinogenic Effects: ADI (mg/kg-day) | Noncarcinogenic Effects: Inhalation RfD (mg/kg-day) | Noncarcinogenic Effects: Hazard Quotient |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 1.1E+1 | 1.3E+9 | 2.7E-11 | 1.50E+1 | 4.0E-10 | 7.9E-11 | 3.0E-4 | 2.6E-7 |
| Aroclor 1248 | 6.1E+0 | 1.3E+9 | 1.5E-11 | 2.00E+0 | 3.0E-11 | 4.4E-11 | NA | |
| Aroclor 1254 | 5.0E+0 | 1.3E+9 | 1.2E-11 | 2.00E+0 | 2.4E-11 | 3.6E-11 | 2.0E-5 | 1.8E-6 |
| Beryllium | 6.7E-1 | 1.3E+9 | 1.6E-12 | 8.40E+0 | 1.4E-11 | 4.8E-12 | 5.0E-3 | 9.6E-10 |
| Benzo(a)anthracene | 1.5E+0 | 1.3E+9 | 3.6E-12 | NA | | 1.0E-11 | NA | |
| Benzo(b)fluroanthene | 1.0E+0 | 1.3E+9 | 2.5E-12 | 6.10E+0 | 1.5E-11 | 7.3E-12 | NA | |
| Benzo(k)fluroanthene | 1.2E+0 | 1.3E+9 | 3.0E-12 | 6.10E+0 | 1.8E-11 | 8.6E-12 | NA | |
| Benzo(a)pyrene | 1.2E+0 | 1.3E+9 | 2.8E-12 | 6.10E+0 | 1.7E-11 | 8.3E-12 | NA | |
| Benzo(g,h,i)perylene | 5.7E-1 | 1.3E+9 | 1.4E-12 | NA | | 4.1E-12 | NA | |
| Bis(2-ethylhexyl)phthalate | 1.9E+1 | 1.3E+9 | 4.6E-11 | 1.40E-2 | 6.4E-13 | 1.3E-10 | 5.7E-2 | 2.3E-9 |
| Dieldrin | 6.4E-2 | 1.3E+9 | 1.6E-13 | 1.60E+1 | 2.5E-12 | 4.6E-13 | 5.0E-5 | 9.1E-9 |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 | 1.3E+9 | 1.4E-12 | 6.10E+0 | 8.4E-12 | 4.0E-12 | NA | |
| Lead | 1.1E+3 | 1.3E+9 | 2.7E-9 | NA | | 7.9E-9 | NA | |
| Mercury | 6.6E-1 | 1.3E+9 | 1.6E-12 | NA | | 4.7E-12 | 8.6E-5 | 5.5E-8 |
| Methylene Chloride | 4.0E-2 | 1.3E+9 | 9.8E-14 | 1.60E-3 | 1.6E-16 | 2.9E-13 | 8.6E-1 | 3.3E-13 |
| Phenanthrene | 2.6E+0 | 1.3E+9 | 6.4E-12 | NA | | 1.9E-11 | NA | |
| Trichloroethene | 5.1E-2 | 1.3E+9 | 1.2E-13 | 6.00E-3 | 7.5E-16 | 3.6E-13 | 6.0E-3 | 6.1E-11 |
| TOTAL | | | -- | -- | **5.3E-10** | -- | -- | **2.1E-6** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncarcer)

NA - Toxicity criterion not available.

*Filename:* GARLAN~1.XLS
*Date:* 3/26/97



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## Table B-17
# Garland Road Landfill Site
## Inhalation from Air - Dust - RME Case - Child Recreational User

***Exposure Equation:***

$$\text{Intake} = \frac{Cs \times ED \times EF \times IR_{air} \times (1/PEF)}{BW \times AT}$$

where,

| | |
|---|---|
| Cs: chemical conc. in soil | ED: exposure duration |
| IR: inhalation rate | BW: bodyweight |
| ET: exposure time | AT: averaging time |
| EF: exposure frequency | PEF = Particlate Emission Factor |

***Exposure Fact***

| | | |
|---|---|---|
| Cs* | -- | (mg/m3) |
| IR | 20 | (m3/day) |
| ET | 6 | (hours/day) |
| ED | 6 | (years) |
| EF | 18 | (days/year) |
| BW | 15 | (kg) |
| AT | 25,550 | (days) cancer |
| AT | 2,190 | (days) noncancer |
| Days at Site | 72 | days/year |

* - Chemical specific value

| Chemical | Soil Concentration (mg/m3) | PEF (m3/kg) | Carcinogenic Effects: LADI (mg/kg-day) | Inhalation SF (mg/kg-day)-1 | Cancer Risk | Noncarcinogenic Effects: ADI (mg/kg-day) | Inhalation RfD (mg/kg-day) | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 1.1E+1 | 1.3E+9 | 4.7E-11 | 1.50E+1 | 7.1E-10 | 5.5E-10 | 3.0E-4 | 1.8E-6 |
| Aroclor 1248 | 6.1E+0 | 1.3E+9 | 2.6E-11 | 2.00E+0 | 5.2E-11 | 3.0E-10 | NA | |
| Aroclor 1254 | 5.0E+0 | 1.3E+9 | 2.1E-11 | 2.00E+0 | 4.3E-11 | 2.5E-10 | 2.0E-5 | 1.2E-5 |
| Beryllium | 6.7E-1 | 1.3E+9 | 2.9E-12 | 8.40E+0 | 2.4E-11 | 3.3E-11 | 5.0E-3 | 6.7E-9 |
| Benzo(a)anthracene | 1.5E+0 | 1.3E+9 | 6.3E-12 | NA | | 7.3E-11 | NA | |
| Benzo(b)fluroanthene | 1.0E+0 | 1.3E+9 | 4.4E-12 | 6.10E+0 | 2.7E-11 | 5.1E-11 | NA | |
| Benzo(k)fluroanthene | 1.2E+0 | 1.3E+9 | 5.2E-12 | 6.10E+0 | 3.2E-11 | 6.0E-11 | NA | |
| Benzo(a)pyrene | 1.2E+0 | 1.3E+9 | 5.0E-12 | 6.10E+0 | 3.0E-11 | 5.8E-11 | NA | |
| Benzo(g,h,i)perylene | 5.7E-1 | 1.3E+9 | 2.4E-12 | NA | | 2.8E-11 | NA | |
| Bis(2-ethylhexyl)phthalate | 1.9E+1 | 1.3E+9 | 8.0E-11 | 1.40E-2 | 1.1E-12 | 9.3E-10 | 5.7E-2 | 1.6E-8 |
| Dieldrin | 6.4E-2 | 1.3E+9 | 2.7E-13 | 1.60E+1 | 4.4E-12 | 3.2E-12 | 5.0E-5 | 6.4E-8 |
| Indeno(1,2,3-cd)pyrene | 5.6E-1 | 1.3E+9 | 2.4E-12 | 6.10E+0 | 1.5E-11 | 2.8E-11 | NA | |
| Lead | 1 1E+3 | 1.3E+9 | 4.7E-9 | NA | | 5.5E-8 | NA | |
| Mercury | 6.6E-1 | 1.3E+9 | 2.8E-12 | NA | | 3.3E-11 | 8.6E-5 | 3.8E-7 |
| Methylene Chloride | 4.0E-2 | 1.3E+9 | 1.7E-13 | 1.60E-3 | 2.7E-16 | 2.0E-12 | 8.6E-1 | 2.3E-12 |
| Phenanthrene | 2.6E+0 | 1.3E+9 | 1.1E-11 | NA | | 1.3E-10 | NA | |
| Trichloroethene | 5.1E-2 | 1.3E+9 | 2.2E-13 | 6.00E-3 | 1.3E-15 | 2.5E-12 | 6.0E-3 | 4.2E-10 |
| | | | | | | 0.0E+0 | | |
| **TOTAL** | | | -- | -- | **9.3E-10** | -- | -- | **14.8E-6** |

LADI : Lifetime Average Daily Dose (Cancer)
ADI : Average Daily Dose (Noncarcer)

NA - Toxicity criterion not available.

*Filename:* GARLAN-1.XLS
*Date:* 3/26/97



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# ATTACHMENT C
# ODNR SPECIES INVENTORY



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OHIO Department of Natural Resources

George V. Voinovich • *Governor*
Donald C. Anderson • *Director*

November 18, 1996

Andrew J. Chartrand
Ecology & Environment, Inc.
6777 N. Engle Rd.
Middleburg Heights, OH 44130

Dear Mr. Chartrand:

After reviewing our Natural Heritage maps and files, I find the Division of Natural Areas and Preserves has no records of rare species in the Garland Road Landfill site, including a 1.5 mile radius, on the West Milton Quad. There are no existing or proposed state nature preserves at the project site. However, the landfill is located along the Stillwater River which is a designated component of the State Scenic River system. I have enclosed a brochure about the river. For additional information, please contact our Southwest Ohio Scenic River Coordinator, Bob Gable, at: (phone) 937-854-0350, (fax) 937-854-9407, or 4675 N. Diamond Mill, Trotwood, OH, 45426-4254

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Please note that we inventory only high-quality plant communities and do not maintain an inventory of all Ohio wetlands.

Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely,

Debbie Woischke

Debbie Woischke, Ecological Analyst
Division of Natural Areas & Preserves

# APPENDIX J

# FATE AND TRANSPORT (NATURAL ATTENUATION) EVALUATION

CONESTOGA-ROVERS & ASSOCIATES

651 Colby Drive, Waterloo, Ontario, Canada N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

# MEMORANDUM

| | | | |
|---|---|---|---|
| TO: | Matthew Ohl, U.S. EPA | REF. NO.: | 7043-90/pw/23 |
| FROM: | Michael Tomka, P.E. | DATE: | December 22, 2005 |
| C.C.: | Terry Branigan, Matt Mankowski, Wendy Carney, William McFarland, Jean Caufield, Ed Peterson, Linda Bentley, Jerome Maynard, Bob Rule | | |
| RE: | **Fate and Transport Evaluation of Degradation Time for TCE to meet MCLs at WMB and at the River, South of the Landfill, Garland Road Landfill Site** | | |

As requested by U.S. EPA during our meeting on November 7, 2005, this memorandum presents an evaluation of the degradation time for TCE in groundwater to meet MCLs at the Waste Management Boundary (WMB) and at the river, south of the landfill for the Garland Road Landfill Site (Site). For the purposes of this evaluation, the WMB coincides with the Site boundary. The evaluation considers reducing the initial concentration of TCE in groundwater by different percentages to assist in the process of selecting a desired groundwater treatment goal to implement in combination with monitored natural attenuation. This memorandum should be used in combination with the memorandum titled Screening Level Groundwater Modeling Results at Garland Road Landfill Site, Miami County, Ohio dated September 7, 2005 (Attachment A), which assesses fate, transport, and processes at the Site.

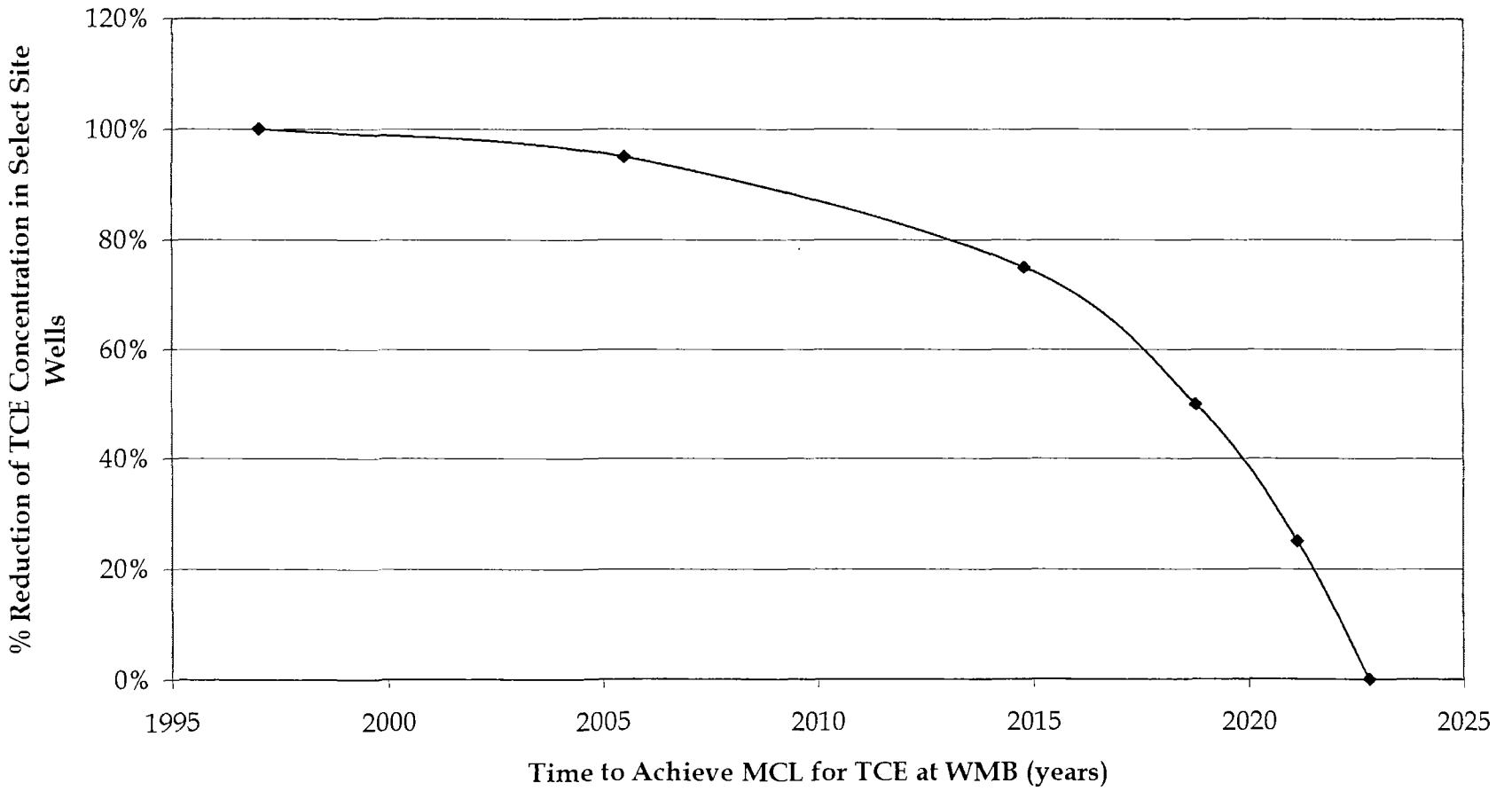
Based on available information for the Site, the 1/2-life of TCE in groundwater was conservatively calculated to be 4 years. Assuming an initial average source TCE concentration of 436 μg/L (based on 1997 data - post removal - from the highest concentrations in monitoring wells within the WMB) it would take approximately 6.5 1/2 lives (26 years) to achieve the MCL of 5 μg/L for TCE at the source, or within the WMB, through natural attenuation processes only. An additional 11.5 years is required for the river, south of the site, to reach MCLs as identified in Attachment A. These processes have been enhanced by the previously implemented source control removal actions which significantly and permanently reduced the sources of TCE and other hazardous substances to groundwater. Based on the parameters developed in the September 7, 2005 memorandum, calculations were completed assuming varying reductions in source groundwater concentration (i.e., 25, 50, 75, 95, and 100%) from active treatment in order to develop a relationship between % reduction and time for TCE to reach MCL at the WMB. Figure 1 presents the relationship between % reduction and time for TCE to reach MCL at the WMB. The percent reductions were assumed to be immediate since the time for treatment is unknown. The relationship was developed based on the 1997 data. Figure 2 presents the relationship between % reduction and time for TCE to reach MCL at the WMB from 2006. The 2002 data had concentrations of TCE as high as 160 μg/L; therefore, given a 4-year half-life, the current concentration in 2006 is 80 μg/L.

GM continues to believe that meeting MCLs at the WMB in 26 years from the removal work, or by 2023, is reasonable. Meeting the MCLs at the river to the south of the site will take an additional 11.5 years, as

identified in Attachment A. This timeframe could be achieved through the ongoing natural attenuation processes without any additional groundwater treatment. In addition, it is not cost-effective to try to reach MCLs sooner, and there is no risk due to institutional controls in effect that already prevent exposure during that time frame to human health risks or the environment due to the limited area of impacted groundwater. However, as part of the Supplement to the Draft EE/CA Report, GM proposes groundwater treatment to reduce TCE concentrations in groundwater within the WMB by 50%. Based on the available Site information, with a groundwater concentration reduction of 50%, meeting the MCL for TCE at the WMB would be expected in approximately 22 years, or by 2019.

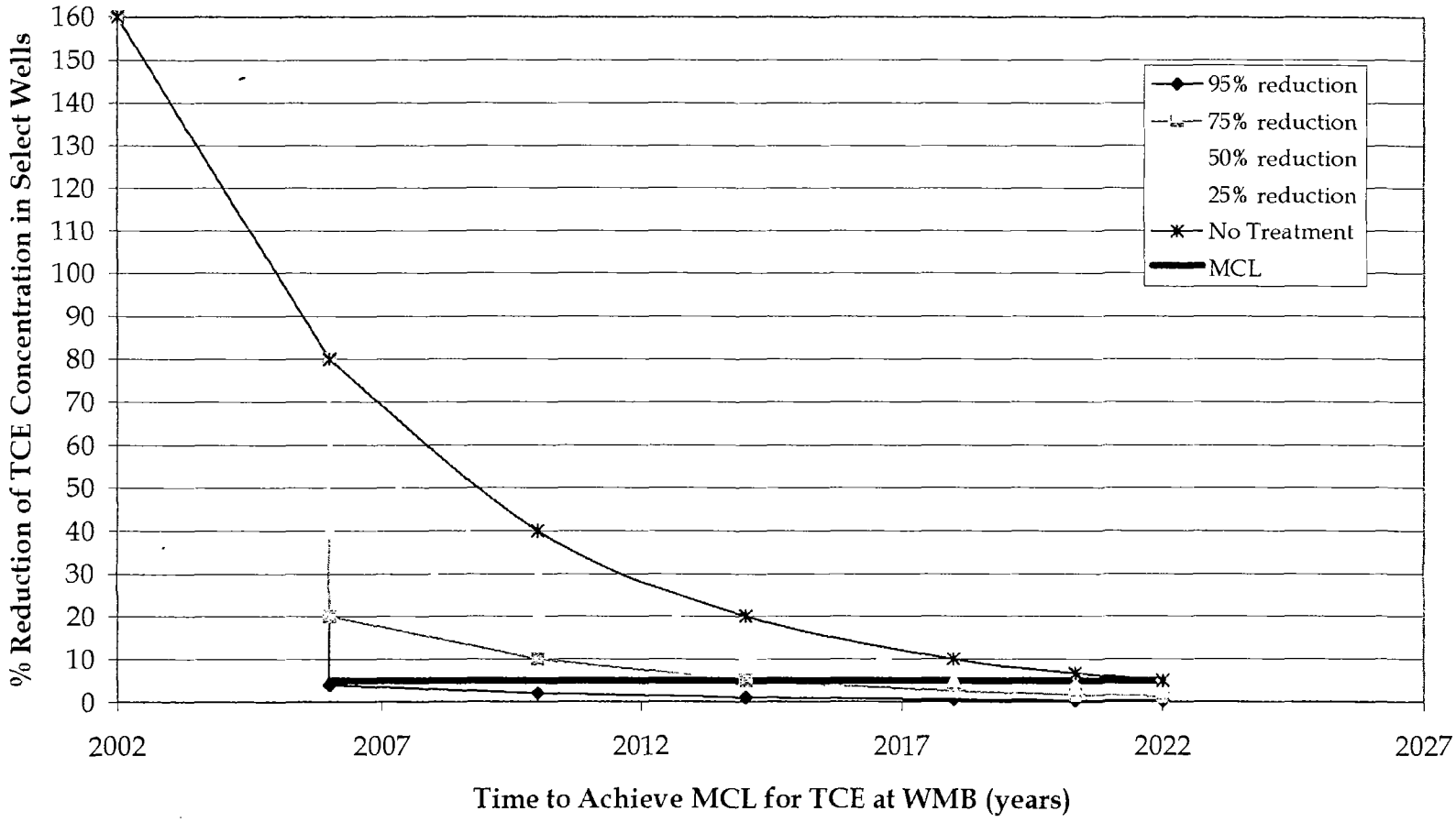
Should you have any questions please do not hesitate to call.

**Figure 1: Time to Reach MCL for TCE (5 µg/L) at WMB vs. Percent Reduction**
**Garland Road Landfill**




Note: Calculated based on site available data.

## Figure 2: Time to Reach MCL for TCE (5 µg/L) at WMB vs. Percent Reduction Garland Road Landfill (Starting in 2002)




Note: Calculated based on site available data. Assumes concentration reduction is instantaneous in 2006.

ATTACHMENT A

SCREENING LEVEL GROUNDWATER MODELING RESULTS AT GARLAND ROAD LANDFILL SITE MIAMI COUNTY, OHIO

CONESTOGA-ROVERS & ASSOCIATES

651 Colby Drive, Waterloo, Ontario, Canada N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

# DRAFT MEMORANDUM

| | | | |
|---|---|---|---|
| TO: | Jean Caufield, Ed Peterson | REF. NO.: | 7043-90/pw/20 |
| FROM: | Jody Vaillancourt, Natalie Smith, Michael Tomka | DATE: | September 7, 2005 |
| RE: | **Screening Level Groundwater Modeling Results at Garland Road Landfill Site Miami County, Ohio** | | |

## 1.0 INTRODUCTION AND PURPOSE

This memorandum presents the results of a screening level evaluation of trichloroethene (TCE) migration in groundwater from the Garland Road Landfill Site (Site) in Miami County, Ohio. The purpose of this evaluation was to estimate the time required for natural attenuation to reduce the concentrations of TCE to the MCL (5 µg/L) at:

1. The downgradient edge of the landfill; and
2. Immediately upgradient of the Stillwater River.

These locations are presented on Figure 1

A screening-level evaluation was performed because there is insufficient Site data to allow for a full numerical modeling exercise to be completed. In cases where Site information was not available but required for calculations, a conservative estimate of the parameter required was used. Every effort was made during the course of this evaluation to use conservative assumptions.

## 2.0 MODEL SELECTED

BIOSCREEN, a screening model developed by the U.S. Environmental Protection Agency, was chosen for this evaluation. BIOSCREEN is a program that simulates remediation through natural attenuation of dissolved contaminants. The software is based on the Domenico analytical solute transport model and has the ability to simulate advection, dispersion, adsorption, and decay in groundwater.

## 3.0 PROCEDURE

The evaluation was performed in several steps. The first step was to estimate the groundwater transport parameters at the Site. This is generally performed by calibrating the model to observed conditions at the Site. Because the Site-specific transport parameters are not known for the Site, attempting to calibrate the model to current conditions would require too many assumptions to provide meaningful results. Steady-state (pre-remediation) conditions would allow estimates of most of the transport parameters involved with

REGISTERED COMPANY FOR ISO 9001 ENGINEERING DESIGN

attenuation (dispersion, diffusion, dilution, degradation). At steady-state no estimate of retardation would be possible, and therefore this would have to be calculated from available information and literature values.

### 3.1 Physical parameters

The sand/gravel unit at the Site is the primary water-bearing unit. The hydraulic conductivity for this unit is approximately 0.03 cm/s, estimated from single well response tests conducted at the location of monitoring well D-3 (CRA, 1998). A porosity value of 0.3 is estimated for the sand/gravel unit (Freeze & Cherry, 1979). The hydraulic gradient was estimated based on groundwater elevations measured at D-2 and MW-6 in June 2002, and is approximately 0.0046 feet/feet. Based on these properties, the linear groundwater flow velocity is 475.9 feet/year.

### 3.2 Simulation 1: Calibration

As previously mentioned, calibration to steady-state conditions will provide an estimate of the overall attenuation rate as groundwater moves downgradient. Steady-state conditions were used for the calibration step only and not for the predictive portion of the modeling. Pre-remediation concentrations were used to determine this overall attenuation rate. Because the downgradient locations were not installed prior to remediation, an assumption was made regarding the downgradient concentrations for the calibration. The concentration in the source locations (S-2 and D-4) were significantly higher in 1996 (before excavation) than in 2002 (after excavation). It was assumed that the concentrations in the downgradient well (MW-6) would have decreased by a similar amount to those in the source wells. The average 1996 concentration in S-2 and D-4 was approximately 3.1 times higher than the average 2002 TCE concentration. Therefore, the 2002 TCE concentration at MW-6 (12 ug/L) was multiplied by 3.1 to provide an estimate of the 1996 concentration at this location (38 ug/L). This is a conservative estimate if steady-state conditions in 1996 can be assumed. In reality, the concentrations in the source wells would have decreased immediately following excavation, while the concentrations in the downgradient wells would have remained at the steady-state concentrations until groundwater from the post-excavation Site reached the downgradient location. The groundwater travel time between these two points is approximately 3 years (1,400 feet at 475.9 feet/year), meaning that the source concentrations had decreased for 3 years before the concentrations at the downgradient locations began to decrease. The calculation of 1996 downgradient TCE concentration assumed that both the source area and downgradient concentrations decreased from 1996 through 2002. This resulted in an overestimate of the 1996 downgradient concentration because the downgradient concentration could only begin to decrease from the steady-state condition approximately 3 years after the excavation of the source material. This means that the downgradient concentrations were not likely as high as 3.1 times the 2002 concentrations. A higher downgradient concentration means that the attenuation factor estimated by this process will underestimate attenuation. A higher downgradient concentration means that less attenuation will be simulated, and therefore our estimate of attenuation along the flowpath will be conservative (i.e. lower than it should be at the Site).

The approximate source concentration (600 μg/L) and the calculated downgradient concentration (38 μg/L) were entered into the model. The dispersion (28 feet) was calculated by BIOSCREEN based on the plume length (1,400 feet). The source width over which the source concentration was applied was estimated at 180 feet. This estimate will affect the results, but we believed that it was conservative based on the other data available near this portion of the Site.

The biodegradation rate was then varied over a series of simulations until the output matched the two "observed" data points. This biodegradation rate is not a true biodegradation rate but also includes some dispersion (BIOSCREEN likely underestimates this significantly) diffusion, dilution and biodegradation.

This rate $0.86yr^{-1}$ (1/2 life = 0.81 years) was used as the attenuation rate for groundwater transport for all other simulations.

### 3.3 Simulation 2 - simulating 2002 concentrations

As a second check on the assumptions made, a simulation was performed using 1997 source concentrations as a starting point and simulation 2002 concentrations at the source and downgradient locations. For this simulation, a 1/2-life of the source was calculated, and therefore steady-state conditions were not assumed.

The rate at which the concentrations decreased in these wells was calculated by using the following formula:

$$C/C_o = e^{-kt}$$

Where:

$C$ = Concentration at time t;
$C_o$ = Concentration at time 0;
$k$ = the degradation rate; and
$t$ = time.

Re-arranging this equation provides:

$$\ln(C/C_o) = -kt$$

Which is the equation of a line on a x-y graph where **t** is the x-axis and $\ln(C/C_o)$ is the y-axis, and k is the slope of the line. The 1997 - 2002 data was then plotted and the slope (k) calculated (0.0006 $day^{-1}$). This corresponds to a 1/2-life of approximately 3.3 years. To be conservative, a 1/2-life of 4 years was assumed.

BIOSCREEN simulations were then performed where the source mass was varied until the source 1/2-life (calculated by BIOSCREEN) was 4 years. The starting concentration was chosen as the average 1997 concentration in the source area (436 µg/L). This was meant to represent post-excavation conditions. The simulation was run for 5 years and the simulated source (192 µg/L) and downgradient (19 µg/L) matched their respective 2002 concentrations reasonably well.

The overall attenuation factor for the Site was therefore considered to be adequately described.

### 3.3 Simulation 3: MCLs at the source area

This simulation was in fact a calculation. With a 1/2-life of 4 years, and starting at a TCE concentration of 436 µg/L it would take approximately 6.5 1/2-lives (26 years) to achieve 5 µg/L in the source area from the start of the simulation (i.e. 1997). This assumes that the current rate of source attenuation will remain unchanged and will continue by whatever mechanism is currently driving the reduction.

### 3.5 Simulation 4: MCLs at the downgradient location

The estimate for when the downgradient TCE concentration will reach the MCL (5 µg/L) was performed in two ways. The first method was performed using the time required to reduce the source to 5 µg/L and then calculating the travel time to the downgradient location. The groundwater flow velocity in the aquifer is 476 feet/year. A retardation factor of 3.9 was calculated using the following formula:

$$R = 1 + D_b/(K_{oc} \times f_{oc})$$

Where:

$D_b$ = Bulk density of the sand (1.85 g/cm3, estimated from literature)
$K_{oc}$ = Organic carbon/water partitioning coefficient (94 L/kg, from EPA Soil Screening Guidance, Technical Background Document [EPA, 1996])
$f_{oc}$ = Fraction of organic carbon (0.005, estimated)

R = Retardation factor (3.9, calculated)

The velocity of TCE in the groundwater is the groundwater velocity (476 feet/year) divided by the retardation factor (3.9), which is 122 feet/ year.

Therefore the travel time from the source to the downgradient location for TCE is approximately 11.5 years. By this calculation the groundwater at the downgradient boundary will be at MCL 11.5 years after the source reaches 5 µg/L, which is 11.5 years after 26 years = 37.5 years from the start of the simulation (i.e. 1997).

This time estimate is likely too conservative, because the concentration at the downgradient location is already significantly lower than at the source location. Therefore another simulation was performed to estimate what source TCE concentration would result in a downgradient TCE concentration of 5 µg/L.

Using BIOSCREEN it is not possible to change the source characteristics in the middle of a simulation, nor is it possible to begin a simulation where there are concentrations of TCE downgradient of the source. Therefore, the first step was to estimate what source concentrations of TCE would result in a concentration of 5 µg/L at the downgradient location. This was completed by performing steady-state simulations with various source concentrations. It was determined that a source TCE concentration of 80 µg/L would result in a downgradient concentration of 5 µg/L. It would take approximately 2.5 1/2-lives (10 years) for the source concentrations to reach this point. It would therefore require an additional 11.5 years for the water to travel to the downgradient location for a total time of 21.5 years since 1997 (i.e. 2019).

It is likely that the actual time required is between the two estimates (21.5 and 37.5 years), but to be conservative the longer estimate (37.5 years from 1997) can be assumed.

## 4.0 LIMITATIONS

This evaluation was performed using the available data and making conservative assumptions where appropriate. However, there are limitations that should be acknowledged.

The evaluation was performed using data from three locations. Two were source area monitoring wells D-2 and S-4 and one was downgradient (monitoring well MW-6). In effect the simulations were all performed using two points. This results in a relatively high degree of uncertainty, because the evaluation relies on the fact that the downgradient location is on the centerline of the plume. If MW-6 is not along the centerline of the plume, then remediation times will be longer than estimated. Additional locations downgradient of the source are required to confirm the predictions of this evaluation.

The downgradient location had only two data points and these data points are more than 3 years old. Therefore, every additional data point could have a significant effect on the results of the evaluation.

The source locations have more data points than the downgradient location, however, there are only four data points post-remediation at each location. To determine if predictions made during the evaluation are appropriate additional source and downgradient data must be collected to confirm the source decay rate and refine the Site attenuation factor between the source and the downgradient well.

There are insufficient Site data to determine Site-specific transport parameters such as dispersion, dilution and retardation. To accurately determine these parameters, additional hydraulic conductivity estimates would be required at a minimum, and potentially a groundwater tracer test. Assumptions were also made regarding density and porosity that can affect the time estimates.

Several other assumptions were made regarding the processes at the Site that should be confirmed by additional sampling, or cannot be confirmed but are generally considered reasonable:

- The decrease in the source area concentrations can be defined by a first-order rate equation;
- The decrease in the source area concentrations will continue at the same rate as 1997-2002 rate by whatever mechanism that was causing the 1997-2002 decrease in concentration;
- The downgradient concentration was 3.1 times higher in 1996 than in 2002;
- No other source will contribute significant TCE mass to the groundwater beyond that described by the model;
- 1996 conditions represented steady-state, pre-excavation conditions;
- The Site attenuation factor can be adequately described by a first-order decay rate;
- The attenuation factor from 1996 will be applicable to conditions in 2002 and beyond;
- The groundwater flow rate and direction are described adequately by the June 2002 piezometric surface;
- MW-6 is along the centerline of the plume; and
- The potential creation of vinyl chloride downgradient of the source will be minor.

If these assumptions are not valid, then the remediation time estimates may not be valid.

K

# APPENDIX K

# PERMEABILITY TEST RESULTS FOR LOCAL CLAY

INSPEC•SOL

# Measurement of Hydraulic Conductivity of Saturated Porous Material Using a Flexible Wall Permeameter

**Constant Head Method**

**( ASTM D-5084)**

**SAMPLE IDENTIFICATION**

| | |
|---|---|
| Sample No. | S-010606-GL- 002 |
| Type of specimen | Compacted sample |
| Depth of undisturbed sample, ft/m. | - |

| | |
|---|---|
| Date | 13-Jan-06 |
| Project No. | 007043-90 |
| Site | Garland Road Landfill, Miami County |

| | |
|---|---|
| Specimen description | Green, SILT and CLAY, trace sand |

| Specimen conditions: | | Initial |
|---|---|---|
| Diameter | cm | *5.049* |
| Length | cm | *5.46* |
| Volume | $cm^3$ | 109.32 |
| Wet Mass | gr. | *220.7* |
| Dry Density | $kg/m^3$ | *1726* |
| Water content | % | *17.0* |

| Permeation condition | | |
|---|---|---|
| Cell pressure | kPa | *97.91* |
| Head pressure | kPa | *48.95* |
| Back pressure | kPa | *29.65* |
| Volume under steady state flow | $cm^3$ | *0.4-2.3* |
| Hydraulic gradient, I | - | *19.3* |

| | |
|---|---|
| **HYDRAULIC CONDUCTIVITY, cm/s** | ***7.81E-09*** |

INSPEC•SOL

# Measurement of Hydraulic Conductivity of Saturated Porous Material Using a Flexible Wall Permeameter

**Constant Head Method**

**( ASTM D-5084)**

**SAMPLE IDENTIFICATION**

| | |
|---|---|
| Sample No. | S-010606-GL- 001 |
| Type of specimen | Compacted sample |
| Depth of undisturbed sample, ft/m. | - |

| | |
|---|---|
| Date | 13-Jan-06 |
| Project No. | 007043-90 |
| Site | Garland Road Landfill, Miami County |

| | |
|---|---|
| Specimen description | Green - brown, CLAY and SILT, trace sand |

| Specimen conditions: | | Initial |
|---|---|---|
| Diameter | cm | *5.049* |
| Length | cm | *5.46* |
| Volume | $cm^3$ | 109.32 |
| Wet Mass | gr. | *191.8* |
| Dry Density | $kg/m^3$ | *1513* |
| Water content | % | *16.0* |

| Permeation condition | | |
|---|---|---|
| Cell pressure | kPa | *97.91* |
| Head pressure | kPa | *48.95* |
| Back pressure | kPa | *29.65* |
| Volume under steady state flow | $cm^3$ | *0.4-2.3* |
| Hydraulic gradient, I | - | *19.3* |

| | |
|---|---|
| HYDRAULIC CONDUCTIVITY, cm/s | *3.97E-08* |

L

# APPENDIX L

# HELP MODEL ANALYSIS FOR VARIOUS CAPS

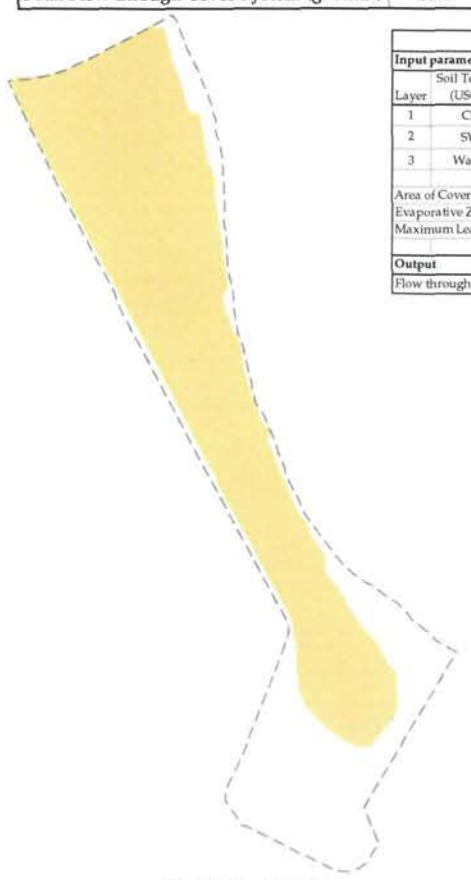
**Total Flow through Cover System (gal/min) 7.15**

| Existing Conditions | | | |
|---|---|---|---|
| **Input parameters** | | | |
| Layer | Soil Texture (USCS) | Depth (in) | Hydraulic Conductivity (cm/s) |
| 1 | SW | 12 | $5.8x10^{-3}$ |
| 2 | Waste | 120 | $1.0x10^{-3}$ |
| Area of Landfill (acres) | | | 15.5 |
| Evaporative Zone Depth (in) | | | 36 |
| Maximum Leaf Area Index | | | 4 |
| **Output** | | | |
| Flow through soil (gal/min) | | | 7.15 |

EXISTING CONDITIONS

**Total Flow through Cover System (gal/min) 1.66**

| Clay Cover ($10^{-7}$ cm/s) | | | |
|---|---|---|---|
| **Input parameters** | | | |
| Layer | Soil Texture (USCS) | Depth (in) | Hydraulic Conductivity (cm/s) |
| 1 | CL | 24 | $1.0x10^{-7}$ |
| 2 | SW | 12 | $5.8x10^{-3}$ |
| 3 | Waste | 120 | $1.0x10^{-3}$ |
| Area of Cover (acres) | | | 15.5 |
| Evaporative Zone Depth (in) | | | 36 |
| Maximum Leaf Area Index | | | 2 |
| **Output** | | | |
| Flow through soil (gal/min) | | | 1.66 |

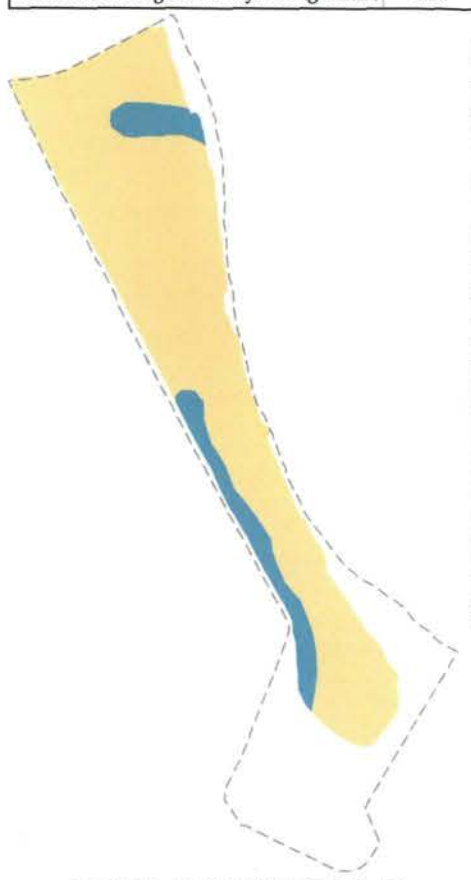


CLAY ($10^{-7}$ cm/s) CAP

**Total Flow through Cover System (gal/min) 1.44**

| Clay Cover ($10^{-7}$ cm/s) | | | |
|---|---|---|---|
| **Input parameters** | | | |
| Layer | Soil Texture (USCS) | Depth (in) | Hydraulic Conductivity (cm/s) |
| 1 | CL | 24 | $1.0x10^{-7}$ |
| 2 | SW | 12 | $5.8x10^{-3}$ |
| 3 | Waste | 120 | $1.0x10^{-3}$ |
| Area of Cover (acres) | | | 13.5 |
| Evaporative Zone Depth (in) | | | 18 |
| Maximum Leaf Area Index | | | 2 |
| **Output** | | | |
| Flow through soil (gal/min) | | | 1.44 |

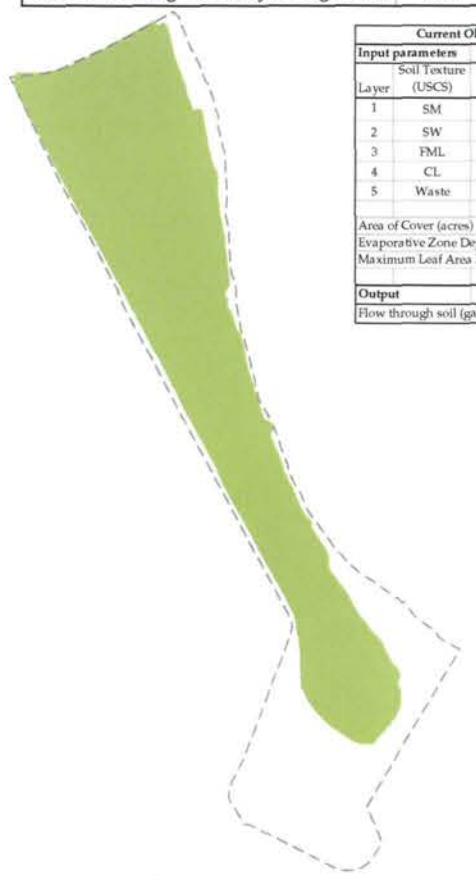
| FML Lined Swales | | | |
|---|---|---|---|
| **Input parameters** | | | |
| Layer | Soil Texture (USCS) | Depth (in) | Hydraulic Conductivity (cm/s) |
| 1 | SM | 6 | $7.2x10^{-4}$ |
| 2 | SW | 12 | $1.0x10^{-2}$ |
| 3 | FML | 2 | $2.0x10^{-13}$ |
| 4 | CL | 24 | $1.0x10^{-7}$ |
| 5 | SW | 12 | $5.8x10^{-3}$ |
| 6 | Waste | 120 | $1.0x10^{-3}$ |
| Area of Swales (acres) | | | 2 |
| Evaporative Zone Depth (in) | | | 18 |
| Maximum Leaf Area Index | | | 2 |
| **Output** | | | |
| Flow through soil (gal/min) | | | 0.00 |



CLAY ($10^{-7}$ cm/s) CAP WITH LINED SWALES

**Total Flow through Cover System (gal/min) 0.01**

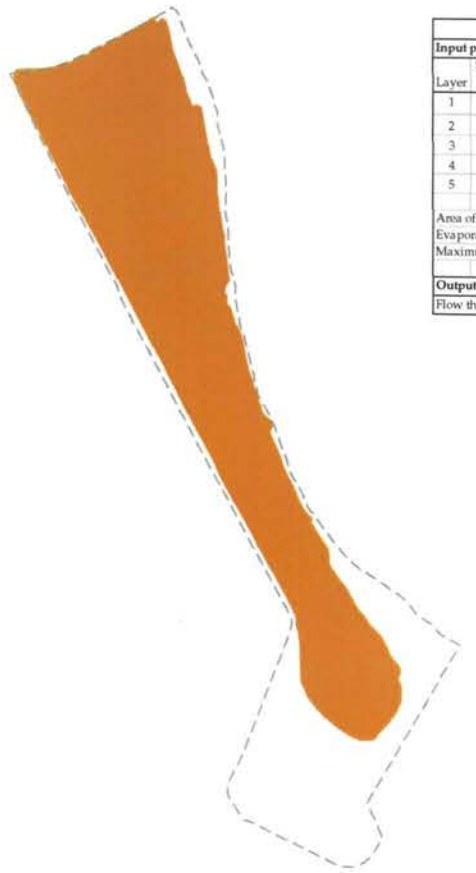
| Current Ohio Solid Waste Cap | | | |
|---|---|---|---|
| **Input parameters** | | | |
| Layer | Soil Texture (USCS) | Depth (in) | Hydraulic Conductivity (cm/s) |
| 1 | SM | 18 | $7.2x10^{-4}$ |
| 2 | SW | 12 | $1.0x10^{-3}$ |
| 3 | FML | 2 | $2.0x10^{-13}$ |
| 4 | CL | 24 | $1.9x10^{-6}$ |
| 5 | Waste | 120 | $1.0x10^{-3}$ |
| Area of Cover (acres) | | | 15.5 |
| Evaporative Zone Depth (in) | | | 24 |
| Maximum Leaf Area Index | | | 1 |
| **Output** | | | |
| Flow through soil (gal/min) | | | 0.01 |



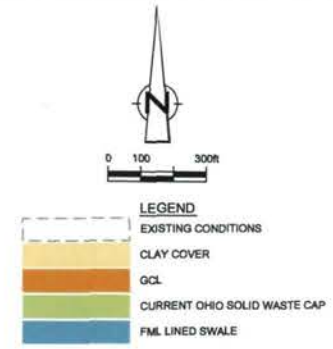
CURRENT OHIO SOLID WASTE CAP

**Total Flow through Cover System (gal/min) 1.60**

| GCL Cover ($10^{-9}$ cm/s) | | | |
|---|---|---|---|
| **Input parameters** | | | |
| Layer | Soil Texture (USCS) | Depth (in) | Hydraulic Conductivity (cm/s) |
| 1 | SM | 6 | $7.2x10^{-4}$ |
| 2 | SW | 12 | $1.0x10^{-2}$ |
| 3 | GCL | 0.5 | $1.0x10^{-9}$ |
| 4 | SW | 12 | $5.8x10^{-3}$ |
| 5 | Waste | 120 | $1.0x10^{-3}$ |
| Area of Cover (acres) | | | 15.5 |
| Evaporative Zone Depth (in) | | | 18 |
| Maximum Leaf Area Index | | | 1 |
| **Output** | | | |
| Flow through soil (gal/min) | | | 1.60 |



GCL ($10^{-9}$ cm/s) CAP




NOTES:

1. Evaporative Zone Depth - the evaporative zone depth is the maximum depth from which water maybe removed by evapotranspiration. Setting the evaporative depth equal to the expected average root depth would tend to yield a low estimate of evapotranspiration and a high estimate of drainage through the evaporative zone.
2. Maximum Leaf Area Index - defined as the dimensionless ratio of the leaf area of actively transpiring vegetation to the nominal surface area of the land on which the vegetation is growing.
   - 0.0 - bare ground
   - 1.0 - poor stand of grass
   - 2.0 - fair stand of grass
   - 3.5 - good stand of grass
   - 5.0 - excellent stand of grass / dense stands of trees and shrubbery
3. Temperature and Solar Radiation - synthetic data from Columbus Ohio (program has database of values for select cities).
4. Precipitation - data taken from NOAA (http://lwf.ncdc.noaa.gov/oa/climate/climatedata.html#SURFACE) for Dayton Ohio (39.58 in/yr on average).

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GARLAND ROAD LANDFILL SITE
MIAMI COUNTY, OHIO

HELP MODEL
SUMMARY

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

| Project Manager: | Reviewed By: | Date: | |
|---|---|---|---|
| MT | JEP | JUNE 2006 | |
| Scale: 1"=300' | Project N°: 07043-90 | Report N°: 014 | Drawing N°: L.1 |

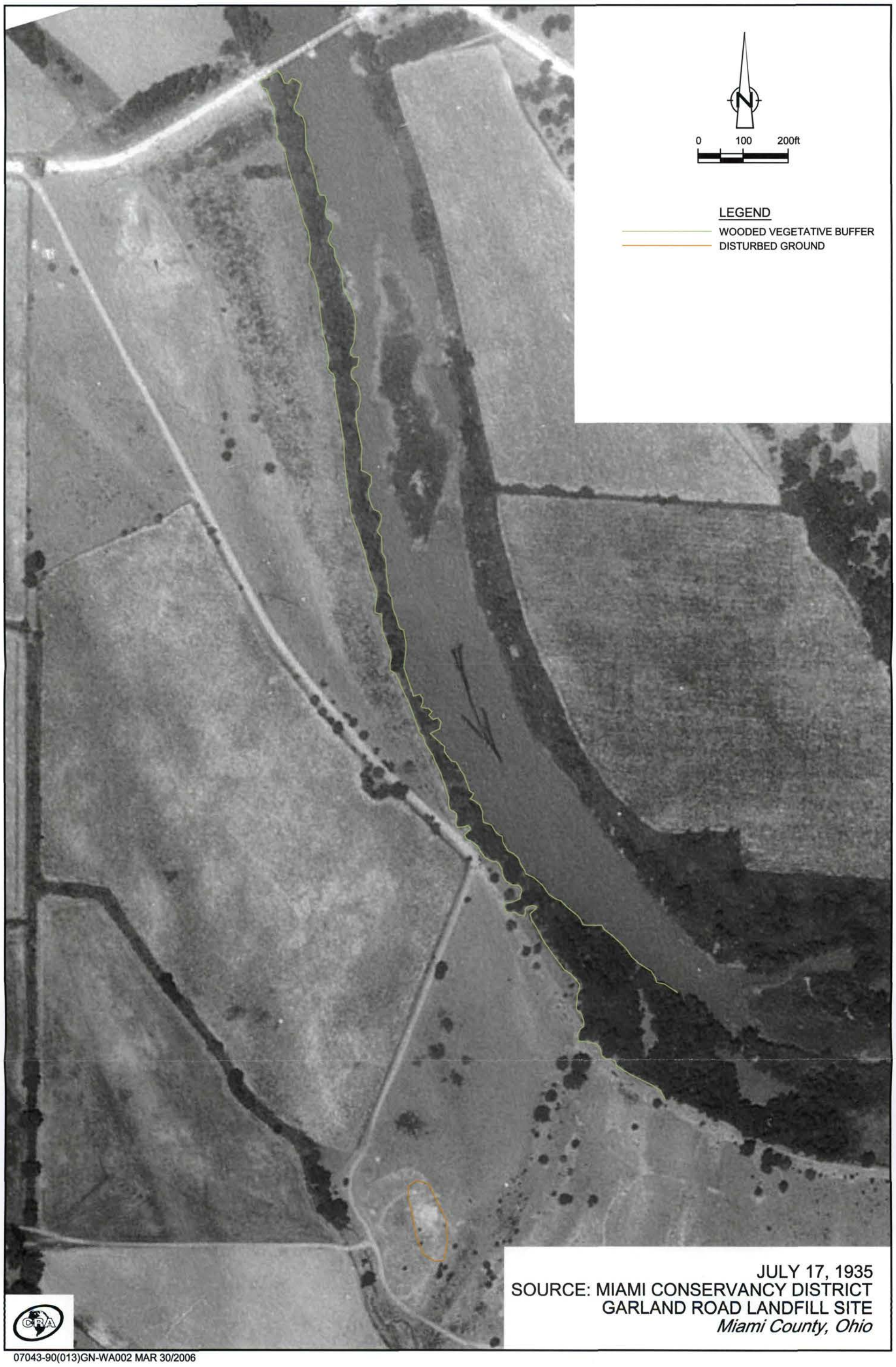
07043-90(014)GN-WA045 JUN 26/2006

M

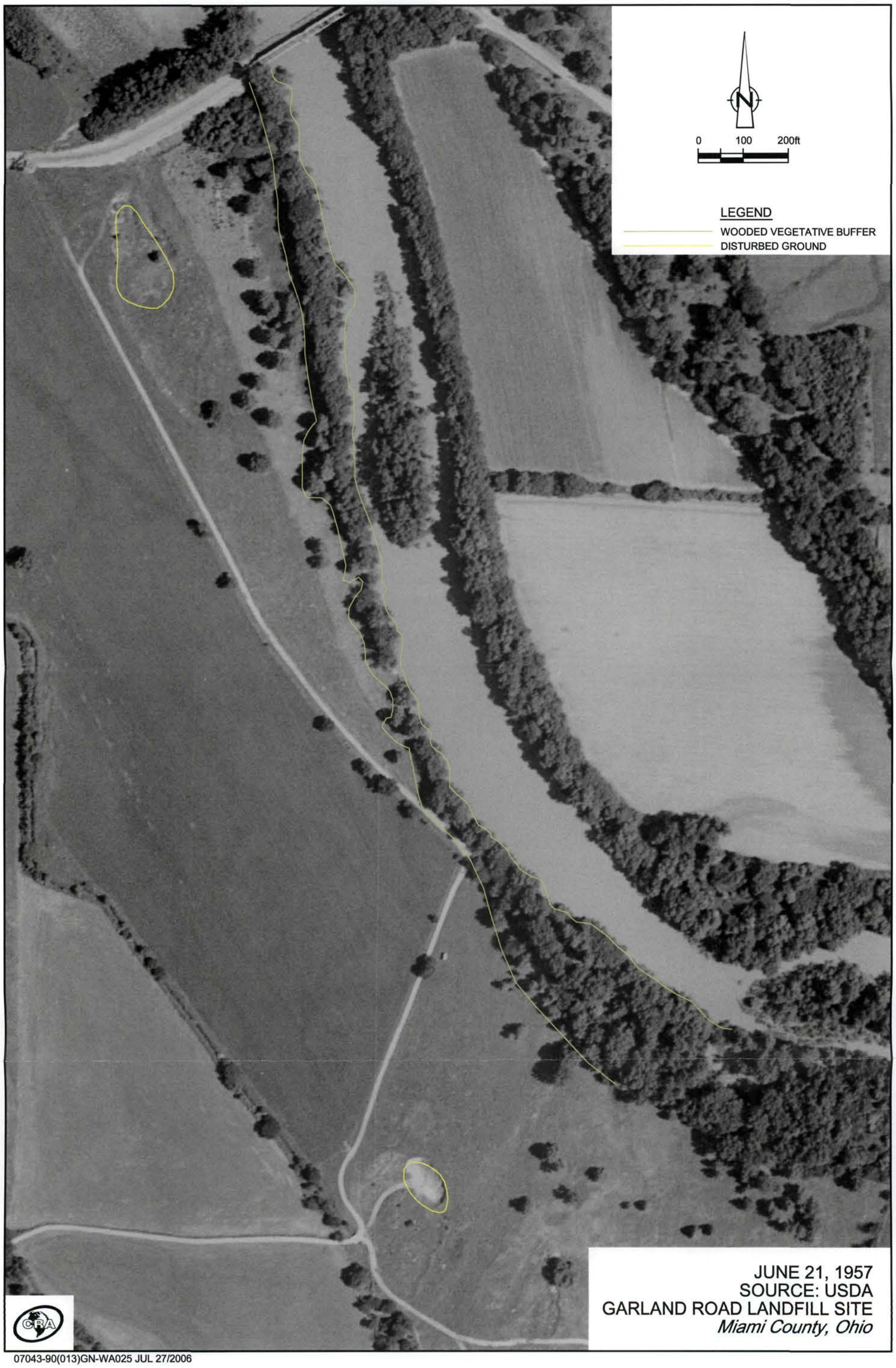
APPENDIX M

COMPREHENSIVE PHOTOGRAPHIC LIBRARY FOR THE SITE

- July 17, 1935
- June 21, 1957
- January 23, 1959
- May 2, 1963
- October 1964
- March 29, 1966
- March 1968
- September 12, 1968
- April 10, 1970
- April 13, 1973
- June 1975
- February 20, 1976
- April 27, 1978

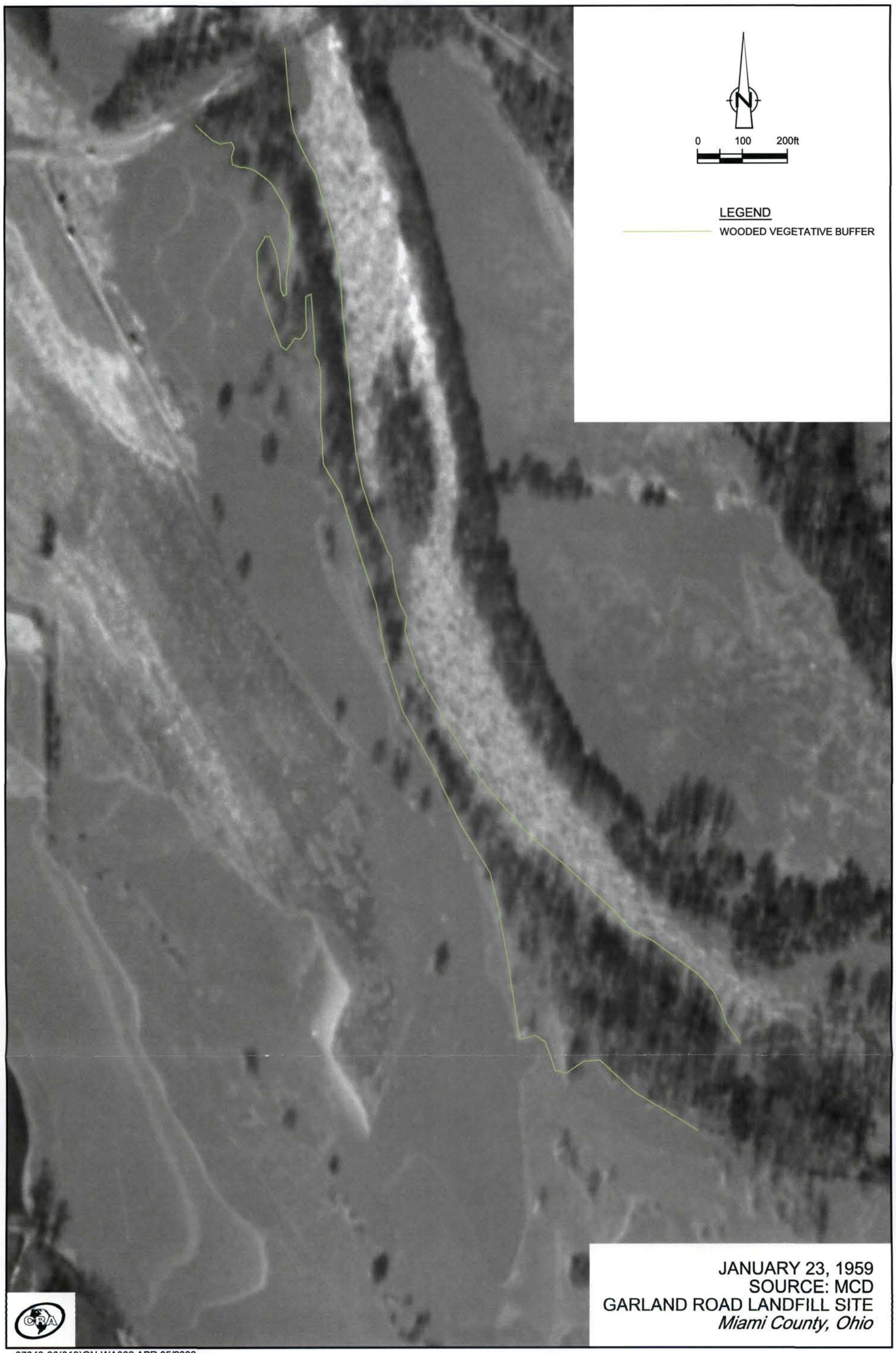



07043-90(013)GN-WA002 MAR 30/2006




JUNE 21, 1957
SOURCE: USDA
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(013)GN-WA025 JUL 27/2006




07043-90(013)GN-WA002 APR 05/2006

MAY 2, 1963
SOURCE: USDA
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(013)GN-WA025 JUL 27/2006

OCTOBER 1964
SOURCE: ODOT
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(013)GN-WA002 MAR 30/2006

MARCH 29, 1966
SOURCE: MCD
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(013)GN-WA002 APR 06/2006

MARCH 1968
SOURCE: ODOT
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(013)GN-WA002 MAR 30/2006

SEPTEMBER 12, 1968
SOURCE: USDA
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(013)GN-WA025 JUL 27/2006

07043-90(013)GN-WA002 MAR 31/2006

07043-90(013)GN-WA002 APR 05/2006

JUNE 1975
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(013)GN-WA002 MAR 30/2006

FEBRUARY 20, 1976
SOURCE: MCD
GARLAND ROAD LANDFILL SITE
*Miami County, Ohio*

07043-90(013)GN-WA002 APR 20/2006

07043-90(013)GN-WA002 APR 20/2006