Superfund Records Center
SITE: Centredale
BREAK: 2-2
OTHER: 462877

Loureiro Engineering Associates, Inc.

SDMS DocID 462877

May 8, 2009

United States Environmental Protection Agency
Region 1 - New England Regional Office
One Congress Street, Suite 1100 (HBR)
Boston, Massachusetts 02114-2023

Attn: Ted Bazenas, On-Scene Coordinator

RE: Centredale Manor Restoration Project Superfund Site, North Providence, RI
Proposed Remedial Alternative for Shallow Groundwater

Dear Mr. Bazenas:

Thank you for taking time to discuss and consider our proposal to implement a shallow groundwater remedy in the vicinity of monitoring well MW-05S at the Centredale Manor Restoration Project Superfund Site (Site). On March 12, 2009, Loureiro Engineering Associates, Inc. (LEA), on behalf of Emhart Industries, Inc. (Emhart), discussed with Ms. Anna Krasko, of the United States Environmental Protection Agency (USEPA), and USEPA's technical support team a proposal to install an impermeable cap over this area of the Site. As proposed, the remedy would be performed under a Time-Critical Removal Action (TCRA). We subsequently discussed with you and Ms. Krasko USEPA's requirement that soil excavation be incorporated as a component of any shallow groundwater remedy implemented under a TCRA, and during our telephone conversation with you and Ms. Krasko on April 22, 2009, we discussed the logistics of incorporating an excavation component into the proposed capping remedy.

This proposal provides a written description of the proposed limited excavation and capping remedy (proposed remedy) that was discussed with you. Details of the proposed remedy are presented in this correspondence following an explanation of the rationale and basis upon which the proposed remedy is predicated. A discussion of the appropriateness and adequacy of the proposed remedy in satisfying performance criteria is also presented in this correspondence. Emhart is prepared to implement the proposed remedy described in this correspondence, upon receipt from USEPA of adequate assurance that the TCRA shall serve as the final remedy for this area of the Site, designated by USEPA as the groundwater action area.

Rationale and Basis for Proposed Remedy

USEPA has requested that the proposed remedy be implemented as a TCRA. We understand that this request is based, *inter alia*, upon USEPA's apparent belief that shallow groundwater in the area of monitoring well MW-05S includes a facilitated dioxin transport pathway from contaminated soil below the water table to the Woonasquatucket River (River). USEPA's contaminant transport theory is generally presented in the *Interim Final Remedial Investigation Report* (Report) prepared by Battelle (2005). In the Report, USEPA reveals its "fate and

transport" theory for the mobilization of dioxin to the River, through: (i) cosolvency, defined as an increased potential for migration of dioxin due to reduced sorption to soil or enhanced solubility; and/or (ii) colloid-facilitated transport, defined as the increased mobility that results from the sorption of normally immobile compounds to mobile colloids.

The proposed remedy is intended to address USEPA's concern regarding mobilization of dioxin to the River, although Emhart does not concur with USEPA's fate and transport theory and Emhart's technical consultants believe that the capping component of this proposed TCRA alone would be sufficient to meet USEPA's remedial objectives for this area. As articulated to USEPA in correspondence that we submitted together with AMEC Earth and Environmental, Inc. (AMEC), on Emhart's behalf: (i) attempts to measure dioxin flux to the River have not demonstrated the occurrence of the facilitated dioxin transport phenomenon; (ii) dioxin concentrations reported for unfiltered and filtered groundwater samples are anomalies and do not indicate dioxin mobilization through groundwater, but result from sheer stress induced on soil particles within the overburden through the groundwater sampling process, thereby mobilizing soil particles proximate to the well screen which, under natural flow conditions, would otherwise remain stationary; and (iii) concentrations of chlorinated volatile organic compounds (VOCs) detected in groundwater are insufficient to enhance dioxin solubility.

Although Emhart's disagreement with USEPA's conceptual site model is substantiated technically, and has been expressed to the Agency, USEPA maintains that facilitated dioxin transport remains plausible and believes that a combination of excavation and capping is required. Accordingly, this proposal is provided to address USEPA's concerns. While it is prepared to implement the proposed remedy, Emhart does not waive, and it specifically reserves all of its rights, claims, defenses, and remedies with respect to challenging the selection by USEPA of the proposed remedy and any other aspect of the remedy selected by USEPA for the Site.

The implementation of the proposed remedy would fulfill USEPA's *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites* (USEPA, 2002) and the recommendations of the Contaminated Sediments Technical Advisory Group (CSTAG) that *all potential sources of contamination should be controlled early and in a logical and iterative manner* (USEPA, 2004). Implemented under a TCRA, the proposed remedy would control potential sources of contamination before the selection and implementation of the overall Site remedy and would be a logical step in the overall remedy for the Site. Moreover, the proposed remedy would reduce risk in the short-term and would provide a permanent remedy consistent with the long-term remedies under evaluation for the other areas of the Site. Also, the remedy would permanently remove contaminant mass, consistent with USEPA's preferred remedy for impacted soil, and would be implemented in a short time frame.

Description of the Proposed Remedy

Area of the Proposed Cap

As shown in Drawing 1, the area proposed to be capped encompasses a portion of the Brook Village parking lot and an adjacent area to the west that extends to the eastern bank of the River. The area of the cap is based on the area of shallow groundwater flow which, based on the current hydrogeologic conditions shown in Drawing 1, has the potential to discharge to the River. The groundwater gradient depicted in Drawing 1 is based on depth-to-water and top-of-casing survey measurements obtained by LEA on March 19, 2009 from the piezometers and monitoring wells installed in this area and the adjacent areas at the Site. LEA determined that, based on these elevations, groundwater within the shallow aquifer may discharge to the River west of monitoring well MW-05S due to a hydraulic "mound" surrounding monitoring well MW-05S.

As shown in this Drawing 1, Site-wide groundwater flows within the shallow subsurface materials generally toward the south. However, in the vicinity of monitoring well MW-05S water-table elevations were high relative to immediately adjacent areas of the Site. This observation is consistent with groundwater elevations previously obtained for this area of the Site. The presence of the hydraulic mound in the vicinity of monitoring well MW-05S results in a hydraulic gradient for groundwater flow toward the River. It is proposed that the cap encompass this area, as shown in Drawing 1.

Proposed Limited Excavation and Removal

Within the limits of the area to be capped, the asphalt and concrete would be removed and transported off-Site to a recycling facility. The underlying soil and sediment within this area would be excavated to varying depths as illustrated in Drawings 1, 2, and 3. In general, soils that are excavated to a depth of approximately four feet below grade would be temporarily stockpiled on Site. Stockpiled soils would be used to backfill deeper excavations that result from the removal of contaminated soils targeted for removal and transport off-Site for thermal treatment at an approved facility.

The limits of excavation are as defined in Drawings 1, 2, and 3. The proposed remedy incorporates the excavation of soil and sediment using a *lines and grades* approach: Soil and sediment would be excavated only to the lines and grades shown in Drawings 1, 2, and 3. Although field monitoring equipment (an organic vapor analyzer (OVA) equipped with a photo-ionization detector (PID)) would be used during the removal, it would be used for health and safety monitoring purposes only. Field PID measurements would not be used as a surrogate to identify the degree of dioxin contamination or the limits of excavation. Field and laboratory data collected to date suggest that the presence of organic vapors, as detected with a PID, as well as visual and olfactory observations, are not indicative of the presence of dioxins or the concentration of dioxins that may be present. As a result, field measurements and observations would not be used to identify the limits of excavation. Soil and sediment would be excavated

only to the lines and grades shown in Drawings 1, 2, and 3. The one and only exception to the lines and grades approach is if an intact container(s) is encountered along a boundary of the excavation. If this occurs, then the container(s) would be removed.

To facilitate the excavation of sediments below the River bed as shown in Drawings 1, 2, and 3, steel sheeting would be driven to a depth of approximately 16 feet below the River to an elevation of approximately 77 feet above mean sea level. The sheeting would serve as a coffer dam and would divert surface water away from the embankment and the toe of the cap. Upon completing the cap, the steel sheeting would be cut to an elevation approximately one foot below the elevation of the River bed. During the construction activities, any surface water or groundwater that is pumped to maintain a dry work area would be treated using filter bags and activated carbon, as appropriate, and would be discharged into the River.

Construction of the Proposed Cap and Its Components

Once the excavation is complete, the area would be backfilled with the stockpiled soil discussed above. The impermeable cap would be constructed on top of the backfilled soil. Because the volume of soil to be temporarily stockpiled on Site and used as backfill is anticipated to be in excess of the available volume generated from the removal of the more contaminated soils at depth, the elevation of the final grade would be slightly above the existing grade along the area of the east embankment of the River. The proposed elevations of the final grade are illustrated in Drawings 1, 2, and 3.

From its base, the components of the cap would consist of:

- a 60-mil thick, textured, high-density polyethylene (HDPE) liner;
- a geosynthetic drainage net;
- two feet of clean backfill materials consisting of the following materials: stone/riprap, for the area of excavation beneath the River bed; stone/riprap, along the embankment; gravel/vegetative topsoil, between the embankment and the parking lot; and gravel/process stone/asphalt, in the parking lot area; and
- run-on and run-off controls.

The components of the cap are illustrated in the cross sections provided in Drawing 2.

Performance Criteria

The limited excavation and removal of soil and sediment, as required by USEPA, would satisfy USEPA's preference for the removal of contaminant mass. The off-Site thermal treatment of the excavated soil and sediment would permanently eliminate human exposure to contaminants present in these materials. Moreover, the off-Site thermal treatment of the excavated soil and sediment would satisfy the statutory preference for treatment as a principle element of the remedy.

Although not a significant exposure pathway for this area, the cap would eliminate the potential for chemical exposure due to direct contact with soils beneath the HDPE liner. In addition, the HDPE liner would eliminate the percolation of water through the underlying soils. Consequently, to the extent that it may be occurring, the downward migration of contaminants through the vadose zone would be eliminated. Also, it is expected that the hydraulic mound in the vicinity of monitoring well MW-05S would dissipate over time, thereby eliminating the hydraulic gradient for groundwater flow toward the west. This outcome is expected because there does not appear to be a continuous source of water that emanates from other areas of the Site that would sustain the mounding condition. Further, based on our review of available data and information, there does not appear to be any subsurface utilities that would convey water to this area of the Site. The hydraulic mound is believed to result from the infiltration of precipitation and low hydraulic conductivity in this area relative to surrounding areas due to the heterogeneous nature of the fill material placed in the area. The relatively low hydraulic conductivity is manifested in the extremely poor yield from monitoring wells located in this area of the Site compared to monitoring wells located at adjacent areas of the Site.

In the event that the hydraulic mound does not dissipate, then the component of groundwater flowing toward the west would discharge between the impermeable liner and the steel sheeting, as shown in cross-section A-A' provided in Drawing 2. If dioxin transport is occurring, as postulated by USEPA, it would be detected with pore water monitoring within this groundwater discharge zone. In that event, if required by USEPA, monitoring would be performed to evaluate remedial effectiveness.

Run-on/run-off controls would be constructed to manage storm water drainage and to prevent erosion of the vegetative cover of the cap. As the cap materials are placed, the drainage controls would be constructed to match the existing controls and would include leak-offs extending from the western limit of the Brook Village parking lot. The cap would be designed to facilitate the drainage of infiltrating precipitation toward the River through the drainage net and to minimize any potential for the movement of the cap sub-base materials.

Estimated Cost

The cost for the proposed excavation and capping remedy is preliminarily estimated to be approximately $1,600,000. This estimated cost is significantly less than the likely costs for the other remedies under evaluation for the groundwater action area (Battelle, 2007). For instance, USEPA estimated the dewatering and excavation alternative presented by Battelle at $2.2 million. However, this estimate is based on the excavation of soil to approximately four feet below the ground surface, on average. Based on the data that was obtained through the installation and sampling of monitoring wells MW-LEA-01, MW-LEA-02, and MW-LEA-03, the lateral and vertical limits of impacted soil are greater than those used as the basis for Battelle's $2.2 million estimate. Given the new data, it is believed that the potential cost to

implement the dewatering and excavation remedy could be as high as $20 million, nearly an order of magnitude higher than that estimated by USEPA.

Summary

The proposed limited excavation and capping remedy would provide overall, long-term protection of human health and the environment. The excavation component of the remedy, which USEPA is requiring, and the capping component of the remedy would effectively mitigate the potential transport mechanisms identified in USEPA's conceptual site model in shallow groundwater in this area of the Site. Future pore water monitoring beneath the River bed would ensure that the performance criteria of the remedy are being satisfied. The appropriateness of the remedy is further supported by the limited short-term impacts that would result from the excavation and the construction of the cap and the low cost of the remedy relative to the other shallow groundwater remedial alternatives being considered by USEPA.

With regard to USEPA's conceptual site model, implementing the proposed remedy as a TCRA quickly eliminates what USEPA considers to be the potential for contaminant transport to the River. As stated above, such an approach is consistent with USEPA guidance (USEPA, 2002) and the CSTAG recommendations (USEPA, 2004). The implementation of the proposed remedy would provide an effective, implementable, protective, and cost-efficient, permanent remedy to address this area of the Site. The proposed remedy would satisfy the statutory preference for treatment as a principle component of the remedy, as well as the other pertinent legal and regulatory requirements.

We look forward to discussing this proposal with you and USEPA's technical team in more detail during our meeting scheduled for Tuesday, May 12, 2009. Upon your review of this proposal, please feel free to contact us to discuss any questions or concerns that you may have in the interim.

Sincerely,

LOUREIRO ENGINEERING ASSOCIATES, INC.

David N. Scotti, P.G.
Project Manager

cc: Anna Krasko (USEPA)
Eve Vaudo (USEPA)
Deirdre Dahlen (Battelle)
Louis Maccarone (RIDEM)

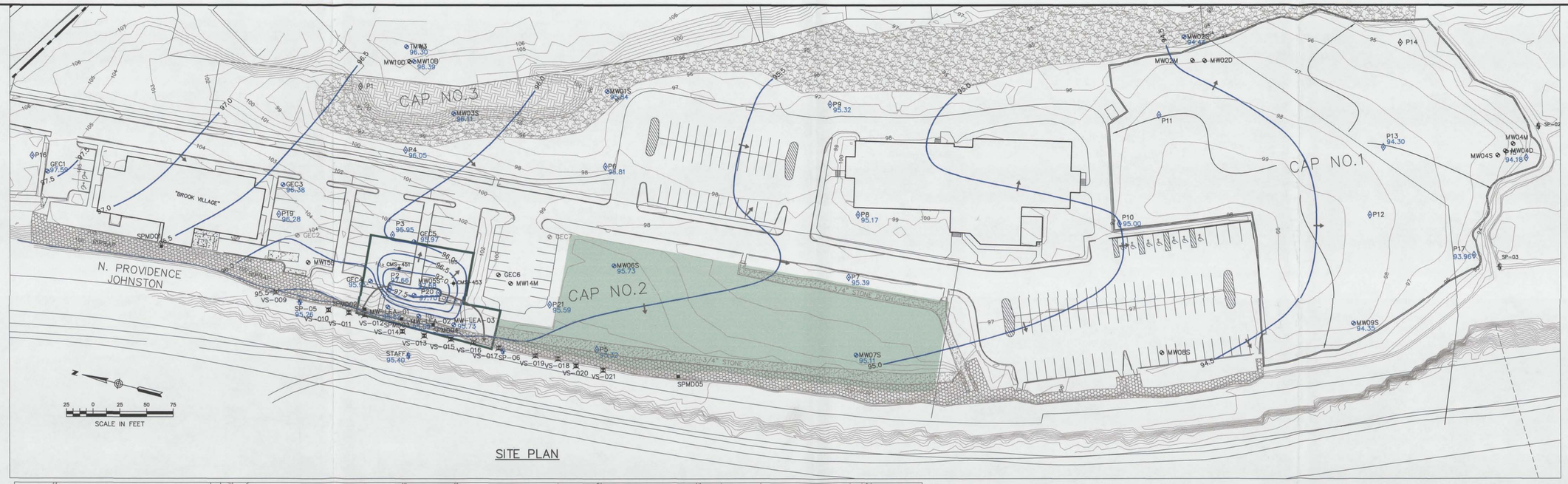
References

Battelle, 2005. *Interim Final Remedial Investigation – Centredale Manor Restoration Project Superfund Site North Providence, Rhode Island.* June 30, 2005.

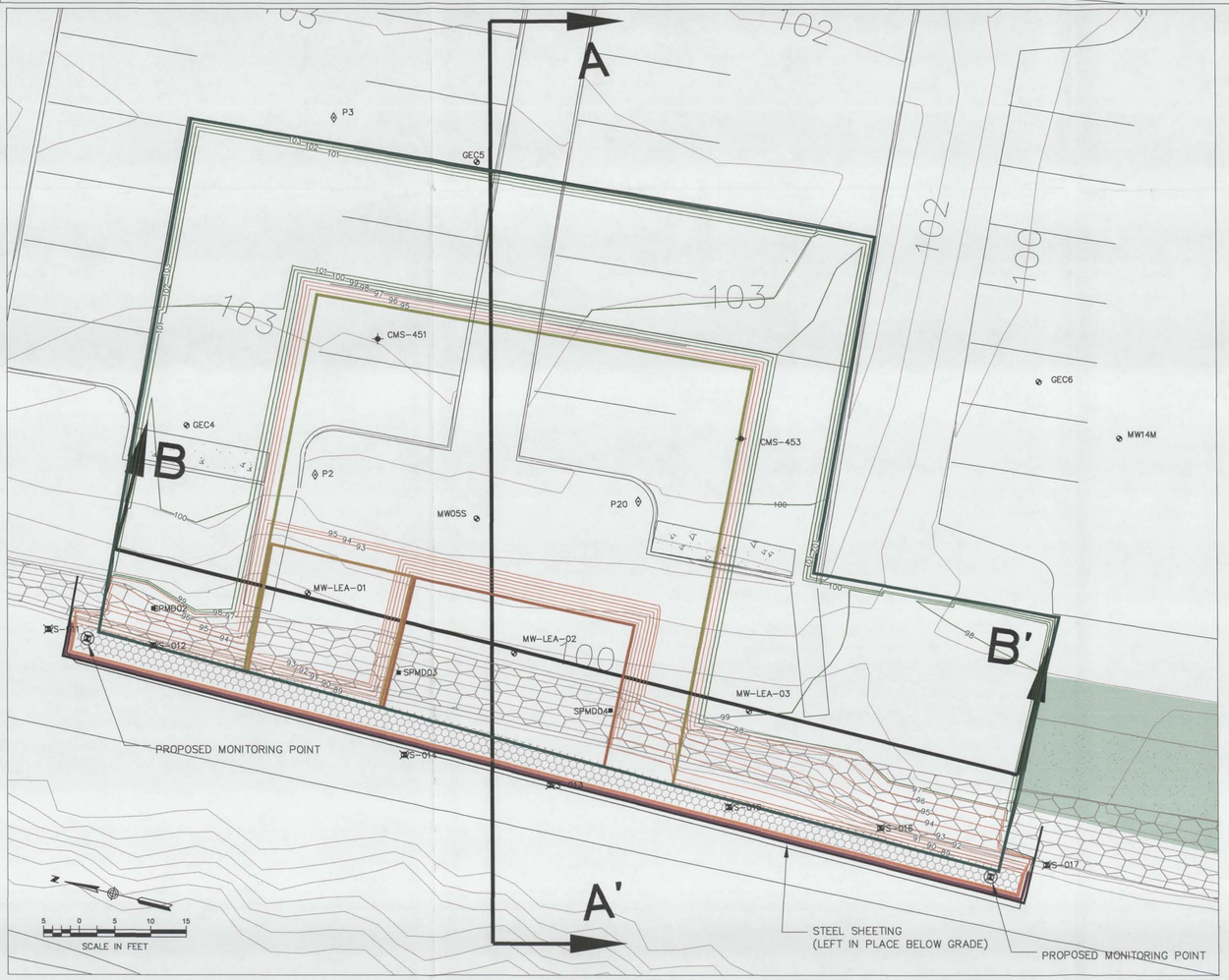
Battelle, 2007. *Remedial Investigation and Feasibility Study – Centredale Manor Restoration Project, North Providence, Rhode Island.* April 23, 2007 Presentation. Centredale Manor Dialog Meeting No. 4.

United States Environmental Protection Agency. 2004. *CSTAG Recommendations on the Centredale Manor Restoration Project (CMRP) Superfund Site.* Memorandum from Stephen J. Ells and John Meyer, CSTAG, to Ms. Anna Krasko. Washington, DC, August 18, 2004.

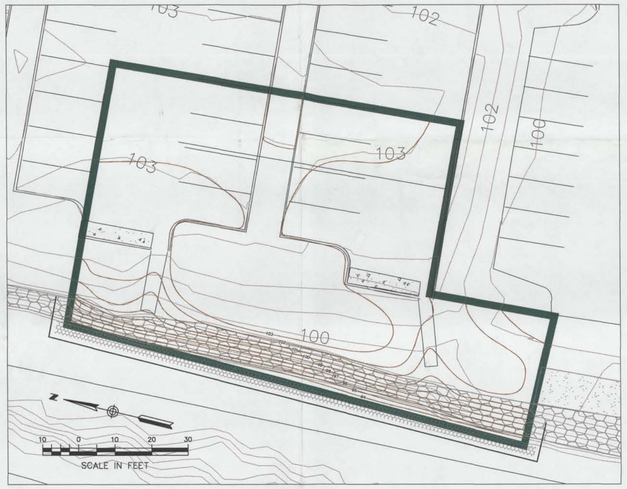
United States Environmental Protection Agency. *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites.* Office of Solid Waste and Emergency Response Directive 9285.6-08. Washington, DC, February 12, 2002.



SITE PLAN



EXCAVATION PLAN



GRADING PLAN

LEGEND

- MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- SOIL BORING
- SEMI-PERMEABLE MEMBRANE DEVICE
- VAPOR DIFFISION SAMPLE LOCATION
- PROPOSED MONITORING POINT
- LIGHT POLE
- UP680 UTILITY POLE
- STORM SEWER
- ELEC HH ELECTICAL BOX
- TREE
- 103 GROUND SURFACE ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL
- EXCAVATED BACKFILL SOIL CONTOUR
- EXCAVATED DISPOSED SOIL CONTOUR
- NEW GRADE CONTOUR
- AREA OF CAP -40 ML LLDPE -DRAINAGE LAYER -CLEAN BACKFILL -SURFACE
- 97.5 GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION

- AREA OF CAP
- SOIL WITHIN THIS AREA BETWEEN ELEVATION 103.0 & 99.0 TO BE USED TO BACKFILL AREAS OF DEEPER EXCAVATION; SOIL WITHIN THIS AREA BETWEEN ELEVATION 99.0 & 95.0 TO BE DISPOSED OFFSITE.
- SOIL WITHIN THIS AREA BETWEEN ELEVATION 101.0 & 99.0 TO BE USED TO BACKFILL AREAS OF DEEPER EXCAVATION; SOIL WITHIN THIS AREA BETWEEN ELEVATION 99.0 & 93.0 TO BE DISPOSED OFFSITE.
- SOIL WITHIN THIS AREA BETWEEN ELEVATION 101.0 & 97.0 TO BE USED TO BACKFILL AREAS OF DEEPER EXCAVATION; SOIL WITHIN THIS AREA BETWEEN ELEVATION 97.0 & 89.0 TO BE DISPOSED OFFSITE.
- SEDIMENT WITHIN THIS AREA BETWEEN ELEVATION 93.0 & 89.0 TO BE DISPOSED OFFSITE

NOTE:

1. REMOVED ASPHALT AND CONCRETE TO BE RECYCLED OFFSITE.
2. ONLY CONTAMINATED SOIL EXCAVATED FROM THE AREAS DESIGNATED ON THIS FIGURE WILL BE DISPOSED OFFSITE.
3. ALL OTHER EXCAVATED SOIL WILL BE USED TO BACKFILL THE EXCAVATED AREAS REFERENCED ABOVE.

REV.	DESCRIPTION OF REVISION	DATE	APPR.

Loureiro Engineering Associates, Inc.
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SCALE: AS SHOWN
COMM. NO.: 15RP601
DRAWN BY: A.C.L. DATE: 05/07/09
APPROVED BY: D.N.S. DATE: 05/07/09

CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

PROPOSED SHALLOW GROUNDWATER REMEDY

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DRAWING 1

SHEET NO. 1 NO. OF SHEETS 1

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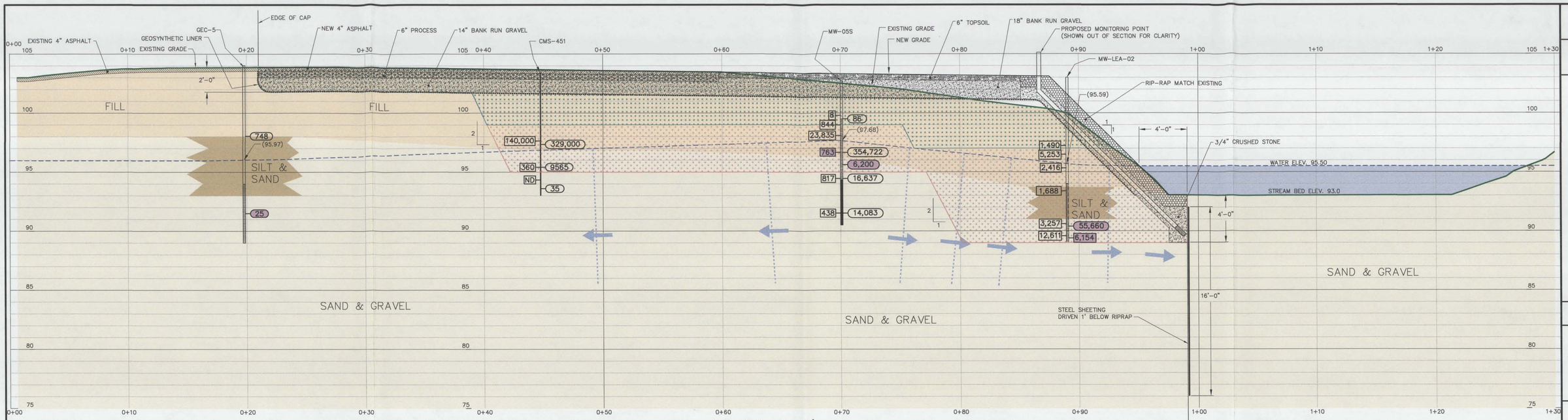
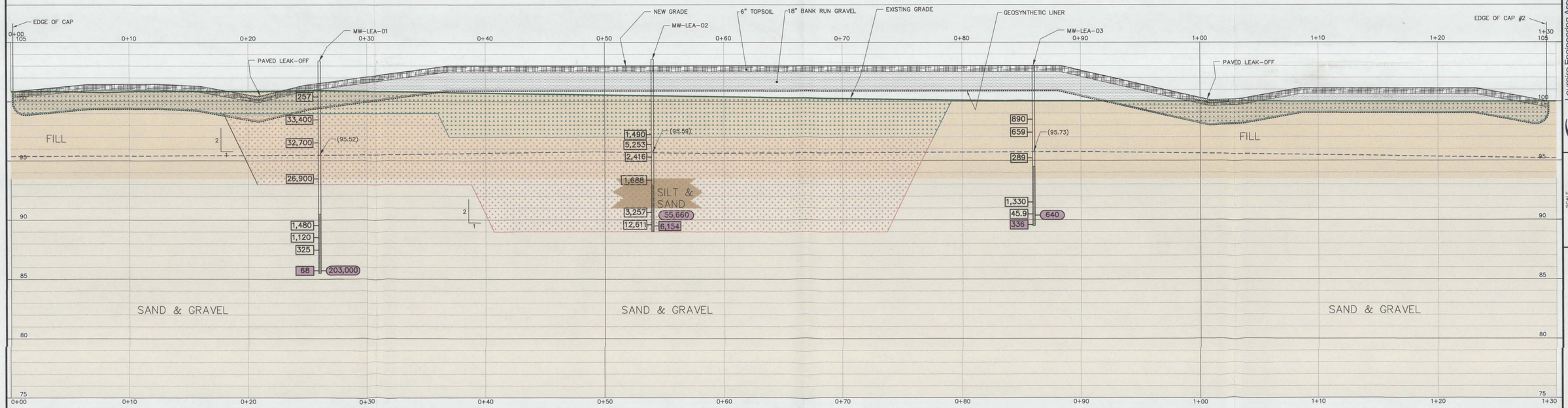


SECTION A–A'

SCALE HORIZONTAL 1"=4'-0"
SCALE VERTICAL 1"=4'-0"



SECTION B–B'

SCALE HORIZONTAL 1"=4'-0"
SCALE VERTICAL 1"=4'-0"

LEGEND SECTION

MW-05S
(95.59)
SCREEN INTERVAL

GROUNDWATER ELEVATION — 6,200
MONITORING WELL — 6,439
TOTAL VOCs IN GROUNDWATER MIROGRAMS PER LITER (µg/l) — 748
DIOXINS/FURANs IN GROUNDWATER PICOGRAMS PER LITER (pg/l) TOTAL TEQ — 5,253
TOTAL VOCs IN SOIL MIROGRAMS PER KILOGRAM (µg/kg)
DIOXINS/FURANs IN SOIL PICOGRAMS PER GRAM (pg/g) TOTAL TEQ
SOIL TO BE REMOVED FROM SITE
SOIL TO BE PLACED IN EXCAVATION

REV.	DESCRIPTION OF REVISION	DATE	APPR.

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SCALE: AS SHOWN
COMM. NO.: 15RP801
DRAWN BY: A.C.L. — DATE: 05/07/09
APPROVED BY: D.N.S. — DATE: 05/07/09

CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

PROPOSED LIMIT OF EXCAVATION AND CAPPING SECTION A-A' AND SECTION B-B'

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DRAWING 2
SHEET NO. 1 — NO. OF SHEETS 1

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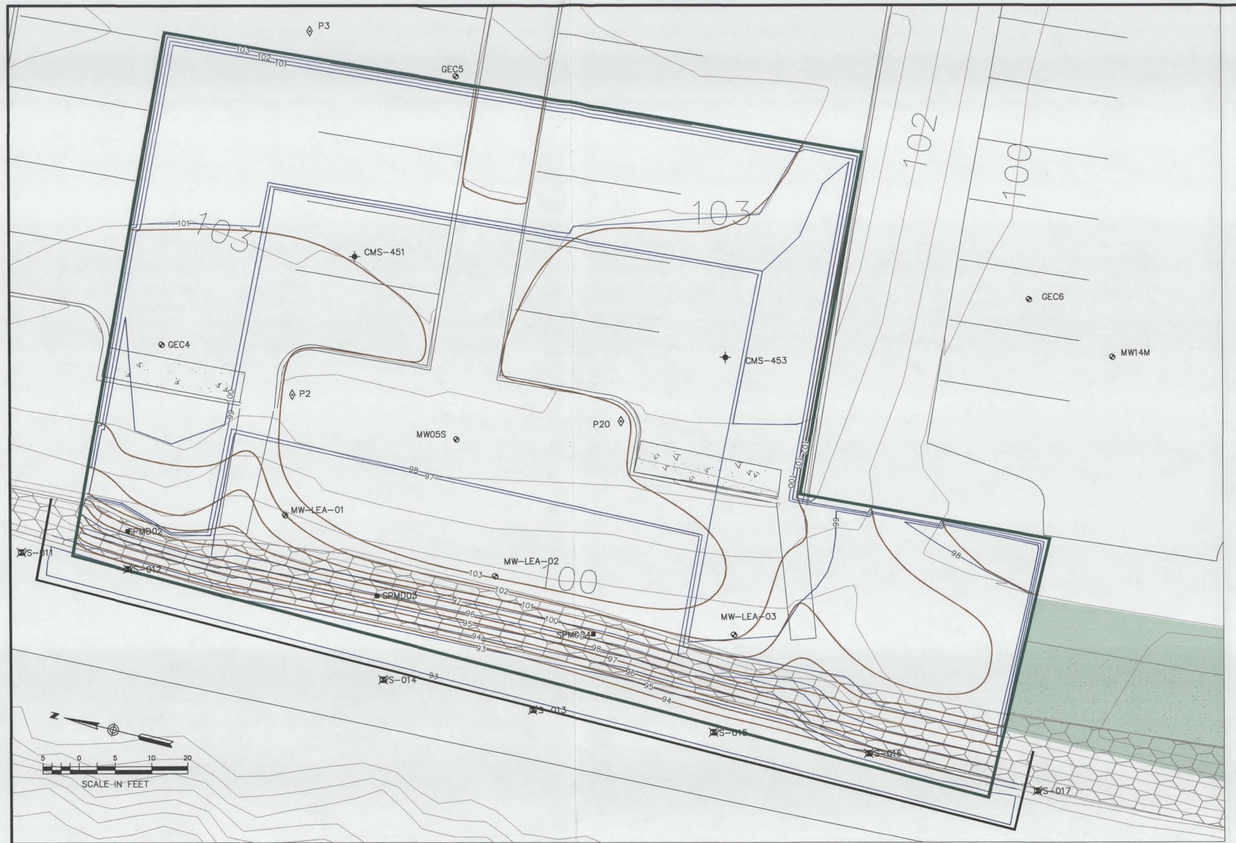

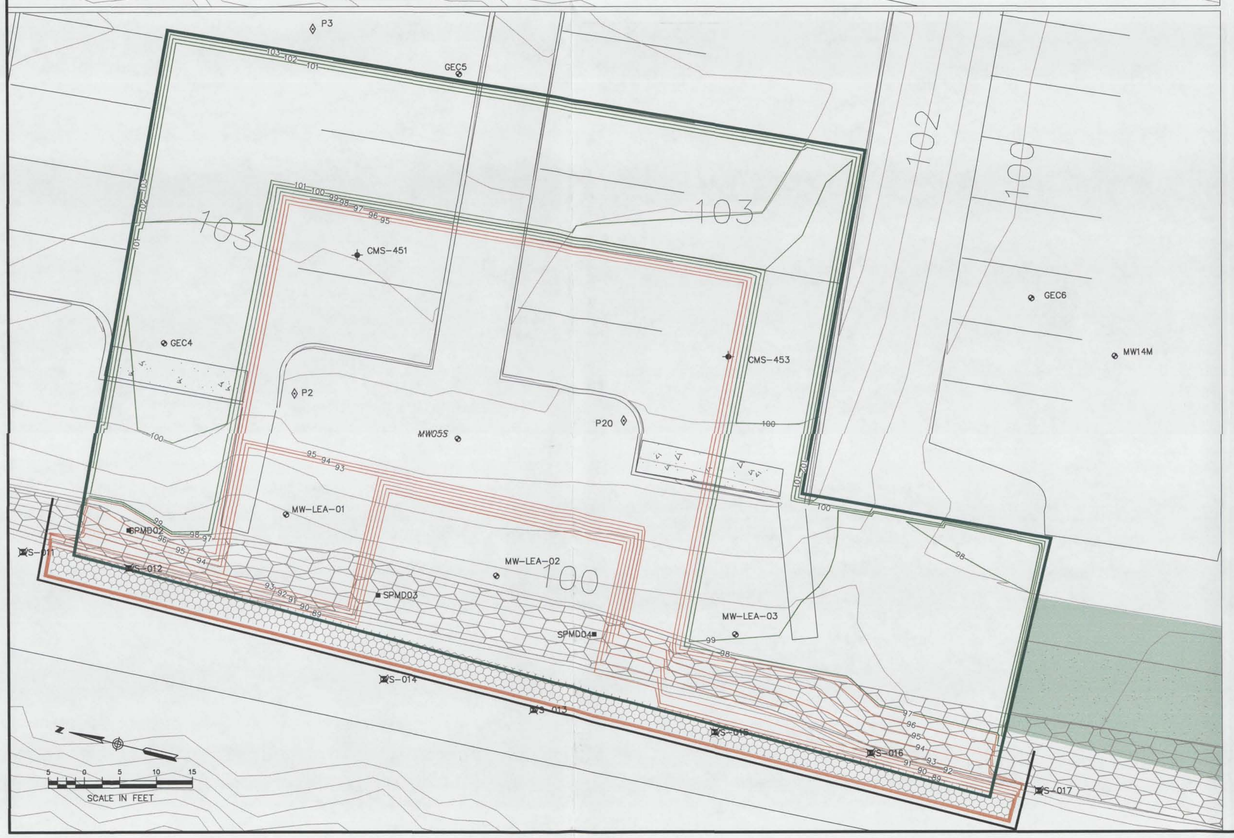

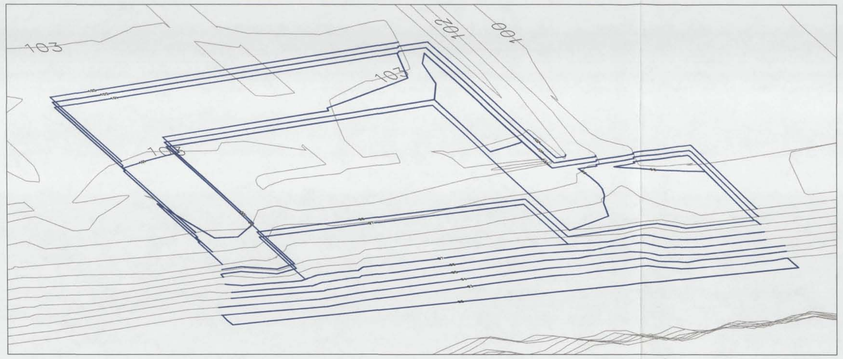

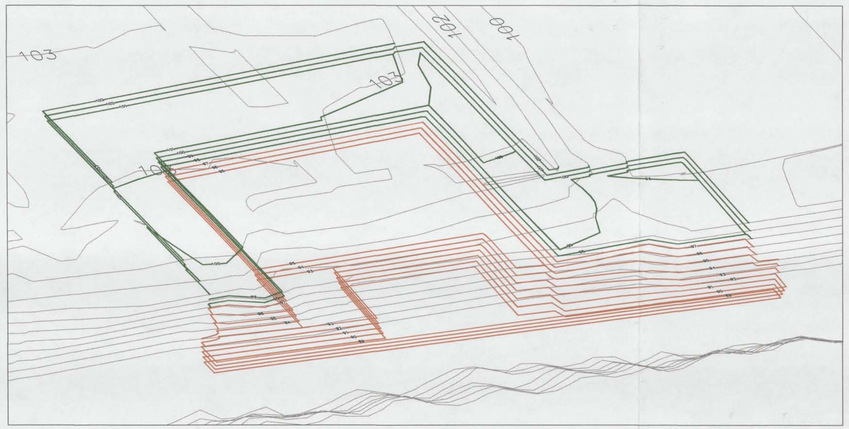

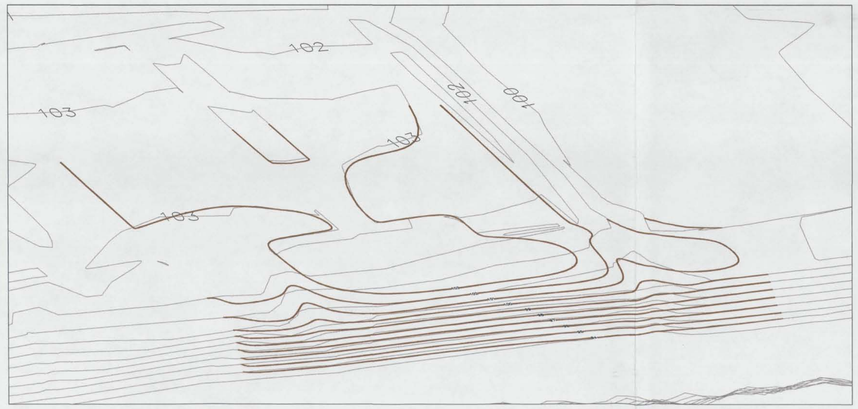

LEGEND

- AREA OF CAP
- EXCAVATED BACKFILL SOIL CONTOUR
- EXCAVATED BACKFILL SOIL CONTOUR
- EXCAVATED DISPOSED SOIL CONTOUR
- NEW GRADE CONTOUR

Prismoidal Volume Results

Original Surface Model:	EXISTING GRADE
Final Surface Model:	DISPOSE (BOTTOM OF EXCAVATION)
Total Cut Volume:	1517.38 cu yd
Original Surface Model:	EXISTING GRADE
Final Surface Model:	BACKFILL (BOTTOM OF FILL)
Total Cut Volume:	819.53 cu yd
Original Surface Model:	BACKFILL (BOTTOM OF FILL)
Final Surface Model:	DISPOSE (BOTTOM OF EXCAVATION)
Total Cut Volume:	696.68 cu yd
Original Surface Model:	EXISTING GRADE
Final Surface Model:	FINISH GRADE
Total Fill Volume:	239.84 cu yd
Original Surface Model:	BOTTOM OF CAP
Final Surface Model:	FINISH GRADE
Total Fill Volume:	587.63 cu yd

REV.	DESCRIPTION OF REVISION	DATE	APPR.

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SCALE: AS SHOWN
COMM. NO.: 15RP601
DRAWN BY: A.C.L. DATE: 05/07/09
APPROVED BY: D.N.S. DATE: 05/07/09

CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

PROPOSED ELEVATIONS OF EXCAVATION AND FINAL GRADE

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DRAWING 3

SHEET NO. 1 NO. OF SHEETS 1

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