Appendix C

Feasibility Study Remedial Alternatives Cost Estimates

TABLE C.2B

COST SUMMARY
REMEDIAL ALTERNATIVE 2B – EXCAVATION AND OFF-SITE DISPOSAL
WITH CONSOLIDATION AND CAPPING
TO MEET PART LAND USE AND PCB RISK-BASED LEVELS OF 2.5 MG/KG RESIDENTIAL AND 9.1 MG/KG COMMERCIAL AREAS
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Estimated Cost* *Total*
CAPITAL COSTS						
A.	***PRE-DESIGN INVESTIGATION***					**$33,200**
1.0	Sampling and Analysis Work Plan (SAP)	LS	1	$25,000	$25,000	
	Survey top of banks at Site	LS	1	$2,000	$2,000	
	Health and Safety Plan Update	LS	1	$1,200	$1,200	
	Multi-Area Quality Assurance Project Plan	LS	1	$5,000	$5,000	
2.0	SAP Implementation					**$108,100**
	Project Set up (mark locations etc.)	LS	1	$6,570	$6,600	
	Private Utility Locate	LS	1	$8,000	$8,000	
	Field Activities	DA	17	$2,900	$49,300	
	Field Technicians					
	Sampling Equipment (push probe technology)					
	Expendables (PPE etc)					
	Temporary Lighting and Carbon Monoxide Control	LS	1	$3,000	$3,000	
	Concrete Coring	LS	1	$3,000	$3,000	
	Laboratory Analysis	LS	1	$37,330	$37,300	
	Investigation Derived Waste Disposal	DA	17	$50	$900	
3.0	Contingency on PDI	LS	1	$70,650	$70,700	**$70,700**
	Based on 50 % of PDI costs					
4.0	Remedial Action Plan	LS	1	$60,000	$60,000	**$60,000**
	TOTAL PRE-DESIGN COSTS					**$272,000**
B.	***CONSTRUCTION***					
1.0	**Mobilization and Set up**					**$234,600**
	Mobilization and Set up	LS	1	$51,500	$51,500	
	Health and Safety	Monthly	4	$28,450	$113,800	
	Erosion Control	LS	1	$18,700	$18,700	
	Site Facilities					
	Temporary Facilities	Monthly	4	$6,810	$27,200	
	Decontamination Pad and Stations	LS	1	$17,375	$17,400	
	Staging Areas	LS	1	$6,000	$6,000	
2.0	**Additional Preparation and/or Demolition (by Redevelopment Area)**					**$138,000**
	Residential 1	LS	1	$12,680	$12,700	
	Residential 2	LS	1	-	-	
	Residential 3	LS	1	$1,225	$1,200	
	Residential 4	LS	1	$850	$900	
	Waterfront Plaza	LS	1	-	-	
	Mixed Residential/Commercial Area 1	LS	1	$600	$600	
	Mixed Residential/Commercial Area 2	LS	1	$56,625	$56,600	
	Commercial Area 1	LS	1	-	-	
	Commercial Area 2	LS	1	-	-	
	Commercial Area 3	LS	1	-	-	
	Commercial Area 4	LS	1	$65,980	$66,000	
3.0	**Excavation (by Redevelopment Area)**					**$279,900**

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PLAINWELL, INC. MILL PROPERTY
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Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Estimated Cost* *Total*
	Residential 1	CY	910	$12	$11,100	
	Residential 2	CY	25	$88	$2,200	
	Residential 3	CY	1,495	$7	$10,800	
	Residential 4	CY	5,340	$3	$16,500	
	Waterfront Plaza	CY	-	-	-	
	Mixed Residential/Commercial Area 1	CY	40	$90	$3,600	
	Mixed Residential/Commercial Area 2	CY	5,800	$33	$189,300	
	Commercial Area 1	CY	12	$104	$1,300	
	Commercial Area 2	CY	-	-	-	
	Commercial Area 3	CY	-	-	-	
	Commercial Area 4	CY	7,185	$6	$45,100	
4.0	**Transportation and Disposal (by Redevelopment Area)**					**$1,543,370**
	Residential 1 - Non Haz Non TSCA Soils	Ton	1,365	$22	$30,000	
	Residential 2 - Non Haz Non TSCA Soils	Ton	-	-	-	
	Residential 3 - Non Haz Non TSCA Soils	Ton	240	$22	$5,300	
	Residential 4 - Non Haz Non TSCA Soils	Ton	8,010	$22	$176,200	
	Residential 4 - Misc Debris	LS	1		$600	
	Waterfront Plaza - Non Haz Non TSCA Soils	Ton	-	$22	-	
	Mixed Residential/Commercial Area 1 - Non Haz Non TSCA Soils	Ton	18	$22	$400	
	Mixed Residential/Commercial Area 1 - Misc. Debris	LS	-	$125	$1,675	
	Mixed Residential/Commercial Area 2 - Non Haz Non TSCA Soils	Ton	7,133	$22	$156,500	
	Mixed Residential/Commercial Area 2 - Misc. Debris	LS	1		$8,245	
	Commercial Area 1 - Non Haz Non TSCA Soils	Ton	18	$22	$400	
	Commercial Area 2 - Non Haz Non TSCA Soils	Ton	-	-	-	
	Commercial Area 2 - Misc. Debris	LS	-	-	-	
	Commercial Area 3 - Non Haz Non TSCA Soils	Ton	-	-	-	
	Commercial Area 3 - Misc. Debris	LS	-	-	-	
	Commercial Area 4 - Non Haz Non TSCA	Ton	2,000	$22	$44,000	
	Commercial Area 4 - Misc. Debris	LS	-		$3,550	
	Commercial Area 4 - TSCA	Ton	7,000	$160	$1,116,500	
5.0	**Consolidation of Soils on Site**					**$34,500**
	Preparation of Consolidation Area (south of Mill Buildings)	LS	1	$27,110	$27,100	
	Consolidation of On Site Soils (Placement of Material)	CY	3,668	$2	$7,400	
6.0	**Capping of Soils On Site**	LS	1	$61,700	$61,700	**$61,700**
7.0	**Restoration (by Redevelopment Area)**					**$400,325**
	Residential 1	LS	1		$22,500	
	Residential 2	LS	1		$5,070	
	Residential 3	LS	1		$30,275	
	Residential 4	LS	1		$80,800	
	Waterfront Plaza	LS	-		-	
	Mixed Residential/Commercial Area 1	LS	1		$7,425	
	Mixed Residential/Commercial Area 2	LS	1		$139,455	
	Commercial Area 1	LS	1		$1,650	
	Commercial Area 2	LS	-		-	
	Commercial Area 3	LS	-		-	
	Commercial Area 4	LS	1		$113,150	

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FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
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Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Estimated Cost* *Total*
8.0	**Demobilization**	LS	1	$32,300	$33,000	**$32,300**
	Decontamination and Demobilization					
	TOTAL CONSTRUCTION COST					**$2,724,695**
C.	***ENGINEERING/OVERSIGHT***					
1.0	**Institutional Controls**					**$50,000**
2.0	**Engineering/ Design (15 % of Construction Costs)**					**$408,700**
3.0	**Construction Oversight (10 % of Construction Costs)**					**$272,500**
	TOTAL ENGINEERING/OVERSIGHT COSTS					**$731,200**
	CONTINGENCY ON CAPITAL COSTS (25 %)					**$863,974**
	TOTAL CAPITAL COSTS					**$4,319,869**
OPERATION, MAINTENANCE, & MONITORING COSTS						
A.	***ANNUAL MONITORING AND MAINTENANCE***					**$9,600**
	Monthly Operation and Maintenance of System	Month	12	$800	$9,600	
	CONTINGENCY ON OM & M COSTS (20 %)					**$1,920**
	TOTAL CAPITAL COSTS					**$4,319,869**
	NET PRESENT VALUE OF OM & M (30 YEARS @ 7 % DISCOUNT RATE)					**$142,952**
	TOTAL COST					**$4,462,820**

Table C.2B

COST SUMMARY NOTES
REMEDIAL ALTERNATIVE 2B – EXCAVATION AND OFF-SITE DISPOSAL
WITH CONSOLIDATION AND CAPPING
TO MEET PART 201 LAND USE CRITERIA AND PCB RISK-BASED LEVELS
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

GENERAL NOTES

A. Estimate for Remedial Alternative 2B - Excavation, Off-Site Disposal with On-Site Consolidation and Capping to meet Part 201 Land Use Criteria and a Site specific PCB Risk-Based Levels (2.5 mg/kg for Residential and 9.1 mg/kg for Commercial Areas, has been prepared based on available information at the time of this document. Redevelopment activities conducted, being conducted and anticipated for the Site by the City of Plainwell may affect the remediation costs. Costs presented in the Feasibility Study (FS) Report have taken into consideration anticipated redevelopment plans by the City of Plainwell. Redevelopment plans include demolition of non-historical buildings to the concrete slab as well as specific land use restrictions/designations for the Site as presented on Figure 1.4 of the FS Report. This cost estimate is expected to be within -30 percent to +50 percent of the actual remedial costs in accordance with United States Environmental Protection Agency (U.S. EPA) guidance.

B. Remediation activities for each of the 11 proposed redevelopment areas were estimated separately; however, the estimate assumes one mobilization and demobilization effort to conduct the work.

C. The cost estimate assumes that new structures have not been constructed in areas that are planned for soil excavation and existing structures remain in place.

D. Costs assume that additional soil investigation will not be conducted under building slabs unless otherwise noted in the pre-design notes below.

E. Areas targeted for soil removal and off-Site disposal were determined based on an iterative/risk-based approach for arsenic and Site specific calculated levels for PCBs as detailed in Appendix A of the FS Revision 2.

F. The estimated costs assume that excavation of impacted soils under the building slabs will not be conducted.

G. The cost estimate includes abandonment and replacement costs of groundwater monitoring wells within excavation areas.

H. Figure 4.1 of the FS Report shows the conceptual area for consolidation of on Site materials in Commercial Area 4 south of the former Mill Buildings in the area formerly occupied by Buildings 9A, 9B, 9D, 9E and 23.

I. Material was considered for consolidation on Site if the following conditions are met:
   1. Soil that was reported with an arsenic concentration of below 37 milligrams per kilogram (mg/kg)
   2. The soil was not reported with an inhalation exceedance
   3. The soil did not contain PCBs (above the Site specific level of 2.5 mg/kg)
   4. The soil does not contain coal
   5. The soil does not contain semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs) above Part 201 Residential Criteria

J. Costs are based on 2014 dollars.

K. All volumes are based on in-place measures unless otherwise stated.

L. Abbreviations used in the "Unit" column in the Cost Estimate Table are as follows:
- CY = Cubic Yard
- EA = Each
- LS = Lump Sum
- TN = Ton
- LF= linear foot

TASK NOTES:

CAPITAL COSTS

A. INVESTIGATION/CONSTRUCTION

1.0 Pre-Design Investigation (PDI) Activities

The following assumptions were made relative to the PDI activities in each of the redevelopment areas and reflected in the cost estimate.

- Generation of a Sampling and Analysis Plan (SAP).
- Update the Health and Safety Plan as necessary.
- Update the Multi-Area Quality Assurance Project Plan as necessary.
- Completion of the SAP - soil boring installation and soil sample collection to delineate the vertical and horizontal extent of impact. Soil borings are assumed to be collected via direct push method. PDI samples will be collected and submitted for laboratory analysis for specific parameters determined to exceed Preliminary Remediation Goals (PRGs) during the Remedial Investigation (RI). Delineation samples will not be collected in areas that were not selected for excavation activities (i.e., under building slabs, etc.)
- Quality Assurance/Quality Control samples are included on a 1 per 10 basis.
- A survey of the "top of bank" is included in the PDI cost estimate.
- All areas where subsurface work is to be conducted will be cleared through a public utility locate (i.e., MISS Dig), a private utility locate, review of available drawings, and discussions with individuals knowledgeable of the Site and utilities located thereon.

Residential Area 1
PRGs exceeded in Residential Area 1 include Part 201 non-residential and residential direct contact criteria for arsenic. Soil samples will be collected to delineate the extent of soil impacted with PCBs adjacent to the storm sewer line installed by the Michigan Department of Transportation (MDOT) in 2012.

- Allowance for 30 soil samples for PCBs
- Allowance for 12 soil samples for arsenic

Residential Area 2
The PRG exceeded in Residential Area 2 is Part 201 residential direct contact criteria for arsenic.

- Allowance for 24 soil samples for arsenic

Residential Area 3
The PRG exceeded in Residential Area 3 is Part 201 residential direct contact criteria for arsenic.

- Allowance for 56 soil samples for arsenic

Residential Area 4
PRGs exceeded in Residential Area 4 include Part 201 non-residential direct contact criteria for arsenic, lead and PCBs. Residential direct contact criteria is exceeded at locations within Residential Area 4 for arsenic, benzo(a)pyrene, cyanide, dibenz(a,h)anthracene, lead and PCBs. Residential soil volatilization to indoor air inhalation criteria (SVIIC) was exceeded at one location for benzene.

- An allowance for 36 soil samples for arsenic
- Benzene above the residential SVIIC at TP-308
    - An allowance for 4 soil samples for benzene was included in the estimate.
- Cyanide was above residential direct contact criteria at SB-302 in the shallow (0-1 foot) interval
    - Four samples for cyanide were included in the estimate
- An allowance for 20 samples for lead was included in the estimate
- PCBs were above the Site specific calculated level at TP-313 and SB-301
    - An allowance for 45 soil samples for PCBs was included in the estimate
- The PNA parameters were identified in shallow samples (0-1.5 feet) below grade at DG3, DG4 and TP-302
    - Allowance for 12 PNA samples

Waterfront Plaza
PDI activities will not be specifically conducted within the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
PRGs exceeded in Mixed Residential/Commercial Area 1 include Part 201 non-residential inhalation criteria for manganese and residential direct contact criteria for arsenic.

- Delineation samples will be collected around 2 locations (TP-306 and TP-334)
- A total of 12 soil samples for arsenic will be collected
- Four samples for manganese will be collected and analyzed around TP-334

Mixed Residential/Commercial Area 2
PRGs exceeded in Mixed Residential/Commercial Area 2 include Part 201 non-residential direct contact criteria for arsenic, benzo(a)pyrene, and lead. Residential direct contact criteria is exceeded at locations within Mixed Residential/Commercial Area 2 for arsenic, benzo(a)pyrene, dibenz(a,h)anthracene; benzo(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene and lead.

Soil delineation by work area as follows:

<u>Arsenic ONLY locations</u>:
Building 25
- Allowance for 8 samples
- A portion of the concrete slab was removed during demolition

Building 28
- Allowance for 8 samples
- A portion of the concrete slab was removed during demolition

Train Shed
- Allowance for 4 samples

Coal Tunnel Area
- Allowance for 30 samples

Former Ash Silo Area (SB-2010 and SB-2011)
- Allowance for 12 samples

Former clarifier area (TP-344)
- Allowance for 8 samples

Area north of Building 3/Former Water Tower Area (TP-340, TP-342, TP-343)

- Allowance for 16 samples

Arsenic and Lead sample locations:

Area around SB-2013

- Allowance for 12 samples

Arsenic, PNAs and Lead sample locations:

Building 3A

- Allowance for 12 samples

Building 6A

- Allowance for 18 samples
- Technicians will be required to don respirators for this work
- The floor in the majority of this building is exposed soil

Arsenic and PNAs sample locations

Fuel Oil AST Area

- Allowance for 24 PNA soil samples
- Allowance for 12 arsenic samples

A total of 140 samples will be collected and analyzed for arsenic.
A total of 54 samples will be collected and analyzed for PNAs.
A total of 42 samples will be collected and analyzed for lead.

Commercial Area 1

PRGs exceeded in Commercial Area 1 include Part 201 non-residential inhalation criteria for manganese and the residential direct contact for arsenic.

- Delineation samples will be collected around SS-105
- Four soil samples will be collected from the 0-2 foot below grade interval and analyzed for arsenic and manganese

Commercial Area 2

Delineation efforts will not be conducted in Commercial Area 2.

Commercial Area 3

Delineation efforts will not be conducted in Commercial Area 2.

Commercial Area 4

PRGs exceeded in Commercial Area 4 include Part 201 non-residential direct contact criteria for arsenic, and PCBs. Residential direct contact criteria is exceeded at locations within Commercial Area 4 for arsenic, benzo(a)pyrene, lead and PCBs.

Soil delineation by building / work area as follows:

Arsenic ONLY locations:

SB-2012

- Allowance for 4 samples

Parking lot area south of Building 17

- Allowance for 60 samples

Arsenic and Lead sample locations:
TP-341
- Allowance for 4 samples

Arsenic, PNAs and Lead sample locations:

Former Substation Area/North of Mill Buildings
- Allowance for 30 samples

PCBs and Arsenic sample locations:
MW-16 Area
- Allowance for 18 samples

A total of 116 samples will be collected and analyzed for arsenic.
A total of 30 samples will be collected and analyzed for PNAs.
A total of 18 samples will be collected and analyzed for PCBs.
A total of 34 samples will be collected and analyzed for lead.

2.0 Mobilization/Set-Up

The following assumptions were made relative to the mobilization/set-up in each of the redevelopment areas and reflected in the cost estimate.

- Mobilization and set-up includes: mobilization of personnel and equipment (including liner crew and equipment); construction survey work (e.g., excavation layout and verification sample locations); and geotechnical and chemical testing on backfill materials.
  - An allowance of $8,000 to mobilize personnel and equipment was included in the estimate.
  - $30,000 for survey work was included in the estimate.
  - Geotechnical and chemical analysis for imported materials was included in the estimate. One set of chemical analysis [Target Analyte List Metals, Target Compound List (TCL) for volatile organic compounds, TCL for semi-volatile compounds, and polychlorinated biphenyl (PCBs) per material (topsoil, general fill and 21AA/gravel]. The topsoil sample will also be analyzed for pH, phosphorous, organic content, pesticides and herbicides.
- Health and Safety includes an on-Site Health and Safety Officer (HSO) for 4 months. Also included in the costs are: air monitoring equipment and calibration gases; a decontamination trailer; and disposable personal protection equipment (PPE).
- Air monitoring assumes real-time air monitoring will be conducted during all excavation work utilizing a photoionization detector (11.7 electronVolt [eV] lamp) and fugitive dust monitor(s). Air monitoring does not include the collection of samples for laboratory analysis or laboratory analytical costs.
- Erosion control includes an allowance for silt fence (4,000 LF) and geofabric to cover catch basins on the Site. Costs for erosion control measures specific to individual redevelopment areas (i.e., turbidity curtains, etc.) are included in individual redevelopment area estimates (e.g., Commercial Area 4). Erosion control (visqueen, hay bales etc.) for the staged consolidation pile(s) of soil and the relocated and staged gravel material area included here.
- Site facility costs include electrical hookup and electricity for two office trailers (one for the contractor and one for the U.S. EPA) for 4 months. Other temporary facilities include portable sanitary services, a drinking water allowance and a small dumpster for worker general refuse. The expense of one Site truck for the duration of the services was included.
- Site facility costs include materials and construction of temporary decontamination pads and decontamination stations for workers. It was assumed that potable water could be obtained from the City of Plainwell for use during the project.

- Site facility costs include $6,000 to for the installation and maintenance of a staging area for waste.
- A perimeter fence currently exists around the majority of the Site. The cost estimate assumes the fence will remain and can be utilized as a security measure to prevent access to the Site during construction activities.

3.0 Preparation/Pre-Excavation Work by Redevelopment Area

The following assumptions were made relative to the preparation/pre-excavation work in each of the redevelopment areas and reflected in the cost estimate.

- A Soil Erosion and Sedimentation Control Permit will be obtained from Allegan County. All other necessary permits will also be obtained prior to intrusive work at the Site.
- All areas where subsurface work is to be conducted will be cleared through a public utility locate (i.e., MISS Dig), a private utility locate, review of available drawings, and discussions with individuals knowledgeable of the Site and utilities located thereon.

Residential Area 1
Specific assumptions for preparation/pre-excavation work in Residential Area 1 under Remedial Alternative 2B are presented below.

- Trees and shrubs in the excavation areas will need to be cleared and grubbed.
- Turbidity curtain will be temporally installed in the Kalamazoo River during excavation and backfill activities.
- One power pole will need to be relocated for the excavation work around SB-104.

Residential Area 2
No specific assumptions for preparation/pre-excavation work in Residential Area 2 under Remedial Alternative 2B were utilized.

Residential Area 3
Specific assumptions for preparation/pre-excavation work in Residential Area 3 under Remedial Alternative 2B are presented below.

- MW-15 will be abandoned.
- Clearing will be required in the area around MW-15.

Residential Area 4
Specific assumptions for preparation/pre-excavation work in Residential Area 4 under Remedial Alternative 2B are presented below.

- Clearing will be required in the area around SB-301/SG-4.
- Pavement by TP-302 will be saw cut.

Waterfront Plaza
No specific assumptions for preparation/pre-excavation work in Waterfront Plaza under Remedial Alternative 2B were utilized.

Mixed Residential/Commercial Area 1
The specific assumption for preparation/pre-excavation work in Mixed Residential/Commercial Area 1 under Remedial Alternative 2B is presented below.

- Pavement in the work areas will be saw cut prior to excavation to leave a clean line for restoration activities.

Mixed Residential/Commercial Area 2
Specific assumptions for preparation/pre-excavation work in Mixed Residential/Commercial Area 2 under Remedial Alternative 2B are presented below.

- The loading dock at the south end of Building 1 will be evaluated by a structural engineering evaluation to ensure excavation of the fuel oil line will not damage either the loading dock or Building 1. Excavation will not occur within Building 1.
- A demolition notice will be submitted to the State of Michigan for the demolition of Building 5A/part of the coal tunnel. Asbestos abatement may be necessary on pipe wrap found outside of Building 5A.
- Excavation of soils under the concrete slabs of the demolished buildings (3A, 25 and 28) will require the relocation of the backfill (less than 3 feet thick) prior to excavation.
- Fuel Oil No. 6 within the former coal tunnel will be removed from the tunnel before the tunnel itself is removed.
- The piping run from the former Fuel Oil No. 6 AST and Building 5 will be exposed at one end and drained of any residual fuel oil prior to removing the line.
- Monitoring well MW-19 will be abandoned prior to excavation activities in this area.
- Monitoring well MW-22 will be abandoned prior to removal of the former fuel oil line.
- Monitoring well MW-2 will be abandoned prior to excavation activities at SB-2010 and SB-2011.
- The concrete floor (Buildings 25 and 3A) will be saw cut prior to excavation (concrete will be broke out during excavation – but saw cut first to create clean lines for restoration).

Commercial Area 1
No specific assumptions for preparation/pre-excavation work Commercial Area 1 under Remedial Alternative 2B were utilized.

Commercial Area 2
No specific assumptions for preparation/pre-excavation work Commercial Area 2 under Remedial Alternative 2B were utilized.

Commercial Area 3
No specific assumptions for preparation/pre-excavation work Commercial Area 3 under Remedial Alternative 2B were utilized.

Commercial Area 4
Specific assumptions for preparation/pre-excavation work in Commercial Area 4 under Remedial Alternative 2B are presented below.

- Excavation of soils under the concrete slabs of the demolished buildings will require the relocation of backfill placed within the former basement cavities to surrounding grade (up to 9 feet thick) prior to excavation. An allowance for five working days to complete this work was included in the estimate at a cost of $20,400.
- Turbidity curtain will be installed in the Mill Race in the area by MW-16 (along the Mill Race) and in the area of MW-3 prior to excavation activities.

- Monitoring of the Mill Race and Kalamazoo River for turbidity will be conducted during excavation activities.
- MW-16 will be abandoned prior to excavation work in that area.
- Protection of MW-3 (barriers) will be installed.
- A structural engineering evaluation of the pedestrian bridge for stability during excavation activities will be conducted. The evaluation will determine if shoring of the bridge is necessary. An allowance of $5,000 is included in the estimate to conduct the evaluation. Shoring costs have not been included in the estimate.
- The water flow of the Mill Race will be diverted in the excavation area. The methodology for this work to be determined in the pre-design phase of the project.
- Rip rap along the Mill Race will be removed and staged for re-use.
- Pavement in the work areas will be saw cut prior to excavation to allow for restoration activities.

4.0 Excavation by Redevelopment Area

Conceptual excavation areas for each of the Redevelopment areas are shown of Figures 3.12 through 3.23 of the FS Report (Revision 2).

The following assumptions were made relative to excavation in each of the redevelopment areas and reflected in the cost estimate.

- Excavation estimates assume dewatering will not be necessary and that all work can be completed in Level D PPE except Building 6A which will be conducted with supplied air (Level B) PPE.
- Standby time was not added to account for the time for laboratory analysis of verification samples. It was assumed that the project would proceed across the Site allowing for laboratory analysis to be conducted while another redevelopment area was being excavated or restored.

Specific assumptions to each redevelopment area, in addition to those presented above globally, are provided below.

Residential Area 1

Residential Area 1 is located at the far west end of the Site, where the majority of the former sludge dewatering lagoons were located. The former Mill wastewater treatment building, activated sludge tank and secondary clarifier were constructed over the lagoons. The wastewater treatment structures were demolished on behalf of the City of Plainwell in November and December 2013. The specific assumption for excavation in Residential Area 1 under Remedial Alternative 2B is presented below.

- Overburden present beyond the target excavation area that must be removed to achieve the full depth of excavation will be disposed of off Site.
- The rip rap at the Kalamazoo River outfall from the storm sewer line does not need to be removed.

Residential Area 2

Residential Area 2 is located between Residential Area 1 and Residential Area 3 and is positioned along the Kalamazoo River. This area was historically occupied by sludge dewatering lagoons (A, B, C) and a primary clarifier. The primary clarifier was demolished to the concrete slab in November 2013. No specific assumptions for excavation in Residential Area 2 under Remedial Alternative 2B are presented.

Residential Area 3

Residential Area 3 is located near the center of the Site. The former aeration basin location occupies the majority of the area. A former secondary clarifier was historically present in this area, which was

demolished in November 2013 with the floor of the former clarifier remaining. Specific assumptions for excavation in Residential Area 3 under Remedial Alternative 2B are presented below.

- Material removed from the bottom of the aeration basin will require double handling due to the slopes of the former aeration basin and the depth of the excavation.

Residential Area 4

Residential Area 4 is positioned along the Kalamazoo River between Residential Area 3 and Mixed Residential Area 2. No aboveground structures are currently present on this area. A portion of this area was historically utilized by the Mill as a coal storage area. No specific assumptions for excavation in Residential Area 4 under Remedial Alternative 2B were made.

Waterfront Plaza

No excavation activities are anticipated in the Waterfront Plaza Area.

Mixed Residential/Commercial Area 1

Mixed Residential/Commercial Area 1 is located between Commercial Area 2 and Commercial Area 3 on the southern property line along Allegan Street. This area was once occupied by the former Specialty Minerals Building and associated above ground storage tanks. The Specialty Minerals building and ASTs were demolished to the concrete slab in December 2011. The specific assumption for excavation in Mixed Residential/Commercial Area 1 under Remedial Alternative 2B is presented below.

- Underground utilities encountered (TP-306) between the former Specialty Minerals Building and the main Mill Buildings will be capped at either end of the excavation.

Mixed Residential and Commercial Area 2

Mixed Residential and Commercial Area 2 is located between Residential Area 4 and Commercial Area 4 at the northern end of the Site along the Kalamazoo River. The majority of the area is occupied by Mill Buildings and pavement. Buildings 3A, 25 and 28 along with the eastern water tower, 200,000-gallon Fuel Oil AST, and the brine USTs, were demolished on behalf of the City of Plainwell. The majority of the concrete slabs were left in place for Buildings 3A and 28. Building 25 was part of the Site's historical wastewater treatment system and had a subsurface vault and system to pump the waste water from the Mill to the on-Site WWTP at the west end of the Site. The vault under the northern portion of Building 25 was not removed. The vault floor was cracked and the sidewalls removed to 4 feet below grade, then the vault was filled with imported general fill. The concrete slab under the remaining portion of Building 25 was left in place.

Specific assumptions for excavation in Mixed Residential/Commercial Area 2 under Remedial Alternative 2B are presented below.

- A storm sewer was installed through the west side of Mixed Residential/Commercial Area 2 in 2012 by the Michigan Department of Transportation (MDOT). The approximate location of the storm sewer is shown on Figure 3.18. Before conducting excavation work to remove the former fuel oil AST line and excavate the east side of the former fuel AST, the exact location of the storm sewer line will be determined, shoring of the line may be necessary during the removal of the fuel oil AST line.
- Soils in Building 6A will be removed using a vacuum extraction system.

Commercial Area 1

Commercial Area 1 is located in the far southwest portion of the Site. No structures or paved areas are currently present in this area that would require unique equipment or procedures to conduct the proposed remedial activities. This area of the Site has not been developed and was not part of historic Mill operations. The area specific assumption for excavation in Commercial Area 1 under Remedial Alternative 2B is presented below.

- A storm sewer was installed through this area in 2012 by the Michigan Department of Transportation (MDOT). The approximate location of the storm sewer is shown on Figure 3.19. Before conducting excavation work in the area of SS-105, the exact location of the line will be determined.

Commercial Area 2

Commercial Area 2 is located in the southwest central portion of the Site. Structures on this portion of the Site include the City of Plainwell Public Safety Building and associated paved parking and egress/ingress areas.

Excavation activities are not anticipated in the Commercial Area 2 for Remedial Alternative 2B.

Commercial Area 3

Commercial Area 3 is located adjacent to the former southwest corner of the Mill Buildings along Allegan Street. Structures on this area include a pump house and a former guard shack. Other historical features within this area have been demolished on behalf of the City of Plainwell. The Clay ASTs, Ammonia AST secondary containment structure, the Starch ASTs and Building 9C were demolished in 2012. The concrete slabs for all demolished features were left in place. Specific assumptions for excavation in Commercial Area 3 under Remedial Alternative 2B are presented below.

Excavation activities are not anticipated in the Commercial Area 3 for Remedial Alternative 2B.

Commercial Area 4

Commercial Area 4 is located on the eastern side of the Site. The majority of this area is covered with either pavement, buildings (vacant and occupied) or former building concrete slabs. Buildings (9A, 9B, 9C, 9D, 9E, 9F, and 23) were demolished on behalf of the City of Plainwell in 2012, with the majority of the former building concrete slabs left in place and backfilled to surrounding grade. The basement areas were backfilled with a combination of crushed concrete (from the buildings on Site), soil from an adjacent retaining wall that was removed, and imported gravel material and vary in thickness from 6 feet to 9 feet. Specific assumptions for excavation in Commercial Area 4 under Remedial Alternative 2B are presented below.

- Access to both the former substation area and around MW-16 will be restricted due to the distance between existing structures and either the Kalamazoo River or the Mill Race. Excavated soils will likely need to be double handled.

5.0 Transportation and Disposal by Redevelopment Area

The following assumptions were made relative to the transportation and disposal of materials in each of the redevelopment areas and reflected in the cost estimate.

- Soil volumes were converted to tonnage assuming a ratio of 1.5 tons per cubic yard for soils. Tonnage for concrete was based on 1.65 tons per cubic yard of material. Waste has been categorized as non-hazardous and non-TSCA soils; TSCA soil; TSCA debris; and miscellaneous debris.
- Transportation and disposal pricing is based on the non-hazardous, non-TSCA material being accepted at Waste Management Autumn Hills Landfill in Zeeland, Michigan. A cost of $22.00 per ton for both transportation and disposal of non-hazardous, non-TSCA waste was used for the estimates.
- A disposal price of $135.00 per ton was used for TSCA soils. For estimation purposes it was assumed that the TSCA soils would be transported to the Environmental Quality Company/U.S. Ecology Company Wayne Disposal Landfill #2, Belleville, Michigan for direct landfill disposal. Transportation of the soils was assumed to be conducted in lined 50 ton gravel trains. Transportation of each load of 50 tons was assumed to cost $500.00.

- Transportation costs assume fuel prices for diesel will not exceed $4.00 per gallon.
- Organic material generated from clearing activities was assumed to be chipped and left on Site.
- Concrete and asphalt will be disposed of off Site, not recycled.

Residential Area 1
The specific assumption for transportation and disposal work in Residential Area 1 under Remedial Alternative 2B is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 910 CY.

Residential Area 2
The specific assumption for transportation and disposal work in Residential Area 2 under Remedial Alternative 2B is presented below.

- Waste was assumed suitable for on-Site consolidation (25 CY).

Residential Area 3
The specific assumption for transportation and disposal work in Residential Area 2 under Remedial Alternative 2B is presented below.

- Waste was assumed suitable for on-Site consolidation (1,495 CY).

Residential Area 4
The specific assumption for transportation and disposal work in Residential Area 3 under Remedial Alternative 2B is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 5,340 CY.
- Allowance of $600 for asphalt.

Waterfront Plaza
No specific assumptions for transportation and disposal work in Waterfront Plaza under Remedial Alternative 2B were utilized. Excavation activities will not be conducted within the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
Specific assumptions for transportation and disposal work in Mixed Residential/Commercial Area 1 under Remedial Alternative 2B are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 12 CY for off-Site disposal.
- The remaining 28 CY of waste targeted for excavation was assumed suitable for on-Site consolidation.
- Allowance of 50 CY for asphalt disposal.

Mixed Residential/Commercial Area 2
Specific assumptions for transportation and disposal work in Mixed Residential/Commercial Area 2 under Remedial Alternative 2B are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil from Building 6A with a volume of 200 CY.
- Waste from the Train Shed was assumed suitable for on-Site consolidation (205 CY).
- Waste was assumed to be non-hazardous, non-TSCA soil from the coal tunnel area with a volume of 1,270 CY.
- Allowance of $3,500 for miscellaneous debris from the coal tunnel area (bricks, concrete)

- Waste was assumed to be non-hazardous, non-TSCA soil from the fuel oil line with a volume of 525 CY.
- Allowance of $600 for disposal of the fuel oil line piping
- Waste was assumed to be non-hazardous, non-TSCA soil from the fuel oil No. 6 AST area with a volume of 2,500 CY.
- Allowance of $1,200 for the concrete ring the fuel oil tank had sat upon and buried concrete and asphalt.
- Waste was assumed to be non-hazardous, non-TSCA soil from the north end of the Mill Buildings (test pits- TP-342 and TP-343) with a volume of 260 CY.
- Waste was assumed to suitable for on-site consolidation from the north end of the Mill Buildings (Buildings-3A, 25, 28, test pits-TP-340 and SB-2013) with a volume of 730 CY.
- Allowance of $6,000 for miscellaneous debris from these areas at the north end of the Mill Building.

Commercial Area 1
Specific assumptions for transportation and disposal work in Commercial Area 1 under Remedial Alternative 2B are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 12 CY.

Commercial Area 2
Waste will not be transported off Site from Commercial Area 2 for Remedial Alternative 2B.

Commercial Area 3
Waste will not be transported off Site from Commercial Area 2 for Remedial Alternative 2B.

Commercial Area 4
Specific assumptions for transportation and disposal work in Commercial Area 4 under Remedial Alternative 2B are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil from the former substation area with a volume of 1,325 CY.
- Waste was assumed to be suitable for on-Site consolidation from the area north of the Mill Buildings with a volume of 1,185 CY
- Waste was assumed to be TSCA soil from the area around MW-16 with a volume of 4,660 CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the area around boring BK5 with a volume of 15 CY.
- Allowance of $250 for asphalt transportation and disposal

6.0 Preparation of Consolidation Area and Consolidation of On-Site Soils

The conceptual area selected for on-Site consolidation of suitable soils is located in Commercial Area 4 (Figure 4.1). The Buildings in this area were demolished in 2011 and the concrete floors were generally left in place (Building 9A has a section of its concrete floor removed). The basement areas were then backfilled with gravel to match the grade to the west and south of the buildings. The thickness of the gravel varies from 6-7 feet (near Allegan Street) to 9 feet (adjacent to the existing Buildings). The gravel material would be excavated to achieve a receiving area for the consolidated soils. Gravel will be staged nearby on the asphalt parking area within Commercial Areas 2 and 3. This area will not generally require remedial excavation activities and is close by to reduce efforts of relocating the gravel material. Erosion control around the relocated gravel will be established. Erosion control costs for this activity were included in the Mobilization Erosion Control Costs.

Based on the conditions identified in the General Notes, 3,668 CY of soil would be available for consolidation under Alternative 2B. Based on the assumptions below, the area selected for consolidation would accept approximately 8,500 CY of soil. The cost estimate for Remedial Alternative 2B assumes 3,668 CY of material will be consolidated on Site. Material will come from Residential Area 2, Residential Area 3 Mixed Area 1, Mixed Area 2 and Commercial Area 1. It was assumed that the material would all be excavated and staged together so that the time the receiving excavation would need to be left open was minimized.

The following specific assumptions for the consolidation area were utilized for the cost estimate:

- The consolidation area was 150 feet by 150 feet in size
- A set back of greater than 20 feet was included on all four sides of the consolidation area
- An average thickness of 5 feet of consolidated soils was allowed
- The relocated / consolidated material would be compacted in place to 95 percent of the proctor
- The gravel material left over after consolidation would be utilized by the City of Plainwell for redevelopment activities.

7.0 Capping On-Site Soils

The area utilized for consolidation of the on-Site soils was assumed to be 150 feet by 150 feet. The estimate allows for 10 percent waste of capping materials (liner and geotextile).

- A three foot cover system was assumed:
  1. A 40 mil LLDPE liner with 12 ounce geotextile will be placed over the material
     a. 25,000 SF of liner and geotextile was included in the estimate
  2. General fill would be placed over the geotextile up to 6 inches of the surface
  3. The existing gravel material would be placed on top (6 inches)
- The liner will not be anchored in
- The general fill would be compacted to 95 -98 percent if the proctor
- The gravel would be compacted to 98 percent of the proctor

8.0 Restoration by Redevelopment Area

The following assumption was made relative to Site restoration in each of the redevelopment areas and reflected in the cost estimate.

- Restoration activities include backfill (material and placement), compaction, compaction testing and any other location specific restoration that may be deemed necessary at this time.
- General fill from a local gravel pit at a delivered material cost of $4.58 ton was used for the estimates. Unprocessed topsoil at a delivered price of $18.98 cubic yard was also used where appropriate.
- A six-inch layer of unscreened topsoil will be placed over the compacted general fill in areas that were previously pervious (i.e., not paved or impervious). Topsoil will be hydroseeded including mulch.
- Restoration for excavation areas under pavement will be backfilled with general fill and compacted to 95 percent of the proctor.
- A six-inch layer of 21AA or equivalent will be placed on the compacted general fill and compacted to 95 percent or greater of the proctor where restoration includes replacing the pavement.
- Concrete will be replaced where removed during excavation activities (sidewalk along Building 17).
- Asphalt will be replaced where removed during excavation activities.

- Permanent markers will be installed to designate areas on Site where impacted soils above Part 201 clean up criteria, based on land use, remain in place.

Residential Area 1
Specific assumptions for Site restoration in Residential Area 1 under Remedial Alternative 2B are presented below.

- Rip rap at the Kalamazoo River around the storm sewer does not need to be replaced.

Residential Area 2
No specific assumptions for Site restoration in Residential Area 2 under Remedial Alternative 2B were utilized.

Residential Area 3
Specific assumptions for Site restoration in Residential Area 3 under Remedial Alternative 2B are presented below.

- Backfill material will be imported general fill and overburden material removed to achieve excavation depth requirements but beyond the area exceeding cleanup criteria.
- MW-15 will be replaced.

Residential Area 4
No specific assumptions for Site restoration in Residential Area 4 under Remedial Alternative 2B were utilized.

Waterfront Plaza
No specific assumptions for Site restoration in Waterfront Plaza under Remedial Alternative 2B were utilized. Restoration will not be required in the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
No specific assumptions for Site restoration in Mixed Residential/Commercial Area 1 under Remedial Alternative 2B were utilized.

Mixed Residential/Commercial Area 2
Specific assumptions for Site restoration in Mixed Residential/Commercial Area 2 under Remedial Alternative 2B are presented below.

- Building 6A currently has a dirt floor; restoration would not include a concrete floor.
- Concrete (former ash silos) will not be replaced at SB-2010.
- Concrete around the former 200,000 gallon fuel oil AST will not be replaced.
- Concrete removed for excavations at SB-216, SB-220, SB-222 and SB-223 will not be replaced.
- Additional backfill will be required to fill in the void space of the coal tunnel.
- MW-2, MW-19 and MW-22 will be replaced.

Commercial Area 1
No specific assumptions for Site restoration in Commercial Area 1 under Remedial Alternative 2B were utilized.

Commercial Area 2
No specific assumptions for Site restoration in Commercial Area 2 under Remedial Alternative 2B were utilized.

Commercial Area 3
No specific assumptions for Site restoration in Commercial Area 3 under Remedial Alternative 2B were utilized.

Commercial Area 4
Specific assumptions for Site restoration in Commercial Area 4 under Remedial Alternative 2B are presented below.

- Asphalt will be 3 inches thick.
- Geotextile and Rip rap will be installed along the Mill Race.
- The Mill Race will be returned to its normal flow path.
- The turbidity curtain will be removed from the Mill Race and Kalamazoo River.
- MW-16 will be replaced.

9.0 Demobilization

The following assumptions were made relative to the demobilization from the Site and reflected in the cost estimate.

- Costs included in the demobilization task include time for Site tear down and final decontamination of equipment, and demobilization of equipment and personnel. Demobilization activities were assumed to take five working days.

B. ENGINEERING/OVERSIGHT

1.0 Engineering/Design

The following assumption was made relative to the installation of engineering/design and reflected in the cost estimate.

- Engineering and project design/specifications were estimated to be 15 percent of the Construction Costs.

2.0 Construction Oversight

The following assumption was made relative to the construction oversight and reflected in the cost estimate.

- Construction oversight was estimated to be 10 percent of the Construction Costs.

TABLE C.2C

COST SUMMARY
REMEDIAL ALTERNATIVE 2C – EXCAVATION AND OFF-SITE DISPOSAL
WITH CONSOLIDATION AND CAPPING
TO MEET LAND USE FOR PART 201, 10^{-5} RISK LEVEL FOR ARSENIC (6.4 MG/KG RESIDENTIAL AND 27 MG/KG FOR NON-RESIDENTIAL),
AND PCB RISK-BASED LEVEL (2.5 MG/KG RESIDENTIAL AND 9.1 MG/KG COMMERCIAL AREAS)
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Estimated Cost* *Total*
CAPITAL COSTS						
A.	***PRE-DESIGN INVESTIGATION***					**$33,200**
1.0	Sampling and Analysis Work Plan (SAP)	LS	1	$25,000	$25,000	
	Survey top of banks at Site	LS	1	$2,000	$2,000	
	Health and Safety Plan Update	LS	1	$1,200	$1,200	
	Multi-Area Quality Assurance Project Plan	LS	1	$5,000	$5,000	
2.0	SAP Implementation					**$123,900**
	Project Set up (mark locations etc.)	LS	1	$8,790	$8,800	
	Private Utility Locate	LS	1	$8,000	$8,000	
	Field Activities	DA	20	$2,900	$58,000	
	Field Technicians					
	Sampling Equipment (push probe technology)					
	Expendables (PPE etc)					
	Temporary Lighting and Carbon Monoxide Control	LS	1	$3,000	$3,000	
	Concrete Coring	LS	1	$6,000	$6,000	
	Laboratory Analysis	LS	1	$39,055	$39,100	
	Investigation Derived Waste Disposal	DA	20	$50	$1,000	
3.0	Contingency on PDI	LS	1	$78,550	$78,600	**$78,600**
	Based on 50 % of SAP costs					
4.0	Remedial Action Plan	LS	1	$60,000	$60,000	**$60,000**
	TOTAL PRE-DESIGN COSTS					**$295,700**
B.	***CONSTRUCTION***					
1.0	**Mobilization and Set up**					**$270,000**
	Mobilization and Set up	LS	1	$51,500	$51,500	
	Health and Safety	Monthly	5	$28,450	$142,300	
	Erosion Control	LS	1	$18,700	$18,700	
	Site Facilities					
	Temporary Facilities	Monthly	5	$6,810	$34,100	
	Decontamination Pad and Stations	LS	1	$17,375	$17,400	
	Staging Areas	LS	1	$6,000	$6,000	
2.0	**Additional Preparation and/or Demolition (by Redevelopment Area)**					**$139,400**
	Residential 1	LS	1	$14,700	$14,700	
	Residential 2	LS	1	-	-	
	Residential 3	LS	1	$1,195	$1,200	
	Residential 4	LS	1	$850	$900	
	Waterfront Plaza	LS	1	-	-	
	Mixed Residential/Commercial Area 1	LS	1	-	-	
	Mixed Residential/Commercial Area 2	LS	1	$56,625	$56,600	
	Commercial Area 1	LS	1	-	-	
	Commercial Area 2	LS	1	-	-	
	Commercial Area 3	LS	1	-	-	
	Commercial Area 4	LS	1	$65,980	$66,000	
3.0	**Excavation (by Redevelopment Area)**					**$293,100**

TABLE C.2C

COST SUMMARY
REMEDIAL ALTERNATIVE 2C – EXCAVATION AND OFF-SITE DISPOSAL
WITH CONSOLIDATION AND CAPPING
TO MEET LAND USE FOR PART 201, 10^{-5} RISK LEVEL FOR ARSENIC (6.4 MG/KG RESIDENTIAL AND 27 MG/KG FOR NON-RESIDENTIAL),
AND PCB RISK-BASED LEVEL (2.5 MG/KG RESIDENTIAL AND 9.1 MG/KG COMMERCIAL AREAS)
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost*	
					Subtotal	*Total*
	Residential 1	CY	935	$14	$12,900	
	Residential 2	CY	620	$12	$7,300	
	Residential 3	CY	1,895	$9	$16,800	
	Residential 4	CY	9,390	$4	$33,000	
	Waterfront Plaza	CY	-	-	-	
	Mixed Residential/Commercial Area 1	CY	70	$61	$4,300	
	Mixed Residential/Commercial Area 2	CY	6,396	$27	$171,200	
	Commercial Area 1	CY	12	$106	$1,300	
	Commercial Area 2	CY	12	$106	$1,300	
	Commercial Area 3	CY	-	-	-	
	Commercial Area 4	CY	7,175	$6	$45,000	
4.0	**Transportation and Disposal (by Redevelopment Area)**					**$1,696,670**
	Residential 1 - Non Haz Non TSCA Soils	Ton	1,403	$22	$30,900	
	Residential 2 - Non Haz Non TSCA Soils	Ton	-	-	-	
	Residential 3 - Non Haz Non TSCA Soils	Ton	240	-	-	
	Residential 4 - Non Haz Non TSCA Soils	Ton	14,085	$22	$309,900	
	Residential 4 - Misc Debris	LS	1		$600	
	Waterfront Plaza - Non Haz Non TSCA Soils	Ton	-	-	-	
	Mixed Residential/Commercial Area 1 - Non Haz Non TSCA Soils	Ton	18	$22	$400	
	Mixed Residential/Commercial Area 1 - Misc. Debris	LS	-	$125	$1,675	
	Mixed Residential/Commercial Area 2 - Non Haz Non TSCA Soils	Ton	8,242	$22	$180,800	
	Mixed Residential/Commercial Area 2 - Misc. Debris	LS	1		$8,245	
	Commercial Area 1 - Non Haz Non TSCA Soils	Ton	18	$22	$400	
	Commercial Area 2 - Non Haz Non TSCA Soils	Ton	18	$22	$400	
	Commercial Area 2 - Misc. Debris	LS	-	-	-	
	Commercial Area 3 - Non Haz Non TSCA Soils	Ton	-	-	-	
	Commercial Area 3 - Misc. Debris	LS	-	-	-	
	Commercial Area 4 - Non Haz Non TSCA Soils	Ton	1,970	$22	$43,300	
	Commercial Area 4 - Misc. Debris	LS	-		$3,550	
	Commercial Area 4 - TSCA	Ton	7,000	$160	$1,116,500	
5.0	**Consolidation of Soils on Site**					**$53,900**
	Preparation of Consolidation Area (south of Mill Buildings)	LS	1	$44,450	$44,500	
	Consolidation of On Site Soils (Placement of Material)	CY	4,700	$2	$9,400	
6.0	**Capping of Soils On Site**	LS	1	$96,525	$96,500	**$96,500**
7.0	**Restoration (by Redevelopment Area)**					**$485,525**
	Residential 1	LS	1		$25,000	
	Residential 2	LS	1		$18,260	
	Residential 3	LS	1		$34,785	
	Residential 4	LS	1		$146,380	
	Waterfront Plaza	LS	-		-	
	Mixed Residential/Commercial Area 1	LS	1		$8,625	
	Mixed Residential/Commercial Area 2	LS	1		$134,220	
	Commercial Area 1	LS	1		$1,670	
	Commercial Area 2	LS	-		$1,670	
	Commercial Area 3	LS	-		-	
	Commercial Area 4	LS	1		$114,915	

TABLE C.2C

COST SUMMARY
REMEDIAL ALTERNATIVE 2C – EXCAVATION AND OFF-SITE DISPOSAL
WITH CONSOLIDATION AND CAPPING
TO MEET LAND USE FOR PART 201, 10^{-5} RISK LEVEL FOR ARSENIC (6.4 MG/KG RESIDENTIAL AND 27 MG/KG FOR NON-RESIDENTIAL),
AND PCB RISK-BASED LEVEL (2.5 MG/KG RESIDENTIAL AND 9.1 MG/KG COMMERCIAL AREAS)
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Estimated Cost* *Total*
8.0	**Demobilization**	LS	1	$32,300	$33,000	**$32,300**
	Decontamination and Demobilization					
	TOTAL CONSTRUCTION COST					**$3,067,395**
C.	***ENGINEERING/OVERSIGHT***					
1.0	**Institutional Controls**					**$50,000**
2.0	**Engineering/ Design (15 % of Construction Costs)**					**$460,100**
3.0	**Construction Oversight (10 % of Construction Costs)**					**$306,700**
	TOTAL ENGINEERING/OVERSIGHT COSTS					**$816,800**
	CONTINGENCY ON CAPITAL COSTS (25 %)					**$971,049**
	TOTAL CAPITAL COSTS					**$4,855,244**
OPERATION, MAINTENANCE, & MONITORING COSTS						
A.	***ANNUAL MONITORING AND MAINTENANCE***					**$9,600**
	Monthly Operation and Maintenance of System	Month	12	$800	$9,600	
	CONTINGENCY ON OM & M COSTS (20 %)					**$1,920**
	TOTAL CAPITAL COSTS					**$4,855,244**
	NET PRESENT VALUE OF OM&M (30 YEARS @ 7 % DISCOUNT RATE)					**$142,952**
	TOTAL COST					**$4,998,195**

Table C.2C

COST SUMMARY NOTES
REMEDIAL ALTERNATIVE 2C – EXCAVATION AND OFF-SITE DISPOSAL
WITH CONSOLIDATION AND CAPPING
TO MEET LAND USE FOR PART 201, 10^{-5} RISK LEVEL FOR ARSENIC AND PCB RISK-BASED LEVEL
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

GENERAL NOTES

A. The estimate for Remedial Alternative 2C - Excavation and Off-Site Disposal with on-Site Consolidation and Capping, to meet Land Use Criteria for Part 201 with Risk Based Approach of 10^{-5} for Arsenic and Site specific calculated PCB Risk-Based Level has been prepared based on available information at the time of this document. Arsenic risk-based criteria are 6.4 milligrams per kilogram (mg/kg) for Residential and Mixed Residential/Commercial Areas and 27 mg/kg for Commercial Areas. Calculated PCB levels of 2.5 mg/kg (Residential Areas) and 9.1 mg/kg (for Commercial areas) were utilized. Redevelopment activities conducted, being conducted and anticipated for the Site by the City of Plainwell may affect the remediation costs. Costs presented in the Feasibility Study (FS) Report have taken into consideration anticipated redevelopment plans by the City of Plainwell. Redevelopment plans include demolition of non-historical buildings to the concrete slab as well as specific land use restrictions/designations for the Site as presented on Figure 1.4 of the FS Report. This cost estimate is expected to be within -30 percent to +50 percent of the actual remedial costs in accordance with United States Environmental Protection Agency (U.S. EPA) guidance.

B. Remediation activities for each of the 11 proposed redevelopment areas were estimated separately; however, the estimate assumes one mobilization and demobilization effort to conduct the work.

C. Costs assume that additional soil investigation will not be conducted under building slabs unless otherwise noted in the pre-design notes below.

D. Areas targeted for soil removal and off-Site disposal were determined based on an iterative/risk-based approach for arsenic and Site specific calculated levels for PCBs as detailed in Appendix A of the FS Revision 2.

E. The cost estimate assumes that new structures have not been constructed in areas that are planned for soil excavation and existing structures remain in place.

F. The cost estimate includes abandonment and replacement costs of groundwater monitoring wells within excavation areas.

G. Figure 4.1 of the FS Report shows the conceptual area for consolidation of on Site materials in Commercial Area 4 south of the former Mill Buildings in the area formerly occupied by Buildings 9A, 9B, 9D, 9E and 23.

H. Material was considered for consolidation on Site if the following conditions are met:
   1. Soil that was reported with an arsenic concentration of below 27 milligrams per kilogram (mg/kg)
   2. The soil was not reported with an inhalation exceedance
   3. The soil did not contain PCBs above 2.5 mg/kg
   4. The soil does not contain coal

I. The soil does not contain semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs) above Part 201 Residential Criteria.

J. Costs are based on 2014 dollars.

K. All volumes are based on in-place measures unless otherwise stated.

L. Abbreviations used in the "Unit" column in the Cost Estimate Table are as follows:
- CY = Cubic Yard
- EA = Each
- LS = Lump Sum
- TN = Ton
- LF= linear foot

TASK NOTES:

CAPITAL COSTS

A. INVESTIGATION/CONSTRUCTION

1.0 Pre-Design Investigation (PDI) Activities

The following assumptions were made relative to the PDI activities in each of the redevelopment areas and reflected in the cost estimate.

- Generation of a Sampling and Analysis Plan (SAP).
- Update the Health and Safety Plan as necessary.
- Update the Multi-Area Quality Assurance Project Plan as necessary.
- Completion of the SAP - soil boring installation and soil sample collection to delineate the vertical and horizontal extent of impact. Soil borings are assumed to be collected via direct push method. PDI samples will be collected and submitted for laboratory analysis for specific parameters determined to exceed Preliminary Remediation Goals (PRGs) during the Remedial Investigation (RI). Delineation samples will not be collected in areas that were not selected for excavation activities (i.e., under building slabs, etc.)
- Quality Assurance/Quality Control samples are included on a 1 per 10 basis.
- A survey of the "top of bank" is included in the PDI cost estimate.
- All areas where subsurface work is to be conducted will be cleared through a public utility locate (i.e., MISS Dig), a private utility locate, review of available drawings, and discussions with individuals knowledgeable of the Site and utilities located thereon.

Residential Area 1
PRGs exceeded in Residential Area 1 include the risked based criteria for arsenic of 6.4 milligrams per kilogram (mg/kg). Soil samples will be collected to delineate the extent of soil impacted with PCBs adjacent to the storm sewer line installed by the Michigan Department of Transportation (MDOT) in 2012.

- Allowance for 30 soil samples for PCBs
- Allowance for 28 soil samples for arsenic

Residential Area 2
PRGs exceeded in Residential Area 2 include the risked based criteria for arsenic of 6.4 mg/kg.

- Allowance for 36 soil samples for arsenic

Residential Area 3
PRGs exceeded in Residential Area 3 include the risked based criteria for arsenic of 6.4 mg/kg.

- Allowance for 60 soil samples for arsenic

Residential Area 4
PRGs exceeded in Residential Area 4 include the risked based criteria for arsenic of 6.4 mg/kg. Part 201 residential direct contact criteria is exceeded at locations within Residential Area 4 for benzo(a)pyrene, cyanide, dibenz(a,h)anthracene and lead. Residential soil volatilization to indoor air inhalation criteria (SVIIC) was exceeded at one location for benzene. The Part 201 non-residential direct contact criterion for lead was exceeded within Residential Area 4. PCBs were above the Site specific calculated PRG of 2.5 mg/kg within Residential Area 4.

- An allowance for 56 soil samples for arsenic
- Benzene above the residential SVIIC at TP-308
    - An allowance for 4 soil samples for benzene was included in the estimate.
- Cyanide was above residential direct contact criteria at SB-302 in the shallow (0-1 foot) interval
    - Four samples for cyanide were included in the estimate
- An allowance for 20 samples for lead was included in the estimate
- The PNA parameters were identified in shallow samples (0-1.5 feet) below grade at DG3, DG4 and TP-302
    - Allowance for 12 PNA samples
- PCBs were above the calculated Site specific level of 2.5 mg/kg at TP-313 and SB-301
    - An allowance for 45 soil samples for PCBs was included in the estimate

Waterfront Plaza
PDI activities will not be specifically conducted within the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
PRGs exceeded in Mixed Residential/Commercial Area 1 include Part 201 non-residential inhalation criteria for manganese and the risked based PRG for arsenic of 6.4 mg/kg.

- A total of 24 soil samples for arsenic will be collected.
- Soil samples will be collected from borings around TP-334 for manganese. Eight samples will be collected for manganese analysis.

Mixed Residential/Commercial Area 2
PRGs exceeded in Mixed Residential/Commercial Area 2 include Part 201 non-residential direct contact criteria for benzo(a)pyrene, and lead. Residential direct contact criteria is exceeded at locations within Mixed Residential/Commercial Area 2 for benzo(a)pyrene, dibenz(a,h)anthracene; benzo(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene and lead. The risked based PRG for arsenic of 6.4 mg/kg is also exceeded at locations within Mixed Residential/Commercial Area 2.

Soil delineation by work area as follows:

<u>Arsenic ONLY locations</u>:
Building 25
- Allowance for 8 samples

Building 28
- Allowance for 8 samples

Train Shed
- Allowance for 4 samples

Coal Tunnel Area
- Allowance for 30 samples

Former Ash Silo Area (SB-2011)

- Allowance for 8 samples

Former clarifier area (TP-344)

- Allowance for 8 samples

Area north of Building 3/Former Water Tower Area (TP-340, TP-342, TP-343)

- Allowance for 16 samples

Arsenic and Lead sample locations:

Area around SB-2013

- Allowance for 12 samples

Arsenic, PNAs and Lead sample locations:

Building 3A

- Allowance for 12 samples

Building 6A

- Allowance for 18 samples
- Technicians will be required to don respirators for this work
- The floor in the majority of this building is exposed soil

Arsenic and PNAs sample locations

Fuel Oil AST Area

- Allowance for 24 PNA soil samples
- Allowance for 12 arsenic samples

A total of 140 samples will be collected and analyzed for arsenic.
A total of 54 samples will be collected and analyzed for PNAs.
A total of 42 samples will be collected and analyzed for lead.

Commercial Area 1

PRGs exceeded in Commercial Area 1 include Part 201 non-residential inhalation criteria for manganese.

- Delineation samples (4) will be collected around SS-105 for manganese.

Commercial Area2

Arsenic above the PRG of 27 mg/kg was exceeded in Commercial Area 2 at TP-321

- Four samples will be collected around TP-321 for arsenic.

Commercial Area3

PRGs are not exceeded in Commercial Area 3.

Commercial Area 4

Part 201 Residential direct contact criteria is exceeded at locations within Commercial Area 4 for benzo(a)pyrene and lead. The risked based PRG criterion for arsenic of 27 mg/kg was exceeded within Commercial Area 4. PCBs above the Site specific calculated PRG of 9.1 mg/kg was identified in the area around MW-16.

Soil delineation by area as follows:

Arsenic ONLY locations:
SB-2012
- Allowance for 4 samples

Parking lot area south of Building 17
- Allowance for 60 samples

Arsenic and Lead sample locations:
TP-341
- Allowance for 4 samples

Arsenic, PNAs and Lead sample locations:
Former Substation Area/North of Mill Buildings
- Allowance for 30 samples

PCBs and Arsenic sample locations:
MW-16 Area
- Allowance for 18 samples

A total of 116 samples will be collected and analyzed for arsenic.
A total of 30 samples will be collected and analyzed for PNAs.
A total of 18 samples will be collected and analyzed for PCBs.
A total of 34 samples will be collected and analyzed for lead.

2.0 Mobilization/Set-Up

The following assumptions were made relative to the mobilization/set-up in each of the redevelopment areas and reflected in the cost estimate.

- Mobilization and set-up includes: mobilization of personnel and equipment (including liner crew and equipment); construction survey work (e.g., excavation layout and verification sample locations); and geotechnical and chemical testing on backfill materials.
  - An allowance of $8,000 to mobilize personnel and equipment was included in the estimate.
  - $30,000 for survey work was included in the estimate.
  - Geotechnical and chemical analysis for imported materials was included in the estimate. One set of chemical analysis [Target Analyte List Metals, Target Compound List (TCL) for volatile organic compounds, TCL for semi-volatile compounds, and polychlorinated biphenyl (PCBs) per material (topsoil, general fill and 21AA/gravel]. The topsoil sample will also be analyzed for pH, phosphorous, organic content, pesticides and herbicides.
- Health and Safety includes an on-Site Health and Safety Officer (HSO) for 4 months, the HSO will not stay on Site during all restoration activities. Also included in the costs are: air monitoring equipment and calibration gases; a decontamination trailer; and disposable personal protection equipment (PPE) for the duration of the project (5 months).
- Air monitoring assumes real-time air monitoring will be conducted during all excavation work utilizing a photoionization detector (11.7 electronVolt [eV] lamp) and fugitive dust monitor(s). Air monitoring does not include the collection of samples for laboratory analysis or laboratory analytical costs.
- Erosion control includes an allowance for silt fence (4,000 LF) and geofabric to cover catch basins on the Site. Costs for erosion control measures specific to individual redevelopment areas (i.e., turbidity curtains, etc.) are included in individual redevelopment area estimates (e.g., Commercial Area 4).

Erosion control (visqueen, hay bales etc.) for the staged consolidation pile(s) of soil and the relocated and staged gravel material area included here.

- Site facility costs include electrical hookup and electricity for two office trailers (one for the contractor and one for the U.S. EPA) for 5 months. Other temporary facilities include portable sanitary services, a drinking water allowance and a small dumpster for worker general refuse. The expense of one Site truck for the duration of the services was included.
- Site facility costs include materials and construction of temporary decontamination pads and decontamination stations for workers. It was assumed that potable water could be obtained from the City of Plainwell for use during the project.
- Site facility costs include $6,000 to for the installation and maintenance of a staging area for waste.
- A perimeter fence currently exists around the majority of the Site. The cost estimate assumes the fence will remain and can be utilized as a security measure to prevent access to the Site during construction activities.

3.0 Preparation/Pre-Excavation Work by Redevelopment Area

The following assumptions were made relative to the preparation/pre-excavation work in each of the redevelopment areas and reflected in the cost estimate.

- A Soil Erosion and Sedimentation Control Permit will be obtained from Allegan County. All other necessary permits will also be obtained prior to intrusive work at the Site.
- All areas where subsurface work is to be conducted will be cleared through a public utility locate (i.e., MISS Dig), a private utility locate, review of available drawings, and discussions with individuals knowledgeable of the Site and utilities located thereon.

Residential Area 1

Specific assumptions for preparation/pre-excavation work in Residential Area 1 under Remedial Alternative 2C are presented below.

- Trees and shrubs in the excavation areas will need to be cleared and grubbed.
- Turbidity curtain will be temporally installed in the Kalamazoo River during excavation and backfill activities.
- One power pole will need to be relocated for the excavation work around SB-104.

Residential Area 2

No specific assumptions for preparation/pre-excavation work in Residential Area 2 under Remedial Alternative 2C were utilized.

Residential Area 3

Specific assumptions for preparation/pre-excavation work in Residential Area 3 under Remedial Alternative 2C are presented below.

- MW-15 will be abandoned.
- Clearing will be required in the area around MW-15.

Residential Area 4

Specific assumptions for preparation/pre-excavation work in Residential Area 4 under Remedial Alternative 2C are presented below.

- Clearing will be required in the area around SB-301/SG-4.
- Pavement by TP-302 will be saw cut.

Waterfront Plaza
No specific assumptions for preparation/pre-excavation work in Waterfront Plaza under Remedial Alternative 2C were utilized.

Mixed Residential/Commercial Area 1
The specific assumption for preparation/pre-excavation work in Mixed Residential/Commercial Area 1 under Remedial Alternative 2C is presented below.

- Pavement in the work areas will be saw cut prior to excavation to leave a clean line for restoration activities.

Mixed Residential/Commercial Area 2
Specific assumptions for preparation/pre-excavation work in Mixed Residential/Commercial Area 2 under Remedial Alternative 2C are presented below.

- The loading dock at the south end of Building 1 will be evaluated by a structural engineering assessment to ensure excavation of the fuel oil line will not damage either the loading dock or Building 1.
- The pavement and concrete will be saw cut prior to excavation to create clean lines for restoration.
- A demolition notice will be submitted to the State of Michigan for the demolition of Building 5A/part of the coal tunnel. Asbestos abatement may be necessary on pipe wrap found outside of Building 5A.
- Excavation of soils under the concrete slabs of the demolished buildings (3A, 25 and 28) will require the relocation of the backfill (less than 3 feet thick) prior to excavation.
- Fuel Oil No. 6 within the former coal tunnel will be removed from the tunnel before the tunnel itself is removed.
- The piping run from the former Fuel Oil No. 6 AST and Building 5 will be exposed at one end and drained of any residual fuel oil prior to removing the line.
- Monitoring well MW-19 will be abandoned prior to excavation activities in this area.
- Monitoring well MW-22 will be abandoned prior to removal of the former fuel oil line.
- Monitoring well MW-2 will be abandoned prior to excavation activities at SB-2010 and SB-2011.

Commercial Area 1
No specific assumptions for preparation/pre-excavation work in Commercial Area 1 under Remedial Alternative 2C were utilized.

Commercial Area 2
No specific assumptions for preparation/pre-excavation work in Commercial Area 2 under Remedial Alternative 2C were utilized.

Commercial Area 3
No specific assumptions for preparation/pre-excavation work in Commercial Area 3 under Remedial Alternative 2C were utilized. Excavation work will not be conducted in Commercial Area 3 for Remedial Alternative 2C.

Commercial Area 4
Specific assumptions for preparation/pre-excavation work in Commercial Area 4 under Remedial Alternative 2C are presented below.

- Turbidity curtain will be installed in the Mill Race in the area by MW-16 (along the Mill Race) and in the area of MW-3 prior to excavation activities.
- Monitoring of the Mill Race and Kalamazoo River for turbidity will be conducted during excavation activities.
- MW-16 will be abandoned prior to excavation work in that area.
- Protection of MW-3 (barriers) will be installed.
- A structural engineering evaluation of the pedestrian bridge for stability during excavation activities will be conducted. The evaluation will determine if shoring of the bridge is necessary. An allowance of $5,000 is included in the estimate to conduct the evaluation. Shoring costs have not been included in the estimate.
- The water flow of the Mill Race will be diverted in the excavation area. The methodology for this work to be determined in the pre-design phase of the project.
- Rip rap along the Mill Race will be removed and staged for re-use.
- Pavement in the work areas will be saw cut prior to excavation to allow for restoration activities.

4.0 Excavation by Redevelopment Area

Conceptual excavation areas for each of the Redevelopment areas are shown of Figures 3.23 through 3.33 of the FS Report (Revision 2).

The following assumptions were made relative to excavation in each of the redevelopment areas and reflected in the cost estimate.

- Soil excavation was not conducted inside of the buildings (see exception for Building 6A – which does not have a concrete floor).
- Excavation estimates assume dewatering will not be necessary and that all work can be completed in Level D PPE except Building 6A which will be conducted with supplied air (Level B) PPE.
- Standby time was not added to account for the time for laboratory analysis of verification samples. It was assumed that the project would proceed across the Site allowing for laboratory analysis to be conducted while another redevelopment area was being excavated or restored.

Specific assumptions to each redevelopment area, in addition to those presented above globally, are provided below.

Residential Area 1

Residential Area 1 is located at the far west end of the Site, where the majority of the former sludge dewatering lagoons were located. The former Mill wastewater treatment building, activated sludge tank and secondary clarifier were constructed over the lagoons. The wastewater treatment structures were demolished on behalf of the City of Plainwell in November and December 2013. The specific assumption for excavation in Residential Area 1 under Remedial Alternative 2C is presented below.

- Overburden present beyond the target excavation area that must be removed to achieve the full depth of excavation will be disposed of off Site.

Residential Area 2

Residential Area 2 is located between Residential Area 1 and Residential Area 3 and is positioned along the Kalamazoo River. This area was historically occupied by sludge dewatering lagoons (A, B, C) and a primary clarifier. The primary clarifier was demolished to the concrete slab in November 2013. No

specific assumptions for excavation work in Residential Area 2 under Remedial Alternative 2C were utilized.

Residential Area 3

Residential Area 3 is located near the center of the Site. The former aeration basin location occupies the majority of the area. A former secondary clarifier was historically present in this area, which was demolished in November 2013 with the floor of the former clarifier remaining. Specific assumptions for excavation in Residential Area 3 under Remedial Alternative 2C are presented below.

- Material removed from the bottom of the aeration basin will require double handling due to the slopes of the former aeration basin and the depth of the excavation.

Residential Area 4

Residential Area 4 is positioned along the Kalamazoo River between Residential Area 3 and Mixed Residential Area 2. No aboveground structures are currently present on this area. A portion of this area was historically utilized by the Mill as a coal storage area. No specific assumptions for excavation in Residential Area 4 under Remedial Alternative 2C were made.

Waterfront Plaza

No excavation activities are anticipated in the Waterfront Plaza Area.

Mixed Residential/Commercial Area 1

Mixed Residential/Commercial Area 1 is located between Commercial Area 2 and Commercial Area 3 on the southern property line along Allegan Street. This area was once occupied by the former Specialty Minerals Building and associated above ground storage tanks. The Specialty Minerals building and ASTs were demolished to the concrete slab in December 2011.

- Underground utilities encountered (TP-303 and TP-306) between the former Specialty Minerals Building and the main Mill Buildings will be capped at either end of the excavation.

Mixed Residential and Commercial Area 2

Mixed Residential and Commercial Area 2 is located between Residential Area 4 and Commercial Area 4 at the northern end of the Site along the Kalamazoo River. The majority of the area is occupied by Mill Buildings and pavement. Buildings 3A, 25 and 28 along with the eastern water tower, 200,000-gallon Fuel Oil AST, and the brine USTs, were demolished on behalf of the City of Plainwell. The concrete slabs were left in place for Buildings 3A and 28. Building 25 was part of the Site's historical wastewater treatment system and had a subsurface vault and system to pump the waste water from the Mill to the on-Site WWTP at the west end of the Site. The vault under the northern portion of Building 25 was not removed. The vault floor was cracked and the sidewalls removed to 4 feet below grade, then the vault was filled with imported general fill. The concrete slab under the remaining portion of Building 25 was left in place.

Specific assumptions for excavation in Mixed Residential/Commercial Area 2 under Remedial Alternative 2C are presented below.

- A storm sewer was installed through the west side of Mixed Residential/Commercial Area 2 in 2012 by the Michigan Department of Transportation (MDOT). The approximate location of the storm sewer is shown on Figure 3.29. Before conducting excavation work to remove the former fuel oil AST line and excavate the east side of the former fuel AST, the exact location of the storm sewer line will be determined, shoring of the line may be necessary during the removal of the fuel oil AST line.
- Soils in Building 6A will be removed using a vacuum extraction system.

Commercial Area 1
Commercial Area 1 is located in the far southwest portion of the Site. No structures or paved areas are currently present in this area that would require unique equipment or procedures to conduct the proposed remedial activities. This area of the Site has not been developed and was not part of historic Mill operations.

- A storm sewer was installed through this area in 2012 by the Michigan Department of Transportation (MDOT). The approximate location of the storm sewer is shown on Figure 3.30. Before conducting excavation work in the area of SS-105, the exact location of the line will be determined.

Commercial Area 2
Commercial Area 2 is located in the southwest central portion of the Site. Structures on this portion of the Site include the City of Plainwell Public Safety Building and associated paved parking and egress /ingress areas. Excavation activities will not take place under the existing building or paved surfaces. No specific assumptions for excavation in Commercial Area 2 under Remedial Alternative 2C were made.

Commercial Area 3
Excavation work will not be conducted in Commercial Area 3 for Remedial Alternative 2C.

Commercial Area 4
Commercial Area 4 is located on the eastern side of the Site. The majority of this area is covered with either pavement, buildings (vacant and occupied) or former building concrete slabs. Buildings (9A, 9B, 9C, 9D, 9E, 9F, and 23) were demolished on behalf of the City of Plainwell in 2012, with the majority of the former building concrete slabs left in place and backfilled to surrounding grade. The basement areas were backfilled with a combination of crushed concrete (from the buildings on Site), soil from an adjacent retaining wall that was removed, and imported gravel material and vary in thickness from 6 feet to 9 feet. Specific assumptions for excavation in Commercial Area 4 under Remedial Alternative 2C are presented below.

- Access to both the former substation area and around MW-16 will be restricted due to the distance between existing structures and either the Kalamazoo River or the Mill Race. Excavated soils will likely need to be double handled.

5.0 Transportation and Disposal by Redevelopment Area

The following assumptions were made relative to the transportation and disposal of materials in each of the redevelopment areas and reflected in the cost estimate.

- Soil volumes were converted to tonnage assuming a ratio of 1.5 tons per cubic yard for soils. Tonnage for concrete was based on 1.65 tons per cubic yard of material. Waste has been categorized as non-hazardous and non-TSCA soils; TSCA soil; TSCA debris; and miscellaneous debris.
- Transportation and disposal pricing is based on the non-hazardous, non-TSCA material being accepted at Waste Management Autumn Hills Landfill in Zeeland, Michigan. A cost of $22.00 per ton for both transportation and disposal of non-hazardous, non-TSCA waste was used for the estimates.
- A disposal price of $135.00 per ton was used for TSCA soils. For estimation purposes it was assumed that the TSCA soils would be transported to the Environmental Quality Company/U.S. Ecology Company Wayne Disposal Site #2 Landfill, Belleville, Michigan for direct landfill disposal. Transportation of the soils was assumed to be conducted in lined 50 ton gravel trains. Transportation of each load of 50 tons was assumed to cost $500.00.
- Transportation costs assume fuel prices for diesel will not exceed $4.00 per gallon.
- Organic material generated from clearing activities was assumed to be chipped and left on Site.

- Concrete and asphalt will be disposed of off-Site, not recycled.

Residential Area 1
The specific assumption for transportation and disposal work in Residential Area 1 under Remedial Alternative 2C is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 935 CY.

Residential Area 2
The specific assumption for transportation and disposal work in Residential Area 2 under Remedial Alternative 2C is presented below.

- Waste was assumed suitable for on-Site consolidation (620 CY).

Residential Area 3
The specific assumption for transportation and disposal work in Residential Area 2 under Remedial Alternative 2C is presented below.

- Waste was assumed suitable for on-Site consolidation (1,735 CY).
- 160 CY of material was assumed to be unsuitable for on-Site consolidation due to buried debris.

Residential Area 4
The specific assumption for transportation and disposal work in Residential Area 3 under Remedial Alternative 2C is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 9,390 CY.
- Allowance of $600 for asphalt.

Waterfront Plaza
No specific assumptions for transportation and disposal work in Waterfront Plaza under Remedial Alternative 2C were utilized. Excavation activities will not be conducted within the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
Specific assumptions for transportation and disposal work in Mixed Residential/Commercial Area 1 under Remedial Alternative 2C are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 12 CY.
- Remaining waste targeted for excavation assumed suitable for on-Site consolidation (58 CY).
- Allowance of 50 CY for asphalt disposal.

Mixed Residential/Commercial Area 2
Specific assumptions for transportation and disposal work in Mixed Residential/Commercial Area 2 under Remedial Alternative 2C are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil from Building 6A with a volume of 200 CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the coal tunnel area with a volume of 1,270 CY.
- Allowance of $3,500 for miscellaneous debris from the coal tunnel area (bricks, concrete).
- Waste was assumed to be non-hazardous, non-TSCA soil from the fuel oil line with a volume of 525 CY.
- Allowance of $600 for disposal of the fuel oil line piping.

- Waste was assumed to be non-hazardous, non-TSCA soil from the fuel oil No. 6 AST area with a volume of 2,500 CY.
- Allowance of $1,200 for the concrete ring the Fuel Oil AST was sitting on and buried concrete and asphalt.
- Waste from the Train Shed was assumed to be suitable for on-Site consolidation (205 CY).
- Waste was assumed to be non-hazardous, non-TSCA soil from the north end of the Mill Buildings (test pits-TP-340, TP-342 and TP-343 and Building 3A borings) with a volume of 1,000 CY.
- Waste was assumed to be suitable for on-Site consolidation from Buildings 25 and 28 plus the area around SB-2010 and SB-2011 (696 CY).
- Allowance of $6,000 for miscellaneous debris from these areas at the north end of the Mill Building.

Commercial Area 1
Specific assumptions for transportation and disposal work in Commercial Area 1 under Remedial Alternative 2C are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 12 CY.

Commercial Area 2
Specific assumptions for transportation and disposal work in Commercial Area 2 under Remedial Alternative 2C are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 12 CY.

Commercial Area 3
No specific assumptions for transportation and disposal work in Commercial Area 3 under Remedial Alternative 2C were utilized. Excavation activities will not be conducted within the Commercial Area 3.

Commercial Area 4
Specific assumptions for transportation and disposal work in Commercial Area 4 under Remedial Alternative 2C are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil from the former substation area and north of the Mill Buildings with a volume of 1,300 CY.
- Waste was assumed to be suitable for on-Site consolidation from north of the Mill Buildings 11, 11A and 19 (1,200 CY).
- Waste was assumed to be TSCA soil from the area around MW-16 with a volume of 4,660 CY.
- Waste was assumed to suitable for consolidation on-Site from the area around BK5 (15 CY).
- Allowance of 400 CY of asphalt.

6.0 Preparation of Consolidation Area and Consolidation of On-Site Soils

The conceptual area selected for on-Site consolidation of suitable soils is located in Commercial Area 4 (Figure 4.1). The Buildings in this area were demolished in 2011 and the concrete floors were generally left in place (Building 9A has a section of its concrete floor removed). The basement areas were then backfilled with gravel to match the grade to the west and south of the buildings. The thickness of the gravel varies from 6-7 feet (near Allegan Street) to 9 feet (adjacent to the existing Buildings). The gravel material would be excavated to achieve a receiving area for the consolidated soils. Gravel will be staged nearby on the asphalt parking area within Commercial Areas 2 and 3. This area will not generally require remedial excavation activities and is close by to reduce efforts of relocating the gravel material. Erosion control around the

relocated gravel will be established. Erosion control costs for this activity were included in the Mobilization Erosion Control Costs.

Based on the conditions identified in the General Notes, 4,700 CY of soil would be available for consolidation under Alternative 2C. The area selected for consolidation could accept approximately 8,500 CY of soil (using a 180 foot by 260 foot area). Material will come from Residential Area 2, Residential Area 3, Mixed Area 1, Mixed Area 2 and Commercial Area 4. It was assumed that the material would all be excavated and staged together so that the time the receiving excavation would need to be left open was minimized.

The following specific assumptions for the consolidation area were utilized for the cost estimate:

- The consolidation area was 150 feet by 200 feet in size
- A set back of greater than 20 feet was included on all four sides of this consolidation area
- An average thickness of 5 feet of consolidated soils was allowed
- The relocated / consolidated material would be compacted in place to 95 percent of the proctor
- The gravel material left over after consolidation would be utilized by the City of Plainwell for redevelopment activities

7.0 Capping On-Site Soils

The area utilized for consolidation of the on-Site soils was assumed to be 150 feet by 200 feet. The estimate allows for 10 percent waste of capping materials (liner and geotextile).

- A three foot cover system was assumed:
  1. A 40 mil LLDPE liner with 12 ounce geotextile will be placed over the material
     a. 33,000 SF of liner was included in the estimate
  2. General fill would be placed over the geotextile up to 6 inches of the surface
- 3. The existing gravel material would be placed on top (6 inches)
- The liner will not be anchored in
- The general fill would be compacted to 95 -98 percent of the proctor
- The gravel would be compacted to 98 percent of the proctor

8.0 Restoration by Redevelopment Area

The following assumption was made relative to Site restoration in each of the redevelopment areas and reflected in the cost estimate.

- Restoration activities include backfill (material and placement), compaction, compaction testing and any other location specific restoration that may be deemed necessary at this time (e.g. replacing a floor).
- General fill from a local gravel pit at a delivered material cost of $4.58 ton was used for the estimates. Unprocessed topsoil at a delivered price of $18.98 cubic yard was also used where appropriate.
- Restoration for the excavation areas include general fill backfill compacted to 92-95 percent of the proctor.
- A 6-inch layer of unscreened topsoil will be placed over the compacted general fill in areas that were previously pervious (i.e., not paved or impervious). Topsoil will be hydroseeded including mulch.
- Restoration for excavation areas under pavement will be backfilled with general fill and compacted to 95 percent of the proctor.

- A six-inch layer of 21AA or equivalent will be placed on the compacted general fill and compacted to 95 percent or greater of the proctor where pavement will be installed.
- Asphalt will be replaced where removed during excavation activities.
- Permanent markers will be installed to designate areas on Site where impacted soils above Part 201 clean up criteria, based on land use, remain in place.

Residential Area 1
Specific assumptions for Site restoration in Residential Area 1 under Remedial Alternative 2C are presented below.

- Backfill material will be imported general fill and overburden material removed to achieve excavation depth requirements but beyond the area exceeding PRGs.

Residential Area 2
No specific assumptions for Site restoration in Residential Area 2 under Remedial Alternative 2C were utilized.

Residential Area 3
Specific assumptions for Site restoration in Residential Area 3 under Remedial Alternative 2C are presented below.

- Backfill material will be imported general fill and overburden material removed to achieve excavation depth requirements but beyond the area exceeding cleanup criteria.
- MW-15 will be replaced.

Residential Area 4
No specific assumptions for Site restoration in Mixed Residential/Commercial Area 1 under Remedial Alternative 2C were utilized.

Waterfront Plaza
No specific assumptions for Site restoration in Waterfront Plaza under Remedial Alternative 2C were utilized. Restoration will not be required in the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
No specific assumptions for Site restoration in Mixed Residential/Commercial Area 1 under Remedial Alternative 2C were utilized.

Mixed Residential/Commercial Area 2
Specific assumptions for Site restoration in Mixed Residential/Commercial Area 2 under Remedial Alternative 2C are presented below.

- Building 6A currently has a dirt floor; restoration would not include a concrete floor.
- Concrete (former ash silos) will not be replaced at SB-2010.
- Concrete around the former 200,000 gallon fuel oil AST will not be replaced.
- Concrete removed for excavations at SB-216, SB-220, SB-222 and SB-223 will not be replaced.
- Additional backfill will be required to fill in the void space of the coal tunnel.
- MW-2, MW-19 and MW-22 will be replaced.

Commercial Area 1
No specific assumptions for Site restoration in Commercial Area 1 under Remedial Alternative 2C were utilized.

Commercial Area 2
No specific assumptions for Site restoration in Commercial Area 2 under Remedial Alternative 2C were utilized.

Commercial Area 3
No specific assumptions for Site restoration in Commercial Area 3 under Remedial Alternative 2C were utilized.

Commercial Area 4
Specific assumptions for Site restoration in Commercial Area 4 under Remedial Alternative 2C are presented below.

- Asphalt will be 3 inches thick.
- Geotextile and Rip rap will be installed along the Mill Race.
- The Mill Race will be returned to its normal flow path.
- The turbidity curtain will be removed from the Mill Race and Kalamazoo River.
- MW-16 will be replaced.

9.0 Demobilization

The following assumptions were made relative to the demobilization from the Site and reflected in the cost estimate.

- Costs included in the demobilization task include time for Site tear down and final decontamination of equipment, and demobilization of equipment and personnel. Demobilization activities were assumed to take 5 working days.

B. ENGINEERING/OVERSIGHT

1.0 Engineering/Design

The following assumption was made relative to the installation of engineering/design and reflected in the cost estimate.

- Engineering and project design/specifications were estimated to be 15 percent of the Construction Costs.

2.0 Construction Oversight

The following assumption was made relative to the construction oversight and reflected in the cost estimate.

- Construction oversight was estimated to be 10 percent of the Construction Costs.

TABLE C.3A

COST SUMMARY
REMEDIAL ALTERNATIVE 3A – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET PART 201 RESIDENTIAL AND TSCA UNRESTRICTED HIGH OCCUPANCY LEVEL
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Total*
CAPITAL COSTS						
A.	***PRE-DESIGN INVESTIGATION***					**$33,200**
1.0	Sampling and Analysis Work Plan (SAP)	LS	1	$25,000	$25,000	
	Survey top of banks at Site	LS	1	$2,000	$2,000	
	Health and Safety Plan Update	LS	1	$1,200	$1,200	
	Multi-Area Quality Assurance Project Plan Update	LS	1	$5,000	$5,000	
2.0	SAP Implementation					**$245,500**
	Project Set up (mark locations etc.)	LS	1	$10,530	$10,500	
	Private Utility Locate	LS	1	$9,000	$9,000	
	Field Activities	DA	50	$2,900	$145,000	
	Field Technicians					
	Sampling Equipment (push probe technology)					
	Expendables (PPE etc)					
	Temporary Lighting and Carbon Monoxide Control	LS	1	$6,000	$6,000	
	Concrete Coring	LS	1	$7,000	$7,000	
	Laboratory Analysis	LS	1	$65,540	$65,500	
	Investigation Derived Waste Disposal	EA	50	$50	$2,500	
3.0	Contingency on PDI	LS	1	$139,350	$139,400	**$139,400**
	Based on 50 % of PDI costs					
4.0	Remedial Action Plan	LS	1	$60,000	$60,000	**$60,000**
	TOTAL PRE-DESIGN COSTS					**$478,100**
B.	***CONSTRUCTION***					
1.0	**Mobilization and Set up**					**$483,500**
	Mobilization and Set up	LS	1	$45,700	$45,700	
	Health and Safety	Monthly	11	$28,450	$313,000	
	Erosion Control	LS	1	$23,040	$23,000	
	Site Facilities					
	Temporary Facilities	Monthly	11	$7,125	$78,400	
	Decontamination Pad and Stations	LS	1	$17,375	$17,400	
	Staging Areas	LS	1	$6,000	$6,000	
2.0	**Additional Preparation and/or Demolition (by Redevelopment Area)**					**$372,700**
	Residential 1	LS	1	$17,641	$17,600	
	Residential 2	LS	1	-	-	
	Residential 3	LS	1	$1,225	$1,200	
	Residential 4	LS	1	$850	$900	
	Waterfront Plaza	LS	1	-	-	
	Mixed Residential/Commercial Area 1	LS	1	$2,970	$3,000	
	Mixed Residential/Commercial Area 2	LS	1	$189,617	$189,600	
	Commercial Area 1	LS	1	$1,981	$2,000	
	Commercial Area 2	LS	1	$16,170	-	
	Commercial Area 3	LS	1	$1,165	-	
	Commercial Area 4	LS	1	$158,447	$158,400	

TABLE C.3A

COST SUMMARY
REMEDIAL ALTERNATIVE 3A – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET PART 201 RESIDENTIAL AND TSCA UNRESTRICTED HIGH OCCUPANCY LEVEL
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Total*
3.0	**Excavation (by Redevelopment Area)**					**$981,200**
	Residential 1	CY	4,905	$8	$39,200	
	Residential 2	CY	3,585	$4	$14,300	
	Residential 3	CY	1,895	$9	$16,800	
	Residential 4	CY	10,535	$4	$38,700	
	Waterfront Plaza	CY	-	-	-	
	Mixed Residential/Commercial Area 1	CY	1,060	$18	$18,600	
	Mixed Residential/Commercial Area 2	CY	7,916	$32	$251,500	
	Commercial Area 1	CY	2,215	$6	$13,000	
	Commercial Area 2	CY	3,000	$52	$156,900	
	Commercial Area 3	CY	5,765	$5	$27,100	
	Commercial Area 4	CY	16,115	$25	$405,100	
4.0	**Transportation and Disposal (by Redevelopment Area)**					**$2,895,765**
	Residential 1 - Non Haz Non TSCA Soils	Ton	7,358	$22	$161,900	
	Residential 2 - Non Haz Non TSCA Soils	Ton	5,378	$22	$118,300	
	Residential 3 - Non Haz Non TSCA Soils	Ton	2,843	$22	$62,500	
	Residential 4 - Non Haz Non TSCA Soils	Ton	15,803	$22	$347,700	
	Residential 4 - Misc Debris	LS	1		$600	
	Waterfront Plaza - Non Haz Non TSCA Soils	Ton	-	$22	-	
	Mixed Residential/Commercial Area 1 - Non Haz Non TSCA Soils	Ton	1,590	$22	$35,000	
	Mixed Residential/Commercial Area 1 - Misc. Debris	LS	-	$1,675	$1,675	
	Mixed Residential/Commercial Area 2 - Non Haz Non TSCA Soils	Ton	11,874	$22	$260,500	
	Mixed Residential/Commercial Area 2 - Misc. Debris	LS	1		$19,995	
	Commercial Area 1 - Non Haz Non TSCA Soils	Ton	3,325	$22	$73,200	
	Commercial Area 2 - Non Haz Non TSCA Soils	Ton	4,500	$22	$99,000	
	Commercial Area 2 - Misc. Debris	LS	1		$5,825	
	Commercial Area 3 - Non Haz Non TSCA Soils	Ton	8,645	$22	$190,200	
	Commercial Area 3 - Misc. Debris	LS	1		$1,750	
	Commercial Area 4 - Non Haz Non TSCA Soils	Ton	17,185	$22	$378,100	
	Commercial Area 4 - Misc. Debris	LS	-		$23,020	
	Commercial Area 4 - TSCA	Ton	7,000	$160	$1,116,500	
7.0	**Restoration (by Redevelopment Area)**					**$1,209,030**
	Residential 1	LS	1		$86,590	
	Residential 2	LS	1		$53,000	
	Residential 3	LS	1		$31,975	
	Residential 4	LS	1		$163,000	
	Waterfront Plaza	LS	-		-	
	Mixed Residential/Commercial Area 1	LS	1		$41,140	
	Mixed Residential/Commercial Area 2	LS	1		$210,800	
	Commercial Area 1	LS	1		$32,950	
	Commercial Area 2	LS	1		$104,275	
	Commercial Area 3	LS	1		$132,210	
	Commercial Area 4	LS	1		$353,090	

TABLE C.3A

COST SUMMARY
REMEDIAL ALTERNATIVE 3A – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET PART 201 RESIDENTIAL AND TSCA UNRESTRICTED HIGH OCCUPANCY LEVEL
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Total*
8.0	**Demobilization**	LS	1	$26,550		**$26,600**
	Decontamination and Demobilization					
	TOTAL CONSTRUCTION COST					**$5,968,795**
C.	***ENGINEERING/OVERSIGHT***					
1.0	**Institutional Controls**					**$50,000**
2.0	**Engineering/ Design (15 % of Construction Costs)**					**$895,300**
3.0	**Construction Oversight (10 % of Construction Costs)**					**$596,900**
	TOTAL ENGINEERING/OVERSIGHT COSTS					**$1,542,200**
	CONTINGENCY ON CAPITAL COSTS (25 %)					**$1,877,749**
	TOTAL CAPITAL COSTS					**$9,388,744**
OPERATION, MAINTENANCE, & MONITORING COSTS						
A.	***ANNUAL MONITORING AND MAINTENANCE***					**$2,400**
	Monthly Operation and Maintenance	Month	12	$200	$2,400	
	CONTINGENCY ON OM & M COSTS (20 %)					**$480**
	TOTAL CAPITAL COSTS					**$9,388,744**
	NET PRESENT VALUE OF OM & M (30 YEARS @ 7 % DISCOUNT RATE)					**$35,738**
	TOTAL COST					**$9,424,482**

Table C.3A

COST SUMMARY NOTES
REMEDIAL ALTERNATIVE 3A – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET PART 201 RESIDENTIAL CRITERIA AND TSCA UNRESTRICTED HIGH OCCUPANCY LEVEL
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

GENERAL NOTES

A. Estimate for Remedial Alternative 3A - Excavation and Off-Site Disposal to Part 201 Residential Criteria and TSCA Unrestricted High Occupancy Level has been prepared based on available information at the time of this document. Redevelopment activities conducted and anticipated for the Site by the City of Plainwell may affect the remediation costs. Costs presented in the Feasibility Study (FS) Report have taken into consideration anticipated redevelopment plans by the City of Plainwell. Redevelopment plans include demolition of non-historical buildings to the concrete slab as well as specific land use restrictions/designations for the Site as presented on Figure 1.4 of the FS Report. This cost estimate is expected to be within -30 percent to +50 percent of the actual remedial costs in accordance with United States Environmental Protection Agency (USEPA) guidance.
B. Remediation activities for each of the 11 proposed redevelopment areas were estimated separately; however, the estimate assumes one mobilization and demobilization effort to conduct the work.
C. The cost estimate assumes that new structures have not been constructed in areas that are planned for soil excavation and existing structures remain in place.
D. The cost estimate includes abandonment and replacement costs of groundwater monitoring wells within excavation areas.
E. Costs are based on 2014 dollars.
F. All volumes are based on in-place measures unless otherwise stated.
G. Abbreviations used in the "Unit" column in the Cost Estimate Table are as follows:
   - CY = Cubic Yard
   - EA = Each
   - LS = Lump Sum
   - TN = Ton
   - LF= linear foot

TASK NOTES:

CAPITAL COSTS

A. INVESTIGATION/CONSTRUCTION

1.0 Pre-Design Investigation (PDI) Activities

The following assumptions were made relative to the PDI activities in each of the redevelopment areas and reflected in the cost estimate.

- Generation of a Sampling and Analysis Plan (SAP).
- Update the Health and Safety Plan as necessary.
- Update the Multi-Area Quality Assurance Project Plan as necessary.

- Completion of the SAP - soil boring installation and soil sample collection to delineate the horizontal and vertical extent of impact. Soil borings are assumed to be collected via direct push method. PDI samples will be collected and submitted for laboratory analysis for specific parameters determined to exceed Preliminary Remediation Goals (PRGs) during the Remedial Investigation (RI).
- Quality Assurance/Quality Control samples are included on a 1 per 10 basis.
- A survey of the "top of bank" is included in the PDI cost estimate.
- All areas where subsurface work is to be conducted will be cleared through a public utility locate (i.e., MISS Dig), a private utility locate, review of available drawings, and discussions with individuals knowledgeable of the Site and utilities located thereon.

Residential Area 1
PRGs exceeded in Residential Area 1 include Part 201 non-residential and residential direct contact criteria for arsenic and TSCA unrestricted high occupancy for PCBs. Soil samples will be collected to delineate the extent of soil impacted with PCBs adjacent to the storm sewer line installed by the Michigan Department of Transportation (MDOT) in 2012. Soil samples will also be collected to delineate exceedances of the PCB PRG identified in former lagoon areas.

- Allowance for 132 soil samples for arsenic
- Allowance for 150 soil samples for PCBs (north ends of Lagoon G and K and around MDOT storm sewer)

Residential Area 2
The PRGs exceeded in Residential Area 2 are Part 201 residential direct contact criteria for arsenic and TSCA unrestricted high occupancy criteria.

- Allowance for 48 soil samples for arsenic
- Allowance for 76 samples for PCBs

Residential Area 3
The PRG exceeded in Residential Area 3 is Part 201 residential direct contact criteria for arsenic.

- Allowance for 60 soil samples for arsenic

Residential Area 4
PRGs exceeded in Residential Area 4 include Part 201 non-residential direct contact criteria for arsenic and lead. In addition, the PRG for PCBs of TSCA unrestricted high occupancy was also exceeded within Residential Area 4. Residential direct contact criteria is exceeded at locations within Residential Area 4 for arsenic, benzo(a)pyrene, cyanide, dibenz(a,h)anthracene and lead. Residential soil volatilization to indoor air inhalation criteria (SVIIC) was exceeded at one location for benzene.

- An allowance for 56 soil samples for arsenic
- Benzene above the residential SVIIC at TP-308
- An allowance for 4 soil samples for benzene was included in the estimate.
- Cyanide was above residential direct contact criteria at SB-302 in the shallow (0-1 foot) interval
    - Four samples for cyanide were included in the estimate
- An allowance for 20 samples for lead was included in the estimate
- PCBs were above criteria at TP-313 and SB-301
    - Allowance for 60 soil samples for PCBs was included in the estimate
- The PNA parameters were identified in shallow samples (0-1.5 feet) below grade at DG3, DG4 and TP-302
    - Allowance for 12 PNA samples

Waterfront Plaza
PDI activities will not be specifically conducted within the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
PRGs exceeded in Mixed Residential/Commercial Area 1 include Part 201 non-residential inhalation criteria for manganese and residential direct contact criteria for arsenic.

- Delineation samples will be collected around eight locations (SB-334, SB-336, SB-337, SB-338, SB-339, TP-303, TP-306, TP-334).
- A total of 62 soil samples for arsenic will be collected.
- Soil samples will be collected from 3 depth intervals from 22 of the 30 borings proposed for this area.
- Soil samples for arsenic analysis will be collected from two depth intervals from four borings around TP-334 for manganese (8 samples).

Mixed Residential/Commercial Area 2
PRGs exceeded in Mixed Residential/Commercial Area 2 include Part 201 non-residential direct contact criteria for arsenic, benzo(a)pyrene, and lead. The PRG for PCBs was also exceeded within Mixed Residential /Commercial Area 2 within the former Mill Buildings and north of the buildings around TP-8. Residential direct contact criteria is exceeded at locations within Mixed Residential/Commercial Area 2 for arsenic, benzo(a)pyrene, dibenz(a,h)anthracene; benzo(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene and lead.

Soil delineation by Building/work area as follows:

Arsenic ONLY locations:
Building 1
- Allowance for 13 samples

Building 1A
- Allowance for 8 samples

Building 2
- Allowance for 8 samples

Building 3
- Allowance for 8 samples

Building 4A
- Allowance for 4 samples

Building 5
- Allowance for 8 samples

Building 5B
- Allowance for 7 samples
- Soil borings around SB-231 will be completed manually

Building 6
- Allowance for 8 samples

Building 25
- Allowance for 8 samples

Building 28
- Allowance for 8 samples

Train Shed
- Allowance for 4 samples

Coal Tunnel Area
- Allowance for 30 samples

Former Ash Silo Area (SB-2010 and SB-2011)

- Allowance for 12 samples

Former clarifier area (TP-344)

- Allowance for 8 samples

Area north of Building 3/Former Water Tower Area (TP-340, TP-342, TP-343)

- Allowance for 16 samples

Arsenic and Lead sample locations:

Building 7

- Allowance for 6 samples for lead
- Allowance for 8 samples for arsenic

Area around SB-2013

- Allowance for 12 samples

Arsenic, PNAs and Lead sample locations:

Building 3A

- Allowance for 12 samples

Arsenic and PNAs sample locations

Fuel Oil AST Area

- Allowance for 24 PNA soil samples
- Allowance for 12 arsenic samples

Arsenic, PNAs, Lead and PCBs

Building 6A (assumes entire dirt floor area will be removed to achieve PRGs for metals which would remove PCB impacted soils)

- Allowance for 20 samples for arsenic, PNAs, lead and PCBs
- Technicians will be required to don respirators for this work

PCBs only

SB-217, SPI-1, and TP-8

- Allowance for 44 samples

A total of 200 samples will be collected and analyzed for arsenic.
A total of 54 samples will be collected and analyzed for PNAs.
A total of 48 samples will be collected and analyzed for lead.
A total of 64 samples will be collected and analyzed for PCBs.

Commercial Area 1

PRGs exceeded in Commercial Area 1 include Part 201 non-residential inhalation criteria for manganese and the residential direct contact for arsenic.

- Delineation samples will be collected around 5 locations (SB-133, SB-144, SS-103, SS-105 and SS-106).
- Soil samples will be collected from the 0-2 foot below grade interval at SS-103, SS-105 and SS-106 and analyzed for arsenic. Samples from SS-105 will also be analyzed for manganese.
- Soil samples will be collected from the 0-2 and 7-9 foot interval for SB-133 and SB-144 and analyzed for arsenic.

Commercial Area 2

PRGs exceeded in Residential Area 1 include Part 201 non-residential and residential direct contact criteria for arsenic.

- Delineation samples were note proposed for indoor exceedances (SB-326, SB-237, SB-340) because this portion of the building is in operation as the Plainwell Public Safety Building.
- Four borings within the garage portion of the Public Safety Building were included in the estimate – 12 samples for arsenic included in the estimate.
- 24 additional samples would be collected for arsenic from areas outside of the building footprint (around TP-316, TP-321, TP-324 and TP-325).

Commercial Area 3
The PRG exceeded in Commercial Area 3 is Part 201 residential direct contact criteria for arsenic.

- Allowance for 48 soil samples for arsenic

Commercial Area 4
PRGs exceeded in Commercial Area 4 include Part 201 non-residential direct contact criterion for arsenic. Residential direct contact criteria is exceeded at locations within Commercial Area 4 for arsenic, benzo(a)pyrene and lead. The non-residential inhalation criterion for manganese is exceeded at one location. PCBs above the PRG of 1 mg/kg were reported in Commercial Area.

Soil delineation by Building / work area as follows:

Arsenic ONLY locations:
Building 9A
- Allowance for 40 samples

Building 9B
- Allowance for 8 samples

Building 9E
- Allowance for 8 samples

Building 9F
- Allowance for 16 samples

Building 10
- Allowance for 8 samples

Building 11A
- Allowance for 24 samples

Building 12
- Allowance for 23 samples
- Can only get three borings in position around SB-2008

Building 15
- Allowance for 4 samples

Building 16
- Allowance for 11 samples
- SB-289 and SB-290 close together and shallow interval

Building 17
- Allowance for 20 samples

Building 19
- Allowance for 4 samples

Building 23
- Allowance for 16 samples

Parking lot area south of Building 17
- Allowance for 60 samples

Arsenic and Lead sample locations:
TP-341
- Allowance for 4 samples

Arsenic and Manganese sample locations:
Building 10
- Allowance for 8 samples

Arsenic, PNAs and Lead sample locations:
Former Substation Area/North of Mill Buildings
- Allowance for 22 samples

Arsenic, PNAs, Lead and PCB sample locations:
TP-5 Area
- Allowance for 8 samples

PCBs and Arsenic sample locations:
MW-16 Area
- Allowance for 18 samples

SB-2012
- Allowance for 4 samples for arsenic and 8 samples for PCBs

A total of 306 samples will be collected and analyzed for arsenic.
A total of 30 samples will be collected and analyzed for PNAs.
A total of 34 samples will be collected and analyzed for PCBs.
A total of 8 samples will be collected and analyzed for manganese.
A total of 34 samples will be collected and analyzed for lead.

2.0 Mobilization/Set-Up

The following assumptions were made relative to the mobilization/set-up in each of the redevelopment areas and reflected in the cost estimate.

- Mobilization and set-up includes: mobilization of personnel and equipment; construction survey work (e.g., excavation layout and verification sample locations); and geotechnical and chemical testing on backfill materials.
  - An allowance of $8,000 to mobilize personnel and equipment was included in the estimate.
  - $30,000 for survey work was included in the estimate.
  - Geotechnical and chemical analysis for imported materials was included in the estimate. One set of chemical analysis [Target Analyte List Metals, Target Compound List (TCL) for volatile organic compounds, TCL for semi-volatile compounds, and polychlorinated biphenyl (PCBs) per material (topsoil, general fill and 21AA/gravel]. The topsoil sample will also be analyzed for pH, phosphorous, organic content, pesticides and herbicides.
- Health and Safety includes an on-Site Health and Safety Officer (HSO) for the duration of the services (11 months). Also included in the costs are: air monitoring equipment and calibration gases; a decontamination trailer; and disposable personal protection equipment (PPE).
- Air monitoring assumes real-time air monitoring will be conducted during all excavation work utilizing a photoionization detector (11.7 electronVolt [eV] lamp) and fugitive dust monitor(s). Air monitoring does not include the collection of samples for laboratory analysis or laboratory analytical costs.

- Erosion control includes an allowance for silt fence (5,760 LF) and geofabric to cover catch basins on the Site. Costs for erosion control measures specific to individual redevelopment areas (i.e., turbidity curtains, etc.) are included in individual redevelopment area estimates (e.g., Commercial Area 4).
- Site facility costs include electrical hookup and electricity for two office trailers (one for the contractor and one for the USEPA) for 11 months. Other temporary facilities include portable sanitary services, a drinking water allowance and a small dumpster for worker general refuse. The expense of one Site truck for the duration of the services was included.
- Site facility costs include materials and construction of temporary decontamination pads and decontamination stations for workers. It was assumed that potable water could be obtained from the City of Plainwell for use during the project.
- Site facility costs include $6,000 to for the installation and maintenance of a staging area for waste.
- A perimeter fence currently exists around the majority of the Site. The cost estimate assumes the fence will remain and can be utilized as a security measure to prevent access to the Site during construction activities.

3.0 Preparation/Pre-Excavation Work by Redevelopment Area

The following assumptions were made relative to the preparation/pre-excavation work in each of the redevelopment areas and reflected in the cost estimate.

- A Soil Erosion and Sedimentation Control Permit will be obtained from Allegan County. All other necessary permits will also be obtained prior to intrusive work at the Site.
- All areas where subsurface work is to be conducted will be cleared through a public utility locate (i.e., MISS Dig), a private utility locate, review of available drawings, and discussions with individuals knowledgeable of the Site and utilities located thereon.

Residential Area 1
Specific assumptions for preparation/pre-excavation work in Residential Area 1 under Remedial Alternative 3A are presented below.

- MW-14 will be abandoned.
- The fence adjacent to MW-14 will need to be removed and replaced after restoration activities are complete.
- Trees and shrubs in the excavation areas will need to be cleared and grubbed.
- Turbidity curtain will be temporally installed in the Kalamazoo River during excavation and backfill activities.
- One power pole will need to be relocated for the excavation work around SB-104.

Residential Area 2
No specific assumptions for preparation/pre-excavation work in Residential Area 2 under Remedial Alternative 3A were utilized.

Residential Area 3
Specific assumptions for preparation/pre-excavation work in Residential Area 3 under Remedial Alternative 3A are presented below.

- MW-15 will be abandoned.
- Clearing will be required in the area around MW-15.

Residential Area 4

Specific assumptions for preparation/pre-excavation work in Residential Area 4 under Remedial Alternative 3A are presented below.

- Clearing will be required in the area around SB-301/SG-4.
- Pavement by TP-302 will be saw cut.

Waterfront Plaza

No specific assumptions for preparation/pre-excavation work in Waterfront Plaza under Remedial Alternative 3A were utilized.

Mixed Residential/Commercial Area 1

The specific assumption for preparation/pre-excavation work in Mixed Residential/Commercial Area 1 under Remedial Alternative 3A is presented below.

- Pavement and concrete in the work areas will be saw cut prior to excavation to leave a clean line for restoration activities.

Mixed Residential/Commercial Area 2

Specific assumptions for preparation/pre-excavation work in Mixed Residential/Commercial Area 2 under Remedial Alternative 3A are presented below.

Inside the Buildings:

- A renovation notice will be submitted to the State of Michigan to comply with Federal Clean Air Act National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements. The notice will include all areas/asbestos within the Mill Buildings scheduled for removal during the remediation efforts.
- Asbestos abatement will need to be conducted primarily due to thermal system insulation on the piping within Buildings 5, 6 and 6A. Asbestos is also present on the boilers housed within Buildings 5 and 6. The asbestos is in poor, heavily damaged condition throughout these buildings.
- A structural engineering evaluation of the elevator in Building 1 will be conducted to ensure that the soil (SB-212) can be removed without compromising the elevator shaft.
- A structural engineering evaluation of the northeast corner of Building 1 will be completed before conducting excavation work in this area (SB-214).
- The loading dock at the south end of Building 1 will be evaluated by a structural engineering evaluation to ensure excavation of the fuel oil line will not damage either the loading dock or Building 1.
- A structural engineering evaluation of the historical western wall of Building 9 will be conducted to ensure excavation activities near this wall will not jeopardize the integrity of the wall.
- A structural engineering evaluation will be completed before conducting the excavation work in Buildings 5 and 6. The evaluation will determine a shoring methodology for ensuring the boiler footing/supports are not compromised during excavation activities.
- Excavations within Buildings 2, 3 and 7 will require the removal of structures within the buildings (e.g., equipment pads).
- Abandoned mill equipment (various chemical tanks [biocides, water softener, etc.], compressors and pumps, will need to be removed from Buildings 1A, 2, 5, 6, and 7 prior to excavation activities. Liquids remaining in the vessels will be removed, containerized, characterized and prepared for off-Site disposal at a licensed facility as appropriate.
- The concrete floor will be saw cut prior to excavation (concrete will be broke out during excavation – but saw cut first to create clean lines for restoration).

Outdoor Areas:

- A demolition notice will be submitted to the State of Michigan for the demolition of Building 5A/part of the coal tunnel. Asbestos abatement may be necessary on pipe wrap found outside of Building 5A.
- Excavation of soils under the concrete slabs of the demolished buildings (3A, 25 and 28) will require the relocation of the backfill (less than 3 feet thick) prior to excavation.
- Fuel Oil No. 6 within the former coal tunnel will be removed from the tunnel before the tunnel itself is removed.
- The piping run from the former Fuel Oil No. 6 AST and Building 5 will be exposed at one end and drained of any residual fuel oil prior to removing the line.
- Monitoring well MW-19 will be abandoned prior to excavation activities in this area.
- Monitoring well MW-22 will be abandoned prior to removal of the former fuel oil line.
- Monitoring well MW-2 will be abandoned prior to excavation activities at SB-2010 and SB-2011.

Commercial Area 1

Specific assumptions for preparation/pre-excavation work in Commercial Area 1 under Remedial Alternative 3A are presented below.

- Limited clearing and grubbing will be performed in the area around SS-106 and SB-144.

Commercial Area 2

Specific assumptions for preparation/pre-excavation work in Commercial Area 2 under Remedial Alternative 3A are presented below.

- Significant pre-excavation preparation is required due to the presence of the City of Plainwell Public Safety Building above the areas to be excavated, including relocating cabinetry, furnishings and flooring.
- Saw cutting of the concrete floor is required to gain access to the soils.

Commercial Area 3

Specific assumptions for preparation/pre-excavation work in Commercial Area 3 under Remedial Alternative 3A are presented below.

- Monitoring well MW-18 will be abandoned prior to excavation activities in this area.
- Pavement within the work area around MW-18 will be saw cut.

Commercial Area 4

Specific assumptions for preparation/pre-excavation work in Commercial Area 4 under Remedial Alternative 3A are presented below.

Inside the Buildings:

- A renovation notice will be submitted to the State of Michigan to comply with Federal Clean Air Act National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements. The notice will include all areas/asbestos within the Mill Buildings scheduled for removal during the remediation efforts.
- Limited asbestos abatement will need to be conducted within the excavation areas/surrounding areas due to thermal system insulation on the piping.
- Excavations within Buildings 10, 11A, and 15 will require the removal of structures within the buildings (e.g., electrical panel, paper stock tanks, and internal walls).

- Abandoned mill equipment will need to be removed from Buildings 16 and 12 prior to excavation activities. Oil in the equipment in both areas contains polychlorinated biphenyls (PCBs). The waste would be disposed of at a licensed TSCA facility.
- The concrete floor will be saw cut prior to excavation.

Outdoor Areas:

- Excavation of soils under the concrete slabs of the demolished buildings will require the relocation of backfill placed within the former basement cavities to surrounding grade (up to 9 feet thick) prior to excavation. An allowance for 5 working days to complete this work was included in the estimate at a cost of $20,400.
- Turbidity curtain will be installed in the Mill Race in the area by MW-16 (along the Mill Race) and in the area of MW-3 prior to excavation activities.
- Monitoring of the Mill Race and Kalamazoo River for turbidity will be conducted during excavation activities.
- MW-16 will be abandoned prior to excavation work in that area.
- Protection of MW-3 (barriers) will be installed.
- A structural engineering evaluation of the pedestrian bridge for stability during excavation activities will be conducted. The evaluation will determine if shoring of the bridge is necessary. An allowance of $5,000 is included in the estimate to conduct the evaluation. Shoring costs have not been included in the estimate.
- The water flow of the Mill Race will be diverted in the excavation area. The methodology for this work to be determined in the pre-design phase of the project.
- Rip rap along the Mill Race will be removed and staged for re-use.
- Pavement in the work areas will be saw cut prior to excavation to allow for restoration activities.

4.0 Excavation by Redevelopment Area

Conceptual excavation areas for each of the Redevelopment areas are shown of Figures 3.1 through 3.11 of the FS Report (Revision 2).

The following assumptions were made relative to excavation in each of the redevelopment areas and reflected in the cost estimate.

- Soil excavation quantities within the buildings are based on excavating horizontally by 5 feet in each direction and 1-foot vertically beyond the sample location exceeding criteria.
- Excavation estimates assume dewatering will not be necessary and that all work can be completed in Level D PPE except Building 6A which will be conducted with supplied air (Level B) PPE.
- Standby time was not added to account for the time for laboratory analysis of verification samples. It was assumed that the project would proceed across the Site allowing for laboratory analysis to be conducted while another redevelopment area was being excavated or restored.
- All work conducted within Site buildings will require an independent power supply, with the exception of Buildings 17 and 19.

Specific assumptions to each redevelopment area, in addition to those presented above globally, are provided below.

Residential Area 1

Residential Area 1 is located at the far west end of the Site, where the majority of the former sludge dewatering lagoons were located. The former Mill wastewater treatment building, activated sludge tank and secondary clarifier were constructed over the lagoons. The wastewater treatment structures were

demolished on behalf of the City of Plainwell in November and December 2013. The specific assumption for excavation in Residential Area 1 under Remedial Alternative 3A is presented below.

- Overburden present beyond the target excavation area that must be removed to achieve the full depth of excavation will be disposed of off Site.

Residential Area 2

Residential Area 2 is located between Residential Area 1 and Residential Area 3 and is positioned along the Kalamazoo River. This area was historically occupied by sludge dewatering lagoons (A, B, C) and a primary clarifier. The primary clarifier was demolished to the concrete slab in November 2013. The specific assumption for excavation in Residential Area 2 under Remedial Alternative 3A is presented below.

- Overburden present above the target excavation area that must be removed to achieve the full depth of excavation can be staged and used for backfill from the area around SB-1.

Residential Area 3

Residential Area 3 is located near the center of the Site. The former aeration basin location occupies the majority of the area. A former secondary clarifier was historically present in this area, which was demolished in November 2013 with the floor of the former clarifier remaining. Specific assumptions for excavation in Residential Area 3 under Remedial Alternative 3A are presented below.

- Material removed from the bottom of the aeration basin will require double handling due to the slopes of the former aeration basin and the depth of the excavation.

Residential Area 4

Residential Area 4 is positioned along the Kalamazoo River between Residential Area 3 and Mixed Residential Area 2. No aboveground structures are currently present on this area. A portion of this area was historically utilized by the Mill as a coal storage area. No specific assumptions for excavation in Residential Area 4 under Remedial Alternative 3A were made.

Waterfront Plaza

No excavation activities are anticipated in the Waterfront Plaza Area.

Mixed Residential/Commercial Area 1

Mixed Residential/Commercial Area 1 is located between Commercial Area 2 and Commercial Area 3 on the southern property line along Allegan Street. This area was once occupied by the former Specialty Minerals Building and associated above ground storage tanks. The Specialty Minerals building and ASTs were demolished to the concrete slab in December 2011.

- Underground utilities encountered (TP-303, TP-306) between the former Specialty Minerals Building and the main Mill Buildings will be capped at either end of the excavation.

Mixed Residential and Commercial Area 2

Mixed Residential and Commercial Area 2 is located between Residential Area 4 and Commercial Area 4 at the northern end of the Site along the Kalamazoo River. The majority of the area is occupied by Mill Buildings and pavement. Buildings 3A, 25 and 28 along with the eastern water tower, 200,000-gallon Fuel Oil AST, and the brine USTs, were demolished on behalf of the City of Plainwell. The concrete slabs were left in place for Buildings 3A and 28. Building 25 was part of the Site's historical wastewater treatment system and had a subsurface vault and system to pump the waste water from the Mill to the on-Site WWTP at the west end of the Site. The vault under the northern portion of Building 25 was not removed. The vault floor was cracked and the sidewalls removed to 4 feet below grade, then the vault was filled with imported general fill. The concrete slab under the remaining portion of Building 25 was left in place.

Redevelopment plans by the City of Plainwell include the demolition of Buildings 1A, 4, 4A, 5, 5A, 5B, 6, 6A, 7 and the Train Shed; however, there are no plans currently to implement this work. Therefore excavation costs assume the buildings will be in place during this work. Specific assumptions for excavation in Mixed Residential/Commercial Area 2 under Remedial Alternative 3A are presented below.

- A storm sewer was installed through the west side of Mixed Residential/Commercial Area 2 in 2012 by the Michigan Department of Transportation (MDOT). The approximate location of the storm sewer is shown on Figure 3.6. Before conducting excavation work to remove the former fuel oil AST line and excavate the east side of the former fuel AST, the exact location of the storm sewer line will be determined, shoring of the line may be necessary during the removal of the fuel oil AST line.
- Excavations within Buildings 1, 1A, 2, 3, 4A, 5, 5B, 6, 7 and 9 will require mini-equipment.
- Soils in Building 6A will be removed using a vacuum extraction system.
- Removal of the soils in Building 4A/5B at SB-231 will require manual labor.
- Excavation work within the buildings will require temporary lighting and mechanical means to remove carbon dioxide generated by running equipment from the work areas/building.
- All waste removed from the excavation areas within the buildings will need to be double handled.

Commercial Area 1

Commercial Area 1 is located in the far southwest portion of the Site. No structures or paved areas are currently present in this area that would require unique equipment or procedures to conduct the proposed remedial activities. This area of the Site has not been developed and was not part of historic Mill operations.

- Any excavation work conducted in the vicinity of SB-133 will require oversight by Michigan Gas Utilities due to proximity of the soil boring to the 6-inch high pressure natural gas line/working within the gas company easement.
- A storm sewer was installed through this area in 2012 by the Michigan Department of Transportation (MDOT). The approximate location of the storm sewer is shown on Figure 3.8. Before conducting excavation work in the area of SS-103 and SS-105, the exact location of the line will be determined.

Commercial Area 2

Commercial Area 2 is located in the southwest central portion of the Site. Structures on this portion of the Site include the City of Plainwell Public Safety Building and associated paved parking and egress/ingress areas. The specific assumption for excavation in Commercial Area 2 under Remedial Alternative 3A is presented below.

- Excavation work with Commercial Area 2 would require mini-equipment to access the soil exceedances above the PRGs within the current City of Plainwell Public Safety Building.

Commercial Area 3

Commercial Area 3 is located adjacent to the former southwest corner of the Mill Buildings along Allegan Street. Structures on this area include a pump house and a former guard shack. Other historical features within this area have been demolished on behalf of the City of Plainwell. The Clay ASTs, Ammonia AST secondary containment structure, the Starch ASTs and Building 9C were demolished in 2012. The concrete slabs for all demolished features were left in place. Specific assumptions for excavation in Commercial Area 3 under Remedial Alternative 3A are presented below.

- The majority of Building 9C did not include a basement. The area where SB-248 was completed was located on the ground floor; however, this area was elevated from the surrounding ground surface by approximately 4 feet. As a result of the demolition of Building 9C the upper 4 feet of the sample interval was relocated (as part of a Soil Relocation Plan (June, 2012) generated on behalf of the City of Plainwell) and placed under imported fill in the general area of Buildings 9A, 9E.

- MDOT installed a storm sewer through this area in 2012. The approximate location of the storm sewer is shown on Figure 3.10. Before conducting excavation work in the area of TP-305 the exact location of the line will be determined.

Commercial Area 4

Commercial Area 4 is located on the eastern side of the Site. The majority of this area is covered with either pavement, buildings (vacant and occupied) or former building concrete slabs. Buildings (9A, 9B, 9C, 9D, 9E, 9F, and 23) were demolished on behalf of the City of Plainwell in 2012, with the majority of the former building concrete slabs left in place and backfilled to surrounding grade. The basement areas were backfilled with a combination of crushed concrete (from the buildings on Site), soil from an adjacent retaining wall that was removed, and imported gravel material and vary in thickness from 6 feet to 9 feet. Specific assumptions for excavation in Commercial Area 4 under Remedial Alternative 3A are presented below.

- Excavations within Buildings 10, 11A, 11, 12, 15, 16, 17 and 19 will require mini-equipment.
- All excavation work within the buildings will require temporary lighting and mechanical means to remove carbon dioxide generated by running equipment from the work areas/building.
- All waste removed from the excavation areas will need to be double handled.

5.0 Transportation and Disposal by Redevelopment Area

The following assumptions were made relative to the transportation and disposal of materials in each of the redevelopment areas and reflected in the cost estimate.

- Soil volumes were converted to tonnage assuming a ratio of 1.5 tons per cubic yard for soils. Tonnage for concrete was based on 1.65 tons per cubic yard of material. Waste has been categorized as non-hazardous and non-TSCA soils; TSCA soil; TSCA debris; and miscellaneous debris.
- Transportation and disposal pricing is based on the non-hazardous, non-TSCA material being accepted at Waste Management Autumn Hills Landfill in Zeeland, Michigan. A cost of $22.00 per ton for both transportation and disposal of non-hazardous, non-TSCA waste was used for the estimates.
- A disposal price of $135.00 per ton was used for TSCA soils. For estimation purposes it was assumed that the TSCA soils would be transported to the Environmental Quality Company/US Ecology Company Wayne Disposal Facility Site #2 landfill located in Belleville, Michigan for direct landfill disposal. Transportation of the soils was assumed to be conducted in lined 50 ton gravel trains. Transportation of each load of 50 tons was assumed to cost $500.00.
- An allowance for the PCB impacted equipment removed as part of the project was included in the estimate since the weight and size of what will need to be removed has not been determined at this time. An allowance of $10,000 for transportation and disposal of the waste to the Environmental Quality Company/US Ecology Company Wayne Disposal Facility Site #2 in Belleville, Michigan.
- Transportation costs assume fuel prices for diesel will not exceed $4.00 per gallon.
- Organic material generated from clearing activities was assumed to be chipped and left on Site.
- Concrete and asphalt will be disposed of off Site, not recycled.

Residential Area 1

The specific assumption for transportation and disposal work in Residential Area 1 under Remedial Alternative 3A is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 4,905 CY.

Residential Area 2
The specific assumption for transportation and disposal work in Residential Area 2 under Remedial Alternative 3A is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 3,585 CY.

Residential Area 3
The specific assumption for transportation and disposal work in Residential Area 2 under Remedial Alternative 3A is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 1,895 CY.

Residential Area 4
The specific assumption for transportation and disposal work in Residential Area 3 under Remedial Alternative 3A is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 10,535 CY.
- Allowance of $600 for asphalt.

Waterfront Plaza
No specific assumptions for transportation and disposal work in Waterfront Plaza under Remedial Alternative 3A were utilized. Excavation activities will not be conducted within the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
Specific assumptions for transportation and disposal work in Mixed Residential/Commercial Area 1 under Remedial Alternative 3A are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 1,060 CY.
- Allowance of 50 tons of concrete from within the various buildings.
- Allowance of 50 CY for asphalt disposal.

Mixed Residential/Commercial Area 2
Specific assumptions for transportation and disposal work in Mixed Residential/Commercial Area 2 under Remedial Alternative 3A are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil from Building 5 with a volume of 30 CY.
- Allowance of $3,100 for miscellaneous equipment from Building 5
- Allowance of 25 tons of concrete from Building 5.
- Waste was assumed to be non-hazardous, non-TSCA soil from Building 6A with a volume of 200 CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the coal tunnel area with a volume of 1,270 CY.
- Allowance of $3,500 for miscellaneous debris from the coal tunnel area (bricks, concrete)
- Waste was assumed to be non-hazardous, non-TSCA soil from the fuel oil line with a volume of 525 CY.
- Allowance of $600 for disposal of the fuel oil line piping
- Waste was assumed to be non-hazardous, non-TSCA soil from the fuel oil No. 6 AST area with a volume of 2,500 CY.
- Allowance of $1,200 for the concrete ring the tank was sitting on and buried concrete and asphalt.

- Waste was assumed to be non-hazardous, non-TSCA soil from Buildings 1, 1A, 2, 4A, 5B, 7, 9 and Train Shed with a volume of 861 CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the north end of the Mill Buildings (Buildings-3A, 25, 28, test pits-TP-340, TP-342,TP-343 and SB-2013) with a volume of 2,520 CY.
- Allowance of $6,000 for miscellaneous debris from these areas at the north end of the Mill Building.

Commercial Area 1
Specific assumptions for transportation and disposal work in Commercial Area 1 under Remedial Alternative 3A are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 2,215 CY.

Commercial Area 2
Specific assumptions for transportation and disposal work in Commercial Area 2 under Remedial Alternative 3A are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 2,455 CY.
- Allowance of $6,000 for construction debris (concrete, flooring, etc.) generated during the preparation activities.

Commercial Area 3
Specific assumptions for transportation and disposal work in Commercial Area 3 under Remedial Alternative 3A are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 5,765 CY.
- Allowance of $900 for the transport and disposal of asphalt and/or concrete from the excavation areas.

Commercial Area 4
Specific assumptions for transportation and disposal work in Commercial Area 4 under Remedial Alternative 3A are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil from inside Buildings 10, 11A, 12, 15, 16, 17, and 19 with a volume of 412 CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from inside building footprints/demolished Buildings 9A, 9B, 9E, 9F, and 23 with a volume of 325CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the former substation area and north of the Mill Buildings with a volume of 3,050CY.
- Waste was assumed to be TSCA soil from the area around MW-16 with a volume of 4,660 CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the parking lot area south of Building 17 with a volume of 7,665 CY.
- Allowance of $12,000 for equipment from Buildings 15 and 16 (PCB impacted).
- Allowance of 1,575 tons of concrete from within the various buildings.
- Allowance of 400 CY of asphalt

6.0 Restoration by Redevelopment Area

The following assumption was made relative to Site restoration in each of the redevelopment areas and reflected in the cost estimate.

- Restoration activities include backfill (material and placement), compaction, compaction testing and any other location specific restoration that may be deemed necessary at this time (e.g., replacing a floor).
- General fill from a local gravel pit at a delivered material cost of $4.58 ton was used for the estimates. Unprocessed topsoil at a delivered price of $18.98 cubic yard was also used where appropriate.
- Restoration for the excavation areas outside of building footprints include general fill backfill compacted to 92-95 percent of the proctor.
- A six-inch layer of unscreened topsoil will be placed over the compacted general fill in areas that were previously pervious (i.e. not paved or impervious). Topsoil will be hydroseeded, including mulch.
- Restoration for excavation areas under pavement, existing or former building slabs will be backfilled with general fill and compacted to 95 percent of the proctor.
- A six-inch layer of 21AA or equivalent will be placed on the compacted general fill and compacted to 95% or greater of the proctor.
- Concrete will be replaced where removed during excavation activities inside of existing buildings.
- Asphalt will be replaced where removed during excavation activities.
- Concrete removed during excavation activities under former building slabs will not be replaced.

Residential Area 1
Specific assumptions for Site restoration in Residential Area 1 under Remedial Alternative 3A are presented below.

- Backfill material will be imported general fill and overburden material removed to achieve excavation depth requirements but beyond the area exceeding PRGs.
- MW-14 will be replaced.

Residential Area 2
Specific assumptions for Site restoration in Residential Area 2 under Remedial Alternative 3A are presented below.

- Backfill material will be imported general fill and overburden material removed to achieve excavation depth requirements but beyond the area exceeding cleanup criteria.
- MW-15 will be replaced.

Residential Area 3
No specific assumptions for Site restoration in Residential Area 3 under Remedial Alternative 3A were utilized.

Residential Area 4
No specific assumptions for Site restoration in Mixed Residential/Commercial Area 1 under Remedial Alternative 3A were utilized.

Waterfront Plaza
No specific assumptions for Site restoration in Waterfront Plaza under Remedial Alternative 3A were utilized. Restoration will not be required in the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
Specific assumptions for Site restoration in Mixed Residential/Commercial Area 1 under Remedial Alternative 3A are presented below.

- Concrete replaced inside the buildings will be 6 inches thick.

Mixed Residential/Commercial Area 2
Specific assumptions for Site restoration in Mixed Residential/Commercial Area 2 under Remedial Alternative 3A are presented below.

- Building 6A currently has a dirt floor; restoration would not include a concrete floor.
- Concrete replaced inside the buildings will be 6 inches thick
- Concrete (former ash silos) will not be replaced at SB-2010 and SB-2011.
- Concrete around the former 200,000 gallon fuel oil AST will not be replaced.
- Concrete removed for excavations at SB-216, SB-220, SB-222 and SB-223 will not be replaced.
- Additional backfill will be required to fill in the void space of the coal tunnel.
- MW-2, MW-19 and MW-22 will be replaced.

Commercial Area 1
No specific assumptions for Site restoration in Commercial Area 1 under Remedial Alternative 3A were utilized.

Commercial Area 2
Specific assumptions for Site restoration in Commercial Area 2 under Remedial Alternative 3A are presented below.

- Areas within the current Public Safety Building will be restored to the previous condition including the replacement of all removed flooring, cabinetry, interior walls, repainting, etc. An allowance of $40,000 was included in the estimate for the restoration inside of the building for these items.
- Concrete replaced will match existing floor conditions and will vary within the building from 4 to 8 inches thick.

Commercial Area 3
No specific assumptions for Site restoration in Commercial Area 3 under Remedial Alternative 3A were utilized.

Commercial Area 4
Specific assumptions for Site restoration in Commercial Area 4 under Remedial Alternative 3A are presented below.

- Concrete replaced inside the buildings will be 6 inches thick.
- Backfill placed in the parking lot will be 2 feet lower than current grade to achieve the desired grade requested by the current property owner.
- Asphalt will be 3 inches thick.
- Geotextile and Rip rap will be installed along the Mill Race.
- The Mill Race will be returned to its normal flow path.
- The turbidity curtain will be removed from the Mill Race and Kalamazoo River.
- MW-16 will be replaced.

7.0 Demobilization

The following assumptions were made relative to the demobilization from the Site and reflected in the cost estimate.

- Costs included in the demobilization task include time for Site tear down and final decontamination of equipment, and demobilization of equipment and personnel. Demobilization activities were assumed to take five working days.

B. ENGINEERING/OVERSIGHT

1.0 Engineering/Design

The following assumption was made relative to the installation of engineering/design and reflected in the cost estimate.

- Engineering and project design/specifications were estimated to be 15 percent of the Construction Costs.

2.0 Construction Oversight

The following assumption was made relative to the construction oversight and reflected in the cost estimate.

- Construction oversight was estimated to be 10 percent of the Construction Costs.

TABLE C.3B

COST SUMMARY
REMEDIAL ALTERNATIVE 3B – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET PART 201 LAND USE AND PCB RISK-BASED LEVELS OF 2.5 MG/KG RESIDENTIAL AND 9.1 MG/KG COMMERCIAL AREAS
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Estimated Cost* *Total*
CAPITAL COSTS						
A.	***PRE-DESIGN INVESTIGATION***					**$33,200**
1.0	Sampling and Analysis Work Plan (SAP)	LS	1	$25,000	$25,000	
	Survey top of banks at Site	LS	1	$2,000	$2,000	
	Health and Safety Plan Update	LS	1	$1,200	$1,200	
	Multi-Area Quality Assurance Project Plan	LS	1	$5,000	$5,000	
2.0	SAP Implementation					**$108,100**
	Project Set up (mark locations etc.)	LS	1	$6,570	$6,600	
	Private Utility Locate	LS	1	$8,000	$8,000	
	Field Activities	DA	17	$2,900	$49,300	
	Field Technicians					
	Sampling Equipment (push probe technology)					
	Expendables (PPE etc)					
	Temporary Lighting and Carbon Monoxide Control	LS	1	$3,000	$3,000	
	Concrete Coring	LS	1	$3,000	$3,000	
	Laboratory Analysis	LS	1	$37,330	$37,300	
	Investigation Derived Waste Disposal	DA	17	$50	$900	
3.0	Contingency on PDI	LS	1	$70,650	$70,700	**$70,700**
	Based on 50 % of SAP costs					
4.0	Remedial Action Plan	LS	1	$60,000	$60,000	**$60,000**
	TOTAL PRE-DESIGN COSTS					**$272,000**
B.	***CONSTRUCTION***					
1.0	**Mobilization and Set up**					**$226,200**
	Mobilization and Set up	LS	1	$45,700	$45,700	
	Health and Safety	Monthly	4	$28,450	$113,800	
	Erosion Control	LS	1	$16,060	$16,100	
	Site Facilities					
	Temporary Facilities	Monthly	4	$6,810	$27,200	
	Decontamination Pad and Stations	LS	1	$17,375	$17,400	
	Staging Areas	LS	1	$6,000	$6,000	
2.0	**Additional Preparation and/or Demolition (by Redevelopment Area)**					**$138,000**
	Residential 1	LS	1	$12,680	$12,700	
	Residential 2	LS	1	-	-	
	Residential 3	LS	1	$1,225	$1,200	
	Residential 4	LS	1	$850	$900	
	Waterfront Plaza	LS	1	-	-	
	Mixed Residential/Commercial Area 1	LS	1	$600	$600	
	Mixed Residential/Commercial Area 2	LS	1	$56,625	$56,600	
	Commercial Area 1	LS	1	-	-	
	Commercial Area 2	LS	1	-	-	
	Commercial Area 3	LS	1	-	-	
	Commercial Area 4	LS	1	$65,980	$66,000	

TABLE C.3B

COST SUMMARY
REMEDIAL ALTERNATIVE 3B – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET PART 201 LAND USE AND PCB RISK-BASED LEVELS OF 2.5 MG/KG RESIDENTIAL AND 9.1 MG/KG COMMERCIAL AREAS
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Estimated Cost* *Total*
3.0	**Excavation (by Redevelopment Area)**					**$279,900**
	Residential 1	CY	910	$12	$11,100	
	Residential 2	CY	25	$88	$2,200	
	Residential 3	CY	1,495	$7	$10,800	
	Residential 4	CY	5,340	$3	$16,500	
	Waterfront Plaza	CY	-	-	-	
	Mixed Residential/Commercial Area 1	CY	40	$90	$3,600	
	Mixed Residential/Commercial Area 2	CY	5,800	$33	$189,300	
	Commercial Area 1	CY	12	$104	$1,300	
	Commercial Area 2	CY	-	-	-	
	Commercial Area 3	CY	-	-	-	
	Commercial Area 4	CY	7,185	$6	$45,100	
4.0	**Transportation and Disposal (by Redevelopment Area)**					**$1,658,970**
	Residential 1 - Non Haz Non TSCA Soils	Ton	1,365	$22	$30,000	
	Residential 2 - Non Haz Non TSCA Soils	Ton	38	$22	$800	
	Residential 3 - Non Haz Non TSCA Soils	Ton	2,243	$22	$49,300	
	Residential 4 - Non Haz Non TSCA Soils	Ton	8,010	$22	$176,200	
	Residential 4 - Misc Debris	LS	1		$600	
	Waterfront Plaza - Non Haz Non TSCA Soils	Ton	-	$22	-	
	Mixed Residential/Commercial Area 1 - Non Haz Non TSCA Soils	Ton	60	$22	$1,300	
	Mixed Residential/Commercial Area 1 - Misc. Debris	LS	-	$125	$1,675	
	Mixed Residential/Commercial Area 2 - Non Haz Non TSCA Soils	Ton	8,535	$22	$187,200	
	Mixed Residential/Commercial Area 2 - Misc. Debris	LS	1		$8,245	
	Commercial Area 1 - Non Haz Non TSCA Soils	Ton	18	$22	$400	
	Commercial Area 2 - Non Haz Non TSCA Soils	Ton	-	-	-	
	Commercial Area 2 - Misc. Debris	LS	-	-	-	
	Commercial Area 3 - Non Haz Non TSCA Soils	Ton	-	-	-	
	Commercial Area 3 - Misc. Debris	LS	-	-	-	
	Commercial Area 4 - Non Haz Non TSCA Soils	Ton	3,782	$22	$83,200	
	Commercial Area 4 - Misc. Debris	LS	-		$3,550	
	Commercial Area 4 - TSCA	Ton	7,000	$160	$1,116,500	
7.0	**Restoration (by Redevelopment Area)**					**$400,325**
	Residential 1	LS	1		$22,500	
	Residential 2	LS	1		$5,070	
	Residential 3	LS	1		$30,275	
	Residential 4	LS	1		$80,800	
	Waterfront Plaza	LS	-		-	
	Mixed Residential/Commercial Area 1	LS	1		$7,425	
	Mixed Residential/Commercial Area 2	LS	1		$139,455	
	Commercial Area 1	LS	1		$1,650	
	Commercial Area 2	LS	-		-	
	Commercial Area 3	LS	-		-	
	Commercial Area 4	LS	1		$113,150	

TABLE C.3B

COST SUMMARY
REMEDIAL ALTERNATIVE 3B – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET PART 201 LAND USE AND PCB RISK-BASED LEVELS OF 2.5 MG/KG RESIDENTIAL AND 9.1 MG/KG COMMERCIAL AREAS
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Subtotal*	*Estimated Cost Total*
8.0	**Demobilization**	LS	1	$26,550		**$26,600**
	Decontamination and Demobilization					
	TOTAL CONSTRUCTION COST					**$2,729,995**
C.	***ENGINEERING/OVERSIGHT***					
1.0	**Institutional Controls**					**$50,000**
2.0	**Engineering/ Design (15 % of Construction Costs)**					**$409,500**
3.0	**Construction Oversight (10 % of Construction Costs)**					**$273,000**
	TOTAL ENGINEERING/OVERSIGHT COSTS					**$732,500**
	CONTINGENCY ON CAPITAL COSTS (25 %)					**$865,624**
	TOTAL CAPITAL COSTS					**$4,328,119**
OPERATION, MAINTENANCE, & MONITORING COSTS						
A.	***ANNUAL MONITORING AND MAINTENANCE***					**$2,400**
	Monthly Operation and Maintenance	Month	12	$200	$2,400	
	CONTINGENCY ON OM & M COSTS (20 %)					**$480**
	TOTAL CAPITAL COSTS					**$4,328,119**
	NET PRESENT VALUE OF OM & M (30 YEARS @ 7 % DISCOUNT RATE)					**$35,738**
	TOTAL COST					**$4,363,857**

Table C.3B

COST SUMMARY NOTES
REMEDIAL ALTERNATIVE 3B – EXCAVATION AND OFF-SITE DISPOSAL
TO PART 201 LAND USE CRITERIA AND SITE SPECIFIC PCB RISK-BASED LEVELS
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

GENERAL NOTES

A. Estimate for Remedial Alternative 3B - Excavation and Off-Site Disposal to Part 201 Land Use Criteria and Site specific calculated PCB Risk-Based Levels [2.5 milligrams/kilogram (mg/kg) for Residential Areas and 9.1 mg/kg for Commercial Areas] has been prepared based on available information at the time of this document. Redevelopment activities conducted, being conducted and anticipated for the Site by the City of Plainwell may affect the remediation costs. Costs presented in the Feasibility Study (FS) Report have taken into consideration anticipated redevelopment plans by the City of Plainwell. Redevelopment plans include demolition of non-historical buildings to the concrete slab as well as specific land use restrictions/designations for the Site as presented on Figure 1.4 of the FS Report. This cost estimate is expected to be within -30 percent to +50 percent of the actual remedial costs in accordance with United States Environmental Protection Agency (USEPA) guidance.

B. Remediation activities for each of the 11 proposed redevelopment areas were estimated separately; however, the estimate assumes one mobilization and demobilization effort to conduct the work.

C. The cost estimate assumes that new structures have not been constructed in areas that are planned for soil excavation and existing structures remain in place.

D. Costs assume that additional soil investigation will not be conducted under building slabs unless otherwise noted in the pre-design notes below.

E. Areas targeted for soil removal and off-Site disposal were determined based on an iterative/risk-based approach for arsenic and Site specific calculated levels for PCBs as detailed in Appendix A of the FS Revision 2.

F. The estimated costs assume that excavation of impacted soils under the building slabs will not be conducted.

G. The cost estimate includes abandonment and replacement costs of groundwater monitoring wells within excavation areas.

H. Costs are based on 2014 dollars.

I. All volumes are based on in-place measures unless otherwise stated.

J. Abbreviations used in the "Unit" column in the Cost Estimate Table are as follows:
   - CY = Cubic Yard
   - EA = Each
   - LS = Lump Sum
   - TN = Ton
   - LF= linear foot

TASK NOTES:

CAPITAL COSTS

A. INVESTIGATION/CONSTRUCTION

1.0 Pre-Design Investigation (PDI) Activities

The following assumptions were made relative to the PDI activities in each of the redevelopment areas and reflected in the cost estimate.

- Generation of a Sampling and Analysis Plan (SAP).
- Update the Health and Safety Plan as necessary.
- Update the Multi-Area Quality Assurance Project Plan as necessary.
- Completion of the SAP - soil boring installation and soil sample collection to delineate the vertical and horizontal extent of impact. Soil borings are assumed to be collected via direct push method. PDI samples will be collected and submitted for laboratory analysis for specific parameters determined to exceed Preliminary Remediation Goals (PRGs) during the Remedial Investigation (RI). Delineation samples will not be collected in areas that were not selected for excavation activities (i.e., under building slabs, etc.)
- Quality Assurance/Quality Control samples are included on a 1 per 10 basis.
- A survey of the "top of bank" is included in the PDI cost estimate.
- All areas where subsurface work is to be conducted will be cleared through a public utility locate (i.e., MISS Dig), a private utility locate, review of available drawings, and discussions with individuals knowledgeable of the Site and utilities located thereon.

Residential Area 1
PRGs exceeded in Residential Area 1 include Part 201 non-residential and residential direct contact criteria for arsenic. Soil samples will be collected to delineate the extent of soil impacted with PCBs adjacent to the storm sewer line installed by the Michigan Department of Transportation (MDOT) in 2012.

- Allowance for 30 soil samples for PCBs
- Allowance for 12 soil samples for arsenic

Residential Area 2
The PRG exceeded in Residential Area 2 is Part 201 residential direct contact criteria for arsenic.

- Allowance for 24 soil samples for arsenic

Residential Area 3
The PRG exceeded in Residential Area 3 is Part 201 residential direct contact criteria for arsenic.

- Allowance for 56 soil samples for arsenic

Residential Area 4
PRGs exceeded in Residential Area 4 include Part 201 non-residential direct contact criteria for arsenic and lead. Residential direct contact criteria is exceeded at locations within Residential Area 4 for arsenic, benzo(a)pyrene, cyanide, dibenz(a,h)anthracene, lead and PCBs. Residential soil volatilization to indoor air inhalation criteria (SVIIC) was exceeded at one location for benzene.

- An allowance for 36 soil samples for arsenic
- Benzene above the residential SVIIC at TP-308
- An allowance for 4 soil samples for benzene was included in the estimate
- Cyanide was above residential direct contact criteria at SB-302 in the shallow (0-1 foot) interval
    - Four samples for cyanide were included in the estimate
- An allowance for 20 samples for lead was included in the estimate
- The PNA parameters were identified in shallow samples (0-1.5 feet) below grade at DG3, DG4 and TP 302
    - Allowance for 12 PNA samples

PCBs were above the Site specific calculated level for Residential areas at TP-313 and SB-301

- An allowance for 16 soil samples for PCBs was included in the estimate

Waterfront Plaza
PDI activities will not be specifically conducted within the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
PRGs exceeded in Mixed Residential/Commercial Area 1 include Part 201 non-residential inhalation criteria for manganese and residential direct contact criteria for arsenic.

- Delineation samples will be collected around 2 locations (TP-306 and TP-334)
- A total of 12 soil samples for arsenic will be collected
- Four samples for manganese will be collected and analyzed around TP-334

Mixed Residential/Commercial Area 2
PRGs exceeded in Mixed Residential/Commercial Area 2 include Part 201 non-residential direct contact criteria for arsenic, benzo(a)pyrene, and lead. Residential direct contact criteria is exceeded at locations within Mixed Residential/Commercial Area 2 for arsenic, benzo(a)pyrene, dibenz(a,h)anthracene; benzo(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene and lead.

Soil delineation by work area as follows:

Arsenic ONLY locations:
Building 25
- Allowance for 8 samples
- A portion of the concrete slab was removed during demolition

Building 28
- Allowance for 8 samples
- A portion of the concrete slab was removed during demolition

Train Shed
- Allowance for 4 samples

Coal Tunnel Area
- Allowance for 30 samples

Former Ash Silo Area (SB-2010 and SB-2011)
- Allowance for 12 samples

Former clarifier area (TP-344)
- Allowance for 8 samples

Area north of Building 3/Former Water Tower Area (TP-340, TP-342, TP-343)
- Allowance for 16 samples

Arsenic and Lead sample locations:
Area around SB-2013
- Allowance for 12 samples

Arsenic, PNAs and Lead sample locations:
Building 3A
- Allowance for 12 samples

Building 6A
- Allowance for 18 samples
- Technicians will be required to don respirators for this work
- The floor in the majority of this building is exposed soil

Arsenic and PNAs sample locations
Fuel Oil AST Area
- Allowance for 24 PNA soil samples
- Allowance for 12 arsenic samples

A total of 140 samples will be collected and analyzed for arsenic.
A total of 54 samples will be collected and analyzed for PNAs.
A total of 42 samples will be collected and analyzed for lead.

Commercial Area 1
PRGs exceeded in Commercial Area 1 include Part 201 non-residential inhalation criteria for manganese and the residential direct contact for arsenic.

- Delineation samples will be collected around SS-105
- Four soil samples will be collected from the 0-2 foot below grade interval and analyzed for arsenic and manganese

Commercial Area 2
Delineation efforts will not be conducted in Commercial Area 2.

Commercial Area 3
Delineation efforts will not be conducted in Commercial Area 2.

Commercial Area 4
Arsenic exceeds the Part 201 non-residential direct contact criteria PRG in Commercial Area 4. Residential direct contact criteria is exceeded at locations within Commercial Area 4 for arsenic, benzo(a)pyrene, and lead. PCBs are above the calculated risk-based PRG of 9.1 mg/kg in the area around MW-16.

Soil delineation by building / work area as follows:

Arsenic ONLY locations:
SB-2012
- Allowance for 4 samples

Parking lot area south of Building 17
- Allowance for 60 samples

Arsenic and Lead sample locations:
TP-341
- Allowance for 4 samples

Arsenic, PNAs and Lead sample locations:

Former Substation Area/North of Mill Buildings

- Allowance for 30 samples

PCBs and Arsenic sample locations:

MW-16 Area

- Allowance for 18 samples

A total of 116 samples will be collected and analyzed for arsenic.
A total of 30 samples will be collected and analyzed for PNAs.
A total of 18 samples will be collected and analyzed for PCBs.
A total of 34 samples will be collected and analyzed for lead.

2.0 Mobilization/Set-Up

The following assumptions were made relative to the mobilization/set-up in each of the redevelopment areas and reflected in the cost estimate.

- Mobilization and set-up includes: mobilization of personnel and equipment; construction survey work (e.g., excavation layout and verification sample locations); and geotechnical and chemical testing on backfill materials.
  - An allowance of $8,000 to mobilize personnel and equipment was included in the estimate.
  - $30,000 for survey work was included in the estimate.
  - Geotechnical and chemical analysis for imported materials was included in the estimate. One set of chemical analysis [Target Analyte List Metals, Target Compound List (TCL) for volatile organic compounds, TCL for semi-volatile compounds, and polychlorinated biphenyl (PCBs) per material (topsoil, general fill and 21AA/gravel]. The topsoil sample will also be analyzed for pH, phosphorous, organic content, pesticides and herbicides.
- Health and Safety includes an on-Site Health and Safety Officer (HSO) for 4 months. Also included in the costs are: air monitoring equipment and calibration gases; a decontamination trailer; and disposable personal protection equipment (PPE).
- Air monitoring assumes real-time air monitoring will be conducted during all excavation work utilizing a photoionization detector (11.7 electronVolt [eV] lamp) and fugitive dust monitor(s). Air monitoring does not include the collection of samples for laboratory analysis or laboratory analytical costs.
- Erosion control includes an allowance for silt fence (4,000 LF) and geofabric to cover catch basins on the Site. Costs for erosion control measures specific to individual redevelopment areas (i.e., turbidity curtains, etc.) are included in individual redevelopment area estimates (e.g., Commercial Area 4).
- Site facility costs include electrical hookup and electricity for two office trailers (one for the contractor and one for the U.S. EPA) for 4 months. Other temporary facilities include portable sanitary services, a drinking water allowance and a small dumpster for worker general refuse. The expense of one Site truck for the duration of the services was included.
- Site facility costs include materials and construction of temporary decontamination pads and decontamination stations for workers. It was assumed that potable water could be obtained from the City of Plainwell for use during the project.
- Site facility costs include $6,000 to for the installation and maintenance of a staging area for waste.
- A perimeter fence currently exists around the majority of the Site. The cost estimate assumes the fence will remain and can be utilized as a security measure to prevent access to the Site during construction activities.

3.0 Preparation/Pre-Excavation Work by Redevelopment Area

The following assumptions were made relative to the preparation/pre-excavation work in each of the redevelopment areas and reflected in the cost estimate.

- A Soil Erosion and Sedimentation Control Permit will be obtained from Allegan County. All other necessary permits will also be obtained prior to intrusive work at the Site.

- All areas where subsurface work is to be conducted will be cleared through a public utility locate (i.e., MISS Dig), a private utility locate, review of available drawings, and discussions with individuals knowledgeable of the Site and utilities located thereon.

Residential Area 1
Specific assumptions for preparation/pre-excavation work in Residential Area 1 under Remedial Alternative 3B are presented below.

- Trees and shrubs in the excavation areas will need to be cleared and grubbed.
- Turbidity curtain will be temporally installed in the Kalamazoo River during excavation and backfill activities.
- One power pole will need to be relocated for the excavation work around SB-104.

Residential Area 2
No specific assumptions for preparation/pre-excavation work in Residential Area 2 under Remedial Alternative 3B were utilized.

Residential Area 3
Specific assumptions for preparation/pre-excavation work in Residential Area 3 under Remedial Alternative 3B are presented below.

- MW-15 will be abandoned.
- Clearing will be required in the area around MW-15.

Residential Area 4
Specific assumptions for preparation/pre-excavation work in Residential Area 4 under Remedial Alternative 3B are presented below.

- Clearing will be required in the area around SB-301/SG-4.
- Pavement by TP-302 will be saw cut.

Waterfront Plaza
No specific assumptions for preparation/pre-excavation work in Waterfront Plaza under Remedial Alternative 3B were utilized.

Mixed Residential/Commercial Area 1
The specific assumption for preparation/pre-excavation work in Mixed Residential/Commercial Area 1 under Remedial Alternative 3B is presented below.

- Pavement in the work areas will be saw cut prior to excavation to leave a clean line for restoration activities.

Mixed Residential/Commercial Area 2

Specific assumptions for preparation/pre-excavation work in Mixed Residential/Commercial Area 2 under Remedial Alternative 3B are presented below.

- The loading dock at the south end of Building 1 will be evaluated by a structural engineering evaluation to ensure excavation of the fuel oil line will not damage either the loading dock or Building 1. Excavation will not occur within Building 1.
- A demolition notice will be submitted to the State of Michigan for the demolition of Building 5A/part of the coal tunnel. Asbestos abatement may be necessary on pipe wrap found outside of Building 5A.
- Excavation of soils under the concrete slabs of the demolished buildings (3A, 25 and 28) will require the relocation of the backfill (less than 3 feet thick) prior to excavation.
- Fuel Oil No. 6 within the former coal tunnel will be removed from the tunnel before the tunnel itself is removed.
- The piping run from the former Fuel Oil No. 6 AST and Building 5 will be exposed at one end and drained of any residual fuel oil prior to removing the line.
- Monitoring well MW-19 will be abandoned prior to excavation activities in this area.
- Monitoring well MW-22 will be abandoned prior to removal of the former fuel oil line.
- Monitoring well MW-2 will be abandoned prior to excavation activities at SB-2010 and SB-2011.
- The concrete floor (Buildings 25 and 3A) will be saw cut prior to excavation (concrete will be broken out during excavation – but saw cut first to create clean lines for restoration).

Commercial Area 1

No specific assumptions for preparation/pre-excavation work Commercial Area 1 under Remedial Alternative 3B were utilized.

Commercial Area 2

No specific assumptions for preparation/pre-excavation work Commercial Area 2 under Remedial Alternative 3B were utilized.

Commercial Area 3

No specific assumptions for preparation/pre-excavation work Commercial Area 3 under Remedial Alternative 3B were utilized.

Commercial Area 4

Specific assumptions for preparation/pre-excavation work in Commercial Area 4 under Remedial Alternative 3B are presented below.

- Excavation of soils under the concrete slabs of the demolished buildings will require the relocation of backfill placed within the former basement cavities to surrounding grade (up to 9 feet thick) prior to excavation. An allowance for 5 working days to complete this work was included in the estimate at a cost of $20,400.
- Turbidity curtain will be installed in the Mill Race in the area by MW-16 (along the Mill Race) and in the area of MW-3 prior to excavation activities.
- Monitoring of the Mill Race and Kalamazoo River for turbidity will be conducted during excavation activities.
- MW-16 will be abandoned prior to excavation work in that area.
- Protection of MW-3 (barriers) will be installed.
- A structural engineering evaluation of the pedestrian bridge for stability during excavation activities will be conducted. The evaluation will determine if shoring of the bridge is necessary. An allowance

of $5,000 is included in the estimate to conduct the evaluation. Shoring costs have not been included in the estimate.

- The water flow of the Mill Race will be diverted in the excavation area. The methodology for this work to be determined in the pre-design phase of the project.
- Rip rap along the Mill Race will be removed and staged for re-use.
- Pavement in the work areas will be saw cut prior to excavation to allow for restoration activities.

4.0 Excavation by Redevelopment Area

Conceptual excavation areas for each of the Redevelopment areas are shown of Figures 3.12 through 3.23 of the FS Report (Revision 2).

The following assumptions were made relative to excavation in each of the redevelopment areas and reflected in the cost estimate.

- Excavation estimates assume dewatering will not be necessary and that all work can be completed in Level D PPE except Building 6A which will be conducted with supplied air (Level B) PPE.
- Standby time was not added to account for the time for laboratory analysis of verification samples. It was assumed that the project would proceed across the Site allowing for laboratory analysis to be conducted while another redevelopment area was being excavated or restored.

Specific assumptions to each redevelopment area, in addition to those presented above globally, are provided below.

Residential Area 1

Residential Area 1 is located at the far west end of the Site, where the majority of the former sludge dewatering lagoons were located. The former Mill wastewater treatment building, activated sludge tank and secondary clarifier were constructed over the lagoons. The wastewater treatment structures were demolished on behalf of the City of Plainwell in November and December 2013. The specific assumption for excavation in Residential Area 1 under Remedial Alternative 3B is presented below.

- Overburden present beyond the target excavation area that must be removed to achieve the full depth of excavation will be disposed of off Site.
- The rip rap at the Kalamazoo River outfall from the storm sewer line does not need to be removed.

Residential Area 2

Residential Area 2 is located between Residential Area 1 and Residential Area 3 and is positioned along the Kalamazoo River. This area was historically occupied by sludge dewatering lagoons (A, B, C) and a primary clarifier. The primary clarifier was demolished to the concrete slab in November 2013. No specific assumptions for excavation in Residential Area 2 under Remedial Alternative 3B are presented.

Residential Area 3

Residential Area 3 is located near the center of the Site. The former aeration basin location occupies the majority of the area. A former secondary clarifier was historically present in this area, which was demolished in November 2013 with the floor of the former clarifier remaining. Specific assumptions for excavation in Residential Area 3 under Remedial Alternative 3B are presented below.

- Material removed from the bottom of the aeration basin will require double handling due to the slopes of the former aeration basin and the depth of the excavation.

Residential Area 4
Residential Area 4 is positioned along the Kalamazoo River between Residential Area 3 and Mixed Residential Area 2. No aboveground structures are currently present on this area. A portion of this area was historically utilized by the Mill as a coal storage area. No specific assumptions for excavation in Residential Area 4 under Remedial Alternative 3B were made.

Waterfront Plaza
No excavation activities are anticipated in the Waterfront Plaza Area.

Mixed Residential/Commercial Area 1
Mixed Residential/Commercial Area 1 is located between Commercial Area 2 and Commercial Area 3 on the southern property line along Allegan Street. This area was once occupied by the former Specialty Minerals Building and associated above ground storage tanks. The Specialty Minerals building and ASTs were demolished to the concrete slab in December 2011. The specific assumption for excavation in Mixed Residential/Commercial Area 1 under Remedial Alternative 3B is presented below.

- Underground utilities encountered (TP-306) between the former Specialty Minerals Building and the main Mill Buildings will be capped at either end of the excavation.

Mixed Residential and Commercial Area 2
Mixed Residential and Commercial Area 2 is located between Residential Area 4 and Commercial Area 4 at the northern end of the Site along the Kalamazoo River. The majority of the area is occupied by Mill Buildings and pavement. Buildings 3A, 25 and 28 along with the eastern water tower, 200,000-gallon Fuel Oil AST, and the brine USTs, were demolished on behalf of the City of Plainwell. The majority of the concrete slabs were left in place for Buildings 3A and 28. Building 25 was part of the Site's historical wastewater treatment system and had a subsurface vault and system to pump the waste water from the Mill to the on-Site WWTP at the west end of the Site. The vault under the northern portion of Building 25 was not removed. The vault floor was cracked and the sidewalls removed to 4 feet below grade, then the vault was filled with imported general fill. The concrete slab under the remaining portion of Building 25 was left in place.

Specific assumptions for excavation in Mixed Residential/Commercial Area 2 under Remedial Alternative 3B are presented below.

- A storm sewer was installed through the west side of Mixed Residential/Commercial Area 2 in 2012 by the Michigan Department of Transportation (MDOT). The approximate location of the storm sewer is shown on Figure 3.18. Before conducting excavation work to remove the former fuel oil AST line and excavate the east side of the former fuel AST, the exact location of the storm sewer line will be determined, shoring of the line may be necessary during the removal of the fuel oil AST line.
- Soils in Building 6A will be removed using a vacuum extraction system.

Commercial Area 1
Commercial Area 1 is located in the far southwest portion of the Site. No structures or paved areas are currently present in this area that would require unique equipment or procedures to conduct the proposed remedial activities. This area of the Site has not been developed and was not part of historic Mill operations. The area specific assumption for excavation in Commercial Area 1 under Remedial Alternative 3B is presented below.

- A storm sewer was installed through this area in 2012 by the Michigan Department of Transportation (MDOT). The approximate location of the storm sewer is shown on Figure 3.19. Before conducting excavation work in the area of SS-105, the exact location of the line will be determined.

Commercial Area 2
Commercial Area 2 is located in the southwest central portion of the Site. Structures on this portion of the Site include the City of Plainwell Public Safety Building and associated paved parking and egress/ingress areas.

Excavation activities are not anticipated in the Commercial Area 2 for Remedial Alternative 3B.

Commercial Area 3
Commercial Area 3 is located adjacent to the former southwest corner of the Mill Buildings along Allegan Street. Structures on this area include a pump house and a former guard shack. Other historical features within this area have been demolished on behalf of the City of Plainwell. The Clay ASTs, Ammonia AST secondary containment structure, the Starch ASTs and Building 9C were demolished in 2012. The concrete slabs for all demolished features were left in place. Specific assumptions for excavation in Commercial Area 3 under Remedial Alternative 3B are presented below.

Excavation activities are not anticipated in the Commercial Area 3 for Remedial Alternative 3B.

Commercial Area 4
Commercial Area 4 is located on the eastern side of the Site. The majority of this area is covered with either pavement, buildings (vacant and occupied) or former building concrete slabs. Buildings (9A, 9B, 9C, 9D, 9E, 9F, and 23) were demolished on behalf of the City of Plainwell in 2012, with the majority of the former building concrete slabs left in place and backfilled to surrounding grade. The basement areas were backfilled with a combination of crushed concrete (from the buildings on Site), soil from an adjacent retaining wall that was removed, and imported gravel material and vary in thickness from 6 feet to 9 feet. Specific assumptions for excavation in Commercial Area 4 under Remedial Alternative 3B are presented below.

- Access to both the former substation area and around MW-16 will be restricted due to the distance between existing structures and either the Kalamazoo River or the Mill Race. Excavated soils will likely need to be double handled.

5.0 Transportation and Disposal by Redevelopment Area

The following assumptions were made relative to the transportation and disposal of materials in each of the redevelopment areas and reflected in the cost estimate.

- Soil volumes were converted to tonnage assuming a ratio of 1.5 tons per cubic yard for soils. Tonnage for concrete was based on 1.65 tons per cubic yard of material. Waste has been categorized as non-hazardous and non-TSCA soils; TSCA soil; TSCA debris; and miscellaneous debris.
- Transportation and disposal pricing is based on the non-hazardous, non-TSCA material being accepted at Waste Management Autumn Hills Landfill in Zeeland, Michigan. A cost of $22.00 per ton for both transportation and disposal of non-hazardous, non-TSCA waste was used for the estimates.
- A disposal price of $135.00 per ton was used for TSCA soils. For estimation purposes it was assumed that the TSCA soils would be transported to the Environmental Quality Company/U.S. Ecology Company Wayne Disposal Landfill #2, Belleville, Michigan for direct landfill disposal. Transportation of the soils was assumed to be conducted in lined 50 ton gravel trains. Transportation of each load of 50 tons was assumed to cost $500.00.
- Transportation costs assume fuel prices for diesel will not exceed $4.00 per gallon.
- Organic material generated from clearing activities was assumed to be chipped and left on Site.
- Concrete and asphalt will be disposed of off Site, not recycled.

Residential Area 1
The specific assumption for transportation and disposal work in Residential Area 1 under Remedial Alternative 3B is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 910 CY.

Residential Area 2
The specific assumption for transportation and disposal work in Residential Area 2 under Remedial Alternative 3B is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 25 CY.

Residential Area 3
The specific assumption for transportation and disposal work in Residential Area 2 under Remedial Alternative 3B is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 1,495 CY.

Residential Area 4
The specific assumption for transportation and disposal work in Residential Area 3 under Remedial Alternative 3B is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 5,340 CY.
- Allowance of $600 for asphalt.

Waterfront Plaza
No specific assumptions for transportation and disposal work in Waterfront Plaza under Remedial Alternative 3B were utilized. Excavation activities will not be conducted within the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
Specific assumptions for transportation and disposal work in Mixed Residential/Commercial Area 1 under Remedial Alternative 3B are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 40 CY.
- Allowance of 50 CY for asphalt disposal.

Mixed Residential/Commercial Area 2
Specific assumptions for transportation and disposal work in Mixed Residential/Commercial Area 2 under Remedial Alternative 3B are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil from Building 6A with a volume of 200 CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the Train Shed with a volume of 205 CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the coal tunnel area with a volume of 1,270 CY.
- Allowance of $3,500 for miscellaneous debris from the coal tunnel area (bricks, concrete).
- Waste was assumed to be non-hazardous, non-TSCA soil from the fuel oil line with a volume of 525 CY.
- Allowance of $600 for disposal of the fuel oil line piping.

- Waste was assumed to be non-hazardous, non-TSCA soil from the fuel oil No. 6 AST area with a volume of 2,500 CY.
- Allowance of $1,200 for the concrete ring the tank was sitting on and buried concrete and asphalt.
- Waste was assumed to be non-hazardous, non-TSCA soil from the north end of the Mill Buildings (Buildings-3A, 25, 28, test pits-TP-340, TP-342,TP-343 and SB-2013) with a volume of 990 CY.
- Allowance of $6,000 for miscellaneous debris from these areas at the north end of the Mill Building.

Commercial Area 1
Specific assumptions for transportation and disposal work in Commercial Area 1 under Remedial Alternative 3B are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 12 CY.

Commercial Area 2
Waste will not be transported off Site from Commercial Area 2 for Remedial Alternative 3B.

Commercial Area 3
Waste will not be transported off Site from Commercial Area 2 for Remedial Alternative 3B.

Commercial Area 4
Specific assumptions for transportation and disposal work in Commercial Area 4 under Remedial Alternative 3B are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil from the former substation area and north of the Mill Buildings with a volume of 2,510 CY.
- Waste was assumed to be TSCA soil from the area around MW-16 with a volume of 4,660 CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the area around boring BK5 with a volume of 15 CY.
- Allowance of $250 for asphalt transportation and disposal.

6.0 Restoration by Redevelopment Area

The following assumption was made relative to Site restoration in each of the redevelopment areas and reflected in the cost estimate.

- Restoration activities include backfill (material and placement), compaction, compaction testing and any other location specific restoration that may be deemed necessary at this time.
- General fill from a local gravel pit at a delivered material cost of $4.58 ton was used for the estimates. Unprocessed topsoil at a delivered price of $18.98 cubic yard was also used where appropriate.
- A six-inch layer of unscreened topsoil will be placed over the compacted general fill in areas that were previously pervious (i.e., not paved or impervious). Topsoil will be hydroseeded, including mulch.
- Restoration for excavation areas under pavement will be backfilled with general fill and compacted to 95 percent of the proctor.
- A 6-inch layer of 21AA or equivalent will be placed on the compacted general fill and compacted to 95 percent or greater of the proctor where restoration includes replacing the pavement.
- Concrete will be replaced where removed during excavation activities (sidewalk along Building 17).
- Asphalt will be replaced where removed during excavation activities.

- Permanent markers will be installed to designate areas on Site where impacted soils above Part 201 clean up criteria based on land use, remain in place.

Residential Area 1
Specific assumptions for Site restoration in Residential Area 1 under Remedial Alternative 3B are presented below.

- Rip rap at the Kalamazoo River around the storm sewer does not need to be replaced.

Residential Area 2
No specific assumptions for Site restoration in Residential Area 2 under Remedial Alternative 3B were utilized.

Residential Area 3
Specific assumptions for Site restoration in Residential Area 3 under Remedial Alternative 3B are presented below.

- Backfill material will be imported general fill and overburden material removed to achieve excavation depth requirements but beyond the area exceeding cleanup criteria.
- MW-15 will be replaced.

Residential Area 4
No specific assumptions for Site restoration in Residential Area 4 under Remedial Alternative 3B were utilized.

Waterfront Plaza
No specific assumptions for Site restoration in Waterfront Plaza under Remedial Alternative 3B were utilized. Restoration will not be required in the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
No specific assumptions for Site restoration in Mixed Residential/Commercial Area 1 under Remedial Alternative 3B were utilized.

Mixed Residential/Commercial Area 2
Specific assumptions for Site restoration in Mixed Residential/Commercial Area 2 under Remedial Alternative 3B are presented below.

- Building 6A currently has a dirt floor; restoration would not include a concrete floor.
- Concrete (former ash silos) will not be replaced at SB-2010.
- Concrete around the former 200,000 gallon fuel oil AST will not be replaced.
- Concrete removed for excavations at SB-216, SB-220, SB-222 and SB-223 will not be replaced.
- Additional backfill will be required to fill in the void space of the coal tunnel.
- MW-2, MW-19 and MW-22 will be replaced.

Commercial Area 1
No specific assumptions for Site restoration in Commercial Area 1 under Remedial Alternative 3B were utilized.

Commercial Area 2
No specific assumptions for Site restoration in Commercial Area 2 under Remedial Alternative 3B were utilized.

Commercial Area 3
No specific assumptions for Site restoration in Commercial Area 3 under Remedial Alternative 3B were utilized.

Commercial Area 4
Specific assumptions for Site restoration in Commercial Area 4 under Remedial Alternative 3B are presented below.

- Asphalt will be 3 inches thick.
- Geotextile and Rip rap will be installed along the Mill Race.
- The Mill Race will be returned to its normal flow path.
- The turbidity curtain will be removed from the Mill Race and Kalamazoo River.
- MW-16 will be replaced.

7.0 Demobilization

The following assumptions were made relative to the demobilization from the Site and reflected in the cost estimate.

- Costs included in the demobilization task include time for Site tear down and final decontamination of equipment, and demobilization of equipment and personnel. Demobilization activities were assumed to take five working days.

B. ENGINEERING/OVERSIGHT

1.0 Engineering/Design

The following assumption was made relative to the installation of engineering/design and reflected in the cost estimate.

- Engineering and project design/specifications were estimated to be 15 percent of the Construction Costs.

2.0 Construction Oversight

The following assumption was made relative to the construction oversight and reflected in the cost estimate.

- Construction oversight was estimated to be 10 percent of the Construction Costs.

TABLE C.3C

COST SUMMARY
REMEDIAL ALTERNATIVE 3C – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET LAND USE FOR PART 201, 10^{-5} RISK LEVEL FOR ARSENIC (6.4 MG/KG RESIDENTIAL AND 27 MG/KG FOR NON-RESIDENTIAL),
AND PCB RISK-BASED LEVEL (2.5 MG/KG RESIDENTIAL AND 9.1 MG/KG COMMERCIAL AREAS)
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Total*
CAPITAL COSTS						
A.	***PRE-DESIGN INVESTIGATION***					**$33,200**
1.0	Sampling and Analysis Work Plan (SAP)	LS	1	$25,000	$25,000	
	Survey top of banks at Site	LS	1	$2,000	$2,000	
	Health and Safety Plan Update	LS	1	$1,200	$1,200	
	Multi-Area Quality Assurance Project Plan	LS	1	$5,000	$5,000	
2.0	SAP Implementation					**$123,900**
	Project Set up (mark locations etc.)	LS	1	$8,790	$8,800	
	Private Utility Locate	LS	1	$8,000	$8,000	
	Field Activities	DA	20	$2,900	$58,000	
	Field Technicians					
	Sampling Equipment (push probe technology)					
	Expendables (PPE etc)					
	Temporary Lighting and Carbon Monoxide Control	LS	1	$3,000	$3,000	
	Concrete Coring	LS	1	$6,000	$6,000	
	Laboratory Analysis	LS	1	$39,055	$39,100	
	Investigation Derived Waste Disposal	DA	20	$50	$1,000	
3.0	Contingency on PDI	LS	1	$78,550	$78,600	**$78,600**
	Based on 50 % of SAP costs					
4.0	Remedial Action Plan	LS	1	$60,000	$60,000	**$60,000**
	TOTAL PRE-DESIGN COSTS					**$295,700**
B.	***CONSTRUCTION***					
1.0	**Mobilization and Set up**					**$261,600**
	Mobilization and Set up	LS	1	$45,700	$45,700	
	Health and Safety	Monthly	5	$28,450	$142,300	
	Erosion Control	LS	1	$16,060	$16,100	
	Site Facilities					
	Temporary Facilities	Monthly	5	$6,810	$34,100	
	Decontamination Pad and Stations	LS	1	$17,375	$17,400	
	Staging Areas	LS	1	$6,000	$6,000	
2.0	**Additional Preparation and/or Demolition (by Redevelopment Area)**					**$139,400**
	Residential 1	LS	1	$14,700	$14,700	
	Residential 2	LS	1	-	-	
	Residential 3	LS	1	$1,195	$1,200	
	Residential 4	LS	1	$850	$900	
	Waterfront Plaza	LS	1	-	-	
	Mixed Residential/Commercial Area 1	LS	1	-	-	
	Mixed Residential/Commercial Area 2	LS	1	$56,625	$56,600	
	Commercial Area 1	LS	1	-	-	
	Commercial Area 2	LS	1	-	-	
	Commercial Area 3	LS	1	-	-	
	Commercial Area 4	LS	1	$65,980	$66,000	

TABLE C.3C

COST SUMMARY
REMEDIAL ALTERNATIVE 3C – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET LAND USE FOR PART 201, 10^{-5} RISK LEVEL FOR ARSENIC (6.4 MG/KG RESIDENTIAL AND 27 MG/KG FOR NON-RESIDENTIAL),
AND PCB RISK-BASED LEVEL (2.5 MG/KG RESIDENTIAL AND 9.1 MG/KG COMMERCIAL AREAS)
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost*	
					Subtotal	*Total*
3.0	**Excavation (by Redevelopment Area)**					**$293,100**
	Residential 1	CY	935	$14	$12,900	
	Residential 2	CY	620	$12	$7,300	
	Residential 3	CY	1,895	$9	$16,800	
	Residential 4	CY	9,390	$4	$33,000	
	Waterfront Plaza	CY	-	-	-	
	Mixed Residential/Commercial Area 1	CY	70	$61	$4,300	
	Mixed Residential/Commercial Area 2	CY	6,396	$27	$171,200	
	Commercial Area 1	CY	12	$106	$1,300	
	Commercial Area 2	CY	12	$106	$1,300	
	Commercial Area 3	CY	-	-	-	
	Commercial Area 4	CY	7,175	$6	$45,000	
4.0	**Transportation and Disposal (by Redevelopment Area)**					**$1,851,070**
	Residential 1 - Non Haz Non TSCA Soils	Ton	1,403	$22	$30,900	
	Residential 2 - Non Haz Non TSCA Soils	Ton	930	$22	$20,500	
	Residential 3 - Non Haz Non TSCA Soils	Ton	2,843	$22	$62,500	
	Residential 4 - Non Haz Non TSCA Soils	Ton	14,085	$22	$309,900	
	Residential 4 - Misc Debris	LS	1		$600	
	Waterfront Plaza - Non Haz Non TSCA Soils	Ton	-	$22	-	
	Mixed Residential/Commercial Area 1 - Non Haz Non TSCA Soils	Ton	105	$22	$2,300	
	Mixed Residential/Commercial Area 1 - Misc. Debris	LS	-	$125	$1,675	
	Mixed Residential/Commercial Area 2 - Non Haz Non TSCA Soils	Ton	9,594	$22	$210,500	
	Mixed Residential/Commercial Area 2 - Misc. Debris	LS	1		$8,245	
	Commercial Area 1 - Non Haz Non TSCA Soils	Ton	18	$22	$400	
	Commercial Area 2 - Non Haz Non TSCA Soils	Ton	18	$22	$400	
	Commercial Area 2 - Misc. Debris	LS	-	-	-	
	Commercial Area 3 - Non Haz Non TSCA Soils	Ton	-	-	-	
	Commercial Area 3 - Misc. Debris	LS	-	-	-	
	Commercial Area 4 - Non Haz Non TSCA Soils	Ton	3,775	$22	$83,100	
	Commercial Area 4 - Misc. Debris	LS	-		$3,550	
	Commercial Area 4 - TSCA	Ton	7,000	$160	$1,116,500	
7.0	**Restoration (by Redevelopment Area)**					**$485,525**
	Residential 1	LS	1		$25,000	
	Residential 2	LS	1		$18,260	
	Residential 3	LS	1		$34,785	
	Residential 4	LS	1		$146,380	
	Waterfront Plaza	LS	-		-	
	Mixed Residential/Commercial Area 1	LS	1		$8,625	
	Mixed Residential/Commercial Area 2	LS	1		$134,220	
	Commercial Area 1	LS	1		$1,670	
	Commercial Area 2	LS	-		$1,670	
	Commercial Area 3	LS	-		-	
	Commercial Area 4	LS	1		$114,915	

TABLE C.3C

COST SUMMARY
REMEDIAL ALTERNATIVE 3C – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET LAND USE FOR PART 201, 10^{-5} RISK LEVEL FOR ARSENIC (6.4 MG/KG RESIDENTIAL AND 27 MG/KG FOR NON-RESIDENTIAL),
AND PCB RISK-BASED LEVEL (2.5 MG/KG RESIDENTIAL AND 9.1 MG/KG COMMERCIAL AREAS)
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Total*
8.0	**Demobilization**	LS	1	$26,550		**$26,600**
	Decontamination and Demobilization					
	TOTAL CONSTRUCTION COST					**$3,057,295**
C.	***ENGINEERING/OVERSIGHT***					
1.0	**Institutional Controls**					**$50,000**
2.0	**Engineering/ Design (15 % of Construction Costs)**					**$458,600**
3.0	**Construction Oversight (10 % of Construction Costs)**					**$305,700**
	TOTAL ENGINEERING/OVERSIGHT COSTS					**$814,300**
	CONTINGENCY ON CAPITAL COSTS (25 %)					**$967,899**
	TOTAL CAPITAL COSTS					**$4,839,494**

OPERATION, MAINTENANCE, & MONITORING COSTS

A.	***ANNUAL MONITORING AND MAINTENANCE***					**$2,400**
	Monthly Operation and Maintenance	Month	12	$200	$2,400	
	CONTINGENCY ON OM & M COSTS (20 %)					**$480**
	TOTAL CAPITAL COSTS					**$4,839,494**
	NET PRESENT VALUE OF OM & M (30 YEARS @ 7 % DISCOUNT RATE)					**$35,738**
	TOTAL COST					**$4,875,232**

Table C.3C

COST SUMMARY NOTES
REMEDIAL ALTERNATIVE 3C – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET LAND USE FOR PART 201, 10^{-5} RISK LEVEL FOR ARSENIC AND PCB RISK-BASED LEVEL
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

GENERAL NOTES

A. Estimate for Remedial Alternative 3C - Excavation and Off-Site Disposal Land Use Criteria with Risk Based Approach of 10^{-5} for Arsenic and Site specific calculated PCB Risk-Based Level has been prepared based on available information at the time of this document. Arsenic risk-based criteria are 6.4 milligrams per kilogram (mg/kg) for Residential and Mixed Residential/Commercial Areas and 27 mg/kg for Commercial Areas. Calculated PCB levels of 2.5 mg/kg (Residential Areas) and 9.1 mg/kg (for Commercial Areas) were utilized. Redevelopment activities conducted, being conducted and anticipated for the Site by the City of Plainwell may affect the remediation costs. Costs presented in the Feasibility Study (FS) Report have taken into consideration anticipated redevelopment plans by the City of Plainwell. Redevelopment plans include demolition of non-historical buildings to the concrete slab as well as specific land use restrictions/designations for the Site as presented on Figure 1.4 of the FS Report. This cost estimate is expected to be within -30 percent to +50 percent of the actual remedial costs in accordance with United States Environmental Protection Agency (U.S. EPA) guidance.

B. Remediation activities for each of the 11 proposed redevelopment areas were estimated separately; however, the estimate assumes one mobilization and demobilization effort to conduct the work.

C. Costs assume that additional soil investigation will not be conducted under building slabs unless otherwise noted in the pre-design notes below.

D. Areas targeted for soil removal and off-Site disposal were determined based on an iterative risk-based approach for arsenic and Site specific calculated levels for PCBs as detailed in Appendix A of the FS Revision 2.

E. The cost estimate assumes that new structures have not been constructed in areas that are planned for soil excavation and existing structures remain in place.

F. The cost estimate includes abandonment and replacement costs of groundwater monitoring wells within excavation areas.

G. Costs are based on 2014 dollars.

H. All volumes are based on in-place measures unless otherwise stated.

I. Abbreviations used in the "Unit" column in the Cost Estimate Table are as follows:
   - CY = Cubic Yard
   - EA = Each
   - LS = Lump Sum
   - TN = Ton
   - LF= linear foot

TASK NOTES:

CAPITAL COSTS

A. INVESTIGATION/CONSTRUCTION

1.0 Pre-Design Investigation (PDI) Activities

The following assumptions were made relative to the PDI activities in each of the redevelopment areas and reflected in the cost estimate.

- Generation of a Sampling and Analysis Plan (SAP).
- Update the Health and Safety Plan as necessary.
- Update the Multi-Area Quality Assurance Project Plan as necessary.
- Completion of the SAP - soil boring installation and soil sample collection to delineate the vertical and horizontal extent of impact. Soil borings are assumed to be collected via direct push method. PDI samples will be collected and submitted for laboratory analysis for specific parameters determined to exceed Preliminary Remediation Goals (PRGs) during the Remedial Investigation (RI). Delineation samples will not be collected in areas that were not selected for excavation activities (i.e., under building slabs, etc.).
- Quality Assurance/Quality Control samples are included on a 1 per 10 basis.
- A survey of the "top of bank" is included in the PDI cost estimate.
- All areas where subsurface work is to be conducted will be cleared through a public utility locate (i.e., MISS Dig), a private utility locate, review of available drawings, and discussions with individuals knowledgeable of the Site and utilities located thereon.

Residential Area 1
PRGs exceeded in Residential Area 1 include the risked based criteria for arsenic of 6.4 milligrams per kilogram (mg/kg). Soil samples will be collected to delineate the extent of soil impacted with PCBs adjacent to the storm sewer line installed by the Michigan Department of Transportation (MDOT) in 2012.

- Allowance for 30 soil samples for PCBs
- Allowance for 28 soil samples for arsenic

Residential Area 2
PRGs exceeded in Residential Area 2 include the risked based criteria for arsenic of 6.4 mg/kg.

- Allowance for 36 soil samples for arsenic

Residential Area 3
PRGs exceeded in Residential Area 3 include the risked based criteria for arsenic of 6.4 mg/kg.

- Allowance for 60 soil samples for arsenic

Residential Area 4
PRGs exceeded in Residential Area 4 include the risked based criteria for arsenic of 6.4 mg/kg. Part 201 residential direct contact criteria is exceeded at locations within Residential Area 4 for benzo(a)pyrene, cyanide, dibenz(a,h)anthracene and lead. Residential soil volatilization to indoor air inhalation criteria (SVIIC) was exceeded at one location for benzene. The Part 201 non-residential direct contact criterion for lead was also exceeded in Residential Area 4. PCBs were above the Site specific calculated PRG of 2.5 mg/kg within Residential Area 4.

- An allowance for 56 soil samples for arsenic
- Benzene above the residential SVIIC at TP-308
    - An allowance for 4 soil samples for benzene was included in the estimate.
- Cyanide was above residential direct contact criteria at SB-302 in the shallow (0-1 foot) interval
    - Four samples for cyanide were included in the estimate
- An allowance for 20 samples for lead was included in the estimate
- The PNA parameters were identified in shallow samples (0-1.5 feet) below grade at DG3, DG4 and TP-302
    - Allowance for 12 PNA samples
- PCBs were above the calculated Site specific level of 2.5 mg/kg at TP-313 and SB-301
    - An allowance for 45 soil samples for PCBs was included in the estimate

Waterfront Plaza
PDI activities will not be specifically conducted within the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
PRGs exceeded in Mixed Residential/Commercial Area 1 include Part 201 non-residential inhalation criteria for manganese and the risked based PRG for arsenic of 6.4 mg/kg.

- A total of 24 soil samples for arsenic will be collected.
- Soil samples will be collected from borings around TP-334 for manganese. Eight samples will be collected for manganese analysis.

Mixed Residential/Commercial Area 2
PRGs exceeded in Mixed Residential/Commercial Area 2 include Part 201 non-residential direct contact criteria for benzo(a)pyrene, and lead. Residential direct contact criteria is exceeded at locations within Mixed Residential/Commercial Area 2 for benzo(a)pyrene, dibenz(a,h)anthracene; benzo(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene and lead. The risked based PRG for arsenic of 6.4 mg/kg is also exceeded at locations within Mixed Residential/Commercial Area 2.

Soil delineation by work area as follows:

Arsenic ONLY locations:
Building 25
- Allowance for 8 samples

Building 28
- Allowance for 8 samples

Train Shed
- Allowance for 4 samples

Coal Tunnel Area
- Allowance for 30 samples

Former Ash Silo Area (SB-2011)
- Allowance for 8 samples

Former clarifier area (TP-344)
- Allowance for 8 samples

Area north of Building 3/Former Water Tower Area (TP-340, TP-342, TP-343)
- Allowance for 16 samples

Arsenic and Lead sample locations:
Area around SB-2013
- Allowance for 12 samples

Arsenic, PNAs and Lead sample locations:
Building 3A
- Allowance for 12 samples

Building 6A
- Allowance for 18 samples
- Technicians will be required to don respirators for this work
- The floor in the majority of this building is exposed soil

Arsenic and PNAs sample locations
Fuel Oil AST Area
- Allowance for 24 PNA soil samples
- Allowance for 12 arsenic samples

A total of 140 samples will be collected and analyzed for arsenic.
A total of 54 samples will be collected and analyzed for PNAs.
A total of 42 samples will be collected and analyzed for lead.

Commercial Area 1
PRGs exceeded in Commercial Area 1 include Part 201 non-residential inhalation criteria for manganese.

- Delineation samples (4) will be collected around SS-105 for manganese.

Commercial Area2
Arsenic was reported above the PRG of 27 mg/kg in Commercial Area 2 at TP-321.

- Four samples will be collected around TP-321 for arsenic.

Commercial Area3
PRGs are not exceeded in Commercial Area 3.

Commercial Area 4
Residential direct contact criteria is exceeded at locations within Commercial Area 4 for benzo(a)pyrene, and lead. The risked based PRG criteria for arsenic of 27 mg/kg was exceeded within Commercial Area 4. PCBs above the Site specific calculated PRG of 9.1 mg/kg were identified in Commercial Area 4 around MW-16.

Soil delineation by area as follows:

Arsenic ONLY locations:
SB-2012
- Allowance for 4 samples

Parking lot area south of Building 17
- Allowance for 60 samples

Arsenic and Lead sample locations:
TP-341
- Allowance for 4 samples

Arsenic, PNAs and Lead sample locations:
Former Substation Area/North of Mill Buildings
- Allowance for 30 samples

PCBs and Arsenic sample locations:
MW-16 Area
- Allowance for 18 samples

A total of 116 samples will be collected and analyzed for arsenic.
A total of 30 samples will be collected and analyzed for PNAs.
A total of 18 samples will be collected and analyzed for PCBs.
A total of 34 samples will be collected and analyzed for lead.

2.0 Mobilization/Set-Up

The following assumptions were made relative to the mobilization/set-up in each of the redevelopment areas and reflected in the cost estimate.

- Mobilization and set-up includes: mobilization of personnel and equipment; construction survey work (e.g., excavation layout and verification sample locations); and geotechnical and chemical testing on backfill materials.
  - An allowance of $8,000 to mobilize personnel and equipment was included in the estimate.
  - $30,000 for survey work was included in the estimate.
  - Geotechnical and chemical analysis for imported materials was included in the estimate. One set of chemical analysis [Target Analyte List Metals, Target Compound List (TCL) for volatile organic compounds, TCL for semi-volatile compounds, and polychlorinated biphenyl (PCBs) per material (topsoil, general fill and 21AA/gravel]. The topsoil sample will also be analyzed for pH, phosphorous, organic content, pesticides and herbicides.
- Health and Safety includes an on-Site Health and Safety Officer (HSO) for 4 months, the HSO will not stay on Site during all restoration activities. Also included in the costs are: air monitoring equipment and calibration gases; a decontamination trailer; and disposable personal protection equipment (PPE).
- Air monitoring assumes real-time air monitoring will be conducted during all excavation work utilizing a photoionization detector (11.7 electronVolt [eV] lamp) and fugitive dust monitor(s). Air monitoring does not include the collection of samples for laboratory analysis or laboratory analytical costs.
- Erosion control includes an allowance for silt fence (4,000 LF) and geofabric to cover catch basins on the Site. Costs for erosion control measures specific to individual redevelopment areas (i.e., turbidity curtains, etc.) are included in individual redevelopment area estimates (e.g., Commercial Area 4).
- Site facility costs include electrical hookup and electricity for two office trailers (one for the contractor and one for the U.S. EPA) for 5 months. Other temporary facilities include portable sanitary services, a drinking water allowance and a small dumpster for worker general refuse. The expense of one Site truck for the duration of the services was included.
- Site facility costs include materials and construction of temporary decontamination pads and decontamination stations for workers. It was assumed that potable water could be obtained from the City of Plainwell for use during the project.
- Site facility costs include $6,000 for the installation and maintenance of a staging area for waste.
- A perimeter fence currently exists around the majority of the Site. The cost estimate assumes the fence will remain and can be utilized as a security measure to prevent access to the Site during construction activities.

3.0 Preparation/Pre-Excavation Work by Redevelopment Area

The following assumptions were made relative to the preparation/pre-excavation work in each of the redevelopment areas and reflected in the cost estimate.

- A Soil Erosion and Sedimentation Control Permit will be obtained from Allegan County. All other necessary permits will also be obtained prior to intrusive work at the Site.
- All areas where subsurface work is to be conducted will be cleared through a public utility locate (i.e., MISS Dig), a private utility locate, review of available drawings, and discussions with individuals knowledgeable of the Site and utilities located thereon.

Residential Area 1
Specific assumptions for preparation/pre-excavation work in Residential Area 1 under Remedial Alternative 3C are presented below.

- Trees and shrubs in the excavation areas will need to be cleared and grubbed.
- Turbidity curtain will be temporally installed in the Kalamazoo River during excavation and backfill activities.
- One power pole will need to be relocated for the excavation work around SB-104.

Residential Area 2
No specific assumptions for preparation/pre-excavation work in Residential Area 2 under Remedial Alternative 3C were utilized.

Residential Area 3
Specific assumptions for preparation/pre-excavation work in Residential Area 3 under Remedial Alternative 3C are presented below.

- MW-15 will be abandoned.
- Clearing will be required in the area around MW-15.

Residential Area 4
Specific assumptions for preparation/pre-excavation work in Residential Area 4 under Remedial Alternative 3C are presented below.

- Clearing will be required in the area around SB-301/SG-4.
- Pavement by TP-302 will be saw cut.

Waterfront Plaza
No specific assumptions for preparation/pre-excavation work in Waterfront Plaza under Remedial Alternative 3C were utilized.

Mixed Residential/Commercial Area 1
The specific assumption for preparation/pre-excavation work in Mixed Residential/Commercial Area 1 under Remedial Alternative 3C is presented below.

- Pavement in the work areas will be saw cut prior to excavation to leave a clean line for restoration activities.

Mixed Residential/Commercial Area 2
Specific assumptions for preparation/pre-excavation work in Mixed Residential/Commercial Area 2 under Remedial Alternative 3C are presented below.

- The loading dock at the south end of Building 1 will be evaluated by a structural engineering assessment to ensure excavation of the fuel oil line will not damage either the loading dock or Building 1.
- The pavement and concrete will be saw cut prior to excavation to create clean lines for restoration.
- A demolition notice will be submitted to the State of Michigan for the demolition of Building 5A/part of the coal tunnel. Asbestos abatement may be necessary on pipe wrap found outside of Building 5A.
- Excavation of soils under the concrete slabs of the demolished buildings (3A, 25 and 28) will require the relocation of the backfill (less than 3 feet thick) prior to excavation.
- Fuel Oil No. 6 within the former coal tunnel will be removed from the tunnel before the tunnel itself is removed.
- The piping run from the former Fuel Oil No. 6 AST and Building 5 will be exposed at one end and drained of any residual fuel oil prior to removing the line.
- Monitoring well MW-19 will be abandoned prior to excavation activities in this area.
- Monitoring well MW-22 will be abandoned prior to removal of the former fuel oil line.
- Monitoring well MW-2 will be abandoned prior to excavation activities at SB-2010 and SB-2011.

Commercial Area 1
No specific assumptions for preparation/pre-excavation work in Commercial Area 1 under Remedial Alternative 3C were utilized.

Commercial Area 2
No specific assumptions for preparation/pre-excavation work in Commercial Area 2 under Remedial Alternative 3C were utilized.

Commercial Area 3
No specific assumptions for preparation/pre-excavation work in Commercial Area 3 under Remedial Alternative 3C were utilized. Excavation work will not be conducted in Commercial Area 3 for Remedial Alternative 3C.

Commercial Area 4
Specific assumptions for preparation/pre-excavation work in Commercial Area 4 under Remedial Alternative 3C are presented below.

- Turbidity curtain will be installed in the Mill Race in the area by MW-16 (along the Mill Race) and in the area of MW-3 prior to excavation activities.
- Monitoring of the Mill Race and Kalamazoo River for turbidity will be conducted during excavation activities.
- MW-16 will be abandoned prior to excavation work in that area.
- Protection of MW-3 (barriers) will be installed.
- A structural engineering evaluation of the pedestrian bridge for stability during excavation activities will be conducted. The evaluation will determine if shoring of the bridge is necessary. An allowance of $5,000 is included in the estimate to conduct the evaluation. Shoring costs have not been included in the estimate.
- The water flow of the Mill Race will be diverted in the excavation area. The methodology for this work to be determined in the pre-design phase of the project.
- Rip rap along the Mill Race will be removed and staged for re-use.
- Pavement in the work areas will be saw cut prior to excavation to allow for restoration activities.

4.0 Excavation by Redevelopment Area

Conceptual excavation areas for each of the Redevelopment areas are shown of Figures 3.23 through 3.33 of the FS Report (Revision 2).

The following assumptions were made relative to excavation in each of the redevelopment areas and reflected in the cost estimate.

- Soil excavation quantities within the buildings are based on excavating horizontally by five feet in each direction and one-foot vertically beyond the sample location exceeding criteria.
- Excavation estimates assume dewatering will not be necessary and that all work can be completed in Level D PPE except Building 6A which will be conducted with supplied air (Level B) PPE.
- Standby time was not added to account for the time for laboratory analysis of verification samples. It was assumed that the project would proceed across the Site allowing for laboratory analysis to be conducted while another redevelopment area was being excavated or restored.

Specific assumptions to each redevelopment area, in addition to those presented above globally, are provided below.

Residential Area 1

Residential Area 1 is located at the far west end of the Site, where the majority of the former sludge dewatering lagoons were located. The former Mill wastewater treatment building, activated sludge tank and secondary clarifier were constructed over the lagoons. The wastewater treatment structures were demolished on behalf of the City of Plainwell in November and December 2013. The specific assumption for excavation in Residential Area 1 under Remedial Alternative 3C is presented below.

- Overburden present beyond the target excavation area that must be removed to achieve the full depth of excavation will be disposed of off Site.

Residential Area 2

Residential Area 2 is located between Residential Area 1 and Residential Area 3 and is positioned along the Kalamazoo River. This area was historically occupied by sludge dewatering lagoons (A, B, C) and a primary clarifier. The primary clarifier was demolished to the concrete slab in November 2013. No specific assumptions for excavation work in Residential Area 2 under Remedial Alternative 3C were utilized.

Residential Area 3

Residential Area 3 is located near the center of the Site. The former aeration basin location occupies the majority of the area. A former secondary clarifier was historically present in this area, which was demolished in November 2013 with the floor of the former clarifier remaining. Specific assumptions for excavation in Residential Area 3 under Remedial Alternative 3C are presented below.

- Material removed from the bottom of the aeration basin will require double handling due to the slopes of the former aeration basin and the depth of the excavation.

Residential Area 4

Residential Area 4 is positioned along the Kalamazoo River between Residential Area 3 and Mixed Residential Area 2. No aboveground structures are currently present on this area. A portion of this area was historically utilized by the Mill as a coal storage area. No specific assumptions for excavation in Residential Area 4 under Remedial Alternative 3C were made.

Waterfront Plaza
No excavation activities are anticipated in the Waterfront Plaza Area.

Mixed Residential/Commercial Area 1
Mixed Residential/Commercial Area 1 is located between Commercial Area 2 and Commercial Area 3 on the southern property line along Allegan Street. This area was once occupied by the former Specialty Minerals Building and associated above ground storage tanks. The Specialty Minerals building and ASTs were demolished to the concrete slab in December 2011.

- Underground utilities encountered (TP-303 and TP-306) between the former Specialty Minerals Building and the main Mill Buildings will be capped at either end of the excavation.

Mixed Residential and Commercial Area 2
Mixed Residential and Commercial Area 2 is located between Residential Area 4 and Commercial Area 4 at the northern end of the Site along the Kalamazoo River. The majority of the area is occupied by Mill Buildings and pavement. Buildings 3A, 25 and 28 along with the eastern water tower, 200,000-gallon Fuel Oil AST, and the brine USTs, were demolished on behalf of the City of Plainwell. The concrete slabs were left in place for Buildings 3A and 28. Building 25 was part of the Site's historical wastewater treatment system and had a subsurface vault and system to pump the waste water from the Mill to the on-Site WWTP at the west end of the Site. The vault under the northern portion of Building 25 was not removed. The vault floor was cracked and the sidewalls removed to 4 feet below grade, then the vault was filled with imported general fill. The concrete slab under the remaining portion of Building 25 was left in place.

Specific assumptions for excavation in Mixed Residential/Commercial Area 2 under Remedial Alternative 3C are presented below.

- A storm sewer was installed through the west side of Mixed Residential/Commercial Area 2 in 2012 by the Michigan Department of Transportation (MDOT). The approximate location of the storm sewer is shown on Figure 3.29. Before conducting excavation work to remove the former fuel oil AST line and excavate the east side of the former fuel AST, the exact location of the storm sewer line will be determined, shoring of the line may be necessary during the removal of the fuel oil AST line.
- Soils in Building 6A will be removed using a vacuum extraction system.

Commercial Area 1
Commercial Area 1 is located in the far southwest portion of the Site. No structures or paved areas are currently present in this area that would require unique equipment or procedures to conduct the proposed remedial activities. This area of the Site has not been developed and was not part of historic Mill operations.

- A storm sewer was installed through this area in 2012 by the Michigan Department of Transportation (MDOT). The approximate location of the storm sewer is shown on Figure 3.30. Before conducting excavation work in the area of SS-105, the exact location of the line will be determined.

Commercial Area 2
Commercial Area 2 is located in the southwest central portion of the Site. Structures on this portion of the Site include the City of Plainwell Public Safety Building and associated paved parking and egress/ingress areas. Excavation activities will not take place under the existing buildings or paved surfaces. No specific assumptions for Commercial Area 2 were made.

Commercial Area 3
Excavation work will not be conducted in Commercial Area 3 for Remedial Alternative 3C.

Commercial Area 4

Commercial Area 4 is located on the eastern side of the Site. The majority of this area is covered with either pavement, buildings (vacant and occupied) or former building concrete slabs. Buildings (9A, 9B, 9C, 9D, 9E, 9F, and 23) were demolished on behalf of the City of Plainwell in 2012, with the majority of the former building concrete slabs left in place and backfilled to surrounding grade. The basement areas were backfilled with a combination of crushed concrete (from the buildings on Site), soil from an adjacent retaining wall that was removed, and imported gravel material and vary in thickness from 6 feet to 9 feet. Specific assumptions for excavation in Commercial Area 4 under Remedial Alternative 3C are presented below.

- Access to both the former substation area and around MW-16 will be restricted due to the distance between existing structures and either the Kalamazoo River or the Mill Race. Excavated soils will likely need to be double handled.

5.0 Transportation and Disposal by Redevelopment Area

The following assumptions were made relative to the transportation and disposal of materials in each of the redevelopment areas and reflected in the cost estimate.

- Soil volumes were converted to tonnage assuming a ratio of 1.5 tons per cubic yard for soils. Tonnage for concrete was based on 1.65 tons per cubic yard of material. Waste has been categorized as non-hazardous and non-TSCA soils; TSCA soil; TSCA debris; and miscellaneous debris.
- Transportation and disposal pricing is based on the non-hazardous, non-TSCA material being accepted at Waste Management Autumn Hills Landfill in Zeeland, Michigan. A cost of $22.00 per ton for both transportation and disposal of non-hazardous, non-TSCA waste was used for the estimates.
- A disposal price of $135.00 per ton was used for TSCA soils. For estimation purposes it was assumed that the TSCA soils would be transported to the Environmental Quality Company/U.S. Ecology Company Wayne Disposal #2 Landfill, Belleville, Michigan for direct landfill disposal. Transportation of the soils was assumed to be conducted in lined 50 ton gravel trains. Transportation of each load of 50 tons was assumed to cost $500.00.
- Transportation costs assume fuel prices for diesel will not exceed $4.00 per gallon.
- Organic material generated from clearing activities was assumed to be chipped and left on Site.
- Concrete and asphalt will be disposed of off Site, not recycled.

Residential Area 1

The specific assumption for transportation and disposal work in Residential Area 1 under Remedial Alternative 3C is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 935 CY.

Residential Area 2

The specific assumption for transportation and disposal work in Residential Area 2 under Remedial Alternative 3C is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 620 CY.

Residential Area 3

The specific assumption for transportation and disposal work in Residential Area 2 under Remedial Alternative 3C is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 1,895 CY.

Residential Area 4
The specific assumption for transportation and disposal work in Residential Area 3 under Remedial Alternative 3C is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 9,390 CY.
- Allowance of $600 for asphalt.

Waterfront Plaza
No specific assumptions for transportation and disposal work in Waterfront Plaza under Remedial Alternative 3C were utilized. Excavation activities will not be conducted within the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
Specific assumptions for transportation and disposal work in Mixed Residential/Commercial Area 1 under Remedial Alternative 3C are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 70 CY.
- Allowance of 50 CY for asphalt disposal.

Mixed Residential/Commercial Area 2
Specific assumptions for transportation and disposal work in Mixed Residential/Commercial Area 2 under Remedial Alternative 3C are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil from Building 6A with a volume of 200CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the coal tunnel area with a volume of 1,270 CY.
- Allowance of $3,500 for miscellaneous debris from the coal tunnel area (bricks, concrete).
- Waste was assumed to be non-hazardous, non-TSCA soil from the fuel oil line with a volume of 525 CY.
- Allowance of $600 for disposal of the fuel oil line piping.
- Waste was assumed to be non-hazardous, non-TSCA soil from the fuel oil No. 6 AST area with a volume of 2,500 CY.
- Allowance of $1,200 for the concrete ring the Fuel Oil AST was sitting on and buried concrete and asphalt.
- The waste from the Train Shed was assumed to be non-hazardous, non-TSCA soil from with a volume of 205 CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the north end of the Mill Buildings (Buildings 3A, 25, 28, test pits-TP-340, TP-342,TP-343 and SB-2013) plus the area around SB-2011 with a volume of 1,696 CY.
- Allowance of $6,000 for miscellaneous debris from these areas at the north end of the Mill Building.

Commercial Area 1
Specific assumptions for transportation and disposal work in Commercial Area 1 under Remedial Alternative 3C are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 12 CY.

Commercial Area 2
Specific assumptions for transportation and disposal work in Commercial Area 2 under Remedial Alternative 3C are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 12 CY.

Commercial Area 3
No specific assumptions for transportation and disposal work in Commercial Area 3 under Remedial Alternative 3C were utilized. Excavation activities will not be conducted within the Commercial Area 3.

Commercial Area 4
Specific assumptions for transportation and disposal work in Commercial Area 4 under Remedial Alternative 3C are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil from the former substation area and north of the Mill Buildings with a volume of 2,500 CY.
- Waste was assumed to be TSCA soil from the area around MW-16 with a volume of 4,660 CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the area around BK5 with a volume of 15 CY.
- Allowance of 400 CY of asphalt.

6.0 Restoration by Redevelopment Area

The following assumption was made relative to Site restoration in each of the redevelopment areas and reflected in the cost estimate.

- Restoration activities include backfill (material and placement), compaction, compaction testing and any other location specific restoration that may be deemed necessary at this time (e.g., replacing a floor).
- General fill from a local gravel pit at a delivered material cost of $4.58 ton was used for the estimates. Unprocessed topsoil at a delivered price of $18.98 cubic yard was also used where appropriate.
- Restoration for the excavation areas include general fill backfill compacted to 92-95 percent of the proctor.
- A 6-inch layer of unscreened topsoil will be placed over the compacted general fill in areas that were previously pervious (i.e., not paved or impervious). Topsoil will be hydroseeded, including mulch.
- Restoration for excavation areas under pavement will be backfilled with general fill and compacted to 95 percent of the proctor.
- A 6-inch layer of 21AA or equivalent will be placed on the compacted general fill and compacted to 95 percent or greater of the proctor where pavement will be installed.
- Asphalt will be replaced where removed during excavation activities.
- Permanent markers will be installed to designate areas on Site where impacted soils above Part 201 clean up criteria based on land use, remain in place.

Residential Area 1
Specific assumptions for Site restoration in Residential Area 1 under Remedial Alternative 3C are presented below.

- Backfill material will be imported general fill and overburden material removed to achieve excavation depth requirements but beyond the area exceeding PRGs.

Residential Area 2
No specific assumptions for Site restoration in Residential Area 2 under Remedial Alternative 3A were utilized.

Residential Area 3
Specific assumptions for Site restoration in Residential Area 3 under Remedial Alternative 3C are presented below.

- Backfill material will be imported general fill and overburden material removed to achieve excavation depth requirements but beyond the area exceeding cleanup criteria.
- MW-15 will be replaced.

Residential Area 4
No specific assumptions for Site restoration in Mixed Residential/Commercial Area 1 under Remedial Alternative 3C were utilized.

Waterfront Plaza
No specific assumptions for Site restoration in Waterfront Plaza under Remedial Alternative 3C were utilized. Restoration will not be required in the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
No specific assumptions for Site restoration in Mixed Residential/Commercial Area 1 under Remedial Alternative 3C were utilized.

Mixed Residential/Commercial Area 2
Specific assumptions for Site restoration in Mixed Residential/Commercial Area 2 under Remedial Alternative 3C are presented below.

- Building 6A currently has a dirt floor; restoration would not include a concrete floor.
- Concrete (former ash silos) will not be replaced at SB-2010.
- Concrete around the former 200,000 gallon fuel oil AST will not be replaced.
- Concrete removed for excavations at SB-216, SB-220, SB-222 and SB-223 will not be replaced.
- Additional backfill will be required to fill in the void space of the coal tunnel.
- MW-2, MW-19 and MW-22 will be replaced.

Commercial Area 1
No specific assumptions for Site restoration in Commercial Area 1 under Remedial Alternative 3C were utilized.

Commercial Area 2
No specific assumptions for Site restoration in Commercial Area 2 under Remedial Alternative 3C were utilized.

Commercial Area 3
No specific assumptions for Site restoration in Commercial Area 3 under Remedial Alternative 3C were utilized.

Commercial Area 4
Specific assumptions for Site restoration in Commercial Area 4 under Remedial Alternative 3C are presented below.

- Asphalt will be 3 inches thick.
- Geotextile and Rip rap will be installed along the Mill Race.
- The Mill Race will be returned to its normal flow path.
- The turbidity curtain will be removed from the Mill Race and Kalamazoo River.
- MW-16 will be replaced.

7.0 Demobilization

The following assumptions were made relative to the demobilization from the Site and reflected in the cost estimate.

- Costs included in the demobilization task include time for Site tear down and final decontamination of equipment, and demobilization of equipment and personnel. Demobilization activities were assumed to take 5 working days.

B. <u>ENGINEERING/OVERSIGHT</u>

1.0 Engineering/Design

The following assumption was made relative to the installation of engineering/design and reflected in the cost estimate.

- Engineering and project design/specifications were estimated to be 15 percent of the Construction Costs.

2.0 Construction Oversight

The following assumption was made relative to the construction oversight and reflected in the cost estimate.

- Construction oversight was estimated to be 10 percent of the Construction Costs.

TABLE C.3D

COST SUMMARY
REMEDIAL ALTERNATIVE 3D – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET LAND USE FOR PART 201, 10^{-6} RISK LEVEL FOR ARSENIC (5.8 MG/KG), AND TSCA HIGH OCCUPANCY LEVEL
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Total*
CAPITAL COSTS						
A.	***PRE-DESIGN INVESTIGATION***					**$33,200**
1.0	Sampling and Analysis Work Plan (SAP)	LS	1	$25,000	$25,000	
	Survey top of banks at Site	LS	1	$2,000	$2,000	
	Health and Safety Plan Update	LS	1	$1,200	$1,200	
	Multi-Area Quality Assurance Project Plan	LS	1	$5,000	$5,000	
2.0	SAP Implementation					**$151,100**
	Project Set up (mark locations etc.)	LS	1	$8,790	$8,800	
	Private Utility Locate	LS	1	$8,000	$8,000	
	Field Activities	DA	23	$2,900	$66,700	
	Field Technicians					
	Sampling Equipment (push probe technology)					
	Expendables (PPE etc)					
	Temporary Lighting and Carbon Monoxide Control	LS	1	$6,000	$6,000	
	Concrete Coring	LS	1	$6,000	$6,000	
	Laboratory Analysis	LS	1	$54,350	$54,400	
	Investigation Derived Waste Disposal	DA	23	$50	$1,200	
3.0	Contingency on PDI	LS	1	$92,150	$92,200	**$92,200**
	Based on 50 % of SAP costs					
4.0	Remedial Action Plan	LS	1	$60,000	$60,000	**$60,000**
	TOTAL PRE-DESIGN COSTS					**$336,500**
B.	***CONSTRUCTION***					
1.0	**Mobilization and Set up**					**$374,200**
	Mobilization and Set up	LS	1	$45,700	$45,700	
	Health and Safety	Monthly	8	$28,450	$227,600	
	Erosion Control	LS	1	$23,040	$23,000	
	Site Facilities					
	Temporary Facilities	Monthly	8	$6,810	$54,500	
	Decontamination Pad and Stations	LS	1	$17,375	$17,400	
	Staging Areas	LS	1	$6,000	$6,000	
2.0	**Additional Preparation and/or Demolition (by Redevelopment Area)**					**$158,200**
	Residential 1	LS	1	$16,950	$17,000	
	Residential 2	LS	1	-	-	
	Residential 3	LS	1	$1,795	$1,800	
	Residential 4	LS	1	$1,100	$1,100	
	Waterfront Plaza	LS	1	-	-	
	Mixed Residential/Commercial Area 1	LS	1	$2,500	$2,500	
	Mixed Residential/Commercial Area 2	LS	1	$67,822	$67,800	
	Commercial Area 1	LS	1	$2,000	$2,000	
	Commercial Area 2	LS	1	-	-	
	Commercial Area 3	LS	1	$625	-	
	Commercial Area 4	LS	1	$65,987	$66,000	

TABLE C.3D

COST SUMMARY
REMEDIAL ALTERNATIVE 3D – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET LAND USE FOR PART 201, 10^{-6} RISK LEVEL FOR ARSENIC (5.8 MG/KG), AND TSCA HIGH OCCUPANCY LEVEL
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Total*
3.0	**Excavation (by Redevelopment Area)**					**$468,700**
	Residential 1	CY	2,730	$11	$29,800	
	Residential 2	CY	3,550	$8	$29,800	
	Residential 3	CY	4,320	$7	$31,700	
	Residential 4	CY	9,965	$5	$52,800	
	Waterfront Plaza	CY	-	-	-	
	Mixed Residential/Commercial Area 1	CY	205	$44	$9,100	
	Mixed Residential/Commercial Area 2	CY	6,964	$26	$183,900	
	Commercial Area 1	CY	165	$26	$4,300	
	Commercial Area 2	CY	2,460	$8	$20,600	
	Commercial Area 3	CY	3,845	$5	$21,100	
	Commercial Area 4	CY	15,375	$6	$85,600	
4.0	**Transportation and Disposal (by Redevelopment Area)**					**$2,636,682**
	Residential 1 - Non Haz Non TSCA Soils	Ton	4,095	$22	$90,100	
	Residential 2 - Non Haz Non TSCA Soils	Ton	5,325	$22	$117,200	
	Residential 3 - Non Haz Non TSCA Soils	Ton	6,480	$22	$142,600	
	Residential 4 - Non Haz Non TSCA Soils	Ton	14,948	$22	$328,800	
	Residential 4 - Misc Debris	LS	1		$600	
	Waterfront Plaza - Non Haz Non TSCA Soils	Ton	-	$22	-	
	Mixed Residential/Commercial Area 1 - Non Haz Non TSCA Soils	Ton	308	$22	$6,800	
	Mixed Residential/Commercial Area 1 - Misc. Debris	LS	-		$1,675	
	Mixed Residential/Commercial Area 2 - Non Haz Non TSCA Soils	Ton	10,446	$22	$229,200	
	Mixed Residential/Commercial Area 2 - Misc. Debris	LS	1		$5,512	
	Commercial Area 1 - Non Haz Non TSCA Soils	Ton	248	$22	$5,400	
	Commercial Area 2 - Non Haz Non TSCA Soils	Ton	3,690	$22	$81,200	
	Commercial Area 2 - Misc. Debris	LS	1		$5,825	
	Commercial Area 3 - Non Haz Non TSCA Soils	Ton	5,768	$22	$126,900	
	Commercial Area 3 - Misc. Debris	LS	1		$1,750	
	Commercial Area 4 - Non Haz Non TSCA Soils	Ton	16,073	$22	$353,600	
	Commercial Area 4 - Misc. Debris	LS	-		$23,020	
	Commercial Area 4 - TSCA	Ton	7,000	$160	$1,116,500	
7.0	**Restoration (by Redevelopment Area)**					**$989,518**
	Residential 1	LS	1		$56,665	
	Residential 2	LS	1		$49,305	
	Residential 3	LS	1		$115,685	
	Residential 4	LS	1		$167,200	
	Waterfront Plaza	LS	-		-	
	Mixed Residential/Commercial Area 1	LS	1		$16,370	
	Mixed Residential/Commercial Area 2	LS	1		$159,050	
	Commercial Area 1	LS	1		$10,560	
	Commercial Area 2	LS	1		$32,385	
	Commercial Area 3	LS	1		$127,800	
	Commercial Area 4	LS	1		$254,498	

TABLE C.3D

COST SUMMARY
REMEDIAL ALTERNATIVE 3D – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET LAND USE FOR PART 201, 10^{-6} RISK LEVEL FOR ARSENIC (5.8 MG/KG), AND TSCA HIGH OCCUPANCY LEVEL
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

Description		*Unit*	*Approx. Quantity*	*Unit Price*	*Estimated Cost* *Subtotal*	*Estimated Cost* *Total*
8.0	**Demobilization**	LS	1	$26,550		**$26,600**
	Decontamination and Demobilization					
	TOTAL CONSTRUCTION COST					**$4,653,900**
C.	***ENGINEERING/OVERSIGHT***					
1.0	**Institutional Controls**					**$50,000**
2.0	**Engineering/ Design (15 % of Construction Costs)**					**$698,100**
3.0	**Construction Oversight (10 % of Construction Costs)**					**$465,400**
	TOTAL ENGINEERING/OVERSIGHT COSTS					**$1,213,500**
	CONTINGENCY ON CAPITAL COSTS (25 %)					**$1,466,850**
	TOTAL CAPITAL COSTS					**$7,334,250**

OPERATION, MAINTENANCE, & MONITORING COSTS

A.	***ANNUAL MONITORING AND MAINTENANCE***					**$9,600**
	Monthly Operation and Maintenance of Systems	Month	12	$800	$9,600	
	CONTINGENCY ON OM & M COSTS (20 %)					**$1,920**
	TOTAL CAPITAL COSTS					**$7,334,250**
	NET PRESENT VALUE OF OM & M (30 YEARS @ 7 % DISCOUNT RATE)					**$142,952**
	TOTAL COST					**$7,477,202**

Table C.3D

COST SUMMARY NOTES
REMEDIAL ALTERNATIVE 3D – EXCAVATION AND OFF-SITE DISPOSAL
TO MEET LAND USE CRITERIA FOR PART 201, 10^{-6} RISK LEVEL FOR ARSENIC,
AND TSCA HIGH OCCUPANCY LEVEL
FEASIBILITY STUDY REPORT
PLAINWELL, INC. MILL PROPERTY
PLAINWELL, MICHIGAN

GENERAL NOTES

A. Estimate for Remedial Alternative 3D - Excavation and Off-Site Disposal to Part 201 Land Use Criteria with a Risk Based Approach of 10^{-6} for Arsenic (5.8 milligrams per kilogram (mg/kg), and TSCA High Occupancy Level (with restrictions) has been prepared based on available information at the time of this document. Redevelopment activities conducted, being conducted and anticipated for the Site by the City of Plainwell may affect the remediation costs. Costs presented in the Feasibility Study (FS) Report have taken into consideration anticipated redevelopment plans by the City of Plainwell. Redevelopment plans include demolition of non-historical buildings to the concrete slab as well as specific land use restrictions/designations for the Site as presented on Figure 1.4 of the FS Report. This cost estimate is expected to be within -30 % to +50 % of the actual remedial costs in accordance with United States Environmental Protection Agency (U.S. EPA) guidance.

B. Remediation activities for each of the 11 proposed redevelopment areas were estimated separately; however, the estimate assumes one mobilization and demobilization effort to conduct the work.

C. Costs assume that additional soil investigation will not be conducted under building slabs unless otherwise noted in the pre-design notes below.

D. Areas targeted for soil removal and off-Site disposal were determined based on a risk-based approach for arsenic as detailed in Appendix A of the FS Report Revision 2.

E. The cost estimate assumes that new structures have not been constructed in areas that are planned for soil excavation and existing structures remain in place.

F. The cost estimate includes abandonment and replacement costs of groundwater monitoring wells within excavation areas.

G. Costs are based on 2014 dollars.

H. All volumes are based on in-place measures unless otherwise stated.

I. Abbreviations used in the "Unit" column in the Cost Estimate Table are as follows:
   - CY = Cubic Yard
   - EA = Each
   - LS = Lump Sum
   - TN = Ton
   - LF= linear foot

TASK NOTES:

CAPITAL COSTS

A. INVESTIGATION/CONSTRUCTION

1.0 Pre-Design Investigation (PDI) Activities

The following assumptions were made relative to the PDI activities in each of the redevelopment areas and reflected in the cost estimate.

- Generation of a Sampling and Analysis Plan (SAP).
- Update the Health and Safety Plan as necessary.
- Update the Multi-Area Quality Assurance Project Plan as necessary.
- Completion of the SAP - soil boring installation and soil sample collection to delineate the vertical and horizontal extent of impact. Soil borings are assumed to be collected via direct push method. PDI samples will be collected and submitted for laboratory analysis for specific parameters determined to exceed Preliminary Remediation Goals (PRGs) during the Remedial Investigation (RI). Delineation samples will not be collected in areas that were not selected for excavation activities (i.e., under building slabs, etc.).
- Quality Assurance/Quality Control samples are included on a 1 per 10 basis.
- A survey of the "top of bank" is included in the PDI cost estimate.
- All areas where subsurface work is to be conducted will be cleared through a public utility locate (i.e., MISS Dig), a private utility locate, review of available drawings, and discussions with individuals knowledgeable of the Site and utilities located thereon.

Residential Area 1
PRGs exceeded in Residential Area 1 include the risked based criteria for arsenic of 5.8 mg/kg. Soil samples will be collected to delineate the extent of soil impacted with PCBs adjacent to the storm sewer line installed by the Michigan Department of Transportation (MDOT) in 2012. The PRG for PCBs was exceeded at SB-132 (former Lagoon K) and SPL-11 (former Lagoon G).

- Allowance for 150 soil samples for PCBs
- Allowance for 76 soil samples for arsenic

Residential Area 2
PRGs exceeded in Residential Area 2 include the risked based criteria for arsenic of 5.8 mg/kg and PCBs above 1 mg/kg.

- Allowance for 36 soil samples for arsenic
- Allowance for 76 soil samples for PCBs

Residential Area 3
PRGs exceeded in Residential Area 3 include the risked based criteria for arsenic of 5.8 mg/kg.

- Allowance for 60 soil samples for arsenic

Residential Area 4
PRGs exceeded in Residential Area 4 include the risked based criteria for arsenic of 5.8 mg/kg, Part 201 residential direct contact criteria for benzo(a)pyrene, cyanide, dibenz(a,h)anthracene and lead. Residential soil volatilization to indoor air inhalation criteria (SVIIC) was exceeded at one location for benzene. The

Part 201 non-residential direct contact criterion for lead was also exceeded in Residential Area 4. PCBs were above the PRG within Residential Area 4.

- An allowance for 60 soil samples for arsenic
- Benzene above the residential SVIIC at TP-308
    - An allowance for 4 soil samples for benzene was included in the estimate
- Cyanide was above residential direct contact criteria at SB-302 in the shallow (0-1 foot) interval
    - Four samples for cyanide were included in the estimate
- An allowance for 20 samples for lead was included in the estimate
- The PNA parameters were identified in shallow samples (0-1.5 feet) below grade at DG3, DG4 and TP-302
    - Allowance for 12 PNA samples
- PCBs were detected above the PRG of 1 mg/kg at TP-313 and SB-301
    - An allowance for 60 soil samples for PCBs was included in the estimate

Waterfront Plaza
PDI activities will not be specifically conducted within the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
PRGs exceeded in Mixed Residential/Commercial Area 1 include Part 201 non-residential inhalation criteria for manganese and the risked based PRG for arsenic of 5.8 mg/kg.

- A total of 46 soil samples for arsenic will be collected.
- Soil samples will be collected from borings around TP-334 for manganese. Four samples will be collected for manganese analysis.

Mixed Residential/Commercial Area 2
PRGs exceeded in Mixed Residential/Commercial Area 2 include Part 201 non-residential direct contact criteria for benzo(a)pyrene, and lead. Residential direct contact criteria is exceeded at locations within Mixed Residential/Commercial Area 2 for benzo(a)pyrene, dibenz(a,h)anthracene; benzo(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene and lead. The risked based PRG for arsenic of 5.8 mg/kg is also exceeded at locations within Mixed Residential/Commercial Area 2. PCBs were detected above the PRG of 1 mg/kg.

Soil delineation by work area as follows:

<u>Arsenic ONLY locations</u>:
Building 25
- Allowance for 8 samples

Building 28
- Allowance for 8 samples

Train Shed
- Allowance for 8 samples

Coal Tunnel Area
- Allowance for 30 samples

Former Ash Silo Area (SB-2011)
- Allowance for 8 samples

Former clarifier area (TP-344)
- Allowance for 8 samples

Area north of Building 3/Former Water Tower Area (TP-340, TP-342, TP-343)
- Allowance for 16 samples

Arsenic and Lead sample locations:
Area around SB-2013

- Allowance for 12 samples

Arsenic, PNAs and Lead sample locations:
Building 3A

- Allowance for 12 samples

Arsenic, PNAs, Lead and PCBs sample locations:
Building 6A

- Allowance for 20 samples
- Technicians will be required to don respirators for this work
- The floor in the majority of this building is exposed soil

Arsenic and PNAs sample locations:
Fuel Oil AST Area

- Allowance for 24 PNA soil samples
- Allowance for 12 arsenic samples

PCB sample locations:
SB-217, SPI-1 and TP-8

- Allowance for 44 PCB soil samples

A total of 142 samples will be collected and analyzed for arsenic.
A total of 56 samples will be collected and analyzed for PNAs.
A total of 44 samples will be collected and analyzed for lead.
A total of 64 samples will be collected and analyzed for PCBs.

Commercial Area 1
PRGs exceeded in Commercial Area 1 include Part 201 non-residential inhalation criteria for manganese and the risked based PRG for arsenic of 5.8 mg/kg.

- Soil samples will be collected from the 0-2 foot below grade interval at SS-103, SS-105, SS-106 and SB-133 and analyzed for arsenic. Samples from SS-105 will also be analyzed for manganese.
- Soil samples will be collected from the 0-2 and 7-9 foot interval for SB-144 and analyzed for arsenic.

Commercial Area2
PRGs exceeded in Residential Area 1 include Part 201 non-residential and the risked based PRG for arsenic of 5.8 mg/kg.

- 24 additional samples would be collected for arsenic from areas outside of the building footprint (around TP-316, TP-321, TP-324 and TP-325)

Commercial Area3
The PRG exceeded in Commercial Area 3 is the risked based PRG for arsenic of 5.8 mg/kg.

- Allowance for 48 soil samples for arsenic

Commercial Area 4
The risked based PRG for arsenic of 5.8 mg/kg was exceeded in Commercial Area 4. Residential direct contact criteria is exceeded at locations within Commercial Area 4 for benzo(a)pyrene and lead. The PRG of 10 mg/kg for PCBs was exceeded within Commercial Area 4.

Soil delineation by area as follows:

Arsenic ONLY locations:
SB-2012
- Allowance for 4 samples

Parking lot area south of Building 17
- Allowance for 28 samples

Arsenic and Lead sample locations:
TP-341
- Allowance for 4 samples

Arsenic, PNAs and Lead sample locations:
Former Substation Area/North of Mill Buildings
- Allowance for 30 samples

Arsenic and PCBs sample locations:
MW-16 Area
- Allowance for 18 samples for arsenic
- Allowance for 18 samples for PCBs

A total of 84 samples will be collected and analyzed for arsenic.
A total of 30 samples will be collected and analyzed for PNAs.
A total of 18 samples will be collected and analyzed for PCBs.
A total of 34 samples will be collected and analyzed for lead.

2.0 Mobilization/Set-Up

The following assumptions were made relative to the mobilization/set-up in each of the redevelopment areas and reflected in the cost estimate.

- Mobilization and set-up includes: mobilization of personnel and equipment; construction survey work (e.g., excavation layout and verification sample locations); and geotechnical and chemical testing on backfill materials.
  - An allowance of $8,000 to mobilize personnel and equipment was included in the estimate.
  - $30,000 for survey work was included in the estimate.
  - Geotechnical and chemical analysis for imported materials was included in the estimate. One set of chemical analysis [Target Analyte List Metals, Target Compound List (TCL) for volatile organic compounds, TCL for semi-volatile compounds, and polychlorinated biphenyl (PCBs) per material (topsoil, general fill and 21AA/gravel]. The topsoil sample will also be analyzed for pH, phosphorous, organic content, pesticides and herbicides.
- Health and Safety includes an on-Site Health and Safety Officer (HSO) for 8 months. Also included in the costs are: air monitoring equipment and calibration gases; a decontamination trailer; and disposable personal protection equipment (PPE).
- Air monitoring assumes real-time air monitoring will be conducted during all excavation work utilizing a photoionization detector (11.7 electronVolt [eV] lamp) and fugitive dust monitor(s). Air monitoring does not include the collection of samples for laboratory analysis or laboratory analytical costs.
- Erosion control includes an allowance for silt fence (5,760 LF) and geofabric to cover catch basins on the Site. Costs for erosion control measures specific to individual redevelopment areas (i.e., turbidity curtains, etc.) are included in individual redevelopment area estimates (e.g., Commercial Area 4).

- Site facility costs include electrical hookup and electricity for two office trailers (one for the contractor and one for the U.S. EPA) for 8 months. Other temporary facilities include portable sanitary services, a drinking water allowance and a small dumpster for worker general refuse. The expense of one Site truck for the duration of the services was included.
- Site facility costs include materials and construction of temporary decontamination pads and decontamination stations for workers. It was assumed that potable water could be obtained from the City of Plainwell for use during the project.
- Site facility costs include $6,000 to for the installation and maintenance of a staging area for waste.
- A perimeter fence currently exists around the majority of the Site. The cost estimate assumes the fence will remain and can be utilized as a security measure to prevent access to the Site during construction activities.

3.0 Preparation/Pre-Excavation Work by Redevelopment Area

The following assumptions were made relative to the preparation/pre-excavation work in each of the redevelopment areas and reflected in the cost estimate.

- A Soil Erosion and Sedimentation Control Permit will be obtained from Allegan County. All other necessary permits will also be obtained prior to intrusive work at the Site.

- All areas where subsurface work is to be conducted will be cleared through a public utility locate (i.e., MISS Dig), a private utility locate, review of available drawings, and discussions with individuals knowledgeable of the Site and utilities located thereon.

Residential Area 1
Specific assumptions for preparation/pre-excavation work in Residential Area 1 under Remedial Alternative 3D are presented below.

- Trees and shrubs in the excavation areas will need to be cleared and grubbed.
- Turbidity curtain will be temporally installed in the Kalamazoo River during excavation and backfill activities.
- One power pole will need to be relocated for the excavation work around SB-104.

Residential Area 2
No specific assumptions for preparation/pre-excavation work in Residential Area 2 under Remedial Alternative 3D were utilized.

Residential Area 3
Specific assumptions for preparation/pre-excavation work in Residential Area 3 under Remedial Alternative 3D are presented below.

- MW-15 will be abandoned.
- Clearing will be required in the area around MW-15.

Residential Area 4
Specific assumptions for preparation/pre-excavation work in Residential Area 4 under Remedial Alternative 3D are presented below.

- Clearing will be required in the area around SB-301/SG-4.
- Pavement by TP-302 will be saw cut.

Waterfront Plaza
No specific assumptions for preparation/pre-excavation work in Waterfront Plaza under Remedial Alternative 3D were utilized.

Mixed Residential/Commercial Area 1
The specific assumption for preparation/pre-excavation work in Mixed Residential/Commercial Area 1 under Remedial Alternative 3D is presented below.

- Pavement and concrete in the work areas will be saw cut prior to excavation to leave a clean line for restoration activities.

Mixed Residential/Commercial Area 2
Specific assumptions for preparation/pre-excavation work in Mixed Residential/Commercial Area 2 under Remedial Alternative 3D are presented below.

- A demolition notice will be submitted to the State of Michigan for the demolition of Building 5A/part of the coal tunnel. Asbestos abatement may be necessary on pipe wrap found outside of Building 5A.
- Excavation of soils under the concrete slabs of the demolished buildings (3A, 25 and 28) will require the relocation of the backfill (less than 3 feet thick) prior to excavation.
- Fuel Oil No. 6 within the former coal tunnel will be removed from the tunnel before the tunnel itself is removed.
- The piping run from the former Fuel Oil No. 6 AST and Building 5 will be exposed at one end and drained of any residual fuel oil prior to removing the line.
- Monitoring well MW-19 will be abandoned prior to excavation activities in this area.
- Monitoring well MW-22 will be abandoned prior to removal of the former fuel oil line.
- Monitoring well MW-2 will be abandoned prior to excavation activities at SB-2010 and SB-2011.
- Large metal mixer / open topped tank in Building 1A will need to be relocated prior to excavation activities. An allowance of $2,000 to move the equipment was included in the estimate.
- Shoring may be required in Building 1A (if still in place). An allowance of $5,000 was included in the estimate for shoring.

Commercial Area 1
Specific assumptions for preparation/pre-excavation work in Commercial Area 1 under Remedial Alternative 3D are presented below.

- Limited clearing and grubbing will be performed in the area around SS-106 and SB-144.

Commercial Area 2
No specific assumptions for preparation/pre-excavation work in Commercial Area 2 under Remedial Alternative 3D were utilized.

Commercial Area 3
Specific assumptions for preparation/pre-excavation work in Commercial Area 3 under Remedial Alternative 3D are presented below.

- Pavement in the work areas will be saw cut prior to excavation to leave a clean line for restoration activities

Commercial Area 4
Specific assumptions for preparation/pre-excavation work in Commercial Area 4 under Remedial Alternative 3D are presented below.

- Turbidity curtain will be installed in the Mill Race in the area by MW-16 (along the Mill Race) and in the area of MW-3 prior to excavation activities.
- Monitoring of the Mill Race and Kalamazoo River for turbidity will be conducted during excavation activities.
- MW-16 will be abandoned prior to excavation work in that area.
- Protection of MW-3 (barriers) will be installed.
- A structural engineering evaluation of the pedestrian bridge for stability during excavation activities will be conducted. The evaluation will determine if shoring of the bridge is necessary. An allowance of $5,000 is included in the estimate to conduct the evaluation. Shoring costs have not been included in the estimate.
- The water flow of the Mill Race will be diverted in the excavation area. The methodology for this work to be determined in the pre-design phase of the project.
- Rip rap along the Mill Race will be removed and staged for re-use.
- Pavement in the work areas will be saw cut prior to excavation to allow for restoration activities.

4.0 Excavation by Redevelopment Area

Conceptual excavation areas for each of the Redevelopment areas are shown of Figures 3.34 through 3.44 of the FS Report (Revision 2).

The following assumptions were made relative to excavation in each of the redevelopment areas and reflected in the cost estimate.

- Excavation estimates assume dewatering will not be necessary and that all work can be completed in Level D PPE except Building 6A which will be conducted with supplied air (Level B) PPE.
- Standby time was not added to account for the time for laboratory analysis of verification samples. It was assumed that the project would proceed across the Site allowing for laboratory analysis to be conducted while another redevelopment area was being excavated or restored.

Specific assumptions to each redevelopment area, in addition to those presented above globally, are provided below.

Residential Area 1
Residential Area 1 is located at the far west end of the Site, where the majority of the former sludge dewatering lagoons were located. The former Mill wastewater treatment building, activated sludge tank and secondary clarifier were constructed over the lagoons. The wastewater treatment structures were demolished on behalf of the City of Plainwell in November and December 2013. The specific assumption for excavation in Residential Area 1 under Remedial Alternative 3D is presented below.

- Overburden present beyond the target excavation area that must be removed to achieve the full depth of excavation will be disposed of off Site.

Residential Area 2
Residential Area 2 is located between Residential Area 1 and Residential Area 3 and is positioned along the Kalamazoo River. This area was historically occupied by sludge dewatering lagoons (A, B, C) and a primary clarifier. The primary clarifier was demolished to the concrete slab in November 2013. The

specific assumption for excavation in Residential Area 2 under Remedial Alternative 3D is presented below.

- Overburden present beyond the target excavation area that must be removed to achieve the full depth of excavation can be staged and used for backfill from the area around SB-1.

Residential Area 3

Residential Area 3 is located near the center of the Site. The former aeration basin location occupies the majority of the area. A former secondary clarifier was historically present in this area, which was demolished in November 2013 with the floor of the former clarifier remaining. Specific assumptions for excavation in Residential Area 3 under Remedial Alternative 3D are presented below.

- Material removed from the bottom of the aeration basin will require double handling due to the slopes of the former aeration basin and the depth of the excavation.

Residential Area 4

Residential Area 4 is positioned along the Kalamazoo River between Residential Area 3 and Mixed Residential Area 2. No aboveground structures are currently present on this area. A portion of this area was historically utilized by the Mill as a coal storage area. No specific assumptions for excavation in Residential Area 4 under Remedial Alternative 3D were made.

Waterfront Plaza

No excavation activities are anticipated in the Waterfront Plaza Area.

Mixed Residential/Commercial Area 1

Mixed Residential/Commercial Area 1 is located between Commercial Area 2 and Commercial Area 3 on the southern property line along Allegan Street. This area was once occupied by the former Specialty Minerals Building and associated above ground storage tanks. The Specialty Minerals building and ASTs were demolished to the concrete slab in December 2011.

- Underground utilities encountered (TP-303, TP-306) between the former Specialty Minerals Building and the main Mill Buildings will be capped at either end of the excavation.

Mixed Residential and Commercial Area 2

Mixed Residential and Commercial Area 2 is located between Residential Area 4 and Commercial Area 4 at the northern end of the Site along the Kalamazoo River. The majority of the area is occupied by Mill Buildings and pavement. Buildings 3A, 25 and 28 along with the eastern water tower, 200,000-gallon Fuel Oil AST, and the brine USTs, were demolished on behalf of the City of Plainwell. The concrete slabs were left in place for Buildings 3A and 28. Building 25 was part of the Site's historical wastewater treatment system and had a subsurface vault and system to pump the waste water from the Mill to the on-Site WWTP at the west end of the Site. The vault under the northern portion of Building 25 was not removed. The vault floor was cracked and the sidewalls removed to 4 feet below grade, then the vault was filled with imported general fill. The concrete slab under the remaining portion of Building 25 was left in place.

Specific assumptions for excavation in Mixed Residential/Commercial Area 2 under Remedial Alternative 3D are presented below.

- A storm sewer was installed through the west side of Mixed Residential/Commercial Area 2 in 2012 by the Michigan Department of Transportation (MDOT). The approximate location of the storm sewer is shown on Figure 3.40. Before conducting excavation work to remove the former fuel oil AST line and excavate the east side of the former fuel AST, the exact location of the storm sewer line will be determined, shoring of the line may be necessary during the removal of the fuel oil AST line.
- Soils in Building 6A will be removed using a vacuum extraction system.

- It was assumed that impacted soils around SPI-1 would be excavated based on redevelopment plans call for demolition of Building 1A and would most likely include removal of the concrete slab.

Commercial Area 1

Commercial Area 1 is located in the far southwest portion of the Site. No structures or paved areas are currently present in this area that would require unique equipment or procedures to conduct the proposed remedial activities. This area of the Site has not been developed and was not part of historic Mill operations.

- Any excavation work conducted in the vicinity of SB-133 will require oversight by Michigan Gas Utilities due to proximity of the soil boring to the 6-inch high pressure natural gas line/working within the gas company easement.

- A storm sewer was installed through this area in 2012 by the Michigan Department of Transportation (MDOT). The approximate location of the storm sewer is shown on Figure 3.41. Before conducting excavation work in the area of SS-103 and SS-105, the exact location of the line will be determined.

Commercial Area 2

Commercial Area 2 is located in the southwest central portion of the Site. Structures on this portion of the Site include the City of Plainwell Public Safety Building and associated paved parking and egress/ingress areas. No specific assumptions for excavation in Commercial Area 2 under Remedial Alternative 3D were made.

Commercial Area 3

Commercial Area 3 is located adjacent to the former southwest corner of the Mill Buildings along Allegan Street. Structures on this area include a pump house and a former guard shack. Other historical features within this area have been demolished on behalf of the City of Plainwell. The Clay ASTs, Ammonia AST secondary containment structure, the Starch ASTs and Building 9C were demolished in 2012. The concrete slabs for all demolished features were left in place. Specific assumptions for excavation in Commercial Area 3 under Remedial Alternative 3D are presented below.

- The majority of Building 9C did not include a basement. The area where SB-248 was completed was located on the ground floor; however, this area was elevated from the surrounding ground surface by approximately 4 feet. As a result of the demolition of Building 9C the upper 4 feet of the sample interval was relocated (as part of a Soil Relocation Plan (June, 2012) generated on behalf of the City of Plainwell) and placed under imported fill in the general area of Buildings 9A, 9E.
- MDOT installed a storm sewer through this area in 2012. The approximate location of the storm sewer is shown on Figure 3.43. Before conducting excavation work in the area of TP-305 the exact location of the line will be determined.

Commercial Area 4

Commercial Area 4 is located on the eastern side of the Site. The majority of this area is covered with either pavement, buildings (vacant and occupied) or former building concrete slabs. Buildings (9A, 9B, 9C, 9D, 9E, 9F, and 23) were demolished on behalf of the City of Plainwell in 2012, with the majority of the former building concrete slabs left in place and backfilled to surrounding grade. The basement areas were backfilled with a combination of crushed concrete (from the buildings on Site), soil from an adjacent retaining wall that was removed, and imported gravel material and vary in thickness from 6 feet to 9 feet. Specific assumptions for excavation in Commercial Area 4 under Remedial Alternative 3D are presented below.

- Access to both the former substation area and around MW-16 will be restricted due to the distance between existing structures and either the Kalamazoo River or the Mill Race. Excavated soils will likely need to be double handled.

5.0 Transportation and Disposal by Redevelopment Area

The following assumptions were made relative to the transportation and disposal of materials in each of the redevelopment areas and reflected in the cost estimate.

- Soil volumes were converted to tonnage assuming a ratio of 1.5 tons per cubic yard for soils. Tonnage for concrete was based on 1.65 tons per cubic yard of material. Waste has been categorized as non-hazardous and non-TSCA soils; TSCA soil; TSCA debris; and miscellaneous debris.
- Transportation and disposal pricing is based on the non-hazardous, non-TSCA material being accepted at Waste Management Autumn Hills Landfill in Zeeland, Michigan. A cost of $22.00 per ton for both transportation and disposal of non-hazardous, non-TSCA waste was used for the estimates.
- A disposal price of $135.00 per ton was used for TSCA soils. For estimation purposes it was assumed that the TSCA soils would be transported to the Environmental Quality Company/U.S. Ecology Wayne Disposal #2 Landfill, Belleville, Michigan for direct landfill disposal. Transportation of the soils was assumed to be conducted in lined 50 ton gravel trains. Transportation of each load of 50 tons was assumed to cost $500.00.
- Transportation costs assume fuel prices for diesel will not exceed $4.00 per gallon.
- Organic material generated from clearing activities was assumed to be chipped and left on Site.
- Concrete and asphalt will be disposed of off Site, not recycled.

Residential Area 1
The specific assumption for transportation and disposal work in Residential Area 1 under Remedial Alternative 3D is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 2,730 CY.

Residential Area 2
The specific assumption for transportation and disposal work in Residential Area 2 under Remedial Alternative 3D is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 3,550 CY.

Residential Area 3
The specific assumption for transportation and disposal work in Residential Area 2 under Remedial Alternative 3D is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 4,320 CY.

Residential Area 4
The specific assumption for transportation and disposal work in Residential Area 3 under Remedial Alternative 3D is presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 9,965 CY.
- Allowance of $600 for asphalt.

Waterfront Plaza
No specific assumptions for transportation and disposal work in Waterfront Plaza under Remedial Alternative 3D were utilized. Excavation activities will not be conducted within the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
Specific assumptions for transportation and disposal work in Mixed Residential/Commercial Area 1 under Remedial Alternative 3D are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 205 CY.
- Allowance of 50 CY for asphalt and concrete disposal.

Mixed Residential/Commercial Area 2
Specific assumptions for transportation and disposal work in Mixed Residential/Commercial Area 2 under Remedial Alternative 3D are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil from Building 6A with a volume of 200CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the coal tunnel area with a volume of 1,320 CY. Additional volume from a deeper excavation at SB-308 location.
- Allowance of $3,500 for miscellaneous debris from the coal tunnel area (bricks, concrete).
- Waste was assumed to be non-hazardous, non-TSCA soil from the fuel oil line with a volume of 525 CY.
- Allowance of $600 for disposal of the fuel oil line piping
- Waste was assumed to be non-hazardous, non-TSCA soil from the fuel oil No. 6 AST area with a volume of 2,500 CY.
- Allowance of $1,200 for the concrete ring the tank was sitting on and buried concrete and asphalt.
- Waste was assumed to be non-hazardous, non-TSCA soil from the Train Shed with a volume of 485CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the north end of the Mill Buildings (Buildings-3A, 25, 28, test pits-TP-340, TP-342,TP-343, T-8 and SB-2013) with a volume of 1,916CY.
- Allowance of $6,000 for miscellaneous debris from these areas at the north end of the Mill Building.
- Waste was assumed to be non-hazardous, non-TSCA from SPl-I with a volume of 18 CY.

Commercial Area 1
Specific assumptions for transportation and disposal work in Commercial Area 1 under Remedial Alternative 3D are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 165 CY.

Commercial Area 2
Specific assumptions for transportation and disposal work in Commercial Area 2 under Remedial Alternative 3D are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 2,460 CY.

Commercial Area 3
Specific assumptions for transportation and disposal work in Commercial Area 3 under Remedial Alternative 3D are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil with a volume of 3,845 CY.
- Allowance of $900 for the transport and disposal of asphalt and/or concrete from the excavation areas.

Commercial Area 4

Specific assumptions for transportation and disposal work in Commercial Area 4 under Remedial Alternative 3D are presented below.

- Waste was assumed to be non-hazardous, non-TSCA soil from the former substation area and north of the Mill Buildings with a volume of 3,050 CY.
- Waste was assumed to be TSCA soil from the area around MW-16 with a volume of 4,660 CY.
- Waste was assumed to be non-hazardous, non-TSCA soil from the parking lot area south of Building 17 with a volume of 7,665 CY.
- Allowance of 1,575 tons of concrete from within the various buildings.
- Allowance of 400 CY of asphalt.

6.0 Restoration by Redevelopment Area

The following assumption was made relative to Site restoration in each of the redevelopment areas and reflected in the cost estimate.

- Restoration activities include backfill (material and placement), compaction, compaction testing and any other location specific restoration that may be deemed necessary at this time.
- General fill from a local gravel pit at a delivered material cost of $4.58 ton was used for the estimates. Unprocessed topsoil at a delivered price of $18.98 cubic yard was also used where appropriate.
- Restoration for the excavation areas outside of building footprints include general fill backfill compacted to 92-95% of the proctor.
- A 6-inch layer of unscreened topsoil will be placed over the compacted general fill in areas that were previously pervious (i.e., not paved or impervious). Topsoil will be hydroseeded, including mulch.
- Restoration for excavation areas under pavement, existing or former building slabs will be backfilled with general fill and compacted to 95% of the proctor.
- A 6-inch layer of 21AA or equivalent will be placed on the compacted general fill and compacted to 95% or greater of the proctor where pavement will be installed.
- Asphalt will be replaced where removed during excavation activities.
- Concrete removed during excavation activities under former building slabs will not be replaced.
- Permanent markers will be installed to designate areas on Site where impacted soils above Part 201 clean up criteria, based on land use, remain in place.

Residential Area 1

Specific assumptions for Site restoration in Residential Area 1 under Remedial Alternative 3D are presented below.

- Backfill material will be imported general fill and overburden material removed to achieve excavation depth requirements but beyond the area exceeding PRGs.

Residential Area 2

Specific assumptions for Site restoration in Residential Area 2 under Remedial Alternative 3D are presented below.

- Backfill material will be imported general fill and overburden material removed to achieve excavation depth requirements but beyond the area exceeding cleanup criteria.
- MW-15 will be replaced.

Residential Area 3
No specific assumptions for Site restoration in Residential Area 3 under Remedial Alternative 3D were utilized.

Residential Area 4
No specific assumptions for Site restoration in Mixed Residential/Commercial Area 1 under Remedial Alternative 3D were utilized.

Waterfront Plaza
No specific assumptions for Site restoration in Waterfront Plaza under Remedial Alternative 3D were utilized. Restoration will not be required in the Waterfront Plaza area.

Mixed Residential/Commercial Area 1
Specific assumptions for Site restoration in Mixed Residential/Commercial Area 1 under Remedial Alternative 3D are presented below.

- Concrete removed will not be replaced.

Mixed Residential/Commercial Area 2
Specific assumptions for Site restoration in Mixed Residential/Commercial Area 2 under Remedial Alternative 3D are presented below.

- Building 6A currently has a dirt floor; restoration would not include a concrete floor.
- Concrete (former ash silos) will not be replaced at SB-2010 and SB-2011.
- Concrete around the former 200,000 gallon fuel oil AST will not be replaced.
- Concrete removed for excavations at SPI-1, SB-216, SB-220, SB-222 and SB-223 will not be replaced.
- Additional backfill will be required to fill in the void space of the coal tunnel.
- MW-2, MW-19 and MW-22 will be replaced.

Commercial Area 1
No specific assumptions for Site restoration in Commercial Area 1 under Remedial Alternative 3D were utilized.

Commercial Area 2
No specific assumptions for Site restoration in Commercial Area 2 under Remedial Alternative 3D were utilized.

Commercial Area 3
No specific assumptions for Site restoration in Commercial Area 3 under Remedial Alternative 3D were utilized.

Commercial Area 4
Specific assumptions for Site restoration in Commercial Area 4 under Remedial Alternative 3D are presented below.

- Backfill placed in the parking lot will be 2 feet lower than current grade to achieve the desired grade requested by the current property owner.
- Asphalt will be 3 inches thick.
- Geotextile and Rip rap will be installed along the Mill Race.
- The Mill Race will be returned to its normal flow path.
- The turbidity curtain will be removed from the Mill Race and Kalamazoo River.

- MW-16 will be replaced.

7.0 Demobilization

The following assumptions were made relative to the demobilization from the Site and reflected in the cost estimate.

- Costs included in the demobilization task include time for Site tear down and final decontamination of equipment, and demobilization of equipment and personnel. Demobilization activities were assumed to take 5 working days.

B. ENGINEERING/OVERSIGHT

1.0 Engineering/Design

The following assumption was made relative to the installation of engineering/design and reflected in the cost estimate.

- Engineering and project design/specifications were estimated to be 15 percent of the Construction Costs.

2.0 Construction Oversight

The following assumption was made relative to the construction oversight and reflected in the cost estimate.

- Construction oversight was estimated to be 10 percent of the Construction Costs.