















TABLE 5-1 TECHNOLOGY SCREENING MATRIX

		SOIL/F	ILL MATERIAL (OPERABLE UNIT 1)			
Technology No Action	Process Options	Effectiveness in Addressing RAOs	Implementability	Key Factors	Cost	Status
No Action	NA	Ineffective	Easily implemented	NA	None	Retained per NCP
Engineering and Institutional Controls In-situ Biological Treatment	Land use restrictions	Effective for human health risk RAOs associated with contact of fill	Easily implemented	Requires regulatory and public acceptance of restricted/diminished resource use.	Low	Retained for potential combination with other technologies.
Phytoremediation	Reliance on natural processes and chemical change	Ineffective due to thickness of fill impacts	Easily implemented; requires demonstration of natural processes causing attenuation and subsequent monitoring	Appropriate only for sites where chemical contamination is relatively shallow. Requires regulatory and public acceptance of short term restrictions on resource use.	Low	Not retained due to depths of soil/fill contamination.
Containment						
Landfill Capping	Multi-media cap	Effectively addresses RAOs associated with contact of fill.	Moderately difficult to implement; requires import of sand, stone, clay placement; monitoring of cap thickness; periodic maintenance and monitoring; steepness of ravine would require substainial earthwork design.	Would require site grading changes and/or consolidation of waste; effective in long term source control; would require long-term groundwater treatment technology.	Moderate	Not retained.
	Impermeable Liner (e.g., clay, plastic, etc.)	Effectively addresses RAOs associated with contact of fill.	Moderately difficult to implement; requires periodic maintenance and monitoring, and steepness of ravine would require substainial earthwork design.	Would require site grading changes and/or consolidation of waste; effective in long term source control; would require long-term groundwater treatment technology.	Moderate	Retain for consideration.
In Situ Physical/Chemical Treat	tment				<u> </u>	
In-situ Stabilization	Addition of amendments/reagents to soil/fill to convert contaminants to stable compounds with reduced or eliminated leaching potential; requires in-situ mixing	Effective for risk-based RAOs and partially effective for source control; would require leachability testings to measure the immobility of contaminants	Depth of contaminants significantly limit the effectiveness of in-situ process; requires import and availability of suitable materials/reagents (e.g.,activated carbon, gypsum, apatite, etc.); stabilization below groundwater table is difficult; periodic monitoring.	Causes significant disturbance to site that may hinder future use; volume increase with bulk can be significant.	Moderate for Shallow Soils (~\$60/yd³) High at Depth (~\$250/yd³)	Retained for potential combination with other technology.
Soil Flushing	Extraction of contaminants from soil with water or other suitable aqueous solutions; soil flushing process includes injection or infiltration process of extraction fluid through soil in-situ.	considered an emerging technology, has not been widely implemented. Moderately difficult to implement; addition of environmentally compatible is; soil flushing injection or any hinder effectiveness sof extraction.		Capture of groundwater and flushing fluids with desorbed contaminants may need treatment to meet appropriate discharge standards prior to release to local, publicly owned wastewater treatment works or receiving streams; separation of solvents from recovered flushing fluid, for reuse in the process is a major factor in the cost of soil flushing. Treatment of the recovered fluids results in process studges and residual solids, such as spent carbon and spent ion exchange resin, which must be appropriately treated before disposal. Residual flushing additives in soil may be a concern.	High	Not retained.
Removal				I	1	
Excavation	Mechanical excavation used to remove soil/fill material	Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below	Implementable; moderately difficult to implement; requires ravine access by excavation equipment; potential for dewatering needs once GW is encountered; staging/access/mobility at base of ravine will be limiting; base of ravine will need to be stabilized for excavation equipment	Could require establishment of dewatering facilities which could slow process.	High	Retain for consideration
Ex-situ Physical/Chemcial Tr	reatment			<u> </u>	1	
Solidification or Stabilization	Amendments added to modify physical and chemical properties of material to facilitate handling and disposal	Effective at immobilizing inorganics within fill.	Relatively easy to implement; can be performed on small batches as material is staged for transport; requires import and addition of amendments; result is decreased water content and toxicity and mobility of contaminants; volume increase.	Requires use of amendments to achieve stabilization	Moderate	Retain for consideration.
Ex-situ chemical treatment	Acid leaching used to remove inorganics from soil/fill	Permeability of fill may hinder effectiveness.	Difficult to implement; requires establishment of a designated treatment facility using potentially hazardous chemicals to remove inorganics from fill.	Requires long term use of facilities for soil/fill treatment and disposal or recycling of leached fluids; rate of treatment may limit rate of excavation and disposal; requires use and maintenance of specialized equipment and chemicals	High	Not retained.
	Vitrification used to convert inorganic contaminants to inert forms	Permeability of fill may hinder effectiveness.	Difficult to implement; requires establishment of a designated treatment facility using high temperature processes to vitrify soil/fill	Requires long term use of facilities for soil/fill treatment and disposal; rate of treatment may limit rate of excavation and disposal; requires use and maintenance of specialized equipment	High	Not retained.
Disposal						
Off-site Disposal	Off-site commercial landfill	May be required for excavation options to meet RAOs	Low degree of difficulty to implement; requires identification of landfills capable of accepting material; landfill capacity and permitting may limit excavation and disposal rates.	Material may require dewatering, stabilization, or treatment to meet criteria for acceptance. Long range transport may be required dependent on landfill capacity/location; extensive site work and earthwork to accommodate transportation of material;	High	Retain for consideration
	Adjacent City of Lockport closed landfill	May be required for excavation options to meet RAOs	Moderately difficult to implement; requires design of a landfill capable of accepting material.	Requires permission and approval from City of Lockport for redesign of landfill; access roads would need to be constructed connecting exeavation area to landfill; extensive site work and earthwork to accommodate excavation of material.	Moderate	Not retained, volume to large for available space at local site.
On-site Disposal	On-site landfill	May be required for excavation options to meet RAOs	Difficult to implement; requires designation and design of a landfill area capable of placing material.	Identification of landfill area at the site and subsequent design and construction; limited to avaiable size of site.	High	Not retained, volume to large for available space onsite.
NOTE: RAO = Remedial Action Obje NA = Not Applicable NCP = National Contigency						

TABLE 5-1 TECHNOLOGY SCREENING MATRIX

		GROU	JNDWATER (OPERABLE UNIT 1)			
Technology	Process Options	Effectiveness in Addressing RAOs	Implementability	Key Factors	Cost	Status
No Action						
No Action	NA	Ineffective	Easily implemented	NA	None	Retained per NCP
Institutional Controls						
Engineering and Institutional Controls	Groundwater use restrictions; and long term monitoring program	Effective for human health risk RAOs	Easily implemented	Requires regulatory and public acceptance of restricted/diminished resource use.	Low	Retained for use with other technologies
Containment						
Physical Barriers	A slurry wall is installed from the ground surface to a confining layer; contains contaminated groundwater; may also divert contaminated groundwater from drinking water intakes or toward a treatment system.	May be required for landfill capping options to meet RAOs	Easily implementable; requires the design/construction of engineered slurry wall or othe type of physical barrier	Most effective when barrier is able to be keyed into a low permeability layer; cost increases greatly when installed deeper than 100 ft	Low	Retained for use with other technologies
Ex Situ Physical/Chemical	Treatment					
Filtration (Adsorption/Absorption)	Isolates solid particles by running a fluid stream through a porous medium; Utilizes gravity or a pressure differential across the filtration medium; chemicals are not destroyed; they are merely concentrated, making reclamation possible.		Moderate difficulty for implementation; would require design/construction of treatment process and facility; treatment building would be permanant and treatment times are extensive; requires long-term operation, maintence, and monitoring; hydrogeological data would be needed to determine flows rates and treatment process parameters	would require frequent replacement of adsorbent unit; chemicals are not destroyed, thereby requiring proper	Moderate to High	Retained for use with other technologies
Precipitation/Flocculation	Pumping or capture of ground water through extraction wells or collection trench and then treatment to precipitate lead and other heavy metals. Metals removal employs precipitation with hydroxides, carbonates, or sulfides; Precipitating agent is added to water in a mixing tank along with flocculating agents; mixture then flows to a flocculation chamber that agglomerate particles, which are then separated from the liquid phase in a sedimentation chamber. Other physical processes, such as filtration, may follow.	May be required for landfill capping options to meet RAOs	Well designed treatment process for metals; Moderate difficulty for implementation; would require design/construction of treatment process and facility; treatment building would be permanant and treatment times are extensive; requires long-term operation, maintence, and monitoring; hydrogeological data would be needed to determine flows rates and treatment process parameters	difficult, thereby requiring further treatment; resulting sludge requires TCLP testing prior to disposal; treated	Moderate to High	Retained for use with other technologies
Ion Exchange	Groundwater is pumped through ion exchange resins. Resin is made of synthetic or natural materials the size of a grain of sand with the opposite charge of the contaminated ion. Resin can be regenerated for re-use after resin capacity has been exhausted.	May be required for landfill capping options to meet RAOs	Well designed treatment process for metals; moderate difficulty for implementation; would require design/construction of treatment process and facility; treatment building would be permanent and treatment times are extensive; requires long term operation, maintence, and monitoring; hydrogeological data would be needed to determine flows rates and treatment process parameters	High concentrations of suspended solid may cause resin blinding; groundwater pH needs to be considered when selecting the ion exchange resin; oxidants in groundwater may damage the ion exchange resin; may require additional treatment		Retained for use with other technologies

TABLE 5-1 TECHNOLOGY SCREENING MATRIX

Disposal Off-site Disposal Off-site Disposal Off-site Disposal Adjacent City of Lockport closed May be required for dredging Off-site Disposal May be required for dredging Off-site Disposal Off-si				EDIMENT (OPERABLE UNIT 2)			
No. Name No. Statistics Size Management		Process Options		Implementability	Key Factors	Cost	Status
The special registrational class of a central color of the following of th	No Action	NA	Ineffective	Easily implemented	NA	None	Retained per NCP
This layer coping with armonic material great or wisten, loss that districtives for some centre change, placement in vacure, annihiring of cap learned in vacure, annihiring of cap changes and cap districtives for some centre changes, profess quantiment of the members, profess that profess the factors of the cap	Engineering and Institutional Controls	Land use restrictions	RAOs associated with contact of	Easily implemented	acceptance of restricted/diminished	Low	combination with other
Moderanty difficults to implement experience import of the propagately historic entitions in most control in longing and the control of the propagate of the pr	Continuent	material (gravel or stone, less than	effectiveness for source control	stone; placement in water; monitoring of cap	may alter habitat; long term source control effective only if contaminant is of limited solubility; requires access	Moderate	Not retained.
Impermable Liner (e.g., edge,		Physical Barrier Multi-media cap Effectively addresses RAOs sand, stone, clay placement in water; monito		sand, stone, clay placement in water; monitoring of	topography/habitat; effective in long term source control unless inorganic are soluble and upwelling is substantial;	Moderate	Retained for use
Coping using antimated carbon corporation in a filling relies than 3 in Joe mixed with and partially effective for south and partially effective for south and partially effective for south experiments of the control of the south and partially effective for south experiments of the control of the south and partially effective for south experiments of the control of the control of the south experiments of the control of the con			Effectively addresses RAOs	would destroy habitat; moderately difficult to implement; requires import of liners; placement in	blocks transport; requires access	Moderate	Not retained.
Reactive Cap Geophies unique suffice complexed internals (Mackinavite, geophies) the phosphosphosphosphose (chimic chansan), or other aportic) in a thin layer (least that a) and partially effective for nource aportic) in a thin layer (least that a) in or mixed with and Difficult to implement; requires import operation of the phosphosphosphosphosphosphosphosphosphos		carbon/organo-carbon in a thin layer (less than 3 in.)or mixed	and partially effective for source	special materials (i.e. Sedi-mite, activated carbon, organic carbon, or similar products); placement in water; monitoring of cap thickness; periodic	substantial changes in bottom topography/habitat; effective in long term source control unless inorganics are soluble and upwelling is substantial; requires access easement	Moderate	Not retained.
Phytoextraction Reliance on natural processes for Contaminant removal and source control		minerals (Mackinawite, gypsum, phosphogypsum), biopolymers (chitin/chitosan), or other compounds (zeolite, organoclay, apatite) in a thin layer (less than 3	and partially effective for source	special materials (i.e. amendments); placement in water; monitoring of cap thickness; periodic	topography/habitat; long term effectiveness is still subject to evaluation; binding likely to decrease toxicity and dissolved phase mobility but does not inhibit physical transport;	Moderate	Not retained.
Reliance on natural processes for on a furnity processes for and source control and source control and source control and source control. **British Chemical Treatment** **In-situ Physical/Chemical Treatment** **	In-situ Biological Treatment	L			L		
Addition of amendments to sediment; may require in situs making in personal control. In-situs Physical/Chemical Treatment Solidification/stabilization Freshment Solidification/stabilization Solidification/stabilization Flydraulic Dredging Mechanical Dred	Phytoextraction			support wetland plant growth; requires planting of appropriate species and subsequent harvest for disposal. May require long time frames, and	habitats; would not provide short-term risk reduction and overall effectiveness	Moderate	Retain for consideration.
In-situ Chemical Treatment In-situ Physical Chemical In-situ Physical Chemical In-situ Physical Chemical Treatment Solidification/stabilization Effective for risk-based RAOs and source control Effective for risk-based RAOs and source control residual for source control residual for source	In Situ Physical/Chemical Trea	tment					
Institute Physical Chemical Treatment Solidification/stabilization Solidification Solidification/stabilization Solidification/stabilization Solidification/stabilization Solidification/stabilization Solidification/stabilization Solidification/stabilization Solidification/stabilization Solidification/stabilization Solidification/stabilization/stabilization Solidification/stabilization Solidification/stabilization/stabilization Solidification/stabilization/stabilization Solidification/stabilization/stabilization/stabilization Solidification/stabiliz	In-situ Chemical Treatment	sediment; may require in situ	and partially effective for source	materials (e.g., Sedi-mite, activated carbon, gypsum, apatite, etc.); placement in water; mixing of upper	habitat; effective long term source control for dissolved phase, but does		Not retained.
Hydraulic Dredging Hydraulic excavation used to remove sediment Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below Will address relevant RAOs, assuming use of handling treatment/disposal potions discussed below Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below Will address relevant RAOs, assuming use of handling treatment/disposal options discussed below Will address relevant RAOs, assuming use of handling treatment RAOs assuming use of handling treatment requires developed to material amendments to facilitate handling and disposal; buried debris, rocks, or bedrock may limit dredging implementation. Workeraley difficult to implement; requires deflected by sediment type: dredging facilities; rate may be limited by deductive type require the addition of material amendments to facilities rate may be imited by deductive requires establishment of dewatering facilities; rate may be indicately difficult to implement; requires design of the developed and resuspension/residuals controls Workeraley difficult to implement; requires design of the defected by sediment typ	Treatment	Solidification/stabilization		stabilization amendments; placement in water; mixing of upper layers of sediment; periodic	habitat and long term change in sediment properties; effective long		Not retained.
Hydraulic Dredging Hydraulic excavation used to remove sediment Will address relevant RAOs, assuming use of handling reatment/disposal options discussed below Will address relevant RAOs, assuming use of handling reatment/disposal options discussed below Will address relevant RAOs, assuming use of handling reatment/disposal options discussed below Will address relevant RAOs, assuming use of handling and disposal; buried debris, rocks, or bedrock may limit dredging implementation. Mechanical Dredging Mechanical excavation used to remove sediment Will address relevant RAOs, assuming use of handling reatment/disposal options discussed below Will address relevant RAOs, assuming use of handling and disposal; buried debris, rocks, or bedrock may limit dredging equipment; less dearence addition of material amendments to facilitate handling and disposal; buried debris, rocks, or bedrock may limit dredging implements to facilitate handling and disposal; buried debris, rocks, or bedrock may limit dredging implements to facilitate handling and disposal; buried debris, rocks, or bedrock may limit dredging implements to facilitate handling and disposal; buried debris, rocks, or bedrock may limit dredging implements to facilitate handling and disposal; buried debris, rocks, or bedrock may limit dredging implements to facilitate handling and disposal; buried debris, rocks, or bedrock may limit dredging implements to facilitate handling and disposal; buried debris, rocks, or bedrock may limit dredging implements to facilitate handling and disposal; buried debris, rocks, or bedrock may limit dredging implements to facilitate handling and disposal; buried debris, rocks, or bedrock may limit dredging implements to facilitate handling and disposal; buried debris, rocks, or bedrock may limit dredging implements to deduce a dearence of debris or obstacles to dredging; dredging to precipe to develope a developed by presence of debris or obstacles to dredging; dredging to precipe to developed a developed processor of debris or	Removal	ı			1	1	
Mechanical excavation used to remove sediment Mill address relevant RAOs, assuming use of handling treatment/disposal options discussed below Mechanical excavation used to remove sediment May be required for dredging options to meet RAOs May be required for dredging options to meet RAOs Modrately difficult to implement; requires design of development, less dewatering practices; rate may also be affected by presence of debris or obstacles to dredging; dredging development, less dewatering practices; rate may also be affected by presence of debris or obstacles to dredging; dredging typically requires water quality monitoring and resuspension/residuals controls Disposal May be required for dredging options to meet RAOs Modrately difficult to implement; requires design of accepting material; landfill capacity may limit dredging and disposal rates. Material may require dewatering, stabilization, or treatment to meet criteria for acceptance. Long range transport may be required dependent on landfill apacity. Material may require dewatering, stabilization, or treatment to meet criteria for acceptance. Long range transport may be required dependent on landfill apacity. Material may require dewatering, stabilization, or treatment to meet criteria for acceptance. Long range transport may be required dependent on landfill apacity. Material may require dewatering, stabilization, or treatment prior to placement; requires design of material pacity. Material may require dewatering, stabilization, or treatment prior to placement; requires design of material pacity. Moderately difficult to implement; requires design of material pacity. Moderately difficult to implement; requires design of material pacity. Moderately difficult to implement; requires design of material pacity. Moderately difficult to implement; requires design of material pacity.	Hydraulic Dredging		assuming use of handling treatment/disposal options	waterway access by hydraulic dredging equipment; requires subsequent dewatering to remove water added by hydraulic conveyance and the addition of material amendments to facilitate handling and disposal; buried debris, rocks, or bedrock may limit	facilities; rate may be limited by distance to and capacity of dewatering facility; rate may also be affected by sediment type; dredging typically requires water quality monitoring and	High	Not retained.
May be required for dredging options to meet RAOs Off-site Disposal Off-site Disposal Adjacent City of Lockport closed May be required for dredging options to meet RAOs May be required for dredging options to meet RAOs Modrately difficult to implement; requires stabilization, or treatment to meet erriteria for acceptance. Long range transport may be required dependent on landfill capacity. Material may require dewatering, stabilization, or treatment to meet erriteria for acceptance. Long range transport may be required dependent on landfill capacity. Material may require dewatering, stabilization, or treatment to meet erriteria for acceptance. Long range transport may be required dependent on landfill capacity. Material may require dewatering, stabilization, or treatment to meet erriteria for acceptance. Long range transport may be required dependent on landfill capacity. Material may require dewatering, stabilization, or treatment to meet erriteria for acceptance. Long range transport may be required dependent on landfill capacity. Material may require dewatering, stabilization, or treatment to meet erriteria for acceptance. Long range transport may be required dependent on landfill capacity. Material may require dewatering, stabilization, or treatment to meet erriteria for acceptance. Long range transport may be required dependent on landfill capacity. Material may require dewatering, stabilization, or treatment to meet erriteria for acceptance. Long range transport may be required dependent on landfill capacity. Material may require dewatering, stabilization, or treatment to meet erriteria for acceptance. Long range transport may be required dependent on landfill capacity. Material may require dewatering, stabilization, or treatment to meet erriteria for acceptance. Long range transport may be required dependent on landfill capacity. Material may require dewatering, stabilization, or treatment to meet erriteria for acceptance. High required watering stabilization or treatment to meet erriter			assuming use of handling treatment/disposal options	waterway access by dredging equipment; less dewatering required than for hydraulic dredging; may require the addition of material amendments to facilitate handling and disposal; buried debris, rocks,	facilities; rate may be limited by dewatering practices; rate may also be affected by presence of debris or obstacles to dredging; dredging typically requires water quality monitoring and resuspension/residuals	High	Retained for consideration.
May be required for dredging options to meet RAOs Off-site Disposal Off-site Disposal Adjacent City of Lockport closed May be required for dredging and disposal rates. May be required for dredging and disposal rates. May be required for dredging and disposal rates. Material may require dewatering, stabilization, or treatment to meet criteria for acceptance. Long range transport may be required dependent on landfill capacity. Material may require dewatering, stabilization, or treatment prior to placement; requires permission and approval from City of Lockport for placement; requires design of reading of purple for City of Lockport for placement; requires design of reading of purple for consideration.	Disposal				Material may require describe		
Off-site Disposal Adjacent City of Lockport closed May be required for dredging Moderately difficult to implement; requires design of paperoval from City of Lockport for paperoval from City of Lockport closed May be required for dredging Moderately difficult to implement; requires design of partial cases regard would Moderate. Petripod for consideration		Off-site commercial landfill		identification of landfills capable of accepting material; landfill capacity may limit dredging and	stabilization, or treatment to meet criteria for acceptance. Long range transport may be required dependent on	High	Retained for consideration.
a landfill capable of accepting material. lead to be constructed connecting excavation area to landfill; extensive site work and earthwork to accommodate excavation of material.	Off-site Disposal			a landfill capable of accepting material.	stabilization, or treatment prior to placement; requires permission and approval from City of Lockport for redesign of landfill; access roads would need to be constructed connecting excavation area to landfill; extensive site work and earthwork to accommodate excavation of material.	Moderate	Retained for consideration.
On-site Disposal On-site landfill May be required for dredging options to meet RAOs on the control of the contr	On-site Disposal	On-site landfill		design of a landfill area capable of accepting	landfill area and subsequent design and	High	Retained for consideration.

TABLE 6-1 ALTERNATIVES SCREENING

			OPERABLE UNIT 1: SOIL		
	Alternative 1A	Alternative 1B	Alternative 2	Alternative 3	Alternative 4
	No Action	Site Management	Complete Removal with Off-Site Disposal	Ex Situ Stabilization with Off-Site Disposal	Landfill Capping with a Part 360 Cap- Existing Landfill Footprint
Size and Configuration of Process Options	NA	conducted on an annual basis. A fence	Approximately 199,000 yd³ of fill would be excavated from the site, to a 80 ft maximum depth. 119,000 tons of the excavated fill (assumed to be hazardous) would be disposed of at a permitted hazardous waste landfill. Remaining fill and debris would be transported to a general waste landfill. An approved source of fill would be used to construct 3:1 slopes into the existing ravine.	Approximately 199,000 yd³ of fill would be excavated and treated on-site with a stabilizing amendment to be disposed of at a non-hazardous permitted disposal facility. An approved source of fill would be used to construct 3:1 slopes into the existing ravine.	Approximately165,000 yd³ of fill would be excavated from the site to reduce the near vertica ravine walls to a 3:1 slope for the purpose of capping. Remaining fill would be covered with a full Part 360 cap.
Time for Remediation	NA	NA	Approximately 40 months	Approximately 40 months	Approximately 21 months
Spatial Requirements			Area of excavation will be inaccessible during remedial activities. Access road into the existing ravine will be necessary to accommodate excavation activities. Area for equipment storage and loading and unloading for contaminated/clean soil (~100 X 400 ft).	Area of excavation will be inaccessible during remedial activities. Access road into the existing ravine will be necessary to accommodate excavation and backfill activities. Area for treatment and utilities equipment (~100 X 400 ft).	Area of excavation will be inaccessible during remedial activities. Access road into the existing ravine will be necessary to accommodate excavation and capping activities. Area for equipment storage and loading and unloading of contaminated soil (-100 X 400 ft).
Options for Disposal	NA	NA	Off-site disposal through approved hazardous waste and general waste facilities. Consideration for treatment and reuse of soils would be handled by the facility.	Off-site disposal for treated soil through approved facilities.	Off-site disposal for ravine slope fill through approved hazardous waste and general waste facilities.
Substantive Technical Permit Requirements	None	None	None	None	None
Limitations or Other Factors Necessary to Evaluate Alternatives	None	None	Disposal facilities will require TCLP analysis for waste characterization prior to acceptance.	Pilot test will be required for full evaluation.	Disposal facilities will require TCLP analysis for waste characterization prior to acceptance.
Public Impacts	Will not reduce exposure to contaminants.	Will not physically reduce exposure to contaminants.	Noise, dust, and traffic may disturb local residents.	Noise, dust, and traffic may disturb local residents.	Noise, dust, and traffic may disturb local residents.
Beneficial and/or Adverse Impacts on Fish and Wildlife Resources		Because the soil would be left untreated, the soil could contribute to further groundwater contamination	No known impacts on fish and wildlife resources. The potential source of groundwater contamination will be removed.	No known impacts on fish and wildlife resources. The potential source of groundwater contamination will be removed.	No known impacts on fish and wildlife resources The potential source of groundwater contamination will be removed.
Net Present Worth	\$0.00	\$160,000	\$43,609,000	\$40.509.000	\$26,975,000

Old Upper Mountain Road Site (932112)
Lockport, New York
Operable Units 1 and 2

TABLE 6-1 ALTERNATIVES SCREENING

		OPERABLE	UNIT 1: SOIL	
	Alternative 5	Alternative 6	Alternative 7	Alternative 8
	Landfill Capping with a Part 360 Cap- Extended Landfill Footprint	Landfill Capping with a Clean Soil Cover- Extended Landfill Footprint	Partial Removal and Off-Site Disposal with In Situ Stabilization of Shallow Waste	Partial Removal, Ex Situ Stabilization and On-Site Placement with In Situ Stabilization of Shallow Waste
Size and Configuration of Process Options	graded to convert the near vertical ravine walls to a 3:1 slope for the purpose of capping. Re-graded	Approximately 51,000 yd ³ of soil would be regraded to convert the near vertical ravine walls to a 3:1 slopefor the purpose of capping. Re-graded fill would be covered with a soil cap.	Approximately 152,000 yd³ of soil would be excavated from the deepest areas of fill ranging from 20 to 80 ft bgs to be disposed of at permitted disposal facilities. An approved source of fill would be used to construct 2:1 slopes into the existing ravine. Shallow fill would be mixed with stabilizing amendment in situ to prevent leaching.	Approximately 152,000 yd³ of fill would be excavated from the deepest areas of fill ranging from 20 to 80 ft bgs to be treated on-site with a stabilizing amendment to be placed back into the excavation and into the existing ravine to allow for 3:1 slopes. Shallow fill would be treated in situ with the same stabilizing amendment. Stabilized soil would be covered with a clean soil cap, topsoil and seed.
Time for Remediation	Approximately 9 months	Approximately 9 months	Approximately 34 months	Approximately 44 months
Spatial Requirements	Area of excavation will be inaccessible during remedial activities. Access road into the existing ravine will be necessary to accommodate excavation and capping activities. Area for equipment storage and loading and unloading of contaminated soil (~100 X 400 ft).	Area of excavation will be inaccessible during remedial activities. Access road into the existing ravine will be necessary to accommodate excavation and capping activities. Area for equipment storage and loading and unloading of contaminated soil (~100 X 400 ft).	Area of excavation will be inaccessible during remedial activities. Access road into the existing ravine will be necessary to accommodate excavation and backfill activities. Area for equipment storage (~100 X 400 ft).	Area of excavation will be inaccessible during remedial activities. Access road into the existing ravine will be necessary to accommodate excavation and backfill activities. Area for equipment storage (~100 X 400 ft).
Options for Disposal	All material will remain on-site.	All material will remain on-site.	Off-site disposal for deep fill through approved hazardous waste and general waste facilities.	All material will remain on-site.
Substantive Technical Permit Requirements	None	None	None	None.
Limitations or Other Factors Necessary to Evaluate Alternatives	None.	None.	Disposal facilities will require TCLP analysis for waste characterization prior to acceptance. Pilot test will be required for full evaluation.	Pilot test will be required for full evaluation.
Public Impacts	Noise, dust, and traffic may disturb local residents.	Noise, dust, and traffic may disturb local residents.	Noise, dust, and traffic may disturb local residents.	Noise, dust, and traffic may disturb local residents.
Beneficial and/or Adverse Impacts on Fish and Wildlife Resources	No known impacts on fish and wildlife resources. The potential source of groundwater contamination will be removed.	No known impacts on fish and wildlife resources. The potential source of groundwater contamination will be removed.	No known impacts on fish and wildlife resources. The potential sources of groundwater contamination will be removed and treated	No known impacts on fish and wildlife resources. The potential sources of groundwater contamination will be treated.
Net Present Worth NOTE: NA = Not Applicable TCLP = Toxicity Charac	\$5,974,000	\$4,208,000	\$41,721,000	\$23,557,000

Old Upper Mountain Road Site (932112)
Lockport, New York
Operable Units 1 and 2

TABLE 6-1 ALTERNATIVES SCREENING

			OPERABLE UNIT 2: SEDIMI	ENT		
	Alternative 1A	Alternative 1B	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	No Action	Site Management	Multi-Media Sub-Aqueous Capping	In Situ Sediment Amendment	Complete Removal with Disposal	Partial Removal with Multi-Media Sub- Aqueous Capping
Size and Configuration of Process Options	NA	A deed restriction would be implemented at the site to limit the use of the property and groundwater. Surface water monitoring would be conducted on an annual basis. A fence would be installed and maintained for site security.	Approximnately 9 acres would be cleared, graded and capped with a protective media designed to not be mobile by flood flows when vegetated. Approximately 3,600 linear feet of stream would be restored overtop of the cap.	Approximately 9 acres would be cleared, grubbed and excavated to amend with chitin. Approximately 26,000 tons of sediment would be ammended. 3,300 linear feet of stream would be restored in the disturbed floodplain.	Approximately 21,000 yd of contaminated materials covering 9 acres would be dredged and dewatered for on-site disposal.	Approximately 20,000 yd³ of contaminated materials covering 6.5 acres would be dredged and dewatered for on-site disposal. Remaining sediments would be capped with a multimedia cap designed to withstand flood flows.
Time for Remediation	NA	2 Months	24 Months	24 Months	12 Months	12 Months
Spatial Requirements	None	None	ravine will be necessary to accommodate excavation activities. Area for equipment storage and loading /unloading cap materials; 7100 X 400 ft). Staging would be staggered in order to minimize disturbance and potential for contamination of clean materials. Work would progress upstream to downstream. Significant	Area of excavation will be inaccessible during remedial activities. Access road into the existing ravine will be necessary to accommodate excavation activities. Area for equipment storage and loading and unloading and mixing soils (100 X 400 ft). Staging would be staggered in order to minimize disturbance and potential for contamination of clean materials. Work would progress upstream to downstream. Significant disturbance for pipe diversion activities would be required.	Area of excavation will be inaccessible during remedial activities. Access road into the existing ravine will be necessary to accommodate excavation activities. Area for equipment storage and stockpiling(*100 X 400 ft). Staging would be staggered in order to minimize disturbance and potential for contamination of clean materials. Work would progress upstream to downstream. Significant disturbance for pipe diversion activities would be required.	ravine will be necessary to accommodate
Options for Disposal	NA	NA	NA	N/A	On-site disposal in accordance with Part 360 requirements for a full cap or a soil cap.	On-site disposal in accordance with Part 360 requirements for a full cap or soil cap.
Substantive Technical Permit Requirements	None	None	Water quality monitoring to ensure no contamination moves downstream required. 404/401 permitting requirements for stream and wetland impacts. Mitigation and annual monitoring required.	Water quality monitoring to ensure no contamination moves downstream required. 404/401 permitting requirements for stream and wetland impacts. Mitigation and annual monitoring required.	Water quality monitoring to ensure no contamination moves downstream required. 404/401 permitting requirements for stream and wetland impacts. Mitigation and annual monitoring required.	Water quality monitoring to ensure no contamination moves downstream required. 404/401 permitting requirements for stream and wetland impacts. Mitigation and annual monitoring required.
Limitations or Other Factors Necessary to Evaluate Alternatives	None	None	Hydraulic and Hydrologic analysis required to evaluate potential for having a stable cap.	Pre-design characterization study required to determine extents of ammendment and contamination.	Pre-design characterization study required to determine extents of dredging.	Hydraulic and Hydrologic analysis required to evaluate potential for having a stable cap. Pre- design characterization study required to determine extents of contamination.
Public Impacts	Will not reduce exposure to contaminants.	Will not physically reduce exposure to contaminants.	Noise, dust, and traffic may disturb local residents. Existing recreation opportunities in Gul; Creek would be temporarily impacted.	Noise, dust, and traffic may disturb local residents. Existing recreation opportunities in Gul: Creek would be temporarily impacted.	Noise, dust, and traffic may disturb local residents. Existing recreation opportunities in Gul Creek would be temporarily impacted.	Noise, dust, and traffic may disturb local residents. Existing recreation opportunities in Gulf Creek would be temporarily impacted.
		Because the soil would be left untreated, the soil could contribute to further groundwater contamination	Potential for surface contact would be removed. Complete restoration of the benthic community would be required. Potential for future exposure due to tree falls and burrowing activity would be present.	Potential for surface contact would be removed, however monitoring would be required to ensure effectiveness of ammendment. Complete restoration of the benthic community would be required.	Potential for surface contact would be removed. Complete restoration of the benthic community would be required.	Potential for surface contact would be removed. Complete restoration of the benthic community would be required. Potential for future exposure due to tree falls and burrowing activity would be present.
Net Present Worth	\$0.00	\$87,000.00	\$2,889,000	\$2,334,000	\$4,638,000	\$3,887,000

Old Upper Mountain Road Site (932112)
Lockport, New York
Operable Units 1 and 2

TABLE 6-2 ALTERNATIVE EVALUATION SUMMARY

			OPERABLE UNIT 1: SOIL		
	Alternative 1A	Alternative 1B	Alternative 2	Alternative 3	Alternative 4
	No Action	Site Management	Complete Removal with Off-Site Disposal	Ex Situ Stabilization with Off-Site Disposal	Landfill Capping with a Part 360 Cap- Existing Landfill Footprint
(1) Overall Protection o	f the Public Health and the Environment		1		The state of the s
	There is no reduction of risk with this alternative. The soil pathways would continue to pose unacceptable risk to all receptors.	Implementation of this alternative would serve to prevent ingestion or direct contact with contaminated soil and groundwater.	Removal of source reduces potential migration of contaminants to groundwater and surface water.	Removal of source reduces potential migration of contaminants to groundwater and surface water.	Capping of impacted area reduces potential migration of contaminants to groundwater.
(2) Standards, Criteria	and Guidance (SCGs)		1		
		Does not meet SCG criterion	Will meet SCG criteria.	Will meet SCG criteria.	Will meet SCG criteria.
(3) Long-Term Effective			1		The state of the s
	This alternative will not provide long-term effectiveness or permanence. This alternative offers no controls.	This alternative would effectively address RAOs if implemented in conjunction with another alternative. As a stand-alone alternative, it is only moderately effective, as contamination will remain in place and no physical barriers would prevent contact or ingestion of soil or groundwater.	When designed and implemented property, effectively eliminates exposure and prevents transport, permanently removes some habitat, eliminates need for groundwater monitoring, RAOs are achieved in short time frame.	When designed and implemented properly, effectively eliminates exposure and prevents transport, permanently removes some habitat, eliminates need for groundwates remedy, RAOs are achieved in short time frame.	
(4) Reduction of Toxicit	y, Mobility, or Volume of Contamination		1		•
Amount of Hazardous	None	None		Excavation will remove soil exceeding allowable risks	
Materials Destroyed, Treated, or Removed	N.	XY.	at the impacted area.	at the impacted area.	hazardous materials.
Degree of Expected Reductions in Toxicity, Mobility, or Volume	None	None	Contaminated soil will be disposed of in permitted facilities that use measures to reduce or eliminate the risk of toxic mobility.	Contaminant toxicity and volume will be reduced.	Contaminant mobility and volume will be reduced.
	No	No	Yes	Yes	Partially reversible. Remaining fill could be un-capped
Residuals Remaining After Treatment	Yes	Yes	Trace residuals may remain after excavation is complete.	Residuals may remain in areas outside of the excavation	Residuals will remain under cap.
(5) Short-Term Impact	and Effectiveness		complete.	area.	I
Community Protection		There is no physical action and therefore, no	Increased short-term risks to the public during	Increased short-term risks to the public during	Increased short-term risks to the public during
	to the community.	additional risk to the community.	exeavation activities and transport of equipment and materials to and from site. Dust will be produced during exeavation activities. These can be mitigated through standard construction practices. Some habitats will be temporarily disturbed and/or removal.	excavation activities and transport of equipment and materials to and from site. Dust may be produced during mixing activities. These can be mitigated through standard construction practices.	exeavation activities and transport of equipment and materials to and from site. Dust will be produced during excavation and grading activities. These can be mitigated through standard construction practices.
Worker Protection	There is no action and therefore no workers will be present on site.	There is no physical action and therefore, no workers will be present at the site	Workers can potentially be exposed to contaminated media during excavation activities. Work around heavy equipment carries potential risk to workers. Risks can be minimized by implementing health and safety controls.	Workers can potentially be exposed to contaminated media during activities. Work around heavy equipment and electrical power carries potential risk to workers. Risks can be minimized by implementing controls.	Workers can potentially be exposed to contaminated media during excavation and grading activities. Work around heavy equipment carries potential risk to workers. Risks can be minimized by implementing health and safety controls.
Environmental Impacts	There are no short-term impacts associated with this alternative.	There are no short-term impacts associated with this alternative.	Wastes produced will include contaminated PPE. Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated with implementation and air emissions.	Wastes produced will include contaminated PPE. Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated with implementation and air emissions.	Wastes produced will include contaminated PPE. Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated with implementation and air emissions.
Time Until Action Complete (Field Construction Time)	No action taken	Approximately 2 months for the deed restriction to be in effect.	Approximately 40 months	Approximately 40 months	Approximately 27 months
(6) Implementability	Nas Ameliada	Traditational controls can be a second control of	Etititititititi	E de la companya de l	II dellidededede-
Ability to Construct and Operate	Not Applicable.	Institutional controls can be implemented, and have been used nationally.	Excavation alternatives can be implemented, and have been used nationally.	Excavation and treatment alternatives can be implemented, and have been used nationally.	Landfill capping alternatives can be implemented, and have been used nationally.
Monitoring Requirements	Not Applicable.	Not Applicable.	Soil shall be sampled and analyzed to confirm removal of impacted area.	Soil shall be sampled and analyzed to confirm removal of impacted area.	
Availability of Equipment and Specialists	Not Applicable.	Specialists are available for the implementation of institutional controls.	•	specialists are available for the implementation of all of t	1
Ability to Obtain Approvals and Coordinate with Other Agencies (7) Cost Effectiveness	Not Applicable.	Ability to obtain approvals and coordinate with other agencies assumed to be possible.	Ability to obta	ain approvals and coordinate with other agencies assume	d to be possible.
-	ec.	61/0 ***	643 (02 222	640.5	
Cost	\$0	\$160,000	\$43,609,000	\$40,509,000	\$26,975,000
(8) Land Use	NA	Restricted	Unrestricted	Unrestricted	Unrestricted
(9) Community Accepta		TDD	TDD	TDD	TDD
	TBD NOTE: PPE = Personal protective equipment ARAR = Applicable or Relevant and Appropris NA = Not Applicable TBD = To be determined	TBD tte Requirement	TBD	TBD	TBD

TABLE 6-2 ALTERNATIVE EVALUATION SUMMARY

Alternative 5		Alternative 6	Alternative 7	Alternative 8
Landfill Capping with a F	art 360 Cap- Land	fill Capping with a Clean Soil Cover- Extended Landfill Footprint	Partial Removal and Off-Site Disposal with In Situ Stabilization of Shallow Waste	Partial Removal, Ex Situ Stabilization and O Site Placement with In Situ Stabilization of Shallow Waste
Il Protection o		•		
Capping of impacted area reduces p	otential migration of Capping of	f impacted area reduces potential migration of		Treatment of impacted fill reduces potential migration
contaminants to groundwater and st	irface water. contamina	ants to groundwater and surface water.	of contaminants to groundwater and surface water.	of contaminants to groundwater and surface water
ards, Criteria :				
Will meet SCG criteria.	Will meet	SCG criteria.	Will meet SCG criteria.	Will meet SCG criteria.
Term Effective			Inc	
Effectively addresses RAOs associ- fill in short time frame, long-term r groundwater and surface water, liss Restrictions) and Engineering Cont- be in-place.	nonitoring of fill in short titutional (Deed groundwa	y addresses RAOs associated with contact of t time frame, long-term monitoring of ter and surface water; Institutional (Deed ns) and Engineering Controls would need to e.	Effectively addresses RAOs associated with contact of fill in short time frame; Institutional (Deed Restrictions) and Engineering Controls would need to be in-place; assumes that soiffill would be removed from areas in contact with groundwater and shallow fill would be treated via in-situ stabilization.	Effectively addresses RAOs associated with contact fill in short time frame; Institutional (Deed Restriction and Engineering Controls would need to be in-place assumes that soi/fill would be removed from areas in contact with groundwater and shallow fill would be treated via in-situ stabilization.
tion of Toxicit				
Hazardous Capping fill materials will not remo		ill materials will not remove or destroy materials.	Partial excavation will remove most of the soil exceeding allowable risks. Treatment will reduce	Treatment will reduce toxicity in all fill
Removed Expected Contaminant mobility will be reduction Toxicity,	ed. Contamin	ant mobility will be reduced.	toxicity of the remaining soil. Contaminant toxicity and volume will be reduced.	Contaminant toxicity will be reduced
r Volume Treatment? Partially reversible. Remaining fill	could be un-capped. Partially r	eversible. Remaining fill could be un-capped.	Yes	Yes
Remaining Residuals will remain under cap.	Residuals	will remain under cap.	Residuals will remain in treatment area, but will be less mobile	Residuals will remain in treated fill, but will be less mobile
Term Impact :			moune.	inone.
y Protection Increased short-term risks to the pu	blic during Increased	short-term risks to the public during	Increased short-term risks to the public during	Increased short-term risks to the public during
materials to and from site. Dust wi during excavation and grading acti- mitigated through standard constru	rities. These can be during ex-	to and from site. Dust will be produced avartion and grading activities. These can be through standard construction practices.	materials to and from site. Dust will be produced during excavation and mixing activities. These can be mitigated through standard construction practices.	materials to and from site. Dust will be produced during excavation and mixing activities. These can mitigated through standard construction practices.
otection Workers can potentially be exposed media during excavation and gradin around heavy equipment earries po workers. Risks can be minimized be health and safety controls.	ag activities. Work media dur iential risk to around he iy implementing workers.	an potentially be exposed to contaminated ing excavation and grading activities. Work avy equipment carries potential risk to Risks can be minimized by implementing safety controls.	Workers can potentially be exposed to contaminated media during activities. Work around heavy equipment carries potential risk to workers. Risks can be minimized by implementing health and safety controls.	Workers can potentially be exposed to contaminated media during activities. Work around heavy equipm carries potential risk to workers. Risks can be minimized by implementing health and safety control
ntal Impacts Wastes produced will include conte Wastes will be managed in complia Limited short term environmental i with implementation and air emissi	nce with ARARs. Wastes with mpacts associated Limited sl	oduced will include contaminated PPE. ill be managed in compliance with ARARs. hort term environmental impacts associated ementation and air emissions.	Wastes produced will include contaminated PPE. Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated with implementation and air emissions.	Wastes produced will include contaminated PPE. Wastes will be managed in compliance with ARARs Limited short term environmental impacts associated with implementation and air emissions.
Action Approximately 9 months Field on Time)	Approxim	ately 9 months	Approximately 34 months	Approximately 44 months
mentability				
Construct and Landfill capping alternatives can be			Excavation and treatment alternatives can be	Excavation and treatment alternatives can be
have been used nationally. Not Applicable.	have been Not Appli	used nationally.	implemented, and have been used nationally. Not Applicable.	implemented, and have been used nationally. Not Applicable.
nts y of and		Equipment and specialists are available for the	he implementation of all of these technologies.	<u> </u>
Obtain and with Other		Ability to obtain approvals and coordinate	with other agencies assumed to be possible.	
ffectiveness	·			
\$5,974,000		\$4,208,000	\$41,721,000	\$23,557,000
Use Unrestricted		Unrestricted	Unrestricted	Unrestricted
unity Accepta TBD		TBD	TBD	TBD
			Unrestricted	

TABLE 6-2 ALTERNATIVE EVALUATION SUMMARY

			OPERABLE UNIT 2: SEDIP			
	Alternative 1A	Alternative 1B	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	No Action	Site Management	Multi-Media Sub-Aqueous Capping	In Situ Sediment Amendment	Complete Removal with Disposal	Partial Removal with Multi-Media Sub-Aqueou Capping
Overall Protection o	f the Public Health and the Environment	one management	Main Media Sub Mqueous Cupping	III Situ Stument / Internation	Complete Removal with Disposal	Спррия
	There is no reduction of risk with this alternative. The soil pathways would continue to pose unacceptable risk to all receptors.	Implementation of this alternative would serve to prevent ingestion or direct contact with contaminated sediment and surface water.	Capping reduces potential for an exposure pathway via surface contact. Continued potential risk of movement of contaminants through sediment bed mobility and surface water if sediment chemistry becomes acidic.	Will reduce risk of exposure through bonding contaminants into stable, non-leaching forms. Will reduce risk of transport of contaminants offsite or through surface water or sediment transport.	Removal of source reduces potential migration of contaminants to surface water or through surface contact. Subsequent capping will reduce potential for an exposure pathway via surface contact.	Removal reduces potential migration of contaminants to surface water or through surface contact. Capping reduces potential for an exposure pathway via surface contact. Continued potential risk of movement of remaining underlying contaminated sediment constituents through surface water if sediment ehemistry becomes acidic.
2) Standards, Criteria :		In	luciu	min	west read in it	luciu
3) Long-Term Effective	Does not meet SCG criterion.	Does not meet SCG criterion	Will meet SCG criteria.			
,	This alternative will not provide long-term effectiveness or permanence. This alternative offers no controls.	This alternative would effectively address RAOs if implemented in conjunction with another alternative, as a stand-alone alternative, its only moderately effective, as contamination will remain in place and no physical barriers would prevent contact or ingestion of sediment or surface water.	Cap would need to be maintained against breach through dredging, tree falls, burrowing animals. Site management and perimeter controls are required.	When designed and implemented properly, effectively eliminates exposure and prevents transport, permanently removes some habitat, RAOs are achieved in short time frame.	When designed and implemented properly, effectively reduces exposure and prevents transport, permanently removes some habitat, RAOs are achieved in short time frame.	When designed and implemented properly, effectively eliminates exposure and prevents transport. Permanently removes some habitat. RAOs are achievee in short time frame. Cap would need to be maintained against breach through excavation, tree falls, and burrowing animals. Site management and perimeter controls are required.
4) Reduction of Toxicit	ty, Mobility, or Volume of Contamination	1			<u> </u>	
amount of Hazardous Materials Destroyed, Treated, or Removed	None	None	None	Amendment will remove most bio-available contamination and reduce overall exposure risks.	Dredging will remove sediment exceeding allowable risks at the impacted area.	Dredging and capping will remove sediment exceeding allowable risks at the impacted area and reduce surface exposure risks.
Degree of Expected Leductions in Toxicity, Mobility, or Volume	None	None	Reduced mobility due to surface exposure. Potential risk remains with surface water and sediment bed mobility transport.	expected.	Contaminated sediment will be disposed of on-site using stabilization amendments to reduce or eliminate the risk of toxic mobility.	Contaminated sediment will be disposed of on-site using stabilization amendments to reduce or eliminate the risk of toxic mobility.
reversible Treatment? esiduals Remaining	No Yes	No Yes	No Yes.	Yes Yes, particularly if impropper amounts of amendments	Yes Trace residuals may remain after dredging is complete.	Yes Residual contamination present below cap.
After Treatment		103	103.	are utilized or impropper mixing.	Contaminated sediment will remain when landfilled on- site.	Contaminated sediment will also remain when landfilled on-site.
5) Short-Term Impact			As no material will leave the site, only risks due to	Increased short-term risks to the public during transport	Increased short-term risks to the public during dredging	Increased short-term risks to the public during dredging
ommuny Processor	There is no pettors and therefore, no additional risk to the community. There is no pettors and therefore, no additional risk to the community.		read or instead with read to use the subject of the construction access, dust, etc are present. No risks to public from contaminted materials.	or capiment and materials to and from site. Dust residuals will be produced during amendment activities. These can be mitigated through standard construction practices. Some adjacent habitats will be temporarily disturbed.	activities and transport of equipment and materials to site. Dust/residuals will be produced during dredging/amendment activities. These can be mitigated through standard construction practices. Some adjacent habitats will be temporarily disturbed.	activities and transport of equipment and materials to and from site. Dust'residuals will be produced during dredging/amenten activities. These can be mitigated through standard construction practices. Some adjacent habitats will be temporarily disturbed.
Worker Protection	There is no action and therefore no workers will be present on site.	There is no physical action and therefore, no workers will be present at the site	Work around heavy equipment carries potential risk to workers. Risks can be minimized by implementing health and safety controls.	Workers can potentially be exposed to contaminated media during amendment activities. Work around heavy equipment carries potential risk to workers. Risks can be minimized by implementing health and safety controls.	Workers can potentially be exposed to contaminated media during dredging activities. Work around heavy equipment carries potential risk to workers. Risks can be minimized by implementing health and safety controls.	Workers can potentially be exposed to contaminated media during dredging activities. Work around heavy equipment carries potential risk to workers. Risks can be minimized by implementing health and safety controls.
nvironmental Impacts	There are no short-term impacts associated with this alternative.	There are no short-term impacts associated with this alternative.	Wastes produced will include contaminated PPE. Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated with implementation and air emissions. Significant impacts to stream, wetland and riparian habitats expected.	Wastes produced will include contaminated PPE. Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated with implementation and air emissions. Significant impacts to stream, wetland and riparian habitats expected.	Wastes produced will include contaminated PPE. Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated with implementation and air emissions. Significant impacts to stream, wetland and riparian habitats expected.	Wastes produced will include contaminated PPE. Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated with implementation and air emissions. Significant impacts to stream, wetland and riparian habitats expected.
ime Until Action Complete (Field Construction Time)	No action taken	Approximately 2 months for the deed restriction to be in effect.	Approximately 24 Months	Approximately 24 Months	Approximately 12 Months	Approximately 12 Months
6) Implementability	*	*	•	•	•	•
ability to Construct and Operate	Not Applicable.	Institutional controls can be implemented, and have been used nationally.	Capping in riparian / stream or floodplain areas must be designed to resist transport. Able to be implemented with specialty contractors and appropriate equipment.		Dredging and landfilling alternatives can be implemented, and have been used nationally.	Dredging, capping and landfilling are proven alternatives and utilized nationally.
Monitoring Requirements		Not Applicable.	Perimeter monitoring and initial characterization recommended. Cap must be monitored for stability.	Sediment shall be sampled and analyzed to confirm reduction of available contaminants.	Sediment shall be sampled and analyzed to confirm removal of impacted area.	Perimeter monitoring and initial characterization recommended. Cap must be monitored for stability.
vailability of quipment and pecialists	Not Applicable.	Specialists are available for the implementation of institutional controls.		Equipment and specialists are available for the	e implementation of all of these technologies.	
ability to Obtain approvals and Coordinate with Other agencies	Not Applicable.	Ability to obtain approvals and coordinate with other agencies assumed to be possible.		Ability to obtain approvals and coordinate	with other agencies assumed to be possible.	
7) Cost Effectiveness						
Cost 8) Land Use	S0 NA	\$87,000 Restricted	\$2,889,000 Unrestricted	\$2,334,000 Unrestricted	\$4,638,000 Unrestricted	\$3,887,000 Unrestricted
		RESILICIE	Omestricica	Omestricted	Omestricted	Ginestricted
9) Community Accepta						

APPENDIX A TECHNOLOGY SCREENING LETTER AND COMMENTS

New York State Department of Environmental Conservation

Division of Environmental Remediation, Region 9

270 Michigan Avenue, Buffalo, New York 14203-2915

Phone: (716) 851-7220 • Fax: (716) 851-7226

Website: www.dec.ny.gov





Mr. Robert Casey 6712 Brooklawn Parkway - Suite 104 Syracuse, New York 13211-2158

Dear Mr. Casey:

Remedial Action Objectives and Feasibility Study Technology Screening Old Upper Mountain Road Site, Site No. 932112 Lockport (C), Niagara County

The New York State Departments of Environmental Conservation (NYSDEC) and Health (NYSDOH) have completed a detailed review of the draft Remedial Action Objectives and Feasibility Study Technology Screening letter submitted to the NYSDEC via e-mail on June 21, 2011. This letter summarizes the results of the Remedial Investigation (RI) and Supplemental RI for the three operable units of the site, discusses the remedial action objectives for each contaminated media identified, and presents the initial screening of remedial alternatives. The initial screening of alternatives, and the alternatives retained for evaluation in the Feasibility Study (FS), appears reasonably given the physical constraints of the site. The Departments, however, have a number of comments concerning the Technology Screening Matrix tables. These comments are summarized as follows:

- 1. <u>Table 2, Soil/Fill, Monitored Natural Attenuation, Page 1:</u> This technology is generally associated with volatile organic compounds. For soil/fill at the Old Upper Mountain Road Site, is this technology being evaluated for metals?
- 2. <u>Table 2, Groundwater, Page 2:</u> If MNA was evaluated and retained for soil/fill and sediment, should it be evaluated and retained for groundwater?
- 3. Table 2, Sediment, Page 3:
 - A. <u>Monitored Natural Attenuation:</u> For sediment at the Old Upper Mountain Road Site, is this technology being evaluated for metals?

- B. <u>Containment:</u> It is not clear from the information given why some of the containment options were not retained for evaluation. For example, a multi-media cap was retained while a thin layer cap was not. From the description given, it appears to us that a thin layer cap would be easier and less disruptive to construct than a multi-media cap.
- C. Removal: For the Eighteenmile Creek Corridor Site, the selected ROD remedy for creek sediment included excavation following creek diversion. This alternative was selected, in part, due to the difficulties in dredging a shallow, rocky creek. A similar alternative should be evaluated for Gulf Creek sediment.
- **D.** <u>Dredged Material Handling and Treatment:</u> It is not clear from the information given why ex-situ chemical treatment was not retained for evaluation.
- 4. <u>Table 3:</u> The text for Alternative 4 on page 1 and Alternative 2 on page 2 is cut-off.

Should you have any questions regarding any of the above, please feel free to contact me at (716) 851-7220.

Sincerely yours,

Glenn M. May, CPG

Henn M May

Environmental Geologist II

GMM:sz

ec: Mr. Gregory Sutton, NYSDEC, Region 9

Mr. Matthew Forcucci, NYSDOH, Buffalo

APPENDIX B COST ESTIMATES

	Option	Total NPV Cost	Capital Cost	Lifetime Monitoring	Lifetime O&M	Time to Complete		
1B	Site Management	\$160,000	\$99,000	\$61,490	NA	2	months	
2	Complete Removal (Excavation) and Disposal Off-site (Commercial)	\$43,609,000	\$43,609,000	NA	NA	40	months	
3	Ex situ Stabilization and Disposal Off-site	\$40,509,000	\$40,509,000	NA	NA	40	months	
4	Partial Removal, Landfill Capping with a Part 360 Cap, and Groundwater Monitoring	\$26,975,000	\$26,552,000	423300	NA	21	months	
	Re-grading, Landfill Capping with a Part 360 Cap, and Groundwater Monitoring	\$5,974,000	\$5,693,000	\$280,600	NA	9	months	
6	Re-grading, Landfill Capping with a Soil Cap, and Groundwater Monitoring	\$4,208,000	\$3,927,000	\$280,600	NA	9	months	
7	Partial Removal (Deeper Fill) and Off-site Disposal, with In Situ Stabilization (Shallow Fill 0-14 ft Depth)	\$41,721,000	\$41,500,000	\$221,100	NA	34	months	
8	Partial Removal (Deeper Fill) with Ex Situ Stabilization and On-site Disposal, with In Situ Stabilization (Shallow Fill 0-14 ft Depth)	\$23,557,000	\$23,336,000	\$221,100	NA	43	months	

REMEDIAL ALTERNATIVE		LOCATION				MEDIA			Estimate	ement	\$160,000					
Soil/Fill Material Alternative 1B Sue Management		Old Upper Mountain Road Lockport, NY					Soil/Fill - OU1					Ope	uction Time: ration Time: n Monitoring	- 0	month month vears	
		Quar	ntities		<u> </u>			Cost Bre	akdowi	n (if available)	1 000 1101110	didioi		Combined Unit Costs	years	
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Mate Unit			laterial tal Cost	Labo Unit Co		Labor Total Cost	Equipment Unit Cost		Equipment Total Cost	Unit Cost		Option otal Cost
REMEDIAL ACTION		TOTAL CAP	TTAL COST	thousan	nd)											\$99,000
Site Management Activities		1					\$0			\$0			\$0	\$114,199	¢	84,199
Surveyor- monument installation		1		ę	_	s	- -	s	_	\$ -	s -	s	- -	\$ 10,000	Φ .	10,000
Lawyer		1		3	-)	-	3		\$ -	3 -	\$	-	\$ 15,000	\$ ¢	15,000
•	32 31 13.20 0200	2,100		¢	19.64	\$	41,244	\$		\$ 9,555	\$ 0.9	Ψ	2,079	\$ 13,000	\$	52,878
	32 31 13.20 5060		Opng	\$		\$	491	Ψ		\$ 683	\$ 74.0		148	\$ -	\$	1,321
Signage, assume small signs attached to perimeter fencing		1.00		\$		\$	-	\$		\$ -	\$ -	\$	-	\$ 5,000	\$	5,000
Professional/Technical Services															\$	14,314
5% Project Management														\$84,199	\$	4,210
6% Remedial Design															\$	5,052
6% Construction Management															\$	5,052
LONG TERM ANNUAL MONITORING AND MAINTENANCE											ANNUAL I			S 1-30)	\$	4,000
Monitoring and Maintenance		<u> </u>	<u> </u>	Т	T			l I	- 1		LIFETIME	LLIN	I (NPV)			\$61,490
Site Monitoring															\$	4,398
															Ψ	4,570
Groundwater sampling for 1 event - Includes collection of field parameters		5	well	\$	-	\$	-	\$	340	\$ 1,700.00	\$ 9	92 \$	458.13	\$ -	\$	2,158
Materials			event	\$	50	\$	50	\$		\$ -	\$ -	\$	-	\$ -	\$	50
Mobilization/Demobilization of Inspector			event	\$	-	\$	-	\$		\$ - \$ 510.00	\$ -	\$	-	\$ 680.00	\$	680
Reporting Maintenance- Fence Maintenance		6	nr	-	\$0	\$	-	\$	85	\$ 510.00	\$ -	\$	-	\$ -	\$	510
	Estimate	1	ls	\$	_	\$	_	\$	-	\$ -	\$ -	\$	-	\$ 1,000.00	\$	1,000
Lifetime Long Term Monitoring (Net Present Value)	zsimuic	1		Ψ		Ψ		Ψ		Ψ	Ψ	Ψ		Ψ 1,000.00	Ψ	1,000
30 Years of Semi-Annual Monitoring																
5% Discount Factor (per NYSDEC)																
TOTAL ESTIMATED NPV TECHNOLOGY COST (Ca) Assumptions:	pital + Lifetime	e O&M + Po	st Remedia	tion Mo	onitori	ing)									\$1	60,000
Labor Cost per hr	\$85]		_	,	Typic		Truck/SUV	/ (1/2 to	s G&A and 10 on or smaller)		74 per	day			
Weighted Average of city cost index (Buffalo, NY) Inflation Hours per working day workers per event	10		101.4%	-				Water Qua Water Leve Submersib Generators	el Meter le Pump	r	\$31. \$113.	00 per 80 per 91 per 68 per	day day			
hours travel per event for materials (gloves, notebooks, etc.)	5 \$50 2	hrs/GW sample hrs/SW sample						Multi-gas i Metals VOCs	meter	Analytical Costs \$75.00	\$75.		auy			
_		-			-		0.5 2	hrs/GW sa hrs/SW sar workers pe hours trave	nple r event		\$8	Lab	oor cost per hr			

REMEDIAL ALTERNATIVE			LOCATION	I	M	EDIA	Estima	ted Cost to I	mplement		509,000
Soil/Fill Material Alternative 2 Complete Removal (Excavation) and Disposal Off-site (C	Commercial)		pper Mountai Lockport, NY		Soil/F	ill - OU1			onstruction Time Operation Time	-	months months
		Qua	ntities			Cost Breakdo	vn (if availabl		iation Monitorin	Combined Unit	years
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
REMEDIAL ACTION			PITAL COST								\$43,609,000
Construction Activities		(totals round	led to nearest	thousand)	\$767,619	a .	\$326,044		\$234,326	\$889,795	\$32,592,60
Pre-Design Characterization Study Driller		1			3/0/,01	,	3320,044		3234,320	3009,793	332,392,00
Mob/Demob Geoprobe/Crew for Soil Borings	quote- SJB quote- SJB	1 41	ls day	s - s -	s - s -	s - s -	s - s -	s - s -	s - s -	\$ 874 \$ 1,273	\$ 87 \$ 52,19
Sample Collection Sample Analysis for TCLP Lead and Zinc	Life Science	410		s -	s -	\$ 85.00	\$ 34,850	s -	s -		\$ 34,85
Reporting	Laboratories Engineer's Estimate	418	sample Is	s -	s -	s -	s -	s -	s -	\$ 593 \$ 20,000	\$ 248,00 \$ 20,00
Site Preparation Utility Locator (based on recent bids)	recent quote	0.5		s -	s -	s -	s -	s -	s -	\$ 2,475	\$ 1,23
Erosion & Sediment Control Plan Stabilization Measures for Erosion and Sedimentation Control Silt Fence, 3' high, adverse conditions	31 25 14.16 1000	2.500		s -	s -	s -	s -	s -	s -	\$ 30,000 \$ 0.68	S 30,00
Sewer Relocation Excavating Trench to install sewer pipe, 10' to 14' deep, 1.5 CY excavator, w		2,785	bey	s -	s -	s -	s -	s -	s -	\$ 8.96	S 24,95
PVC sewer pipe, 13' lengths, 18" diameter Install manholes- concrete, precast, 4' ID, 10' deep	33 31 13.25 2300 33 49 13.10 0600 and 0700	1,400	lf ea	S - 1.358.94	s - s 5,436	\$ - \$ 2.636.87	\$ - \$ 10,547	S -	s - s 559	\$ 28.74	\$ 40,23 \$ 16,54
Supply and Transportation of NYS Certified Clean Back Fill Material	Recent quote- ESG	,	Cia .	3 1,000.74	5 5,450	2,030.07	3 10,547	3 137.74	3 337	-	0 10,5
Haul Road Upgrades	from Seven Springs	2,698	cy	S 28	\$ 74,184	s -	s -	s -	s -	s -	S 74,18
Haul Road Upgrades, Roads. 8" gravel (From ravine to upper staging area) Install Guard Rails along Haul Road, corr steel, steel box beam	01 55 23.50 0100 34 71 13.26 1120 recent quote-	917 350	sy If	s -	s -	s -	s -	S -	s -	\$ 13.86 \$ 69.74	S 12,77 S 24,4
Monitoring Well Abandonment Cut and chip medium, trees to 12" dia.	EnviroTrac 31 11 10.10 0200	276 6	lf acre	s -	s - s -	\$ - \$ 3,323	\$ - \$ 19,939	S - S 2,295	\$ - \$ 13,769	\$ 22 \$ -	\$ 6,0° \$ 33,7°
Stockpile Pad Construction Silt Fence	31 25 13.10 1000	1,000	lf	S 0.23	S 230		\$ 450	s -	s -	s -	\$ 61
30 mil HDPE Liner 3/4" Gravel Fill (9") Sheetpiling Along RR Tracks (40' deep, drive, extract and salvage)	33 47 13.53 1100 ECHOS 17 03 0300 31 41 16.10 1000	80,000 2,222 509	sf cy ton	\$ 0.30 \$ 26.26 \$ 551.66		\$ 3.63	\$ 68,000 \$ 8,066 \$ 134,342	\$ - \$ 1.28 \$ 305.97		S - S -	\$ 92,0 \$ 69,2 \$ 571,0
Sheetpiling Along RR Fracks (40' deep, drive, extract and salvage) Sheetpiling Along OUMR (20' deep, drive, extract and salvage) Excavation	31 41 16.10 1000 31 41 16.10 1600	7,220	sf	\$ 551.66	\$ 280,905		\$ 134,342	\$ 305.97 \$ 7.70	\$ 155,800	š -	\$ 5/1,0° \$ 161,8°
Community Air Monitoring (Dust)	recent quote - Pine Environmental	4	ea	s -	s -	s -	s -	s -	s -	\$ 15,097.50	S 60,3
Dust Control, Heavy, assume 10 days per month Grading of embankment, by dozer Soil-Excavator, hydraulic, crawler mtd. 3.5 CY cap = 350 CY/hr	31 23 23.20 2510 31 23 23.20 2300 31 23 16.42 5500	400 228,850 199,000	ley bey	S -	S - S -	s - s -	s - s -	S - S -	s -	\$ 1,734.40 \$ 1.82 \$ 1.16	\$ 693,76 \$ 416,56 \$ 230,84
34 CY off-road 20 min. wait 2,000 ft cycle Haul Road Maintenance	31 23 23.20 6300 31 23 23.20 2600	228,850 400	lcy day	S -	s -	s - s -	s - s -	s - s -	s -	\$ 3.22 \$ 1,141.04	\$ 736,89 \$ 456,41
Maintain Stockpile, 700HP Dozer, 50ft Haul Excavator Loadout, 4.5 CY bucket, 80% fill factor	31 23 16.46 6010 31 23 16.43 4700	199,000 228,850	bey	S -	S -	S -	s - s -	s - s -	s - s -	\$ 1.68 \$ 1.14	\$ 334,32 \$ 260,88
Spotter at Loadout Confirmation Soil Sampling	31 23 23.20 2310	4,000	hrs sample	s -	S -	S -	S - S 1.836	S -	s -	\$ 45.96	\$ 183,84 \$ 7.65
Grab Samples- 12 per acre plus 20% QA/QC Lab Analyses - TAL Metals	Life Science Laboratories	86	sample	s -	S -	\$ 21 \$ -	\$ 1,836 \$ -	s -	\$ 5,765	S - 82.50	\$ 7,63 \$ 7,12
Hazardous Soil Disposal Soil Characterization Sampling (1 sample per 500 CY, per CWM)	Life Science Laboratories	398	sample	e	e		c	e	e	\$593.48	S 236,20
Joint Characterization (Samping 1) Sample per Joo C1, per Cwist) Hazardous Soil Disposal Transportation using dumps	CWM CWM	119,400 119,400		s -	s -	s -	s -	s - s -	s -	\$ 140.00 \$ 19.50	\$ 16,716,0 \$ 2,328,3
Demurrage (assume 1 hour per week of loading) Fuel Surcharge- 36% of Transportation	CWM CWM	109	hour Is	S -	s - s -	s - s -	s - s -	s - s -	s - s -	\$ 85.00 \$ 838,188.00	\$ 9,22 \$ 838,18
Non-Hazardous Soil Disposal Soil transportation and disposal	Recent quote- ESG plus 10%	179,100	ton	s -	s -	s -	s -	s -	s -	\$ 37.68	\$ 6,747,59
Backfill and Compaction											
Supply and Transportation of NYS Certified Clean Back Fill Material Backfill 300HP Dozer, 150' haul	Recent quote- ESG from Seven Springs 31 23 23.14 5220	9,680	ley	S 28	\$ 266,200		s -	s -	s -	s -	\$ 266,20
Finishing grading slopes, steep Compacting backfill, 12* lift, 2 passes w/ vibrating roller	31 23 23.14 3220 31 22 16.10 3310 31 23 23.23 5060	9,680 29,040 8,417	sy	s - s -	s - s -	S - S -	s - s -	S - S -	s -	\$ 1.20 \$ 0.21 \$ 0.20	\$ 11,6 \$ 6,0 \$ 1,6
Site Restoration		.,,,,,									
Topsoil	Recent quote- ESG from Seven Springs	9,680	cy	S 45	S 430,760		s -	s -	s -	s -	S 430,76
Finishing grading slopes, gentle Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer Fence, chain link, 9 ga. Wire, in concrete, 6' H	31 22 16.10 3300 32 92 19.14 5400 32 31 13.20 0200	44,000 396 2,100	msf	S 68.11 S 19.64			\$ 3,960 \$ 3,524 \$ 9,555	\$ 0.08 \$ 8.39 \$ 0.99	\$ 3,322	s -	\$ 7,4 \$ 33,8 \$ 52,8
Double swing gates, 6' H, 12' open, in concrete	32 31 13.20 5060	2,100		\$ 245.25		\$ 341.36	\$ 683	\$ 74.03		s -	\$ 1,32
Mobilization and Demobilization 5% of Total Costs of Site Work, Treatment										\$ 10,197,438	\$ 509,87 \$ 509,83
Contingency											\$ 4,965,37
15% of Total Construction Activities Professional/Technical Services										\$ 33,102,478	\$ 4,965,3 \$ 5,540,74
55% Project Management 6% Remedial Design										\$ 32,592,606	\$ 1,629,63 \$ 1,955,55
6% Construction Management											\$ 1,955,5
TOTAL ESTIMATED NPV TECHNOLOGY COST	(Capital + Lifeti	me O&M +	Post Remed	liation Mon	itoring)						\$43,609,000
Assumptions: Working condition is Safety Level:		D	(Labor produc			; Equipment pr	oductivity:	100%)		
Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation		101.4% 10% 3%		for costs derive	d from vendor o	puotes).					Labor
Estimated number of soil samples			samples	20%	times sampled added for QA/0	QC samples	0.25	hrs/sample worker sampling		\$85	Cost per hr
Characterization Cost Analytical cost	Table A (per CWM) TAL Metals	\$75.00	per sample per sample					,			
For each sampling event, assumed: Disposal			_	loves, notebooks,		.					
Lead contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz			per ton per ton		119,400 22			5,427	loads for haz di		
Concrete			lbs per cy		-	tons concrete for		5,141	loads for non-in	a. dispositi	
Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID		\$96.08	per day			_		20) loads per day) working days p		
Truck/SUV (1/2 ton or smaller)			per day					3		-design character	ization
Work day consists of: Excavation With Concrete and Asphalt:		10	nrs					34	months for site months to comp ft/day drilling		
Excavation With Concrete and Asphalt: Concrete and Asphalt: Excavation Area:	0.0% 261,360	sf	volume					150	, seuay urning		
Excavation Volume: Excavated Weight:	199,000 298,500	cy tons	228,850	lcy							
Roll-off dumpster can hold approximately:	12										
Notes sy square yard gy which word	mo Io	month									
cy cubic yard ley loose cubic yard bey bank cubic yard	ls O&M H&S	lump sum Operation and m Health and Saf									
of the source feet sf source feet		ann da									
s square reer											

REMEDIAL ALTERNATIVE			LOCATION	ſ		1	ИED	DIA	Estin	ate	d Cost to In	nplement	\$40,	509,000
Soil/Fill Material Alternative 3 Ex situ Stabilization and Disposal Off-site			pper Mountai Lockport, NY			Soil	Fill	- OU1			•	nstruction Time: Operation Time:		months months
		Quai	ntities					Cost Breakdow	n (if availa	ole)	Post Remedia	ation Monitoring	Combined Unit Costs	years
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Mate Unit		Material Total Cos		Labor Unit Cost	Labor Total Co	st	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
REMEDIAL ACTION			TTAL COST	thousan	ıd)									\$40,509,000
Construction Activities Pre-Design Pilot Study		1				\$767,7	99		\$743	683		\$425,854	\$35,709	\$30,645,843
Pilot Study Treatment Sample analysis	MT2 Estimate MT2 Estimate	5	ton sample				4						\$ 33.24 \$ 550.00	\$ 166 \$ 550
Sainpre analysis Site Preparation Utility Locator (based on recent bids)	recent quote	0.5	day	s		s ·	1	s -	s	-	s -	s -	\$ 2,475.00	\$ 1,238
Erosion & Sediment Control Plan	Engineer's Estimate	1	ls	s	1	s -		s -	s	-	s -	s -	\$ 30,000	\$ 30,000
Stabilization Measures for Erosion and Sedimentation Control Silt Fence, 3' high, adverse conditions	31 25 14.16 1000	1,200	lf	s	0.21	S 2	52	\$ 0.47	S	564	S -	S -	s -	\$ 816
Sewer Relocation Excavating Trench to remove sewer pipe, 10' to 14' deep, 1.5 CY excavator Pipe removal, sewer, no excavation, 18" diameter	31 23 16.13 1000 02 41 13.33 2930	2,113 1,019	bey If	s		s -		\$ 1.59 \$ 8.16		360 315	\$ 1.93 \$ 11.94	\$ 4,079 \$ 12,167	s -	\$ 7,439 \$ 20,482
Remove existing manhole Excavating Trench to install sewer pipe, 10' to 14' deep, 1.5 CY excavator, wi	02 41 13.33 0020	2,785	ea bey	S	-	s -		\$ 297.07 \$ -		188	\$ 90.80 \$ -	\$ 363 \$ -	\$ - \$ 8.96	\$ 1,551 \$ 24,958
PVC sewer pipe, 13' lengths, 18" diameter Install manholes- concrete, precast, 4' ID, 10' deep	33 31 13.25 2300 33 49 13.10 0600 and 0700	1,400	lf ca	S 1	,358.94	\$	7	\$ - \$ 2,636.87		547	\$ - \$ 9,742.50	S - S 38,970	\$ 28.74 \$ -	\$ 40,236 \$ 54,953
Supply and Transportation of NYS Certified Clean Back Fill Material	Recent quote- ESG			.,				e 2,030.01	6	547	e -	5 30,770		
Stockpile Pad Construction Silt Fence	from Seven Springs 31 25 13.10 1000	2,698 1,000	lf	S	0.23	\$ 74,1 \$ 2	30	\$ 0.45	s	450	s -	s -	s -	\$ 74,184 \$ 680
30 mil HDPE Liner 3/4" Gravel Fill (9")	33 47 13.53 1100 ECHOS 17 03 0300	80,000 2,222	sf cv	S S	0.30	\$ 24,0 \$ 58,3	00	\$ 0.85 \$ 3.63	\$ 68	000	\$ - \$ 1.28	\$ - \$ 2,839	s -	\$ 92,000 \$ 69,255
Haul Road Upgrades Haul Road Upgrades, Roads. 8" gravel (From ravine to upper staging area)	01 55 23.50 0100	917	sy	s	-	\$		\$ -	\$	-	s -	s -	\$ 13.86	\$ 12,705
Install Guard Rails along Haul Road, corr steel, steel box beam Monitoring Well Abandonment	34 71 13.26 1120 recent quote-	350	lf 16	S	-	s -	1	s -	S	-	s -	s -	\$ 69.74	\$ 24,409
Cut and chip medium, trees to 12" dia.	EnviroTrac 31 11 10.10 0200		lf acre	S S	-	S -	oc :	\$ - \$ 3,323		939	\$ - \$ 2,295	\$ - \$ 13,769	\$ 22.00 \$ -	\$ 6,072 \$ 33,707
Sheetpiling Along RR Tracks (40' deep, drive, extract and salvage) Sheetpiling Along OUMR (20' deep, drive, extract and salvage) Excavation	31 41 16.10 1000 31 41 16.10 1600	509 7,220	ton sf	S	551.66 8.06	\$ 280,9 \$ 58,1		\$ 263.83 \$ 6.65	\$ 134 \$ 48	013	\$ 305.97 \$ 7.70	\$ 155,800 \$ 55,594	s - s -	\$ 571,047 \$ 161,800
Community Air Monitoring (Dust)	recent quote - Pine Environmental	40	mo	s	-	s ·		\$ 55	\$ 439	061	\$ 3,420	\$ 136,508		\$ 575,569
Dust Control, Heavy Grading of embankment, by dozer	31 23 23.20 2510 31 23 23.20 2300	399.15 228,850	day lcy	S S		\$ - \$ -		s -	S S	-	S -	S -	\$ 1,734.40 \$ 1.82	\$ 692,280 \$ 416,507
Soil-Excavator, hydraulic, crawler mtd. 3.5 CY cap = 350 CY/hr 34CY off-road 20min. Wait 2,000ft cycle	31 23 16.42 5500 31 23 23.20 6300	199,000 228,850	bcy lcy	s s		s -		S -	S	-	s -	S -	\$ 1.16 \$ 3.22	\$ 230,840 \$ 736,897
Haul Road Maintenance Maintain Stockpile, 700HP Dozer, 50ft Haul	31 23 23.20 2600 31 23 16.46 6010	399 199,000	day bcy	S S	-	s -		s -	S	-	S -	S -	\$ 1,141.04 \$ 1.68	\$ 455,442 \$ 334,320
Excavator Loadout, 4.5 CY bucket, 80% fill factor Spotter at Loadout	31 23 16.43 4700 31 23 23.20 2310	228,850 3,991	lcy hrs	S	-	s -		s -	s	-	s -	s -	\$ 1.14 \$ 45.96	\$ 260,889 \$ 183,448
Confirmation Soil Sampling Grab Samples- 12 per acre plus 20% QA/QC	Life Science	86	sample	s	-	S	50	\$ 21	S 1	836	\$ 67	\$ 5,765	s -	\$ 7,651
Lab Analyses - TAL Metals EcoBond Treat	Laboratories	86	sample	S	-	s -	-	s -	S	-	s -	s -	\$ 82.50	\$ 7,128
Treat w/ EcoBond, load and dispose off-site Backfill and Compaction	MT2 est	324,849	ton										\$ 76.05	\$ 24,704,766
Supply and Transportation of NYS Certified Clean Back Fill Material	Recent quote- ESG from Seven Springs	9,680	lcy	s	28	\$ 266,2	00	s -	s	-	s -	s -	s -	\$ 266,200
Backfill 300HP Dozer, 150' haul Finishing grading slopes, steep	31 23 23.14 5220 31 22 16.10 3310	9,680 29,040	lcy sy	s s	-	s -		s - s -	S S	-	S - S -	s - s -	\$ 1.20 \$ 0.21	\$ 11,616 \$ 6,098
Compacting backfill, 12" lift, 2 passes w/ vibrating roller Site Restoration	31 23 23.23 5060	8,417	ecy	S	-	\$.		s -	\$	-	\$ -	s -	\$ 0.20	\$ 1,683
	Recent quote- ESG													
Topsoil Finishing grading slopes, gentle	from Seven Springs 31 22 16.10 3300	9,680 44,000	cy sy	S S	45 -	\$ 430,7 \$		\$ - \$ 0.09		- 960	\$ - \$ 0.08	\$ - \$ 3,520	s - s -	\$ 430,760 \$ 7,480
Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer Fence, chain link, 9 ga. Wire, in concrete, 6' H	32 92 19.14 5400 32 31 13.20 0200	396 2,100	msf lf	S	68.11 19.64	\$ 26,9 \$ 41,2	44	\$ 8.90 \$ 4.55	\$ 9	524 555	\$ 8.39 \$ 0.99	\$ 3,322 \$ 2,079	\$ - \$ -	\$ 33,818 \$ 52,878
Double swing gates, 6' H, 12' open, in concrete Mobilization and Demobilization	32 31 13.20 5060	2	Opng	S	245.25	S 4	91	\$ 341.36	S	683	\$ 74.03	S 148	\$ -	\$ 1,321 \$ 49,288
5% of Total Costs of Site Work, Treatment							#						\$985,769	\$ 49,288
Contingency 15% of Total Construction Activities							4						\$30,695,131	\$ 4,604,270 \$ 4,604,270
Professional/Technical Services							4						000,000,000	\$ 5,209,793
5% Project Management 6% Remedial Design													\$30,645,843	\$ 1,532,292 \$ 1,838,751
6% Construction Management							_							\$ 1,838,751
TOTAL ESTIMATED NPV TECHNOLOGY COST (Capital + Lifetim	e O&M + Po	ost Remedia	tion M	onito	ring)								\$40,509,000
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor		D 101.4% 10%	(Labor producti (not applicable		derived t	82% from vendor		Equipment pro	ductivity:	Į	100%	þ		
Inflation Estimated number of soil samples			per year samples	20		times sample		samnles	0.25	1	hrs/sample worker sampling			Labor Cost per hr
Characterization Cost Analytical cost	Table A (per CWM) TCLP Metals		per sample per sample	20	/0	added for QA	AUC !	миріся		1	worker sampting			
Analytical cost For each sampling event, assumed: Disposal	ACLA MICIAIS		per sampie for materials (glo	oves, notel	books, et	c.)								
Lead contaminated soil			per ton				22 to	ons soil hazardou		3% ha		l		
Lead contaminated soil as non-haz Concrete			per ton lbs per cy		l I	179,1		ons soil for non-		ŀ		loads for disposa tons for treatmer		
Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID			per day					ons concrete for	uisposai			tons per day fo loads per day	r treatment	
Truck/SUV (1/2 ton or smaller)		\$70.74	per day								20	working days pe hours per work		
Work day consists of:		10	hrs								3	months for site p	prep/restoration	
Excavation With Concrete and Asphalt: Concrete and Asphalt:	0.0%	% of excavation	volume											
Excavation Area: Excavation Volume:	261,360 199,000	sf cy	228,850	lcy										
Excavated Weight: Roll-off dumpster can hold approximately:	298,500 12	tons tons												
Notes														
sy square yard cy cubic yard	mo ls	month lump sum												
ley loose cubic yard bey bank cubic yard	O&M H&S	Operation and m Health and Safe												
If linear feet sf square feet														
msf 1,000 square feet														

REMEDIAL ALTERNATIVE			LOCATION		ME	DIA	Estimate	ed Cost to In	nplement	\$26,9	75,000
Soil/Fill Material Alternative 4		Old U	pper Mountai	n Road	Soil/Fil	I - OU1		Co	nstruction Time:	21	months
Partial Removal, Landfill Capping with a Part 360 Cap, and Monitoring	l Groundwater		Lockport, NY						Operation Time	-	months
						G (P. 11	<i>at</i> 211)	Post Remedi	ation Monitoring	30 Combined Unit	years
Description	Data Source	Quantity	Quantity	Material	Material	Labor	vn (if available) Labor	Equipment	Equipment	Costs	Option
	(Means ¹ or Other)	Amount	Unit	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
REMEDIAL ACTION			ITAL COST ed to nearest	thousand)							\$26,552,000
Construction Activities		1			\$947,482		\$350,716		\$166,740	\$473,433	\$ 19,387,715
Pre-Design Characterization Study Driller											
Mob/Demob Geoprobe/Crew for Soil Borings	quote- SJB quote- SJB	1 21	ls day	s -	s -	s -	s -	s -	s -	\$ 800 \$ 1,200	\$ 800 \$ 25,200
Sample Collection	Life Science	210	hr	s -	s -	\$85	\$ 17,850	s -	s -	\$0	\$ 17,850
Sample Analysis for TCLP Lead and Zinc	Laboratories	209	sample	s -	s -	s -	s -	s -	s -	\$ 330	\$ 68,970
Reporting Site Preparation	Engineer's Estimate	1	ls	s -	S -	s -	s -	s -	s -	\$ 15,000 \$0	\$ 15,000 \$ -
Utility Locator (based on recent bids) Erosion & Sediment Control Plan	recent quote	0.5	day ls	s - s -	S -	s - s -	s - s -	s - s -	s - s -	\$ 2,475.00 \$ 30,000	\$ 1,238 \$ 30,000
Stabilization Measures for Erosion and Sedimentation Control Silt Fence, 3' high, adverse conditions	31 25 14.16 1000	1,200	lf	\$ 0.21	\$ 252	\$ 0.47	\$ 564	s -	s -	s -	\$ 816
Sewer Relocation Excavating Trench to remove sewer pipe, 10' to 14' deep, 1.5 CY excavator	31 23 16.13 1000	2,113	bey	s -	s -	\$ 1.59	\$ 3,360	\$ 1.93	\$ 4,079	s -	\$ 7,439
Pipe removal, sewer, no excavation, 18" diameter Remove existing manhole	02 41 13.33 2930 02 41 13.33 0020	1,019	lf ca	\$ - \$	S -	\$ 8.16 \$ 297.07	\$ 8,315 \$ 1,188	\$ 11.94 \$ 90.80	\$ 12,167 \$ 363	s -	\$ 20,482 \$ 1,551
Excavating Trench to install sewer pipe, 10' to 14' deep, 1.5 CY excavator, wit PVC sewer pipe, 13' lengths, 18" diameter		2,785 1,400	bcy If	s -	S -	\$ - \$ -	\$ - \$ -	\$ - \$ -	s -	\$ 8.96 \$ 28.74	\$ 24,958 \$ 40,236
Install manholes- concrete, precast, 4' ID, 10' deep	33 49 13.10 0600 and 0700	1,400	ea	\$ 1,358.94	s 5,436	\$ 2,636.87	\$ 10,547	\$ 14,938.50	\$ 59,754	\$ -	\$ 40,236 \$ 75,737
Supply and Transportation of NYS Certified Clean Back Fill Material	Recent quote- ESG from Seven Springs	2,698	cy	\$ 28	\$ 74,184	s -	s -	s -	s -	s -	\$ 74,184
Haul Road Upgrades Haul Road Upgrades, Roads. 8" gravel (From ravine to upper staging area)	01 55 23.50 0100	917	sy	s -	s -	s -	s -	s -	s -	\$ 13.86	\$ 12,705
Install Guard Rails along Haul Road, corr steel, steel box beam	34 71 13.26 1120 recent quote-	350	lf	s -	s -	s -	s -	s -	s -	\$ 69.74	\$ 24,409
Monitoring Well Abandonment Stockpile Pad Construction	EnviroTrac	240	lf	s -	s -	s -	s -	s -	s -	\$ 22.00	\$ 5,280
Silt Fence 30 mil HDPE Liner	31 25 13.10 1000 33 47 13.53 1100	1,000 80,000	lf sf	\$ 0.23 \$ 0.30	\$ 230 \$ 24,000	\$ 0.45 \$ 0.85	\$ 450 \$ 68,000	s - s -	s - s -	s - s -	\$ 680 \$ 92,000
3/4" Gravel Fill (9") Excavation	ECHOS 17 03 0300	2,222	cy	\$ 26.26	\$ 58,349	\$ 3.63	\$ 8,066	\$ 1.28	\$ 2,839	s -	\$ 69,255
Community Air Monitoring (Dust)	recent quote - Pine Environmental	21	mo	٠ .	s .	\$ 55	\$ 226,750	\$ 3,420	\$ 70,499	s -	\$ 297,249
Dust Control, Heavy, assumes 10 days per working month Grading of embankment, by dozer	31 23 23.20 2510 31 23 23.20 2300	206 190,133		s -	s -	s -	\$ - \$ -	S -	s -	\$ 1,734.40 \$ 1.82	\$ 357,523 \$ 346,043
Soil-Excavator, hydraulic, crawler mtd. 3.5 CY cap = 350 CY/hr	31 23 16.42 5500	165,333	bcy	s -	s -	s -	\$ -	S -	s -	\$ 1.16	\$ 191,787
34CY off-road 20min. Wait 2,000ft cycle Haul Road Maintenance	31 23 23.20 6300 31 23 23.20 2600	190,133 206	day	s -	s -	S -	\$ - \$ -	S -	s -	\$ 3.22 \$ 1,141.04	\$ 612,229 \$ 235,210
Maintain Stockpile, 700HP Dozer, 50ft Haul Excavator Loadout, 4.5 CY bucket, 80% fill factor	31 23 16.46 6010 31 23 16.43 4700	103,333 118,833	lcy	\$ - \$ -	\$ - \$ -	s -	\$ - \$ -	S -	s -	\$ 1.68 \$ 1.14	\$ 173,600 \$ 135,470
Spotter at Loadout Hazardous Soil Disposal	31 23 23.20 2310	2,061.36	hrs	s -	S -	s -	s -	S -	s -	\$ 45.96	\$ 94,740
Soil Characterization Sampling (1 sample per 500 CY, per CWM)	Life Science Laboratories	83	sample	s -	s -	s -	s -	s -	s -	\$ 593.48	\$ 49,061
Hazardous Soil Disposal Transportation using dumps	CWM CWM	62,000 62,000	ton ton	S -	S -	S -	S -	S -	s -	\$ 140.00 \$ 19.50	\$ 8,680,000 \$ 1,209,000
Demurrage (assume 1 hour per week of loading) Fuel Surcharge- 36% of Transportation	CWM CWM	56 1	hour ls	s -	s -	s -	s -	s -	s -	\$ 85.00 \$ 435,240.00	\$ 4,791 \$ 435,240
Non-Hazardous Soil Disposal	Recent quote- ESG										
Soil transportation and disposal Capping 3:1 Side Slope (Ravine)	plus 10%	93,000	ton	S -	S -	S -	S -	S -	S -	\$37.68	\$ 3,503,775
Finishing grading slopes, steep Polymeric Liner Anchor Trench 3'x1.5' (level B)	31 22 16.10 3310 ECHOS 2006 33	17,000 2,300	sy	s -	s -	s -	s -	s -	s -	\$ 0.21	\$ 3,570
	08 0503 ECHOS 2006 33			s -	s -	s -	s -	s -	s -	\$ 1.87	\$ 4,299
Deploy 10oz/sy mil Nonwoven Geotextile (level C) 60 mil HDPE Liner (level C)	08 0533 ECHOS 2006 33 08 0572	17,000 153,000	sf	s -	s -	s -	s -	s -	s -	\$ 2.40 \$ 4.02	\$ 40,766 \$ 615,094
Drainage Netting, Geotextile Fabric Heat Bonded (2 sides) (level E)	ECHOS 2006 33 08 0513	153,000	sf	s -	s -	s -	s -	s -	s -	\$ 0.67	\$ 102,516
Supply and Transportation of NYS Certified Clean Back Fill Material	Recent quote- ESG from Seven Springs	11,333	су	\$ 28	\$ 311,667	s -	s -	s -	s -	s -	\$ 311,667
Spreading and Compaction of General Fill	ECHOS 2006 17 03 0422	11,333	су	s -	s -	s -	s -	s -	s -	\$ 9.12	\$ 103,382
Topsoil	Recent quote- ESG from Seven Springs ECHOS 2006 18	2,833	су	\$ 45	\$ 126,083	s -	s -	s -	s -	s -	\$ 126,083
Spreading Topsoil 6" Lifts Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	ECHOS 2006 18 05 0301 32 92 19.14 5400	2,833 153	cy msf	\$ 68.11	\$ - \$ 10,421	\$ - \$ 8.90	\$ - \$ 1,362	\$ - \$ 8.39	\$ - \$ 1,284	\$ 9.43 \$	\$ 26,711 \$ 13,066
Capping Finishing grading slopes, gentle	31 22 16.10 3300	12,778	ev.	\$ 08.11	\$ 10,421 \$ -	\$ 0.09	\$ 1,150	\$ 0.08	\$ 1,022	s -	\$ 2,172
Deploy 10oz/sy mil Nonwoven Geotextile (level C)	ECHOS 2006 33 08 0533	12,778	sy	s -	s -	\$ -	\$ -	s -	\$ 1,022	s 2.40	\$ 2,172 \$ 30,641
60 mil HDPE Liner (level C)	ECHOS 2006 33 08 0572	115,000	sf	s -	s -	s -	s -	s -	s -	\$ 4.02	\$ 462,326
Drainage Netting, Geotextile Fabric Heat Bonded (2 sides) (level E)	ECHOS 2006 33 08 0513	115,000	sf	s -	s -	s -	s -	s -	s -	\$ 0.67	\$ 77,054
Gor Vente	Recent quote- Modern		ca .	s -	e	s -		s -		9 1715 50	\$ 12,000
Gas Vents Supply and Transportation of NYS Certified Clean Back Fill Material	Environmental Recent quote- ESG from Seven Springs	8,519	cv	s 28	\$ - \$ 234,259	s -	s -	s -	s -	\$ 1,715.58 \$ -	\$ 12,009 \$ 234,259
Spreading and Compaction of General Fill	ECHOS 2006 17 03 0422	8,519	cy	s -	s -	s -	s -	s -	s -	\$ 9.12	\$ 234,239 \$ 77,705
Topsoil	Recent quote- ESG from Seven Springs	2,130	су	\$ 45	s 94,769	s -	s -	s -	s -	s -	\$ 94,769
Spreading Topsoil 6" Lifts	ECHOS 2006 18 05 0301	2,130	cy		s -	s -	s -	S -	s -	\$ 9.43	\$ 20,077
Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	32 92 19.14 5400	115	msf	\$ 68.11	\$ 7,833	\$ 8.90	\$ 1,024	\$ 8.39	\$ 965	S -	\$ 9,821 \$ -
Site Restoration Fence, chain link, 9 ga. Wire, in concrete, 6' H	32 31 13.20 0200	2,100	lf	\$ 19.64	\$ 41,244	\$ 4.55	\$ 9,555	\$ 0.99	\$ 2,079	s -	\$ - \$ 52,878
Double swing gates, 6' H, 12' open, in concrete Monitoring Well Installation	32 31 13.20 5060 recent quote-	2	Opng	\$ 245.25	\$ 491	\$ 341.36	\$ 683	\$ 74.03	\$ 148	s -	\$ 1,321
THE INSTITUTE OF THE PROPERTY	EnviroTrac	330	lî .	S -	S -	S -	S -	S -	S -	\$ 94.00	\$ 31,020
Mobilization and Demobilization											\$ 834,918
5% of Total Costs of Site Work, Treatment										\$16,698,365	\$ 834,918
Contingency 15% of Total Construction Activities										\$20,222,633	\$ 3,033,395 \$ 3,033,395
Professional/Technical Services 5% Project Management										\$19,387,715	\$ 3,295,912 \$ 969,386
6% Remedial Design										\$19,367,/13	\$ 1,163,263
6% Construction Management		1	l		l		l		l .	1	\$ 1,163,263

REMEDIAL ALTERNATIVE Soil/Fill Material Alternative 4			LOCATION	i	ME	DIA	Estimat	ed Cost to Ir	nplement	\$26,975,000	
	6 1 1	Old U	pper Mounta	in Road	Soil/Fil	l - OU1		Co	onstruction Time:	21	months
Partial Removal, Landfill Capping with a Part 360 Cap, and Monitoring	Groundwater		Lockport, N	Y					Operation Time:	-	months
								Post Remedi	ation Monitoring	30	years
		Qua	ntities			Cost Breakdo	wn (if available)			Combined Unit	
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
LONG TERM ANNUAL MONITORING AND MAINTENANCE	Е							ANNUAL LT	TM COST (YR TM COST (YR	S 1-5)	\$34,000 \$25,000
		_						LIFETIME I	LTM (NPV)		\$423,300
Monitoring, Sampling, Testing and Analysis (Per Event) Assume 80% of combined sampling event for OU1 and OU3											\$8,94
Site Monitoring											30,54
Groundwater sampling for 1 event - Includes collection of field parameter	's	5	well	s -	s -	\$ 340	\$ 1,700.00	S 92	\$ 458.13	s -	\$2,15
Surface water sampling for 1 event		4	samples			\$ 85	\$ 340.00	s -	٠ .	s .	\$34
Materials						. 65	3 340.00				
Mobilization/Demobilization of Field Sampling Crew		1	event	\$ 40	\$ 40 \$ -	S -	s -	S -	S -	S - 680.00	\$4 \$61
Reporting		40	event hr	\$ - \$85	\$ 3,400.00	S -	s -	s -	s -	\$ 000.00	\$3,40
monitoring event		1	ea ea	\$ -	\$ -	\$340	\$ 340.00	\$75.00	\$ 75.00	s -	\$4
Laboratory analysis											
Metals and VOCs, plus 20% QA/QC	Life Science Laboratories	11	an.	c	c	¢	s	c	e	\$ 174.00	\$1,91
Maintenance- Cap Maintenance	Laboratories	- 11	ca		3	, .		,	, .	3 174.00	31,71
Mowing brush, tractor with rotary mower, Medium density 2x per year	32 01 90.19 1670	153	msf	s -	s -	\$ 28.51	\$ 4,362	S 24.74	\$ 3,786	s -	\$8,14
Lifetime Long Term Monitoring (Net Present Value)											
5 Years of Semi-Annual Monitoring 25 Years of Annual Monitoring											
25 Years of Annual Monitoring 5% Discount Factor (per NYSDEC)											
TOTAL ESTIMATED NPV TECHNOLOGY COST (C	Capital + Lifetime	e O&M + Po	st Remedia	tion Monitor	ing)						\$26,975,000
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY)	Capital + Lifetime	D 101.4%	(Labor produc		82%	; Equipment pr	oductivity:	100%])		\$26,975,000
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation	Capital + Lifetime	D 101.4% 10% 3%	(Labor produc (not applicable	tivity: for costs derived	82% from vendor quo])		Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor	Capital + Lifetime	D 101.4%	(Labor produc (not applicable	tivity: for costs derived	82%	ites).	oductivity:	100% hrs/sample worker sampling])		
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation	Table A (per CWM)	D 101.4% 10% 3% 72 \$593.48	(Labor produc (not applicable per year samples	tivity: for costs derived	82% from vendor quo times sampled	ites).		hrs/sample])		Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost		D 101.4% 10% 3% 72 \$593.48	(Labor produce (not applicable) per year samples per sample per sample	tivity: for costs derived 1 20%	82% from vendor quo times sampled added for QA/QO	ites).		hrs/sample]) ;		Labor
Assumptions: Working condition is Safety Level: Weighted Avenges of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed:	Table A (per CWM)	D 101.4% 10% 3% 72 \$593.48	(Labor produce (not applicable) per year samples per sample per sample	tivity: for costs derived	82% from vendor quo times sampled added for QA/QO	ites).		hrs/sample])		Labor
Assumptions: Working condition is Safety Level: Weighted Avenges of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed:	Table A (per CWM)	D 101.4% 10% 3% 72 \$593.48	(Labor produc (not applicable per year samples per sample for materials (gl	tivity: for costs derived 1 20%	82% from vendor quo times sampled added for QA/QC	tes). C samples tons soil hazarde		hrs/sample worker sampling nazardous)	_	\$85	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal	Table A (per CWM)	D 101.4% 10% 3% 72 \$593.48 \$75.00 \$50	(Labor produc (not applicable per year samples per sample for materials (gl	tivity: for costs derived 1 20%	82% from vendor quo times sampled added for QA/QC	ctes).	0.25 1 us (assume 43% l	hrs/sample worker sampling nazardous)	_	\$85	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete	Table A (per CWM)	D 101.4% 10% 3% 72 \$593.48 \$75.00 \$50	(Labor produc (not applicable per year samples per sample per sample for materials (gl	tivity: for costs derived 1 20%	82% from vendor quo times sampled added for QA/QC (c.)	tons soil hazarde tons per load tons soil for non tons concrete for	us (assume 43% l	hrs/sample worker sampling nazardous) 2,818 4,227	loads for haz disp loads for non-haz	\$85	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit	Table A (per CWM)	D 101.4% 10% 3% 72 \$593.48 \$75.00 \$50 \$275	(Labor produc (not applicable per year samples per sample per sample for materials (gl per ton per ton	fivity: for costs derived 1 20%	82% from vendor quo times sampled added for QA/QC (c.) 62,000 22 93,000	tons soil hazarde tons per load tons soil for non tons concrete for lb/cf iron filings	0.25 1 us (assume 43% l haz disposal disposal	hrs/sample worker sampling azzardous) 2,818 4,227 sposal Assumpt	loads for haz disploads for non-haz	posal disposal	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID	Table A (per CWM)	D 101.4% 3% 72 \$593.48 \$75.00 \$50 \$275 \$39.87	(Labor produc (not applicable per year samples per sample for materials (gl per ton lbs per cy per day	fivity: for costs derived 1 20%	82% from vendor quo times sampled added for QA/QC 62,000 22 93,000 180 ron Filings chang	tons soil hazarde tons per load tons soil for non lb/cf iron filings	0,25 1 sus (assume 43%) chaz disposal disposal Di	hrs/sample worker sampling azardous) 2,818 4,227 sposal Assumpt 20 20	loads for haz disploads for non-hazedions loads per day working days per	posal e disposal	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lend contaminated soil as a "listed" waste-incineration Lend contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PiD Truck/SUV (1/2 ton or smaller)	Table A (per CWM)	D 101.4% 35% 72 \$593.48 \$75.00 \$50 \$39.87 \$39.87 \$39.87 \$70.74	(Labor produc (not applicable per year samples per sample for materials (gl per ton per ton lbs per cy per day per day	fivity: for costs derived 1 20%	82% from vendor quo times sampled added for QA/QC (c.) 62,000 22 93,000	tons soil hazarde tons per load tons one relations of the first of the first tons concrete for lb/cf iron filings e-out Assumptic cy/day iron fili days for iron fili	0.25 us (assume 43% l haz disposal disposal Di ns ngs changeout ng removal	hrs/sample worker sampling nazardous) 2,818 4,227 sposal Assumpt 20 20 10	loads for haz disploads for non-haz tions loads per day working days per blours per worki months for site p	sss sss sosal disposal roundh ing day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rac Survey Mode PID TrackSUV (1/2 ton or smaller) Work day consists of:	Table A (per CWM)	D 101.4% 35% 72 \$593.48 \$75.00 \$50 \$39.87 \$39.87 \$39.87 \$70.74	(Labor produc (not applicable per year samples per sample for materials (gl per ton lbs per cy per day	fivity: for costs derived 1 20%	82% from vendor quo times sampled added for QA/QC (c.) 62,000 22 93,000	tons soil hazarde tons per load tons soil for non tons concrete for lb/cf fron filings e-out Assumptie cy/day iron fili	us (assume 43% l haz disposal Di ms ngs changeout ng removal	hrs/sample worker sampling 2.818 4,227 26 26 101 3 150	loads for haz displaced for non-haz displace	sss sss sosal disposal roundh ing day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of:	Table A (per CWM) TCLP Menis	D 101.4% 109.4% 109.4% 33% 72 72 73 8593.48 975.00 \$50 \$51 \$5278 \$39.87 3,300 \$56.08 \$70,74 10	(Labor produc (not applicable per year aamples per sample per sample for materials (gl per ton per ton lbs per cy per day per day	fivity: for costs derived 1 20%	82% from vendor quo times sampled added for QA/QC 62,000 62,000 180 700 Filings change 400 #REF!	tons soil hazarde tons per load tons soil for non tons concrete for libred iron libred iron filings e-out Assumptic cy/day for fili days for iron fili workers for iron	us (assume 43%) us (assume 43%) haz disposal Di us us gs changeout gremoval	hrs/sample worker sampling 2,818 4,227 20 20 20 10 3 18 150 Froundwater Months	loads for haz displeads for non-haz ions loads for non-haz loads per day working days per b hours per worki months for site p months to comple ft/day nitoring	sss sss sosal disposal roundh ing day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lend contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (12 ton or smaller) Work day consists of: Execavation: Execavation: Concrete and Asphalt:	Table A (per CWM) TCLP Metals	D 101.4% 109.5% 3% 3% 593.48 575.00 5275 5275 5276 5276 5276 5276 5276 5276	(Labor produc (not applicable per year aamples per sample per sample for materials (gl per ton per ton lbs per cy per day per day	fivity: for costs derived 1 20%	82% from vendor quo times sampled added for QA/QC 62,000 62,000 180 700 Filings change 400 #REF!	tons soil hazarde tons per load tons soil for non tons concrete for libred iron libred iron filings e-out Assumptic cy/day for fili days for iron fili workers for iron	us (assume 43% l haz disposal Di ms ngs changeout ng removal filing removal	hrs/sample worker sampling azzardous) 2,818 4,227 5posal Assumpt 20 10 3 18 150 iroundwater Moese G&A and 10	loads for haz disploads for non-haz tions loads per day working days per hours per worki months for site p months to complo ft/day % Profit	ossal r disposal r month ing day repirestoration	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Execution: Concrete and Asphalt: Execution: Concrete and Asphalt: Execution: Execution Volume:	Table A (per CWM) TCLP Metals 0.0% 261,360 1165,336	D 101.4% 109.4% 109.4% 3% 559.48 575.00 550 5275 539.87 3,300 596.08 570.74	(Labor produc (not applicable per year aamples per sample per sample for materials (gl per ton per ton lbs per cy per day per day	tivity: for costs derived 1 20% toves, notebooks, et	82% from vendor quo times sampled added for QA/QC 62,000 62,000 180 700 Filings change 400 #REF!	tons soil hazarde tons per load tons soil for non tons concrete for libred iron libred iron filings e-out Assumptic cy/day for fili days for iron fili workers for iron	us (assume 43%) us (assume 43%) haz disposal Di us us gs changeout gremoval	hrs/sample worker sampling 2.818 4.227 2.0 2.0 3.3 18 is-iroundwater More G&A and 16 to or smaller)	loads for haz disploads for non-haz disploads for non-haz disons loads per day working days per bhours per working days per in months to complete for the second filter of the se	s85 bosal r month fing day rep'restoration ettion per day per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Track/SUV (1/2 ton or smaller) Work day consists of: Exeavation: Concrete and Asphalt: Exeavation Concrete and Asphalt: Exeavation Area: Exeavation Volume: Exeavation Volume:	Table A (per CWM) TCLP Menls 6.0% 261,360 165,333 248,303	D 101.45% 109.45% 37% 72 \$593.48 \$750.00 \$50 \$275 \$30.87 3.300 \$96.08 \$70.74 10	(Labor produc (not applicable per year amples per sample for materials (gl per ton per ton lbs per cy per day per day per day	tivity: for costs derived 1 20% toves, notebooks, et	82% from vendor quo times sampled added for QA/QC 62,000 62,000 180 700 Filings change 400 #REF!	tons soil hazarde tons per load tons soil for non tons concrete for libred iron libred iron filings e-out Assumptic cy/day for fili days for iron fili workers for iron	us (assume 43% l haz disposal Di ms ngs changeout ng removal TruckSUV (12 Water Quality A	hrs/sample worker sampling 2.8188 4.227 sposal Assumpt 20 20 20 20 33 18 150 sroundwater Mores G&A and 16 to nor smaller)	loads for haz disploads for non-haz disploads for non-haz disploads per day working days per bloads per day working days per bloads months for site ps. months to comple ft/day mitoring 19/6 Profit \$70.74	sosal r month ing day representation per day per day per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Execution: Concrete and Asphalt: Execution: Concrete and Asphalt: Execution: Execution Volume:	Table A (per CWM) TCLP Metals 0.0% 261,360 1165,336	D 101.45% 109.45% 37% 72 \$593.48 \$750.00 \$50 \$275 \$30.87 3.300 \$96.08 \$70.74 10	(Labor produc (not applicable per year amples per sample for materials (gl per ton per ton lbs per cy per day per day per day	tivity: for costs derived 1 20% toves, notebooks, et	82% from vendor quo times sampled added for QA/QC 62,000 62,000 180 700 Filings change 400 #REF!	tons soil hazarde tons per load tons soil for non tons concrete for libred iron libred iron filings e-out Assumptic cy/day for fili days for iron fili workers for iron	us (assume 43% l haz disposal Di ms ngs changeout ng removal filing removal TruckSUV (1/2 Water Quality A	hrs/sample worker sampling azzardous) 2.818 4.227 sposal Assumpt 150 150 croundwater Mose G&A and 10 ton or smaller) hadyer	loads for haz disploads for non-haz disploads for non-haz disons loads per day working days per bhours per working days per in months to complete for the second filter of the se	posal r month ring day represtoration tition per day per day per day per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation Area: Excavation Volume: Excavated Weight: Roll-off dumpser can hold approximately: Volume fill remaining onsite	Table A (per CWM) TCLP Menals 0.05% 261.360 165.333 248.000	D 101.45% 109.45% 37% 72 \$593.48 \$750.00 \$50 \$275 \$30.87 3.300 \$96.08 \$70.74 10	(Labor produc (not applicable per year amples per sample for materials (gl per ton per ton lbs per cy per day per day per day	tivity: for costs derived 1 20% toves, notebooks, et	82% from vendor quo times sampled added for QA/QC 62,000 62,000 180 700 Filings change 400 #REF!	tons soil hazarde tons per load tons soil for non tons concrete for libred iron libred iron filings e-out Assumptic cy/day for fili days for iron fili workers for iron	us (assume 43%) haz disposal Di us ag changeout germoval Rates - Includ Truck/SUV (1/2 Water (Quality) Water Level Me	hrs/sample worker sampling 2.818 4,227 20 20 20 10 3 150 iroundwater Mose G&A and 10 ton or smaller) nalyzer ere rup	loads for haz displands for non-haz loads for non-haz loads per day working days per hours per work: months for site ps months to complete for the complete for	sass month ing day representation tion per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lend contaminated soil as a "listed" waste-incineration Lend contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID TruckSUV (1/2 ton or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation Concrete and Asphalt: Excavation Volume: Excavated Weight: Rol-off dampster can hold approximately: Volume fill remaining onsite Notes	Table A (per CWM) TCLP Metals 0.0% 261,360 165,333 248,000 12 62,000	D 101.4% 109.5% 3% 593.48 575.00 575.00 5275 530.87 570.74 10 % of excavation sf cy tons	(Labor produc (not applicable per year amples per sample for materials (gl per ton per ton lbs per cy per day per day per day	tivity: for costs derived 1 20% toves, notebooks, et	82% from vendor quo times sampled added for QA/QC 62,000 62,000 180 700 Filings change 400 #REF!	tons soil hazarde tons per load tons soil for non tons concrete for libred iron libred iron filings e-out Assumptic cy/day for fili days for iron fili workers for iron	us (assume 43%) us (assume 43%) haz disposal Di us gs changeout gremoval TruckSUV (1/2 Water Lucel Me Submershle Pu Generators: 220 Multi-gas meter	hrs/sample worker sampling 2.818 4.227 sposal Assumpt 20 20 10 3 18 18 18 19 19 10 10 10 10 10 10 10 10	loads for haz displands for non-haz loads for non-haz loads for non-haz loads per day working days per hours per working the business per working the second for size per fidal	sass month ing day representation tion per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation Area: Excavation Volume: Excavated Weight: Roll-off dumpster can hold approximately: Volume fill remaining onsite	Table A (per CWM) TCLP Metals 6.05% 261,360 165,333 248,000 120 62,000	D 101.45% 109.45% 37% 72 \$593.48 \$750.00 \$50 \$275 \$30.87 3.300 \$96.08 \$70.74 10	(Labor produc (not applicable per year amples per sample for materials (gl per ton per ton lbs per cy per day per day per day	tivity: for costs derived 1 20% toves, notebooks, et	82% from vendor quo times sampled added for QA/QC 62,000 62,000 180 700 Filings change 400 #REF!	tons soil hazarde tons per load tons soil for non tons concrete for libred iron libred iron filings e-out Assumptic cy/day for fili days for iron fili workers for iron	us (assume 43% i haz disposal disposal Di us gs changeout gg removal filing removal Cl Rates - Includ Truck/SUV (1/2 Water Quality A Submersible Pur Generators: 206	hrs/sample worker sampling 2,318 4,227 sposal Assumpt 20 20 20 31 150 iroundwater Mon or smaller) nalyzer np Volt Analytical CC 575,000	loads for haz displands for non-haz loads for non-haz loads per day working days per hours per work: months for site ps months to complete for the complete for	sass month ing day representation tion per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Baffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID TruckSUV (1/2 ton or smaller) Work day consists of: Exeavation: Concrete and Asphalit: Exeavation Area: Exeavation Volume: Exeavation Volume: Exeavation in the proposition of t	Table A (per CWM) TCLP Menls 0.05% 261,360 165,333 248,000 12 62,000 mo ls O&M	D 101.45% 109% 37% 722 \$593.484 \$750.00 \$50 \$275 \$30.87 \$3.00 \$50	(Labor produc (not applicable per year samples per sample per sample for materials (gl per ton per ton libs per cy per day per day per day per day	tivity: for costs derived 1 20% toves, notebooks, et	82% from vendor quo times sampled added for QA/QC 62,000 62,000 180 700 Filings change 400 #REF!	tons soil hazarde tons per load tons soil for non tons concrete for libre from filings re-word xsamphic cy/day from filing says for miling ton filing ton filings and tons for from Typical Renta	us (assume 43% l haz disposal Di ms ns changeout ag removal TruckSUV (12 Water Quality A Water Level Me Submersible Pu Generation: 22 Multi-gas meter Metals VOCs	hrs/sample worker sampling 2,318 4,227 sposal Assumpt 20 20 20 31 150 iroundwater Mon or smaller) nalyzer np Volt Analytical CC 575,000	loads for haz displands for non-haz loads for non-haz loads for non-haz loads per day working days per hours per working the bours per working months for site ps months to comple it days to complete for the foreign for the	sass month ing day representation tion per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Exervation: Concrete and Asphalt: Exervation Exervation Area: Exervation Volume: Exervated Weight: Roll-off dumpster can hold approximately: Volume fill remaining onsite Notes yp square yard cy loose cubic yard by bank cubic yard by bank cubic yard	Table A (per CWM) TCLP Menls 0.05% 261,360 165,333 248,000 12 62,000 mo ls O&M	D 101.4% 109.5% 3% \$593.48 \$75.00 \$575.00 \$575.00 \$575.00 \$575.00 \$570.74 10 % of excavation sf cy jons tons tons tons tons tons tons tons t	(Labor produc (not applicable per year samples per sample per sample for materials (gl per ton per ton libs per cy per day per day per day per day	tivity: for costs derived 1 20% toves, notebooks, et	82% from vendor quo times sampled added for QA/QC 62,000 62,000 180 700 Filings change 400 #REF!	tons soil hazarde tons per load tons per load tons soil for non tons concrete for libef iron filings e-rout Assumptive cy/day iron fili days for iron fili days for iron fili August for iron fili Typical Renta	us (assume 43%) haz disposal Di ms ngs changeout germoval Rates - Includ Truck/SUV (12) Water Quality A Water Level Me Submensible Pu Generators: 220 Multi-gas meier Metals VOCs Ins/SUW sample Ins/SUW sample	hrs/sample worker sampling azzardous) 2.818 4.227 26 26 100 3 18 150 croundwater Moses G&A and 16 ton or smaller) nalyzer ere up p Volt Analytical CC 575.06 590.06	loads for haz displands for non-haz loads for non-haz loads for non-haz loads per day working days per hours per working the bours per working months for site ps months to comple it days to complete for the foreign for the	posal r month ring day represtoration ction per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (I/2 ton or smaller) Work day consists of: Excavation: Concrete and Asphalit: Excavation Area: Excavation Area: Excavation dumes: Excavation foliumster can hold approximately: Volume fill remaining onsite Notes square yard ye clubic yard yellosse cubic yard	Table A (per CWM) TCLP Menls 0.05% 261,360 165,333 248,000 12 62,000 mo ls O&M	D 101.45% 109% 37% 722 \$593.484 \$750.00 \$50 \$275 \$30.87 \$3.00 \$50	(Labor produc (not applicable per year samples per sample per sample for materials (gl per ton per ton libs per cy per day per day per day per day	tivity: for costs derived 1 20% toves, notebooks, et	82% from vendor quo times sampled added for QA/QC 62,000 62,000 180 700 Filings change 400 #REF!	tons soil hazardo tons per load tons soil for non tons concrete for libef iron filings re-out Assumption cyday iron fili days for iron Typical Renta 2 2 0.5	us (assume 43% l haz disposal Di ms ns changeout ag removal TruckSUV (12 Water Quality A Water Level Me Submersible Pu Generation: 22 Multi-gas meter Metals VOCs	hrs/sample worker sampling 2.8181 4.227 sposal Assumpt 20 20 20 10 3 18 18 siroundwater Moi cs G&A and 10 ton or smaller) nalyzer pap Analytical Ct Analytical Ct S75.00 S70.00 at	loads for haz displands for non-haz loads for non-haz loads for non-haz loads per day working days per hours per working the bours per working months for site ps months to comple it days to complete for the foreign for the	posal r month ring day represtoration ction per day	Labor

REMEDIAL ALTERNATIVE			LOCATION		ME	DIA	Estimate	ed Cost to In	nplement	\$5,97	4,000
Soil/Fill Material Alternative 5		Old U	pper Mounta Lockport, N		Soil/Fil	II - OU1			nstruction Time: Operation Time:	9	months months
Re-grading, Landfill Capping with a Part 360 Cap, and Grou	ndwater Monitoring			-				Post Remedi	ation Monitoring	30	years
		Qua	ntities			Cost Breakd	own (if available)			Combined Unit Costs	
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
REMEDIAL ACTION			PITAL COST								\$5,693,000
		(totals round	led to hearest	thousand)	6002.251		6202 100		61.47.220	625.211	6 425(000
Construction Activities Site Preparation		1		\$ -	\$983,371 s	s -	\$292,189 \$	s -	\$147,220 \$	\$37,311 s	\$ 4,256,899 \$
Utility Locator (based on recent bids) Erosion & Sediment Control Plan	recent quote	0.5	day ls	s -	S -	s -	s -	S -	s -	\$ 2,475.00 \$ 30,000	\$ 1,238 \$ 30,000
Stabilization Measures for Erosion and Sedimentation Control Silt Fence, 3' high, adverse conditions	31 25 14.16 1000	1,200	lf	\$ 0.21	\$ 252	\$ 0.4	7 \$ 564	s -	s -	S -	\$ 816
Sewer Relocation				0.21	232						
Excavating Trench to remove sewer pipe, 10' to 14' deep, 1.5 CY excavator Pipe removal, sewer, no excavation, 18" diameter	02 41 13.33 2930	2,113 1,019		s -	s -	\$ 1.5 \$ 8.1	\$ 8,315	\$ 1.93 \$ 11.94	\$ 4,079 \$ 12,167	s -	\$ 7,439 \$ 20,482
Remove existing manhole Excavating Trench to install sewer pipe, 10' to 14' deep, 1.5 CY excavator,	02 41 13.33 0020 with t 31 23 16.13 1000	2,785	ea bcy	s -	S -	\$ 297.0 \$ -	7 \$ 1,188 \$ -	\$ 90.80 \$ -	\$ 363 \$ -	\$ - \$ 8.96	\$ 1,551 \$ 24,958
PVC sewer pipe, 13' lengths, 18" diameter	33 31 13.25 2300 33 49 13.10 0600 and	1,400	lf	s -	S -	S -	s -	s -	s -	\$ 28.74	\$ 40,236
Install manholes- concrete, precast, 4' ID, 10' deep	0700 Recent quote- ESG	4	ea	\$ 1,358.94	\$ 5,436	\$ 2,636.8	7 \$ 10,547	\$ 14,938.50	\$ 59,754	S -	\$ 75,737
Supply and Transportation of NYS Certified Clean Back Fill Material Haul Road Upgrades	from Seven Springs	2,698	су	\$ 28	\$ 74,184	s -	s -	s -	s -	S -	\$ 74,184
Haul Road Upgrades, Roads. 8" gravel (From ravine to upper staging area)	01 55 23.50 0100 34 71 13.26 1120	917 350		S -	S -	s -	s -	s -	S -	\$ 13.86 \$ 69.74	\$ 12,705 \$ 24,409
Install Guard Rails along Haul Road, corr steel, steel box beam Monitoring Well Abandonment	recent quote-	350 240								\$ 69.74 \$ 22.00	\$ 24,409 \$ 5,280
Stockpile Pad Construction	EnviroTrac										
Silt Fence 30 mil HDPE Liner	31 25 13.10 1000 33 47 13.53 1100	1,000 80,000	sf	\$ 0.23 \$ 0.30	\$ 230 \$ 24,000	\$ 0.4 \$ 0.8	\$ 68,000	S -	S -	S -	\$ 680 \$ 92,000
3/4" Gravel Fill (9") Cut and chip medium, trees to 12" dia.	ECHOS 17 03 0300 31 11 10.10 0200	2,222	cy acre	\$ 26.26 \$ -	\$ 58,349 \$ -	\$ 3.6 \$ 3,32		\$ 1.28 \$ 2,295	\$ 2,839 \$ 13,769	S -	\$ 69,255 \$ 33,707
Landfill Base Drainage Layer				1		-,,,,	,,,,,,,,	=,=>0	12,137		22,707
Removal of Sediment in Drainage Layer Area Soil-Excavator, hydraulic, crawler mtd. 2 CY cap = 165 CY/hr	31 23 16.42 0260	4,222.22		s -	s -	\$ 0.6		\$ 1.03	\$ 4,349	S -	\$ 7,093
12 CY truck, 15 mph average, cycle 2 miles, 10 min wait/ld/unld Supply 6" perf pipe (used PVC cost)	31 23 23.20 1218 Recent quote	4,855.56 1,125.00	lcy If	S -	S -	\$ 1.8	\$ \$,886 \$ -	S 3.11	\$ 15,101 \$ -	\$ 14.54	\$ 23,986 \$ 16,358
Supply and transport gravel for drainage layer, 13 cy load, 2 hr haul	Engineer's Estimate	4,222.22	су	\$ 8.50	\$ 35,889	\$ 13.0	7 \$ 55,184	s -	s -	s -	\$ 91,073
Placement of gravel for drainage layer, 24" thickness	Engineer's Estimate	4,222.22	су		s -		s -		s -	\$ 18.24	\$ 77,013
Deploy 10oz/sy mil Nonwoven Geotextile (Level C)	ECHOS 2006 33 08 0533	6,333.33	sy		s -		s -		s -	\$ 2.40	\$ 15,200
Excavation Community Air Monitoring (Dust)	recent quote - Pine										
Dust Control, Heavy, assumes 10 days per working month	Environmental 31 23 23.20 2510	92.19	mo day	s -	S -	\$ 5 \$ -	\$ 101,409 \$ -	\$ 3,420 \$ -	\$ 31,529 \$ -	\$ 1,734.40	\$ 132,937 \$ 159,894
Grading of embankment, by dozer Soil-Excavator, hydraulic, crawler mtd. 3.5 CY cap = 350 CY/hr	31 23 23.20 2300 31 23 16.42 5500	58,650 51,000	lcy	s -	s -	s -	s -	s -	s -	\$ 1.82 \$ 1.16	\$ 106,743 \$ 59,160
34CY off-road 20min. Wait 2,000ft cycle	31 23 23.20 6300	58,650	lcy	s -	\$ - \$ -	s -	s -	s -	s -	\$ 3.22	\$ 188,853
Haul Road Maintenance Maintain Stockpile, 700HP Dozer, 50ft Haul	31 23 23.20 2600 31 23 16.46 6010	92 14,663		S -	\$ -	S -	\$ - \$ -	s -	S -	\$ 1,141.04 \$ 1.68	\$ 105,192 \$ 24,633
Landfill Placement Excavator Loadout, 4.5 CY bucket, 80% fill factor	31 23 16.43 4700	58,650	ley	s -	s -	s -	s -	s -	s -	\$ 1.14	\$ 66,861
12 CY truck, 15 mph average, cycle 1 mile, 15 min wait/ld/unld Compaction, riding, vibrating roller, 2 passes, 12" lifts	31 23 23.20 1016 31 23 23.23 5060	58,650 51,000	lcy ecy	s -	s -	s -	s - s -	s -	s -	\$ 3.38 \$ 0.26	\$ 198,237 \$ 13,260
Finishing grading slopes, steep	31 22 16.10 3310	12,000		s -	s -	s -	s -	s -	s -	S 0.21	\$ 2,520
Capping 3:1 Side Slope (Ravine) Finishing grading slopes, steep	31 22 16.10 3310	17,000	sy	\$ -	s -	\$ -	\$ -	s -	s -	\$ 0.21	\$ 3,570
Polymeric Liner Anchor Trench 3'x1.5' (level B)	ECHOS 2006 33 08 0503	2,300	lf	s -	s -	s -	s -	s -	s -	\$ 1.87	\$ 4,299
Deploy 10oz/sy mil Nonwoven Geotextile (level C)	ECHOS 2006 33 08 0533	17,000	sy	s -	s -	s -	s -	s -	s -	\$ 2.40	\$ 40,766
60 mil HDPE Liner (level C)	ECHOS 2006 33 08 0572	153,000	sf	s -	s -	s -	s -	s -	s -	\$ 4.02	\$ 615,094
Drainage Netting, Geotextile Fabric Heat Bonded (2 sides) (level E)	ECHOS 2006 33 08 0513 Recent quote- ESG	153,000	sf	s -	s -	s -	s -	s -	s -	\$ 0.67	\$ 102,516
Supply and Transportation of NYS Certified Clean Back Fill Material	from Seven Springs ECHOS 2006 17	11,333	су	\$ 28	\$ 311,667	s -	s -	s -	s -	s -	\$ 311,667
Spreading and Compaction of General Fill	03 0422 Recent quote- ESG	11,333	су	s -	s -	s -	s -	s -	s -	\$ 9.12	\$ 103,382
Topsoil	from Seven Springs ECHOS 2006 18	2,833	су	\$ 45	\$ 126,083	s -	s -	s -	s -	s -	\$ 126,083
Spreading Topsoil 6" Lifts	05 0301 32 92 19.14 5400	2,833 153		\$ 68.11	S - S 10,421	s - s 8.9	\$ - 0 \$ 1,362	S - S 8.39	\$ - \$ 1,284	\$ 9.43	\$ 26,711
Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer Capping				9 08.11	o 10,421					-	\$ 13,066
Finishing grading slopes, gentle	31 22 16.10 3300 ECHOS 2006 33	12,778		s -	S -	\$ 0.0 \$ -	\$ 1,150	S 0.08	\$ 1,022	s -	\$ 2,172
Deploy 10oz/sy mil Nonwoven Geotextile (level C)	08 0533 ECHOS 2006 33	12,778		s -	S -	s -	s -	s -	S -	\$ 2.40	\$ 30,641
60 mil HDPE Liner (level C) Drainage Netting, Geotextile Fabric Heat Bonded (2 sides) (level E)	08 0572 ECHOS 2006 33	115,000		s -	s -	s -	s -	s -	s -	\$ 4.02 \$ 0.67	\$ 462,326 \$ 77,054
Durings Detring, Georganic Fabric ficat donned (2 sides) (level E)	08 0513 Recent quote- Modern	115,000	J1	s -	-	s -		s -	-	\$ 0.67	\$ 77,054
Gas Vents	Modern Environmental Recent quote- ESG	7	ca		s -		s -		s -	\$ 1,715.58	\$ 12,009
Supply and Transportation of NYS Certified Clean Back Fill Material	from Seven Springs ECHOS 2006 17	8,519	су	\$ 28	\$ 234,259	\$ -	\$ -	s -	s -	s -	\$ 234,259
Spreading and Compaction of General Fill	03 0422 Recent quote- ESG	8,519	cy	s -	s -	s -	\$ -	s -	s -	\$ 9.12	\$ 77,705
Topsoil	from Seven Springs ECHOS 2006 18	2,130	су	\$ 45	\$ 94,769	s -	s -	s -	s -	S -	\$ 94,769
Spreading Topsoil 6" Lifts Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	05 0301 32 92 19.14 5400	2,130 115		\$ 68.11	\$ - \$ 7,833	\$ - \$ 8.9	\$ - 0 \$ 1,024	S - 8.39	s - s 965	\$ 9.43 \$ -	\$ 20,077 \$ 9,821
	Ju Ju 17.14 J400	115		9 00.11	, 1,033	- 6.9	1,024	0.39	2 903	-	\$ -
Site Restoration Fence, chain link, 9 ga. Wire, in concrete, 6' H	32 31 13.20 0200	2,100		\$ 19.64	\$ 41,244	\$ 4.5		\$ 0.99	\$ 2,079	s -	\$ 52,878
Double swing gates, 6' H, 12' open, in concrete	32 31 13.20 5060 recent quote-		Opng	\$ 245.25	\$ 491	\$ 341.3	5 \$ 683	\$ 74.03	\$ 148	s -	\$ 1,321
Monitoring Well Installation	EnviroTrac	330	lf	s -	s -	\$ -	s -	s -	s -	\$ 94.00	\$ 31,020
Mobilization and Demobilization							1				\$ 64,367
Mobilization and Demobilization 5% of Total Costs of Site Work, Treatment										\$1,287,344	\$ 64,367 \$ 64,367
Contingency			1	1							\$ 648,190
15% of Total Construction Activities										\$4,321,266	\$ 648,190
Professional/Technical Services											\$ 723,673
5% Project Management			1		1	Ī	1	1	1	\$4,256,899	\$ 212,845

REMEDIAL ALTERNATIVE			LOCATION	ŧ .	ME	EDIA	Estimated Cost to Implement			\$5,974,000	
Soil/Fill Material Alternative 5		Old U	pper Mounta	in Road	Soil/Fi	ill - OU1		Co	nstruction Time:	9	months
Re-grading, Landfill Capping with a Part 360 Cap, and Ground			Lockport, N						Operation Time:	_	months
Re-grading, Landtill Capping with a Part 360 Cap, and Ground	water Monitoring			-					ation Monitoring	30	years
			ntities				wn (if available)			Combined Unit Costs	
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
LONG TERM ANNUAL MONITORING AND MAINTENANCE	E						1		TM COST (YR TM COST (YR LTM (NPV)		\$24,000 \$16,000 \$280,600
Monitoring, Sampling, Testing and Analysis (Per Event) Assume 80% of combined sampling event for OU1 and OU2											\$8,085
Site Monitoring											
Groundwater sampling for 1 event - Includes collection of field parameter	rs	5	well	s -	s -	\$ 340	\$ 1,700.00	s 92	\$ 458.13	s -	\$2,158
Materials		1	event	\$ 40	S 40	s -	s -	s -	s -	s -	\$40
Mobilization/Demobilization of Field Sampling Crew		,	event	e	e	e .	e	e	e	s 680.00	\$680
Reporting		40	hr	\$85	\$ 3,400.00	s -	\$ -	S -	s -	\$ -	\$3,400
Landfill Cap Inspection, 4 hrs each event, mob/demob with monitoring even Laboratory analysis	nt	1	ca	s -	s -	\$340	\$ 340.00	\$75.00	\$ 75.00	s -	\$415
Metals and VOCs, plus 20% QA/QC	Life Science Laboratories	8	ca	s -	s -	s -	s -	s -	s -	\$ 174.00	\$1,392
Maintenance- Cap Maintenance											***
Mowing brush, tractor with rotary mower, Medium density 1x per year Lifetime Long Term Monitoring (Net Present Value)	32 01 90.19 1670	153	msf	S -	S -	\$ 28.51	\$ 4,362	\$ 24.74	\$ 3,786	S -	\$8,147
5 Years of Semi-Annual Monitoring											
25 Years of Annual Monitoring 5% Discount Factor (per NYSDEC)											
TOTAL ESTIMATED NPV TECHNOLOGY COST (C	•		st Kemeura	tion Monitor	ing)						\$5,974,000
	•	D	(Labor produc	tivity:	82%	; Equipment pr	oductivity:	100%	b		\$5,974,000
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY)	•	D 101.4%	(Labor produc		82%	; Equipment pr otes).	oductivity:	100%])		\$5,974,000
Assumptions: Working condition is Safety Level:	<u>. </u>	D	(Labor produc (not applicable	tivity:	82%]; Equipment pr otes).	oductivity:	100%])		
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor	·	D 101.4%	(Labor produc (not applicable	tivity: for costs derived	82% from vendor qu times sampled	otes).	0.25	hrs/sample])		Labor Cost per hr
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost	Table A (per CWM)	D 101.4% 10% 3% 72 \$593.48	(Labor produc (not applicable per year samples	tivity: for costs derived	82% from vendor qu	otes).	0.25]) 		Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost		D 101.4% 10% 3% 72 \$593.48	(Labor produc (not applicable per year samples per sample per sample	tivity: for costs derived 1 20%	82% from vendor que times sampled added for QA/Q	otes).	0.25	hrs/sample])		Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost	Table A (per CWM)	D 101.4% 3% 72 \$593.48 \$75.00	(Labor produc (not applicable per year samples per sample per sample for materials (g	tivity: for costs derived	82% from vendor que times sampled added for QA/Q	otes).	0.25	hrs/sample]) 		Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal	Table A (per CWM)	D 101.4% 10% 3% 72 \$593.48 \$75.00 \$50	(Labor produc (not applicable per year samples per sample per sample	tivity: for costs derived 1 20%	82% from vendor que times sampled added for QA/Q	otes).	0.25	hrs/sample]) 		Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz Concrete	Table A (per CWM)	D 101.4% 10% 33% 72 \$593.48 \$75.00 \$50 \$275	(Labor produc (not applicable per year samples per sample per sample for materials (g	tivity: for costs derived 1 20%	82% from vendor que times sampled added for QA/Q	otes).	0.25	hrs/sample worker sampling	ions		Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffaio, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz	Table A (per CWM)	D 101.4% 10% 3% 72 \$593.48 \$75.00 \$50 \$275	(Labor produc (not applicable per year samples per sample per sample for materials (g per ton	tivity: for costs derived 1 20%	82% from vendor que times sampled added for QA/Q	otes).	0.25 1	hrs/sample worker sampling sposal Assumpt	ions	\$85	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffaio, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit	Table A (per CWM)	D 101.4% 3% 72 \$593.48 \$75.00 \$50 \$275 \$39.87	(Labor produc (not applicable per year samples per sample per sample for materials (g per ton lbs per cy	tivity: for costs derived 1 20%	82% from vendor qu times sampled added for QA/Q (c.)	tons concrete for ge-out Assumptio	0.25 1 disposal Disposal Disposa ons one changeout	hrs/sample worker sampling sposal Assumpt 20 20 10	ions loads per day working days per hours per worki	month ng day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID	Table A (per CWM)	D 101.4% 3% 72 \$593.48 \$75.00 \$50 \$275 \$39.87	(Labor produc (not applicable) per year samples per sample per sample for materials (g per ton lbs per cy per day per day	tivity: for costs derived 1 20%	82% from vendor que times sampled added for QA/Q cc.)	tons concrete for	0.25 I disposal Disposa Disposa ngs changeout ng removal	hrs/sample worker sampling sposal Assumpt 20 20 10	ions I loads per day working days per	month ng day represtoration	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste- incincration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Excavation:	Table A (per CWM) TCLP Metals	D 101.4% 109.4% 33% 72 539.48 575.00 \$50 \$278 \$39.87 3,300 \$50.00 \$70,74 10	(Labor produc (not applicable per year amples per sample per sample for materials (g per ton per ton lbs per cy per day per day	tivity: for costs derived 1 20%	82% from vendor que times sampled added for QA/Q cc.)	tons concrete for ge-out Assumptio cycley iron fili days for iron fili 3 workers for iron	0.25 1 disposal Disp	hrs/sample worker sampling	ions loads per day working days per hours per worki months for site pi months to comple fil/day nitoring	month ng day represtoration	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (12 ton or smaller) Work day consists of: Execavation: Execavation: Concrete and Asphalt:	Table A (per CWM) TCLP Metals	D 101.4% 109.4% 33% 72 539.48 575.00 \$50 \$278 \$39.87 3,300 \$50.00 \$70,74 10	(Labor produc (not applicable per year amples per sample per sample for materials (g per ton per ton lbs per cy per day per day	tivity: for costs derived 1 20%	82% from vendor que times sampled added for QA/Q cc.)	tons concrete for ge-out Assumptio cycley iron fili days for iron fili 3 workers for iron	0.25 1 disposal Disons mgs changeout ng removal filing removal GI Rates - Includ	hrs/sample worker sampling posal Assumpt 20 20 10 10 3 6 6 15 15 15 15 15 15 15 15 15 15 15 15 15	ions loads per day working days per hours per worki months for site pi months to comple ft/day nitoring % Profit	month ing day rep/restoration	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation: Concrete and Asphalt: Excavation: Excavation volume:	Table A (per CWM) TCLP Metals 0.6% 261,360 51,000	D 101.4% 109% 3% 575.00 \$593.48 \$575.00 \$275 \$39.87 \$39.87 \$70.74 \$10 24 of excavation sf	(Labor produc (not applicable per year amples per sample per sample for materials (g per ton per ton lbs per cy per day per day	tivity: for costs derived 20% loves, notebooks, c	82% from vendor que times sampled added for QA/Q cc.)	tons concrete for ge-out Assumptio cycley iron fili days for iron fili 3 workers for iron	0.25 1 disposal Disons ngs changeout ng removal filing removal TruckSUV (1/2 Water Quality A.	hrs/sample worker sampling posal Assumpt 20, 2c, 2c, 2c, 2c, 2c, 2c, 2c, 2c, 2c, 2c	ions loads per day working days per hours per worki months for site pr months to comple ft/day % Profit \$70.74 \$159.00	month ng day represtoration tition	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rac Survey Mode PID Track/SUV (1/2 ton or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation Area: Excavation Volume: Excavation Volume: Excavation Volume:	Table A (per CWM) TCLP Metals 0.0% 261,360 51,000 75,500	D 101.4% 109% 3% 3% 5593.48 575.00 \$50 \$275 \$33.87 3.300 \$70.74 10 pt of excavation of cylindric and cylindric	(Labor produc (not applicable per year samples per sample for materials (g per ton per ton lbs per cy per day per day per day	tivity: for costs derived 20% loves, notebooks, c	82% from vendor que times sampled added for QA/Q cc.)	tons concrete for ge-out Assumptio cycley iron fili days for iron fili 3 workers for iron	0,25 I disposal Dis ons ons gas changeout on gremoval filing removal Truck/SUV (1/2 Water Quality A Water Level Me	hrs/sample worker sampling posal Assumpt 20 20 20 10 3 6 6 roundvater Mo- es G&A and 10 to or smaller)	ions loads per day working days per hours per work mouths for site pi mouths to comple ft/day initoring % Profit \$70.74 \$159.00 \$31.80	month ing day cprestoration tition per day per day per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste- incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation: Concrete and Asphalt: Excavation: Excavation volume:	Table A (per CWM) TCLP Metals 0.6% 261,360 51,000	D 101.4% 109% 3% 3% 5593.48 575-00 \$590 \$590 \$570 3.300 \$70,74 10	(Labor produc (not applicable per year samples per sample for materials (g per ton per ton lbs per cy per day per day per day	tivity: for costs derived 20% loves, notebooks, c	82% from vendor que times sampled added for QA/Q cc.)	tons concrete for ge-out Assumptio cycley iron fili days for iron fili 3 workers for iron	0.25 I disposal Die ons ons on gremoval filing removal Truck/SUV (1/2 Water Cuality A Water Level Me Generators: 200 Submersible Pum Generators: 200 Submersi	hrs/sample worker sampling 20 20 20 10 3 6 to 150 roundwater Moses G&A and 16 ton or smaller) halyzer er	ions loads per day working days per hours per working months for site p months for site p mitoring fitday Profit \$170.74 \$150.00 \$13.30 \$13.31 \$32.38	month ng day represtoration tition	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-baz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation Area: Excavation Volume: Excavated Weight: Roll-of dumpster can hold approximately:	Table A (per CWM) TCLP Metals 0.05% 261360 51,000 76,500	D 101.4% 109% 3% 3% 5593.48 575.00 \$50 \$275 \$33.87 3.300 \$70.74 10 pt of excavation of cylindric and cylindric	(Labor produc (not applicable per year samples per sample for materials (g per ton per ton lbs per cy per day per day per day	tivity: for costs derived 20% loves, notebooks, c	82% from vendor que times sampled added for QA/Q cc.)	tons concrete for ge-out Assumptio cycley iron fili days for iron fili 3 workers for iron	0.25 1 disposal Dis ns mgs changeout ng removal Rates - Includ Water (Quality & Water Level Met	hrs/sample worker sampling 20 20 20 10 3 6 to 150 roundwater Moses G&A and 16 ton or smaller) halyzer er	loads per day working days per hours per workir months for site pr months to comple ft/day % Profit \$159.00 \$31.80 \$31.80 \$31.80 \$575.00	month ng day per day per day per day per day per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation Area: Excavation Volume: Excavation Includes Cast And Concrete and Asphalt: Excavation of the Concrete and Excavation of the Concr	Table A (per CWM) TCLP Metals 0.05% 261,360 51,000 75,5000 12 51,000	D 101.4% 109% 3% 572 \$593.48 \$75.00 \$50 \$275 \$39.87 3.300 \$96.08 \$70.74 10 % of excavation of the control of t	(Labor produc (not applicable per year samples per sample for materials (g per ton per ton lbs per cy per day per day per day	tivity: for costs derived 20% loves, notebooks, c	82% from vendor que times sampled added for QA/Q cc.)	tons concrete for ge-out Assumptio cycley iron fili days for iron fili 3 workers for iron	disposal Diricular disposal disposal diricular disposal disp	hrs/sample worker sampling posal Assumpt 20 20 20 20 20 3 3 5 5 7 5 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	ions loads per day working days per hours per worki months for site pr months to comple ft/day % Profit \$159.00 \$113.91 \$52.68 \$113.91 \$52.68	month ng day per day per day per day per day per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation Area: Excavation Volume: Excavated Weight: Roll-off dumpser can hold approximately: Volume fill remaining onsite Notes Sy square yard cubic yard	Table A (per CWM) TCLP Metals 0.05% 261,360 51,000 76,590 12 51,000	D 101.45% 109.5% 35% 35% \$593.48 \$575.040 \$594.88 \$570.74 10 7% of excavation sf ccy tons bory month lump sum	(Labor produc (not applicable per year samples per sample per sample for materials (g per ton lbs per cy per day per day per day per day volume	tivity: for costs derived 20% loves, notebooks, c	82% from vendor que times sampled added for QA/Q cc.)	tons concrete for ge-out Assumptio eydday iron fili days for in offi ways for in offi Typical Renta	0.25 I disposal Dis us ggs changeout ng removal filing removal Truck/SUV (1/2 Water Level Met Submersbile Phun Generations: 20 Multi-gas meter Metals Metals Metals Metals	hrs/sample worker sampling posal Assumpt 20 20 20 20 20 3 3 5 5 7 5 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	ions loads per day working days per hours per workin months for site pe months to comple fit day 1519.00 \$13.30 \$13.30 \$13.30 \$13.30 \$52.66 \$575.00 sts	month ng day represtoration tition per day per day per day per day per day per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation Area: Excavation Volume: Excavation Includes Cast And Concrete and Asphalt: Excavation of the Concrete and Excavation of the Concr	Table A (per CWM) TCLP Metals 0.05% 261,360 51,000 75,5000 12 51,000	D 101.4% 109% 3% 572 \$593.48 \$75.00 \$50 \$275 \$39.87 3.300 \$96.08 \$70.74 10 % of excavation of the control of t	(Labor production applicable per year sample per sample for materials (g per ton per ton libs per cy per day per day per day year day hrs.	tivity: for costs derived 20% loves, notebooks, c	82% from vendor que times sampled added for QA/Q cc.)	tons concrete for ge-out Assumption cyday iron fili days for iron fili days for iron fili days for iron fili days for iron fili workers for iron Typical Renta	0.25 1 disposal Dis 1 ms 1 mgs changeout 1 gremoval 1 filing removal 2 Water (Quality & Water Level Met 2 Submershile Pust Wet 4 Water Level Met Wolf-ass meter Metals VOCs Ans/GW sample	hrs/sample worker sampling posal Assumpt 2c 2c 2c 10 3 6 6 50 roundwater Moses G&A and 10 tonly zer cr 2r 4nalytical CC 575.06	ions loads per day working days per hours per workin months for site pe months to comple fit day 1519.00 \$13.30 \$13.30 \$13.30 \$13.30 \$52.66 \$575.00 sts	month ng day per day per day per day per day per day	Labor
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated soil as a "listed" waste-incineration Lead contaminated soil as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rac Survey Mode PID Truck/SUV (1/2 ton or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation Area: Excavation Area: Excavation fundaminated of the province	Table A (per CWM) TCLP Metals 0.0% 261,360 51,000 75,500 12 51,000	D 101.4% 109.4%	(Labor production applicable per year sample per sample for materials (g per ton per ton libs per cy per day per day per day year day hrs.	tivity: for costs derived 20% loves, notebooks, c	82% from vendor que times sampled added for QA/Q cc.)	tons concrete for tons concrete for cycley from file advaps for in military something to cycley from the days for in military something to the cycley from the cycley from the cycley from the cycle from	0.25 I disposal Dis ons gas changeout ag removal filing removal Truck/SUV (1/2 Water Quality A Water Level Me Submersible Pun Generators: 20 Multi-gas meter Metals Ans:GW sample hrs:SW sample workers per ever	hrs/sample worker sampling posal Assumpt 20 20 20 10 3 6 Froundvater More se G&A and 10 ton or smaller) nabyzer Analytical Ct Analytical Ct 575.06 590.06	ions loads per day working days per hours per workin months for site pe months to comple fit day 1519.00 \$13.30 \$13.30 \$13.30 \$13.30 \$52.66 \$575.00 sts	month ng day represtoration tition per day per day per day per day per day per day	Labor

REMEDIAL ALTERNATIVE Soil/Fill Material Alternative 6			LOCATION	I	ME	DIA	Estimate	d Cost to I	nplement	\$4,20	08,000
			pper Mountai		Soil/Fil	l - OU1			nstruction Time:	9	months
Partial Removal, Landfill Capping with a Soil Cap, and Groun	dwater Monitoring		Lockport, NY						Operation Time: ation Monitoring	30	
		Qua	ntities		!	Cost Breakdov	vn (if available)	i ost Keineur	idon Monitoring	Combined Unit Costs	years
Description	Data Source (Means ¹ or Other)	Quantity	Quantity	Material	Material	Labor	Labor	Equipment	Equipment		Option
	(Means or Other)	Amount	Unit	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
REMEDIAL ACTION			PITAL COST ded to nearest				,		,		\$3,927,000
Construction Activities		1			\$1,025,105		\$302,426		\$149,447	\$1,204,080	\$ 2,924,203
Site Preparation Utility Locator (based on recent bids)	recent quote	0.5	day	c	s	e	•	e	c	S 2.475.00	S 1.238
Erosion & Sediment Control Plan	recem quoie	0.3	ls	s -	s -	\$ -	\$ -	s -	\$ -	\$ 30,000	
Stabilization Measures for Erosion and Sedimentation Control Silt Fence, 3' high, adverse conditions	31 25 14.16 1000	1,200	lf	\$ 0.21	\$ 252	\$ 0.47	\$ 564	s -	S -	s -	\$ 816
Sewer Relocation					-						
Excavating Trench to remove sewer pipe, 10' to 14' deep, 1.5 CY excavator Pipe removal, sewer, no excavation, 18" diameter	31 23 16.13 1000 02 41 13.33 2930	2,113 1,019		s -	s -	\$ 1.59 \$ 8.16	\$ 3,360 \$ 8,315			s -	\$ 7,439 \$ 20,482
Remove existing manhole	02 41 13.33 0020	4 2,785	ea	s -	s - s -	\$ 297.07		S 90.80	\$ 363 \$ -	S - S 8.96	\$ 1,551 \$ 24,958
Excavating Trench to install sewer pipe, 10' to 14' deep, 1.5 CY excavator, v PVC sewer pipe, 13' lengths, 18" diameter	33 31 13.25 2300	1,400		s -	s -	S -	s -	s -	\$ -	\$ 28.74	\$ 40,236
Install manholes- concrete, precast, 4' ID, 10' deep	33 49 13.10 0600 and 0700	4	ea	\$ 1,358.94	s 5,436	\$ 2,636.87	\$ 10,547	\$ 14,938.50	\$ 59,754	s -	\$ 75,737
Supply and Transportation of NYS Certified Clean Back Fill Material	Recent quote- ESG from Seven Springs	2,698	cy	S 28	S 74,184	s -	s -	s -	s -	s -	\$ 74,184
Haul Road Upgrades				. 20	. /-,104						
Haul Road Upgrades, Roads. 8" gravel (From ravine to upper staging area) Install Guard Rails along Haul Road, corr steel, steel box beam	01 55 23.50 0100 34 71 13.26 1120	917 350	sy lf	s -	S -	s -	s -	s -	s -	\$ 13.86 \$ 69.74	\$ 12,705 \$ 24,409
Monitoring Well Abandonment	recent quote- EnviroTrac	240	lf	s -	s -	s -	s -	s -	s -	s 22.00	\$ 5,280
Stockpile Pad Construction			te.							22.00	
Silt Fence 30 mil HDPE Liner	31 25 13.10 1000 33 47 13.53 1100	1,000 80,000	lf sf	\$ 0.23 \$ 0.30	\$ 230 \$ 24,000	\$ 0.45 \$ 0.85	\$ 450 \$ 68,000	s -	s -	S -	\$ 680 \$ 92,000
3/4" Gravel Fill (9") Cut and chip medium, trees to 12" dia.	ECHOS 17 03 0300 31 11 10:10 0200	2,222	cy acre	\$ 26.26	\$ 58,349	\$ 3.63 \$ 3,323	\$ 8,066 \$ 19,939	\$ 1.28 \$ 2,295	\$ 2,839 \$ 13,769	S -	\$ 69,255 \$ 33,707
Landfill Base Drainage Layer	31 11 10.10 0200		acre		3 -	\$ 3,323	3 19,939	\$ 2,293	\$ 15,769	3 -	\$ 33,707
Removal of Sediment in Drainage Layer Area Soil-Excavator, hydraulic, crawler mtd. 2 CY cap = 165 CY/hr	31 23 16.42 0260	4,222	bcy	s .	\$.	\$ 0.65	\$ 2,744	S 1.03	\$ 4,349		\$ 7,093
12 CY truck, 15 mph average, cycle 2 miles, 10 min wait/ld/unld	31 23 23.20 1218	4,856	ley	s -	s -	\$ 1.83	\$ 8,886	\$ 3.11	\$ 15,101	,	\$ 23,986
Supply 6" perf pipe (used PVC cost)	Recent quote	1,125	lf	\$ -	S -	\$ -	\$ -	s -	\$ -	\$ 14.54	\$ 16,358
Supply and transport gravel for drainage layer, 13 cy load, 2 hr haul	Engineer's Estimate	4,222	cy	\$ 8.50	\$ 35,889	\$ 13.07	\$ 55,184	s -	s -	S -	\$ 91,073
Placement of gravel for drainage layer, 24" thickness	Engineer's Estimate ECHOS 2006	4,222	cy		S -		s -		s -	S 18.24	\$ 77,013
Deploy 10oz/sy mil Nonwoven Geotextile (Level C)	33 08 0533	6,333	sy		s -		s -		s -	S 2.40	\$ 15,200
Excavation Community Air Monitoring (Dust)	recent quote - Pine										
Dust Control, Heavy, assumes 10 days per working month	Environmental 31 23 23.20 2510	9 92.19	mo dav	S -	S -	\$ 55 \$ -	\$ 101,409 \$ -	\$ 3,420 \$ -	\$ 31,529 \$ -	S 1,734.40	\$ 132,937 \$ 159,894
Grading of embankment, by dozer	31 23 23.20 2300	58,650		s -	S -	s -	s -	s -	s -	S 1.82	\$ 106,743
Soil-Excavator, hydraulic, crawler mtd. 3.5 CY cap = 350 CY/hr 34CY off-road 20min. Wait 2,000ft cycle	31 23 16.42 5500 31 23 23.20 6300	51,000 58,650		s -	\$ -	s -	\$ -	s -	\$ -	\$ 1.16 \$ 3.22	\$ 59,160 \$ 188,853
Haul Road Maintenance Maintain Stockpile, 700HP Dozer, 50ft Haul	31 23 23.20 2600 31 23 16.46 6010	92 14,663	day	\$ -	s -	s -	s -	s -	\$ -	\$ 1,141.04 \$ 1.68	\$ 105,192 \$ 24,634
Landfill Placement			bcy		3 -	3 -	3 -	3 -	, .		
Excavator Loadout, 4.5 CY bucket, 80% fill factor 12 CY truck, 15 mph average, cycle 1 mile, 15 min wait/ld/unld	31 23 16.43 4700 31 23 23.20 1016	58,650 58,650	ley	s -	s -	s -	s -	s -	s -	\$ 1.14 \$ 3.38	\$ 66,861 \$ 198,237
Compaction, riding, vibrating roller, 2 passes, 12" lifts	31 23 23.23 5060	51,000	ecy	s -	s -	s -	\$ -	s -	s -	\$ 0.26	\$ 13,260
Finishing grading slopes, steep Capping 3:1 Side Slope (Ravine)	31 22 16.10 3310	12,000	sy	S -	\$ -	S -	\$ -	s -	S -	\$ 0.21	\$ 2,520
Finishing grading slopes, steep	31 22 16.10 3310 Recent quote- ESG	17,000	sy	s -	S -	s -	s -	s -	s -	S 0.21	\$ 3,570
Supply and Transportation of NYS Certified Clean Back Fill Material	from Seven Springs	11,333	cy	S 28	\$ 311,667	s -	s -	s -	s -	s -	\$ 311,667
Spreading and Compaction of General Fill	ECHOS 2006 17 03 0422	11,333	cy	s -	s -	s -	s -	s -	s -	S 9.12	\$ 103,382
Topsoil	Recent quote- ESG from Seven Springs	2,833	cy	S 45	S 126,083	s -	s -	s -	s -	s -	\$ 126,083
Spreading Topsoil 6" Lifts	ECHOS 2006 18 05 0301	2,833	cy		s -	s -	s -	s -	s -	s 9.43	\$ 26,711
Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	32 92 19.14 5400	153	msf	\$ 68.11	S 10,421	\$ 8.90	\$ 1,362	\$ 8.39	\$ 1,284	S -	\$ 13,066
Capping Finishing grading slopes, gentle	31 22 16.10 3300	12,778	sy	s -	s -	\$ 0.09	\$ 1,150	\$ 0.08	\$ 1,022	s -	\$ 2,172
	Recent quote- Modern			s -		s -		s -			
Gas Vents	Environmental Recent quote- ESG	7	ea		S -		s -		S -	\$ 1,715.58	\$ 12,009
Supply and Transportation of NYS Certified Clean Back Fill Material	from Seven Springs ECHOS 2006	8,519	cy	S 28	\$ 234,259	S -	s -	s -	s -	s -	\$ 234,259
Spreading and Compaction of General Fill	17 03 0422	8,519	cy	s -	s -	s -	s -	s -	s -	S 9.12	\$ 77,705
Topsoil	Recent quote- ESG from Seven Springs	2,130	cy	\$ 45	s 94,769	s -	s -	s -	s -	s -	\$ 94,769
Spreading Topsoil 6" Lifts	ECHOS 2006 18 05 0301	2,130			s -	s -	s -	s -	s -	s 9.43	
Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	32 92 19.14 5400	115	msf	\$ 68.11	\$ 7,833	\$ 8.90	\$ 1,024	\$ 8.39	\$ 965	S -	\$ 9,821 \$
Site Restoration											s -
Fence, chain link, 9 ga. Wire, in concrete, 6' H Double swing gates, 6' H, 12' open, in concrete	32 31 13.20 0200 32 31 13.20 5060	2,100	lf Opng	\$ 19.64 \$ 245.25	S 41,244 S 491	\$ 4.55 \$ 341.36	\$ 9,555 \$ 683	\$ 0.99 \$ 74.03	\$ 2,079 \$ 148	S -	\$ 52,878 \$ 1,321
Monitoring Well Installation	recent quote- EnviroTrac	330	lf	s -	s -	s -	s -	s -	s -	S 94.00	\$ 31,020
	_mra our at	530								,	-1,020
Mobilization and Demobilization									-		\$ 58,335
5% of Total Costs of Site Work, Treatment										\$1,166,691	
Contingency											\$ 447,381
15% of Total Construction Activities										\$2,982,537	\$ 447,381
		-									\$ 497,114
Professional/Technical Services											
Professional/Technical Services 5% Project Management 6% Remedial Design										\$2,924,203	

REMEDIAL ALTERNATIVE			LOCATION	I	ME	EDIA	Estimate	ed Cost to I	nplement	\$4,20	08,000
Soil/Fill Material Alternative 6		Old U	pper Mountai	n Road	Soil/Fi	ill - OU1		Co	nstruction Time	: 9	months
Partial Removal, Landfill Capping with a Soil Cap, and Ground	dwater Monitoring		Lockport, NY	ď					Operation Time	-	months
								Post Remedia	ation Monitoring	Combined Unit	years
			ntities				wn (if available)			Costs	
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
LONG TERM ANNUAL MONITORING AND MAINTENANG		Amount	Unit	Unit Cost	Total Cost	Unit Cost	Total Cost		TM COST (Y		\$24,000
LONG TEXAL PROPERTY OF THE SELECT CONTROL OF	J.L.								TM COST (Y		\$16,000
								LIFETIME			\$280,600
Monitoring, Sampling, Testing and Analysis (Per Event)									(,		1200,000
Assume 80% of combined sampling event for OU1 and OU2											\$8,013
Site Monitoring Groundwater sampling for 1 event - Includes collection of field											
parameters			well	s -	s -	S 340	\$ 1,700.00	S 92	\$ 458.15	s -	\$2,158
Materials Mobilization/Demobilization of Field Sampling Crew			event	\$ 40			S -	s -	S -	S - 680.00	\$40
Reporting		40	event hr	\$ - \$85	S - S 3,400.00	s -	s -	s -	s -	\$ 680.00	\$680 \$3,400
Landfill Cap Inspection, 4 per year, 4 hrs each event, mob/demob witl				-	,					-	
monitoring event		- 1	ea	s -	S -	\$340	\$ 340.00	\$75.00	\$ 75.00	S -	\$415
Laboratory analysis											
Metals and VOCs, plus 20% QA/QC	Life Science	_	ea		_	_					
-	Laboratories	8	ea	\$ -	S -	\$ -	\$ -	\$ -	\$ -	\$ 165.00	\$1,320
Maintenance- Cap Maintenance											
Mowing brush, tractor with rotary mower, Medium density 1x per year Lifetime Long Term Monitoring (Net Present Value)	32 01 90.19 1670	153	msf	\$ -	S -	\$ 28.51	\$ 4,362	S 24.74	\$ 3,786	S -	\$8,147
5 Years of Semi-Annual Monitoring											
25 Years of Annual Monitoring											
5% Discount Factor (per NYSDEC)											
TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions:	(Capital + Lifeti	me O&M +	Post Reme	diation Mon	itoring)						\$4,208,000
Working condition is Safety Level:		D	(Labor product		82%	; Equipment pr	oductivity:	100%)		
Weighted Average of city cost index (Buffalo, NY)				for costs derived	l from vendor q	uotes).			='		
Costs are loaded with a profit factor Inflation		10%									Labor
Estimated number of soil samples		72	per year samples	- 1	times sampled		0.25	hrs/sample		\$85	Cost per hr
2.5timated number of soil samples			Jaminpies	20%	added for QA/Q	C samples		worker sampling	3	300	con per in
Characterization Cost	Table A (per CWM)		per sample		•						
Analytical cost	TCLP Metals		per sample								
For each sampling event, assumed: Disposal		\$50	for materials (gi	oves, notebooks,	etc.)						
Lead contaminated soil as a "listed" waste- incineration		\$275	per ton						1		
Lead contaminated soil as non-haz		\$39.87	per ton						1		
Concrete		3,300	lbs per cy		-	tons concrete for	r disposal Dis	sposal Assumpt	ions		
Typical Rental Rates - Includes G&A and 10% Profit			7		180				loads per day		
Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller)		\$96.08	per day per day	Ir		ge-out Assumption cy/day iron fili			working days po hours per work		
Truck/SCV (1/2 ton or smaller)		\$70.74	per day			days for iron fili			months for site		
Work day consists of:		10	hrs			3 workers for iron		6	months to comp		
							_		ft/day		
Excavation: Concrete and Asphalt:	0.0%	% of excavation	volume			Typical Renta	G I Rates - Includ	roundwater Mo les G&A and 1			
Excavation Area:	261,360		volume				Truck/SUV (1/2			per day	
Excavation Volume:	165,333	cy	190,133	lcy			Water Quality A	nalyzer	\$159.00	per day	
Excavated Weight:	248,000						Water Level Me			per day	
Roll-off dumpster can hold approximately: Volume fill remaining onsite	62,000	tons					Submersible Pur Generators: 220			per day per day	
volume ini temaning disite	02,000	L.y					Multi-gas meter	voit	\$75.00	per day	
Notes								Analytical Co		-	
sy square yard	mo Is	month					Metals		per sample		
cy cubic yard lcy loose cubic yard	ls O&M	lump sum Operation and n	naintenance				VOCs hrs/GW sample	\$90.00	per sample	Labor cost per hr	
bcy bank cubic yard	H&S	Health and Saf					hrs/SW sample		363	Jean-or cost per fir	
lf linear feet						2	workers per eve				
sf square feet							hours travel per				
msf 1,000 square feet						\$50	for materials (gl	oves, notebooks,	etc.)		

REMEDIAL ALTERNATIVE			LOCATION		ME	EDIA	Estimate	ed Cost to In	nplement	\$41,7	721,000
Soil/Fill Material Alternative 7		Old U	pper Mountai	n Road	Soil/Fi	ll - OU1		Cor	nstruction Time:	34	months
Partial Removal (Deeper Fill) and Off-site Disposal, with In S (Shallow Fill 0-14 ft Depth)	Situ Stabilization		Lockport, NY	?					Operation Time: ition Monitoring	- 30	months years
,		Qua	ntities			Cost Breakdov	vn (if available)			Combined Unit	,
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
REMEDIAL ACTION		TOTAL CAI	PITAL COST	•							\$41,500,000
		(totals round	led to nearest	thousand)	1	T	l	1	1	l	
Construction Activities Pre-Design Pilot Study		1			\$288,229		\$536,265		\$201,473	\$725,750	\$ 30,615,329
Pilot Study Treatment Sample analysis	MT2 Estimate MT2 Estimate	5	ton sample	s -	s -	s -	s -	s -	s -	\$ 33.24 \$ 550.00	\$ 166 \$ 550
Pre-Design Characterization Study Driller					-					3 330.00	330
Mob/Demob Geoprobe/Crew for Soil Borings	quote- SJB quote- SJB	1 21	ls day	s -	s -	s -	s -	s -	s -	\$ 800 \$ 1,273	\$ 800 \$ 26,735
Sample Collection	Life Science	210	hr	\$ -	s -	\$ 85.00	\$ 17,850	\$ -	s -	\$ 1,273 \$ -	\$ 17,850
Sample Analysis for TCLP Lead and Zinc Reporting	Laboratories Engineer's Estimate	161	sample	s -	s -	\$ -	s -	s -	s -	\$ 593	\$ 95,550
	Engineer's Estimate	1	ls	\$ -	S -	\$ -	s -	s -	s -	\$ 15,000	\$ 15,000 \$ -
Site Preparation Utility Locator (based on recent bids)	recent quote	0.5	day	s -	s -	\$ -	s -	s -	s -	\$ 2,475.00	\$ 1,238
Erosion & Sediment Control Plan Stabilization Measures for Erosion and Sedimentation Control	Engineer's Estimate	1	ls	s -	s -	s -	s -	s -	s -	\$ 30,000	\$ 30,000
Silt Fence, 3' high, adverse conditions	31 25 14.16 1000	1,200	lf	\$ 0.21	\$ 252	\$ 0.47	\$ 564	s -	s -	s -	\$ 816
Sewer Relocation Excavating Trench to install sewer pipe, 10' to 14' deep, 1.5 CY excavator, w	ith 31 23 16.13 1000 33 31 13.25 2300	2,785	bcy	s -	s -	s -	s -	S -	s -	\$ 8.96	\$ 24,958 \$ 40,236
PVC sewer pipe, 13' lengths, 18" diameter Install manholes- concrete, precast, 4' ID, 10' deep	33 49 13.10 0600 and 0700	1,400	ea	\$ 1,358.94	\$ 5,436	\$ 2,636.87	s 10.547	s 129.90	\$ 520	\$ 28.74 \$ -	\$ 40,236 \$ 16,503
Supply and Transportation of NYS Certified Clean Back Fill Material	Recent quote- ESG			- 1,000		,				_	
Haul Road Upgrades	from Seven Springs	2,698	су	\$ 28	\$ 74,184	\$ -	s -	\$ -	s -	s -	\$ 74,184
Haul Road Upgrades, Roads. 8" gravel (From ravine to upper staging area) Install Guard Rails along Haul Road, corr steel, steel box beam	01 55 23.50 0100 34 71 13.26 1120	917 350	sy If	s - s -	s -	s - s -	s -	s - s -	s - s -	\$ 13.86 \$ 69.74	\$ 12,705 \$ 24,409
Monitoring Well Abandonment	recent quote- EnviroTrac	240	lf	s -	s -	s -	s -	s -	s -	\$ 22.00	\$ 5,280
Monitoring Well Installation	recent quote- EnviroTrac	330	lf	s -	s -	s -	s -	s -	s -	\$ 94.00	\$ 31,020
Cut and chip medium, trees to 12" dia. Stockpile Pad Construction	31 11 10.10 0200	6	acre	\$ -	s -	\$ 3,323	\$ 19,939	\$ 2,295	\$ 13,769	S -	\$ 33,707
Silt Fence 30 mil HDPE Liner	31 25 13.10 1000 33 47 13.53 1100	1,000 80,000	sf	\$ 0.23 \$ 0.30	\$ 230 \$ 24,000	\$ 0.45 \$ 0.85	\$ 450 \$ 68,000	s -	\$ - \$ -	s -	\$ 680 \$ 92,000
3/4" Gravel Fill (9") Sheetpiling Along RR Tracks (40' deep, drive, extract and salvage)	ECHOS 17 03 0300 31 41 16.10 1000	2,222 228	cy ton	\$ 26.26 \$ 551.66	\$ 58,349 \$ 125,778	\$ 3.63 \$ 263.83	\$ 8,066 \$ 60,153	\$ 1.28 \$ 305.97	\$ 2,839 \$ 69,761	s -	\$ 69,255 \$ 255,693
Excavation Community Air Monitoring (Dust)	recent quote - Pine	34	mo	s	e	\$ 55	\$ 368,545	\$ 3,420	\$ 114,584		\$ 483,130
Dust Control, Heavy Grading of embankment, by dozer	Environmental 31 23 23.20 2510 31 23 23.20 2300	335 175,041	day	s -	S -	\$ - \$ -	\$ - \$ -	\$ - \$ -	\$ - \$ -	\$ 1,734.40 \$ 1.82	\$ 581,096 \$ 318,575
Soil-Excavator, hydraulic, crawler mtd. 3.5 CY cap = 350 CY/hr 34CY off-road 20min. Wait 2,000ft cycle	31 23 23.20 2300 31 23 16.42 5500 31 23 23.20 6300	175,041 152,210 175,041	bcy	s -	s -	s -	S -	s -	s -	\$ 1.16 \$ 3.22	\$ 176,564 \$ 563,633
34C Y 0TF-Road 20min. wait 2,000rt cycle Haul Road Maintenance Maintain Stockpile, 700HP Dozer, 50ft Haul	31 23 23.20 2600 31 23 16.46 6010	335 152,210	day bcy	S -	S -	S -	S -	s - s -	s -	\$ 1,141.04 \$ 1.68	\$ 382,296 \$ 255,713
Excavator Loadout, 4.5 CY bucket, 80% fill factor	31 23 16.43 4700	175,041	lcy	s -	\$ -	\$ -	\$ -	\$ -	s -	\$ 1.14	\$ 199,547
Spotter at Loadout Hazardous Soil Disposal	31 23 23.20 2310 Life Science	3,350	hrs	\$ -	\$ -	\$ -	\$ -	S -	\$ -	\$ 45.96	\$ 153,985
Soil Characterization Sampling (1 sample per 500 CY, per CWM) Hazardous Soil Disposal	Laboratories CWM	398 98,175	sample ton	s -	s -	s -	s -	s -	s -	\$593.48 \$ 140.00	\$ 236,205 \$ 13,744,556
Transportation using dumps Demurrage (assume 1 hour per week of loading)	CWM CWM	98,175 89	ton hour	\$ - \$ -	s -	\$ - \$ -	S -	s -	S -	\$ 19.50 \$ 85.00	\$ 1,914,420 \$ 7,586
Fuel Surcharge- 36% of Transportation Non-Hazardous Soil Disposal	CWM	1	ls	s -	S -	\$ -	S -	s -	S -	\$ 689,191.32	\$ 689,191
Soil transportation and disposal	Recent quote- ESG plus 10%	130,139	ton	s -	s -	s -	s -	s -	s -	\$37.68	\$ 4,903,005
Stabilization with Ecobond Treat w/ EcoBond, 5% volume added	MT2 est	70,185	ton	s -	s -	\$ -	s -	s -	s -	\$ 39.93	\$ 2,802,491
Site Restoration											
Supply and Transportation of NYS Certified Clean Back Fill Material	Recent quote- ESG	76,105	lcy	\$ 27.50	\$ 2,092,886	s -	s -	s -	s -	s -	\$ 2,092,886
Soil-Excavator, 3.5 CY cap, earthwork of clean backfill	from Seven Springs 31 23 16.42 5500	76,105	bcy	s -	s -	\$ -	s -	s -	s -	\$ 1.16	\$ 88,282
Finishing grading slopes, steep (Treated fill)	31 22 16.10 3310	11,516	sy	s -	s -	s -	s -	s -	s -	S 0.21	\$ 2,418
Topsoil	Recent quote- ESG from Seven Springs	1,919	су	\$ 45	\$ 85,407	s -	s -	s -	s -	s -	\$ 85,407
Finishing grading slopes, gentle Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	31 22 16.10 3300 32 92 19.14 5400	11,516 104	sy msf	\$ - \$ 68.11	\$ - \$ 7,059	\$ 0.09 \$ 8.90	\$ 1,036 \$ 922	\$ 0.08 \$ 8.39	\$ 921 \$ 870	S -	\$ 1,958 \$ 8,851
Fence, chain link, 9 ga. Wire, in concrete, 6' H Double swing gates, 6' H, 12' open, in concrete	32 31 13.20 0200 32 31 13.20 5060	2,100 2	lf Opng	\$ 19.64 \$ 245.25	\$ 41,244 \$ 491	\$ 4.55 \$ 341.36	\$ 9,555 \$ 683	\$ 0.99 \$ 74.03	\$ 2,079 \$ 148	s -	\$ 52,878 \$ 1,321
Mobilization and Demobilization											\$ 946,200
5% of Total Costs of Site Work, Treatment										\$ 18,923,996	\$ 946,200
Contingency 15% of Total Construction Activities										\$ 31,561,529	\$ 4,734,229 \$ 4,734,229
Professional/Technical Services											\$ 5,204,606
5% Project Management 6% Remedial Design										\$ 30,615,329	\$ 1,530,766 \$ 1,836,920
6% Construction Management LONG TERM ANNUAL MONITORING AND MAINTENANG	TE.							ANNHAL LT	TM COST (YI	RS 1-5)	\$ 1,836,920 \$23,000
								ANNUAL LT	M COST (YI		\$11,000
Monitoring, Sampling, Testing and Analysis (Per Event)								LIFETIME I	IIII (MPV)		\$221,100
Assume 80% of combined sampling event for OU1 and OU3 Site Monitoring Chamber Sampling for 1 event - includes concentration of field											\$11,388
Surface water sampling for 1 event		4	well samples	\$ -	5 -	\$ 340 \$ 340	\$ 2,720.00 \$ 1,360.00	\$ 92 \$ 92	\$ 733.01 \$ 366.50	s -	\$3,453 \$1,727
Materials Mobilization/Demobilization of Field Sampling Crew		1	event event	\$ 40 \$ -	S -	s -	s -	s -	s -	\$ 680.00	\$40 \$680
Reporting Laboratory analysis	I:6. S-:	40	нГ	\$85	\$ 3,400.00	\$ -	S -	S -	5 -	s -	\$3,400
Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value)	Life Science Laboratories	12	ca	s -	s -	s -	s -	s -	s -	S 174.00	\$2,088
5 Years of Semi-Annual Monitoring 25 Years of Annual Monitoring											
5% Discount Factor (per NYSDEC)											
TOTAL ESTIMATED NPV TECHNOLOGY COST	(Capital + Lifetir	ne O&M +	Post Remed	iation Mon	itoring)						\$41,721,000

REMEDIAL ALTERNATIVE			LOCATION		ME	EDIA	Estimat	ed Cost to Ir	nplement	\$41,	721,000
Soil/Fill Material Alternative 7		Old U	pper Mountai	n Road	Soil/Fi	ll - OU1		Co	nstruction Time	34	months
Partial Removal (Deeper Fill) and Off-site Disposal, with	In Situ Stabilization		Lockport, NY	č.					Operation Time:	-	months
(Shallow Fill 0-14 ft Depth)			•					Post Remedia	ation Monitoring	30	vears
		Qua	intities			Cost Breakdo	wn (if available)			Combined Unit	
Description	Data Source (Means ¹ or Other)	Quantity	Quantity	Material	Material	Labor	Labor	Equipment	Equipment		Option
	(Means of Other)	Amount	Unit	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
Assumptions:			T			1			1.		
Working condition is Safety Level:		D	(Labor product		82%	; Equipment p	roductivity:	100%	P		
Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor		101.4%		for costs derived	from vendor qu	iotes).					
Inflation			6 per year								Labor
Estimated number of soil samples		37			times sampled		0.25	hrs/sample		695	Cost per hr
Estinated number of son samples			samples	20%	added for QA/Q	C samples	0.23	worker sampling		303	cost per in
Characterization Cost	Table A (per CWM)	\$593.4	8 per sample								
Analytical cost	TAL Metals		per sample								
For each sampling event, assumed:		\$5		oves, notebooks,	etc.)						
Disposal			_								
Lead contaminated soil as a "listed" waste- incineration		\$27	per ton		98,175	tons soil hazard	ous (assume 43%	hazardous)			
					22	tons per load		4,463	loads for haz dis	posal	
Lead contaminated soil as non-haz		\$39.8	7 per ton		130,139	tons soil for nor	n-haz disposal		loads for non-ha		
Concrete		3,300	lbs per cy					70,185	tons for treatmen	nt	
Typical Rental Rates - Includes G&A and 10% Profit						150	ft/day drilling	1000	tons per day fo	r treatment	
Mini-Rae Survey Mode PID		\$96.0	8 per day					20	loads per day		
Truck/SUV (1/2 ton or smaller)		\$70.7	4 per day					20	working days pe	r month	
			_						hours per work		
Work day consists of:		10	hrs							-design activities	
									months for site p		
Excavation With Concrete and Asphalt:		-						29	months of constr	ruction	
Concrete and Asphalt:	0.0%	% of excavation	n volume								
Excavation Area: Excavation Volume:	0	sf		٦.							
Excavation volume: Excavated Weight:	152,210 228,315	cy	175,041	icy							
Roll-off dumpster can hold approximately:		tons									
Kon-on dumpster can note approximately.	12	tons									
Notes											
Sy square yard	mo	month									
cy cubic yard	ls	lump sum									
lcy loose cubic yard	O&M	Operation and a	naintenance								
bey bank cubic yard	H&S	Health and Sa									
If linear feet			-								
sf square feet											
1 000 fort											

REMEDIAL ALTERNATIVE			LOCATION		ME	DIA	Estimate	ed Cost to In	nplement	\$23,	557,000
Soil/Fill Material Alternative 8 Partial Removal (Deeper Fill) with Ex Situ Stabilization and	On-site Disposal with		pper Mountai Lockport, NY		Soil/Fil	I - OU1			nstruction Time:		months months
In Situ Stabilization (Shallow Fill 0-14 ft De	pth)								tion Monitoring	30 Combined Unit	
Description	Data Source	Quantity	Quantity	Material	Material	Cost Breakdow Labor	n (if available)	Equipment	Equipment	Costs	Option
	(Means ¹ or Other)	Amount	Unit	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
REMEDIAL ACTION			PITAL COST led to nearest	thousand)							\$23,336,000
Construction Activities		1			\$558,377		\$710,752		\$253,454	\$37,333	\$ 17,667,109
Pre-Design Pilot Study Pilot Study Treatment	MT2 Estimate	5	ton	s -	s -	s -	s -	s -	s -	s 33.24	\$ 166
Sample analysis Site Preparation	MT2 Estimate	1	sample	s -	\$ -	s -	s -	s -	s -	\$ 550.00	\$ 550 \$
Utility Locator (based on recent bids)	recent quote	0.5	day	s -	s -	S -	\$ -	S -	s -	S 2,475.00	\$ 1,238
Erosion & Sediment Control Plan Stabilization Measures for Erosion and Sedimentation Control	Engineer's Estimate	1	ls	s -	s -	S -	s -	s -	s -	\$ 30,000	\$ 30,000
Silt Fence, 3' high, adverse conditions Sewer Relocation	31 25 14.16 1000	1,200	lf	S 0.21	\$ 252	S 0.47	\$ 564	S -	s -	s -	\$ 816
Excavating Trench to install sewer pipe, 10' to 14' deep, 1.5 CY excavator, PVC sewer pipe, 13' lengths, 18" diameter	with 31 23 16.13 1000 33 31 13.25 2300	2,785 1,400	bcy	S -	s -	S -	s -	S -	s -	\$ 8.96 \$ 28.74	\$ 24,958 \$ 40,236
Install manholes- concrete, precast, 4' ID, 10' deep	33 49 13.10 0600 and 0700	1,400	ea	s 1,358.94	\$ 5,436	s 2,636.87	\$ 10,547	S 129.90	\$ 520	S -	\$ 16,503
Supply and Transportation of NYS Certified Clean Back Fill Material	Recent quote- ESG										
Haul Road Upgrades	from Seven Springs	2,698	cy	S 28	\$ 74,184	s -	s -	s -	s -	s -	S 74,184
Haul Road Upgrades, Roads. 8" gravel (From ravine to upper staging area)	01 55 23.50 0100 34 71 13.26 1120	917 350	sy	s -	s -	s -	s -	s -	s -	S 13.86 S 69.74	S 12,705 S 24,409
Install Guard Rails along Haul Road, corr steel, steel box beam Monitoring Well Abandonment	recent quote- EnviroTrac	350 240	lf	s -	s -	s -	s -	s -	s -	S 69.74 S 22.00	\$ 24,409 \$ 5,280
Monitoring Well Installation	recent quote- EnviroTrac	330	lf	s -	s -	s -	s -	s -	s -	s 94.00	\$ 31,020
Cut and chip medium, trees to 12" dia. Stockpile Pad Construction	31 11 10.10 0200	6	acre	S -	s -	S 3,323	\$ 19,939	S 2,295	\$ 13,769	S -	\$ 33,707
Silt Fence 30 mil HDPE Liner	31 25 13.10 1000 33 47 13.53 1100	1,000 80,000	lf of	\$ 0.23 \$ 0.30	\$ 230 \$ 24,000	\$ 0.45 \$ 0.85	\$ 450 \$ 68,000	s -	s -	s -	\$ 680 \$ 92,000
3/4" Gravel Fill (9")	ECHOS 17 03 0300	2,222	sf cy	\$ 26.26	\$ 58,349	\$ 3.63	\$ 8,066	S 1.28	\$ 2,839	s -	\$ 69,255
Sheetpiling Along RR Tracks (40' deep, drive, extract and salvage) Excavation	31 41 16.10 1000	228	ton	\$ 551.66	\$ 125,778	S 263.83	\$ 60,153	S 305.97	\$ 69,761	s -	\$ 255,693
Community Air Monitoring (Dust)	recent quote - Pine Environmental	43	mo	s -	s -	S 55	\$ 476,227	S 3,420	\$ 148,063		s 624,290
Dust Control, Heavy Grading of embankment, by dozer	31 23 23.20 2510 31 23 23.20 2300	433 175,041	lcy	S -	s -	s -	S -	S -	s -	S 1,734.40 S 1.82	\$ 750,879 \$ 318,575
Soil-Excavator, hydraulic, crawler mtd. 3.5 CY cap = 350 CY/hr 34CY off-road 20min. Wait 2,000ft cycle	31 23 16.42 5500 31 23 23.20 6300	152,210 175,041		s -	s -		s -	s -	s -	\$ 1.16 \$ 3.22	\$ 176,564 \$ 563,633
Haul Road Maintenance Maintain Stockpile, 700HP Dozer, 50ft Haul	31 23 23.20 2600 31 23 16.46 6010	433 152,210		S -	s -	S -	s - s -	S -	s -	\$ 1,141.04 \$ 1.68	\$ 493,994 \$ 255,713
Excavator Loadout, 4.5 CY bucket, 80% fill factor Spotter at Loadout	31 23 16.43 4700 31 23 23.20 2310	175,041 4,329		s -	s -	s -	s -	s -	s -	S 1.14 S 45.96	\$ 199,547 \$ 198,976
Treat w/ EcoBond In Situ, 5% volume added	MT2 est	70,185	ton	e	•	e	•	e	e	s 39.93	S 2,802,491
Treat w/ EcoBond Ex Situ, 5% volume added	MT2 est	228,315	ton	s -	\$ -	s -	s -	s -	s -	\$ 39.93	\$ 9,116,614
Landfill Base Drainage Layer Removal of Sediment in Drainage Layer Area											
Soil-Excavator, hydraulic, crawler mtd. 2 CY cap = 165 CY/hr 12 CY truck, 15 mph average, cycle 2 miles, 10 min wait/ld/unld	31 23 16.42 0260 31 23 23.20 1218	4,222.22 4,222.22	lcy	S -	s -	S 0.65 S 1.83	\$ 2,744 \$ 7,727	S 1.03 S 3.11	\$ 4,349 \$ 13,131	s -	\$ 7,093 \$ 20,858
Supply 6" perf pipe (used PVC cost) Supply and transport gravel for drainage layer, 13 cy load, 2 hr haul	Recent quote Engineer's Estimate	1,125.00	lf		s -		s -	S -	S -	S 14.54	\$ 16,358
Placement of gravel for drainage layer, 24" thickness	Engineer's Estimate	4,222.22	cy	S 8.50	\$ 35,889	S 13.07	\$ 55,184	s -	s -	S -	\$ 91,073
Deploy 10oz/sy mil Nonwoven Geotextile (Level C)	ECHOS 2006 33 08 0533	4,222.22 6,333.33	ev		s -		s -		s -	S 18.24 S 2.40	\$ 77,013 \$ 15,200
Treated Soil Placement Excavator Loadout, 4.5 CY bucket, 80% fill factor	31 23 16.43 4700	175.041	lov	c	•	e	•	e	s -	S 1.14	S 199.547
12 CY truck, 15 mph average, cycle 1 mile, 15 min wait/ld/unld	31 23 23.20 1016 31 23 23.23 5060	175,041 152,210	lcy	S -	s -	S -	s -	S -	s -	S 3.38 S 0.26	\$ 591,640 \$ 39.575
Compaction, riding, vibrating roller, 2 passes, 12" lifts Finishing grading slopes, steep	31 22 16.10 3310	12,000	sy	s -	\$ -	s -	\$ -	s -	\$ -	S 0.26	\$ 2,520
Capping Finishing grading slopes, gentle	31 22 16.10 3300	12,778	sy	s -	s -	S 0.09	\$ 1,150	S 0.08	\$ 1,022	s -	\$ 2,172
Gas Vents	Recent quote- Modern Environmental	3	en.	s -		s -		s -		S 1,570.00	\$ 4,710
Supply and Transportation of NYS Certified Clean Back Fill Material	Recent quote- ESG from Seven Springs	8,519	ev	s 28	\$ 234,259	s -	s .	s -	s -	s -	s 234,259
Spreading and Compaction of General Fill	ECHOS 2006 17 03 0422	8,519	cy	s -	s -	S -	s -	s -	s -	s -	s -
Site Restoration											
Topsoil	Recent quote- ESG from Seven Springs	1,919	ev	s 45	\$ 85,407	s -	s -	s -	s -	s -	S 85,407
Finishing grading slopes, gentle Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	31 22 16.10 3300 32 92 19.14 5400	11,516 104	sy	S - S 68.11	\$ - \$ 7,059	S 0.09 S 8.90	\$ 1,036 \$ 922	S 0.08 S 8.39	S 921 S 870	S -	\$ 1,958 \$ 8,851
Fence, chain link, 9 ga. Wire, in concrete, 6' H	32 31 13.20 0200	2,100	lf	S 19.64	\$ 41,244	S 4.55	\$ 9,555	S 0.99	\$ 2,079	s -	\$ 52,878
Double swing gates, 6' H, 12' open, in concrete	32 31 13.20 5060	2	Opng	S 245.25	\$ 491	\$ 341.36	\$ 683	S 74.03	\$ 148	S -	\$ 1,321
Mobilization and Demobilization 5% of Total Costs of Site Work, Treatment										S 274,017	\$ 13,701 \$ 13,701
Contingency											\$ 2,652,121
15% of Total Construction Activities										\$ 17,680,810	S 2,652,121
Professional/Technical Services 5% Project Management										S 17,667,109	\$ 3,003,409 \$ 883,355
6% Remedial Design											\$ 1,060,027
6% Construction Management LONG TERM ANNUAL MONITORING AND MAINTENAL	NCE								TM COST (YE		\$ 1,060,027 \$23,000
								ANNUAL LT LIFETIME L	M COST (YI	RS 6-30)	\$11,000 \$221,100
Monitoring, Sampling, Testing and Analysis (Per Event)								L. L. ZTIMIE I	(.111)		
Assume 80% of combined sampling event for OU1 and OU2 Site Monitoring											\$11,388
Groundwater sampling for 1 event - Includes collection of field parameters			well samples	s -	s -	S 340 S 340		S 92 S 92			\$3,453 \$1,727
Surface water sampling for 1 event Materials Malleria Characteristics of Civil Country Country Materials		1	event	\$ 40				s 92			\$40
Mobilization/Demobilization of Field Sampling Crew Reporting		1 40		\$ -	\$ - \$ 3,400.00		s -	s -	s - s -	\$ 680.00 \$ -	\$680 \$3,400
Laboratory analysis Metals and VOCs, plus 20% QA/QC	Life Science	-									
Lifetime Long Term Monitoring (Net Present Value)	Laboratories	12	ea	s -	2 -	5 -	\$ -	s -	5 -	S 174.00	\$2,088
5 Years of Semi-Annual Monitoring 25 Years of Annual Monitoring					<u></u>						
5% Discount Factor (per NYSDEC)	•						-				

REMEDIAL ALTERNATIVE			LOCATION		ME	EDIA	Estimate	ed Cost to In	nplement	\$23,	557,000
Soil/Fill Material Alternative 8		Old Ur	per Mountai	n Road	Soil/Fil	II - OU1		Co	nstruction Time:	43	months
Partial Removal (Deeper Fill) with Ex Situ Stabilization and On	site Disposal, with		Lockport, NY						Operation Time:		months
In Situ Stabilization (Shallow Fill 0-14 ft Dept									tion Monitoring	30	vears
	-,	Quan	tities			Cost Breakdov	vn (if available)			Combined Unit	, cars
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
TOTAL ESTIMATED NPV TECHNOLOGY COST (Capital + Lifetim	e O&M + Po	st Remedia	tion Monito	ring)						\$23,557,000
Assumptions:						_			_		
Working condition is Safety Level:		D	(Labor product		82%	; Equipment pr	oductivity:	100%	Ь		
Weighted Average of city cost index (Buffalo, NY)			(not applicable	for costs derived	from vendor que	otes).					
Costs are loaded with a profit factor		10%									
Inflation		3%	per year					_			Labor
Estimated number of soil samples		0	samples		times sampled		0.25	hrs/sample		\$85	Cost per hr
				20%	added for QA/Q0	C samples	1	worker sampling			
Characterization Cost	Table A (per CWM)	\$593.48	per sample								
Analytical cost	TAL Metals	\$75.00	per sample								
For each sampling event, assumed:		\$50	for materials (glo	oves, notebooks, e	tc.)						
Disposal											
Lead contaminated soil as a "listed" waste- incineration		\$275	per ton		228,315	tos soil treated e:	situ for onsite di	sposal			
					22	tons per load		10,378	loads for haz disp	posal	
Lead contaminated soil as non-haz		\$39.87	per ton		130,139	tons soil for non-	haz disposal	5,915	loads for non-haz	z disposal	
								70,185	tons for in situ tre	eatment	
Concrete		3,300	lbs per cy						CY per day for e		
Typical Rental Rates - Includes G&A and 10% Profit						150	ft/day drilling		tons per day for		
Mini-Rae Survey Mode PID		\$96.08	ner day				,		loads per day		
Truck/SUV (1/2 ton or smaller)		\$70.74							working days per	r month	
Track 50 v (12 toll of similar)		\$10.74	per uny						hours per worki		
Work day consists of:		10	hre						nours per work	ing duy	
work day Collaists of.		10	iiis					2	months for site p	non/nortomation	
Excavation With Concrete and Asphalt:									months of constr		
Concrete and Asphalt:	0.0%	% of excavation v	olumo					40	months of constr	uction	
Concrete and Aspnait: Excavation Area:	0.0%	o or excavation v	rotune								
Excavation Area: Excavation Volume:	152,210	81	175,041	h							
Excavation Volume: Excavated Weight:		tons	175,041	jiey							
		tons									
Roll-off dumpster can hold approximately:	12	ions									
Notes											
Sy square yard	mo	month									
cy cubic yard	ls	lump sum									
lcy loose cubic yard	O&M	Operation and ma	intenance								
bcy bank cubic yard	H&S	Health and Safe									
If linear feet		Sale	~								
sf square feet											
msf 1.000 square feet											
nisi 1,000 square reer											

	Option	Total NPV Cost	Capital Cost	Lifetime Monitoring	Lifetime O&M	Time to (Complete
18	Site Management	\$87,000	\$41,000	\$46,117	NA	2	months
2	In situ Multi-media Sub-aqueous Capping	\$2,889,000	\$2,775,000	\$113,900	NA	24	months
3	In Situ Sediment Amendment	\$2,334,000	\$2,295,000	\$39,400	NA	24	months
4	Complete Removal Dredging (Mechanical) with Dewatering and On-site Disposal	\$4,638,000	\$4,638,000	NA	NA	12	months
5	Mass Removal Dredging with Onsite Disposal and Multi-Media Residual Capping	\$3,887,000	\$3,875,000	NA	NA	12	months

REMEDIAL ALTERNATIVE	LOCATION			MI	EDIA	Estimate	d Cost to In	\$87	,000	
OU 2 Alternative 1B	Old U	pper Mounta	in Road	Sedime	ent - OU2		Cor	2	months	
Site Management	0.00	Lockport, N		Stame	002			Operation Time:		months
		1,						tion Monitoring	30	years
	Qua	ntities		•	Cost Breakdov	wn (if available)			Combined Unit Costs	
Description Data Source (Means¹ or Other	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
REMEDIAL ACTION	TOTAL CAI	PITAL COST	,	Total Cost	Onit Cost	Total Cost	Oint Cost	Total Cost	Unit Cost	\$41,000
Site Management Activities	1			\$()	\$0		\$0	\$65,433	\$ 35,433
Surveyor- monument installation	1	ls	s -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10,000	\$ 10,000
Lawyer	1	ls	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 15,000	\$ 15,000
Fence, chain link, 9 ga. Wire, in concrete, 6' H 32 31 13.20 0200	200	lf	\$ 15.92	\$ 3,184		\$ 706	\$ 1.11	\$ 222	\$ 15,000	\$ 4,112
Double swing gates, 6' H, 12' open, in concrete 32 31 13.20 5060		Opng	\$ 245.25	\$ 491		\$ 683	\$ 74.03	\$ 148	s -	\$ 1,321
Signage, assume small signs attached to perimeter fencing	1	ls	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,000	\$ 5,000
Professional/Technical Services	1		Ψ	Ψ		Ψ	Ψ	Ψ	Φ 5,000	\$ 6,024
5% Project Management					+	1			\$35,433	\$ 1,772
6% Remedial Design									ψ33,433	\$ 2,126
6% Construction Management					+	1				\$ 2,126
LONG TERM ANNUAL MONITORING AND MAINTENANCE		1		L			ANNUAL LT LIFETIME L		SS 1-30)	\$3,000 \$46,117
Monitoring and Maintenance										. ,
Site Monitoring										\$ 2,766
Mobilization/Demobilization of Inspector	1	event	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 340	\$ 340
Surface water sampling for 1 event	4	samples	\$ -	\$ -	\$ 42.50	\$ 170	\$ -	\$ -	\$ -	\$ 170
Materials	1	event	\$ 50.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 50
Reporting	6	hr	\$ -	\$ -	\$ 85.00	\$ 510	\$ -	\$ -	\$ -	\$ 510
Laboratory analysis										
Life Science					s -	4				Φ
Metals and VOCs, plus 20% QA/QC Laboratories	4	ea	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 174	\$ 696
Maintenance- Fence Maintenance Repair fence 32 01 90.19 1670	1	ls	s -	\$ -	\$ -	s -	\$ -	¢	\$ 1,000	\$ 1,000
Repair fence 32 01 90.19 1670 Lifetime Long Term Monitoring (Net Present Value)	1	is	\$ -	5 -	5 -	\$ -	3 -	\$ -	\$ 1,000	\$ 1,000
30 Years of Annual Monitoring										
· · ·										
5% Discount Factor (per NYSDEC)						ll				
TOTAL ESTIMATED NPV TECHNOLOGY COST (Capital + Lifetin	ne O&M + Po	ost Remedia	ntion Monito	ring)						\$87,000
Assumptions:										
Labor Cost per hr \$1	35									
	1 5 50	101.4% 3%			Metals VOCs		per sample per sample			
	hrs/SW sample									

OUA III II A		LOCATIO!		ME		Estimat	ed Cost to Im	\$2,889,000			
OU 2 Alternative 2 In situ Multi-media Sub-aqueous Capping	3		per Mounta Lockport, N		Sedimer	nt - OU2		,	Construction Time: Operation Time:	months months	
				1		G .B 11	Post Remediation Monitor			30 Combined Unit	years
Description	Data Source	Quantity Quantity	Quantity	Material	Material	Cost Breakdo	wn (if available) Labor	Equipment	Equipment	Costs	Option
	(Means ¹ or Other)	Amount	Unit	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
REMEDIAL ACTION		TOTAL CAPIT									\$2,775,000
		(totals rounded	1 to nearest	thousand)							
Construction Activities Pre-Construction		1			\$51,912		\$45,019		\$13,032	\$62,744	\$ 2,023,017
Apply for wetland permits Hydrology and Hydraulics study, no FEMA LOMR	Engineer's Estimate Engineer's Estimate		LS LS	s - s -	s - s -	s - s -	S 15,000 S 40,000	s - s -	s -	s - s -	S 15,000 S 40,000
Fluvial Geomorph Investigation	Engineer's Estimate	- 1	LS	s -	s -	s -	\$ 10,000	s -	s -	s -	S 10,000
Site Preparation Utility Locator (based on recent bids)	recent quote	0.5	day				s -	6	c	\$ 2,475.00	S 1,238
	Recent bids			3 -				3 -	3 -		
Survey 1-foot contours Cut and chip medium, trees to 12" dia.	31 11 10.10 0200	9.5	acres acre	s -	s -	s -	S -	s -	s -	\$ 4,400.00 \$ 5,617.88	\$ 44,000 \$ 53,370
Haul Road Upgrades, Roads. 8" gravel (From ravine to upper staging area) Install Guard Rails along Haul Road, corr steel, steel box beam	01 55 23.50 0100 34 71 13.26 1120	917 350	sy lf	s -	s - s -	s -	S -	s - s -	s - s -	\$ 13.86 \$ 69.74	S 12,705 S 24,409
2 laborers, 2 hrs per day, 10 days for controlled release of beaver dams	Means labor costs p 481	40	hrs	s -	s -	\$ 52.67	S 2,107	s -	s -	s -	S 2,107
Dewatering											
Installation of gravity pipe (2x18"corr metal pipe) Outlet protection (Class II rip-rap for slope and channel protection)	31 23 19.20 1400 Recent Bids	3,600 20		\$ 14.42 \$ -	\$ 51,912 \$ -	\$ 11.92 \$ -	s -	s -	S -	\$ - \$ 78.75	\$ 107,856 \$ 1,575
Misc erosion and sediment control (silt fences, stockpiles, etc) Capping	Engineer's Estimate	1	LS	S -	s -	s -	S -	S -	S -	\$ 50,000.00	\$ 50,000
Deploy 10oz/sy mil Nonwoven Geotextile (Level C)	ECHOS 2006 33 08 0533	28,848	sy	s -	s -	s -	s -	s -	s -	\$ 2.40	S 69,178
Supply and Transportation of Clean Sand to Site - Triaxel 13CY.load, 85/HR to Supply and Transportation Clean Graded Armor Stone	ruclRecent Bids Recent Bids	9,616 9,616	cy	\$ 8.50 \$ 27.50		\$ 13.07 \$ 13.07	s -	s -	s -	\$ 23.73 \$ 44.63	\$ 228,159 \$ 429,133
Spreading and Compaction of Sand 1' thick Spreading and Compaction of Stone 1' thick		9,616 9,616		s - s -	S -	\$ - \$ -	S -	s -	s -	\$ 9.12 \$ 9.12	\$ 87,716 \$ 87,716
Haul Road Maintenance Restoration	31 23 23.20 2600	104	day	s -	s -	s -	S -	s -	s -	\$ 1,141.04	\$118,66
Topsoil 6"	Recent quote- ESG from Seven Springs	4,808	cy	\$ 44.50	s -	s -	s -	s -	s -	\$ 44.50	S 213,956
Spreading Topsoil 6" Lifts	ECHOS 2006 18 05 0301 32 92 19.14 5800 with	4,808	cy	s -	s -	s -	s -	s -	s -	\$ 9.43	\$ 45,328
Wetland Seeding by hydroseeder with feritilizer and lime	adjustment for native species	260	msf	\$ 61.30	\$ 15,914	\$ 8.90	s 2,311	\$ 8.39	s 2,178	s	S 20,403
Riffle Grade Controls for Cap Stability and Habitat Restoration Grade Stream Channel Through Cap	Recent Bids	5 3,300	EA LF	\$ -	\$ -	\$ -	\$ - \$ -	\$ - \$ -	\$ -	\$ 20,740.00 \$ 21.00	\$ 103,700 \$ 69,300
Sod and Log Structures to maintain stream pattern	Recent Bids Recent Bids			s -	s -	\$ -	s -	s -	\$ -	\$ 7,500.00	\$ 187,500
Mobilization and Demobilization											\$ 91,178
5% of Total Costs of Site Work, Treatment										\$ 1,823,559	\$ 91,178
Contingency 15% of Total Construction Activities										\$ 2,114,195	\$ 317,129 \$ 317,129
Professional/Technical Services											\$ 343,913
5% Project Management 6% Remedial Design										\$ 2,023,017	\$ 101,151 \$ 121,381
6% Construction Management LONG TERM MONITORING								ANNUALITA	I COST (YRS 1-		\$ 121,381 \$ 11,000
LONG TERM MONITORING									I COST (YRS 6-		\$ 6,000
Monitoring, Sampling, Testing and Analysis (Per Event)		1		1				LIFETIME LT	M (NPV)	l	\$113,900
Assume 20% of combined sampling event for OU1 and OU2											\$ 5,507
Site Monitoring Surface water sampling for 1 event		4	samples	s -	s -	\$ 22.91	S 92	s -	s -	s -	S 92
Site Monitoring Surface water sampling for 1 event Materials Mobilization/Demobilization of Field Sampling Crew		1	samples event event	S - S 50 S -	\$ - \$ 50 \$ -	s -	S -	s -	S -	\$ - \$ - \$ 680.00	\$ 50
Surface water sampling for 1 event Materials Mobilization/Demobilization of Field Sampling Crew Reporting		1	event event		\$ - \$ 50 \$ - \$ 3,400	S - S -	S - S - S -	S - S - S -	S - S -	\$ - \$ - \$ 680.00 \$ -	\$ 50 \$ 680 \$ 3,400
Surface water sampling for 1 event Materials Mobilization/Demobilization of Field Sampling Crew		1	event event	\$ 50 \$ -	s -	s -	S -	s - s -	s - s -	\$ - \$ - \$ 680.00 \$ -	\$ 50 \$ 680 \$ 3,400
Surface water sampling for I event Materials Mobilization Demobilization of Field Sampling Grew Reporting Cap Inspection, 4 hrs each event, mob/demob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC	Life Science Laboratories	1	event event	\$ 50 \$ -	s -	S - S -	S - S - S -	S - S - S -	S - S -	\$ - \$ 680.00 \$ - \$ -	\$ 50 \$ 680 \$ 3,400 \$ 413
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mob/demob with monitoring event Laboratory analysis		1	event event	\$ 50 \$ -	s -	S - S -	S - S - S -	S - S - S -	S - S -	s -	\$ 50 \$ 680 \$ 3,400 \$ 413
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mobidemob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5 Years of Semi-Annual Monitoring 25 Years of Semi-Annual Monitoring		1	event event	\$ 50 \$ -	s -	S - S -	S - S - S -	S - S - S -	S - S -	s -	\$ 50 \$ 680 \$ 3,400 \$ 413
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mob/demob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5. Years of Semi-Annual Monitoring 25. Years of Semi-Annual Monitoring 55% [Discount Factor (per NYSDEC)	Laboratories	1 1 40 1	event event hr ea ea	\$ 50 \$ - \$ 85.00 \$ -	\$ - \$ 3,400 \$ -	S - S -	S - S - S -	S - S - S -	S - S -	s -	\$ 55 \$ 680 \$ 3,400 \$ 415 \$ 870
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Impection, 4 hrs each event, mobidemob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) Syrars of Sami-Annual Monitoring Syrars of Annual Monitoring Discount Factor (per NYSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST	Laboratories	1 1 40 1	event event hr ea ea	\$ 50 \$ - \$ 85.00 \$ -	\$ - \$ 3,400 \$ -	S - S -	S - S - S -	S - S - S -	S - S -	s -	\$ 50 \$ 680 \$ 3,400 \$ 413
Surface water sampling for I event Materials Mobilization Demobilization of Field Sampling Crew Reporting Cop Impection, 4 hrs each event, mobidemob with monitoring event Laboratory analysis Metals and VICCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) S Years of Semi-Annual Monitoring 25 Years of Annual Monitoring Total Estimated New York Copy (Net Present Value) TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level:	Laboratories	1	event event hr ea ca Remediat	\$ 50 \$ - \$ 85.00 \$ -	\$ - 3,400 \$ - \$ \$ - \$	\$ - \$ - \$ - \$ - \$ \$ - \$ \$ - \$ \$ - \$ \$ - \$ \$ \$ - \$ \$ \$ - \$ \$ \$ \$ - \$ \$ \$ \$ - \$ \$ \$ \$ \$ - \$	\$ - \$ - \$ - \$ 340.00	S - S - S -	S - S -	s -	\$ 5688 \$ 3,400 \$ 41:
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Reporting Approximation of Field Sampling Crew Reporting Approximation of the cach event, mobidemob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5 Years of Semi-Annual Monitoring 25 Years of Annual Monitoring 35 Years of Annual Monitoring TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor	Laboratories	1 1 40 40 1 1 5 5 CO&M + Post D 101.4%	event event hr ca Remediat (Labor produ (not applicah	\$ 50 \$ 50 \$ 85.00 \$ -	\$ - 3,400 \$ - \$ \$ - \$	\$ - \$ - \$ - \$ - \$ \$ - \$ \$ - \$ \$ - \$ \$ - \$ \$ \$ - \$ \$ \$ - \$ \$ \$ \$ - \$ \$ \$ \$ - \$ \$ \$ \$ \$ - \$	\$ - \$ - \$ - \$ 340.00	\$ - \$ - \$ - \$ 75.00	S - S -	S - S - S 174.00	\$ 58 \$ 688 \$ 3,404 \$ 412 \$ \$70
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mobidemob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5. Years of Semi-Annual Monitoring 25. Years of Semi-Annual Monitoring 55% Discount Factor (per NYSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY)	Laboratories	1 1 40 40 1 1 5 5 CO&M + Post	event event hr ea ca Remediat	S 50 S - S 85.00 S - S - S - S - S - S - S - S - S - S -	\$ 3,400 \$ - \$ 3 \$ 3,400 \$ -	S - S - S - S - S - S - S - S - S - S -	\$ - \$ - \$ - \$ 340.00	\$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ -	S - S -	\$ - \$ 174.00	\$ 5688 \$ 3,400 \$ 41:
Surface water sampling for I event Materials Mobilization Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mobidemob with monitoring event Laboratory analysis Laboratory analysis VCK, plus 20% QAQC Lifetime Long Term Monitoring (Net Present Value) 5	(Capital + Lifetime	1 1 40 40 11 5 5 5 5 5 5 5 5 5 5 6 6 6 6 6 6 6 6	event event hr ca Ca Remediat (Labor produ(not applicah per year samples per sample	\$ 50 \$ 5 - \$ 85.00 \$ - \$ 100 \$ 5 - \$ 100 \$ 5 - \$ 100 \$	\$ 3,400 \$ - \$ - \$ -	S - S - S - S - S - S - S - S - S - S -	\$ - \$ - \$ - \$ 340.00 \$ - \$	S - S - S - S - S - S - S - S - S - S -	S - S -	\$ - \$ 174.00	\$ 55 \$ 658 \$ 3,400 \$ 412 \$ 870 \$2,889,000
Surface water sampling for I event Materials Mobilization Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mobidemob with monitoring event Laboratory analysis Laboratory analysis Surface Su	Laboratories (Capital + Lifetime	1 1 40 40 11 5 5 5 5 5 5 5 5 5 5 6 6 6 6 6 6 6 6	event event hr ca Ca Remediat (Labor produ (mot applicah per year samples per sample	S 50 S - S 85.00 S - S - S - S - S - S - S - S - S - S -	S - 3,400 S S S	S - S - S - S - S - S - S - S - S - S -	\$ - \$ - \$ - \$ 340.00 \$ - \$	\$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ -	S - S -	\$ - \$ 174.00	\$ 55 \$ 658 \$ 3,400 \$ 412 \$ 870 \$2,889,000
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 Ins each event, mobidemob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/OC Lifetime Long Term Monitoring (Net Present Value) 5	(Capital + Lifetime	1 1 40 40 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	event hr ca ca (Labor produ (not applicab per year samples per sample for materials (\$ 50 50 50 50 50 50 50 50 50 50 50 50 50	S - 3,400 S S S	S - S - S - S - S - S - S - S - S - S -	S	S - S - S - S - S - S - S - S - S - S -	S - S -	\$ - \$ 174.00	\$ 55 \$ 658 \$ 3,400 \$ 412 \$ 870 \$2,889,000
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mob/demob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5. Years of Semi-Annual Monitoring 25. Years of Semi-Annual Monitoring 35% Discount Factor (per NVSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated sediment as a "listed" waste-incineration	(Capital + Lifetime	1 1 4 40 40 1 1 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	event event hr ca ca (Labor prodi (not applicab per year sample per sample for materials (per ton	\$ 50 50 50 50 50 50 50 50 50 50 50 50 50	S - 3,400 S S S	S - S - S - S - S - S - S - S - S - S -	\$ \$	\$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ -	\$	S - S - S - S - S - S - S - S - S - S -	\$ 55 \$ 658 \$ 3,400 \$ 412 \$ 870 \$2,889,000
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mob/demob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5. Years of Semi-Annual Monitoring 25. Years of Semi-Annual Monitoring 35% Discount Factor (per NVSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost Feech sampling event, assumed: Disposal Lead contaminated sediment as a "listed" waste-incineration Lead contaminated sediment as non-haz	(Capital + Lifetime	1 1 1 40 40 1 1 1 1 1 1 1 1 1 1 1 1 1 1	event hr ea ca (Labor produ (not applicah per sample for materials (per ton per ton	\$ 50 50 50 50 50 50 50 50 50 50 50 50 50	\$ - 3,400 \$ \$ 5 \$ 5 \$ 6 \$ 6 \$ 7 -	S	\$ \$	\$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ -	\$	S - S - S - S - S - S - S - S - S - S -	\$ 55 \$ 658 \$ 3,400 \$ 412 \$ 870 \$2,889,000
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mob/demob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5 Years of Semi-Annual Monitoring 25 Years of Semi-Annual Monitoring 35% Discount Factor (per NVSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated sediment as a "listed" waste-incineration Lead contaminated sediment as non-haz Concrete Typical Retatal Rates - Includes G&A and 10% Profit	(Capital + Lifetime	1 1 1 40 40 1 1 1 1 1 1 1 1 1 1 1 1 1 1	event hr ca ca (Labor productor applicab per year samples per sample for materials of per ton lbs per cy	\$ 50 50 50 50 50 50 50 50 50 50 50 50 50	\$ - 3,400 \$ \$ 5 \$ 5 \$ 6 \$ 6 \$ 7 -	S - S - S - S - S - S - S - S - S - S -	\$ \$	S - S - S - S - S - S - S - S - S - S -	S	S - S - S - S - S - S - S - S - S - S -	\$ 55 \$ 658 \$ 3,400 \$ 412 \$ 870 \$2,889,000
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mobidemob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5 Years of Annual Monitoring 55 Years of Annual Monitoring 55 Discount Factor (pen NYSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated sediment as non-haz Concrete	(Capital + Lifetime	1 1 40 40 40 40 40 40 40 40 40 40 40 40 40	event hr ea ca (Labor produ (not applicah per sample for materials (per ton per ton	\$ 50 50 50 50 50 50 50 50 50 50 50 50 50	\$ - 3,400 \$ \$ 5 \$ 5 \$ 6 \$ 6 \$ 7 -	S	\$ \$	\$ \$ \$ \$ \$ \$ \$ \$ -	S	\$ - \$ \$ 174.00 \$ \$85.	\$ 55 \$ 658 \$ 3,400 \$ 412 \$ 870 \$2,889,000
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mob/demob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5 Years of Semi-Annual Monitoring 25 Years of Semi-Annual Monitoring 25 Discount Factor (per NYSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are haded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost Lead contaminated sediment as a "listed" waste- incineration Lead contaminated sediment as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rea Survey Mode PID	(Capital + Lifetime	1 1 40 40 40 40 40 40 40 40 40 40 40 40 40	event hr ca ca (Labor prodi (not applicab per year samples per sample per sample per sample per somple per sample per sample	\$ 50 50 50 50 50 50 50 50 50 50 50 50 50	\$ - 3,400 \$ \$ 5 \$ 5 \$ 6 \$ 6 \$ 7 -	S	\$ \$	S	S	\$ - \$ \$ 174.00 \$ \$ 185 \$	\$ 55 \$ 658 \$ 3,400 \$ 412 \$ 870 \$2,889,000
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Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mobidemob with monitoring event Laboratory analysis Metals and VOCx, plus 20% QA-QC Liffetime Long Term Monitoring (Net Present Value) 5 Vears of Semi-Annual Monitoring 25 Vears of Semi-Annual Monitoring 35% Discount Factor (per NYSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated sediment as a "listed" waste- incineration Lead contaminated sediment as non-haz Concrete Typical Rates - Includes G&A and 10% Profit Min-Rae Survey Mode PID Truck/SUV (12 on or smaller) Work day consists of: Execusion: Concrete and Asphalt: Execusion Area:	(Capital + Lifetime Table A (per CWM) TCLP Metals	1 1 1 40 40 40 40 41 41 41 41 41 41 41 41 41 41 41 41 41	event hr ca ca Remediat (Labor produ (not applicab per year samples per sample for materials of per ton lbs per cy per day per day hrs	s 50 s - 5 s 85.00 s 5 s - 6 s - 6 s - 7 s -	S 3,400 S S S 82% from vendor quote times sampled added for QA/QC sc.) 22	S - S - S - S - S - S - S - S - S - S -	S	S - S - S - S - S - S - S - S - S - S -	s s	S - S - S - S - S - S - S - S - S - S -	\$ 58 58 5 5 3,40 5 41: 5 87/1
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mob/demob with monitoring event Laboratory analysis Metals and VOCx, plus 20% QA/QC Liffetime Long Term Monitoring (Net Present Value) 5 Vears of Semi-Annual Monitoring 25 Vears of Semi-Annual Monitoring 35% Discount Factor (per NYSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated sediment as a "listed" waste-incineration Lead contaminated sediment as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Min-Rae Survey Mode PID Truck/SUV (12 non or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation: Concrete and Asphalt: Excavation Volume: Excavation Volume: Excavation Volume: Excavation Volume:	(Capital + Lifetime Table A (per CWM) TCLP Metals 0.09% 138.294 0 0	1 1 1 40 40 40 40 41 41 41 41 41 41 41 41 41 41 41 41 41	event hr ca ca Remediat (Labor produ (not applicab per year samples per sample for materials of per ton lbs per cy per day per day hrs	\$ 50 50 50 50 50 50 50 50 50 50 50 50 50	S 3,400 S S S 82% from vendor quote times sampled added for QA/QC sc.) 22	S - S - S - S - S - S - S - S - S - S -	S	S - S - S - S - S - S - S - S - S - S -	leads for haz dispone loads for haz dispone loads for non-haz de samplions working days per mounts to complete rinks grant file file file file file file file file	S - S - S - S - S - S - S - S - S - S -	\$ 55 \$ 658 \$ 3,400 \$ 412 \$ 870 \$2,889,000
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mob/demob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5 Years of Semi-Annual Monitoring 25 Years of Semi-Annual Monitoring 55% Discount Factor (per NYSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Arabytical cost For each sampling event, assumed: Disposal Lead contaminated sediment as a "listed" waste-incineration Lead contaminated sediment as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (12 son or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation: Concrete and Asphalt: Excavation Area: Excavation Cotume:	(Capital + Lifetime Table A (per CWM) TCLP Metals 0.09% 138.294 0 0	1 1 40 40 40 40 41 41 41 41 41 41 41 41 41 41 41 41 41	event hr ca ca Remediat (Labor produ (not applicab per year samples per sample for materials of per ton lbs per cy per day per day hrs	s 50 s - 5 s 85.00 s 5 s - 6 s - 6 s - 7 s -	S 3,400 S S S 82% from vendor quote times sampled added for QA/QC sc.) 22	S - S - S - S - S - S - S - S - S - S -	S S	S	S S	S - S - S - S - S - S - S - S - S - S -	\$ 55 \$ 6685 \$ 3,400 \$ 412 \$ 870 \$2,889,000
Surface water sampling for I event Materials Mobilization Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mobidemob with monitoring event Laboratory analysis Metals and VOCx, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5 Years of Semi-Annual Monitoring 25 Years of Semi-Annual Monitoring 35% Discount Factor (per NYSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Estimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Disposal Lead contaminated sediment as a "listed" waste-incineration Lead contaminated sediment as non-baz Concrete Typical Retatal Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck-SUV (12 non or smaller) Work day censists of: Exervation: Concrete and Asphalt: Exervation Area: Exervation Area: Exervation Area: Exervation dumpser can hold approximately: Notes	Laboratories (Capital + Lifetime Table A (per CWM) TCLP Metals 0.05% 138,3244 0.0 0.12	1 1 40 40 40 40 40 40 40 40 40 40 40 40 40	event hr ca ca Remediat (Labor produ (not applicab per year samples per sample for materials of per ton lbs per cy per day per day hrs	s 50 s - 5 s 85.00 s 5 s - 6 s - 6 s - 7 s -	S 3,400 S S S 82% from vendor quote times sampled added for QA/QC sc.) 22	S - S - S - S - S - S - S - S - S - S -	S	S	S S	S - S - S - S - S - S - S - S - S - S -	\$ 55 \$ 6685 \$ 3,400 \$ 412 \$ 870 \$2,889,000
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 Ins each event, mobidemob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5	Laboratories (Capital + Lifetime Table A (per CWM) TCLP Metals 0.05% 138,3244 0.0 0.12	1	event hr ca ea (Labor production applicable per year samples per sample per sample per sample per sample per day per day per day per day hrs hume	s 50 s - 5 s 85.00 s 5 s - 6 s - 7 s -	S 3,400 S S S 82% from vendor quote times sampled added for QA/QC sc.) 22	S	S	S	loads for hzz dispon S	S - S - S - S - S - S - S - S - S - S -	\$ 55 \$ 6685 \$ 3,400 \$ 412 \$ 870 \$2,889,000
Surface water sampling for I event Materials Mobilization Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mobidemob with monitoring event Laboratory analysis Metals and VOCs, plus 20% QA/QC Lifetime Long Term Monitoring (Net Present Value) 5	(Capital + Lifetime Table A (per CWM) TCLP Metals 138,394 0 0 12	1 1 40 40 40 41 1 1 1 1 1 1 1 1 1 1 1 1	event hr ea ca (Labor prodi (not applicab per sample per sample for materials (per ton per ton lbs per cy per day per day hrs dume 0	s 50 s - 5 s 85.00 s 5 s - 6 s - 7 s -	S 3,400 S S S 82% from vendor quote times sampled added for QA/QC sc.) 22	S	s	S	loads for hzz dispon S	S - S - S - S - S - S - S - S - S - S -	\$ 55 \$ 6685 \$ 3,400 \$ 412 \$ 870 \$2,889,000
Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Cap Inspection, 4 hrs each event, mob/demob with monitoring event Laboratory analysis Metals and VOCx, plus 20% QA-QC Lifetime Long Term Monitoring (Net Present Value) 5 Vears of Semi-Annual Monitoring 25 Vears of Semi-Annual Monitoring 35 Discount Factor (per NYSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor Inflation Statimated number of soil samples Characterization Cost Analytical cost For each sampling event, assumed: Biposal Lead contaminated sediment as non-haz Concrete Typical Rental Rates - Includes G&A and 10% Profit Mnii-Rae Survey Mode PID Truck/SUV (12 non or smaller) Work day consists of: Excavation: Concrete and Asphalt: Excavation Area: Excavation Volume: Excavation fodume: Excavation Gentles and Cost of Samples Roll off dumpster can hold approximately: Notes Sy square yard cy cobic yard	(Capital + Lifetime Table A (per CWM) TCLP Metals 138,394 0 0 12	1	event hr ea ca (Labor prodi (not applicab per sample per sample for materials (per ton per ton lbs per cy per day per day hrs dume 0	s 50 s - 5 s 85.00 s 5 s - 6 s - 7 s -	S 3,400 S S S 82% from vendor quote times sampled added for QA/QC sc.) 22	S	s - s - s - s - s - s - s - s - s - s -	S	loads for hzz dispon S	S - S - S - S - S - S - S - S - S - S -	Labor

REMEDIAL ALTERNATIVE			LOCATIO	N	MED	IA	Estimat	ed Cost to Imp	\$2,	\$2,334,000	
OU 2 Alternative 3 In Situ Sediment Amendment		Old Upper Mountain Road Lockport, NY			Sediment	Sediment - OU2			nstruction Time: Operation Time:	24	months months
an situ standarda i anti-		1	оскрогт,	\1					tion Monitoring	30	
		Quan					lown (if available)			Combined Unit Costs	
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
REMEDIAL ACTION		TOTAL C	APITAL 6	COST							\$2,295,000
REMEDIAL ACTION				arest thousa	and)						32,273,000
Construction Activities		1			\$51,912		\$46,312		\$13,032	\$67,735	\$ 1,692,432
Pre-Construction Apply for wetland permits	Engineer's Estimate	1	LS	s -	\$ -	s -	\$ 5,000	s -	s -	s -	S 5,000
Hydrology and Hydraulics study, no FEMA LOMR Fluvial Geomorph Investigation	Engineer's Estimate	1	LS LS	S -	S -	s -	\$ 40,000 \$ 10,000	s -	S -	S -	\$ 40,000 \$ 10,000
Bench-scale and Pilot Study Amendment Testing	Engineer's Estimate Engineer's Estimate	1	LS	s -	\$ 15,000	\$ -	\$ 20,000	\$ -	\$ -	\$ -	\$ 35,000
Site Preparation											
Utility Locator (based on recent bids) Survey 1-foot contours	recent quote Recent bids	0.5 10.0	day acres	s -	S -	s -	s -	S -	s - s -	\$ 2,475.00 \$ 4,400.00	\$ 1,238 \$ 44,000
Cut and chip medium, trees to 12" dia. Haul Road Upgrades, Roads. 8" gravel (From ravine to upper staging area)	31 11 10.10 0200 01 55 23.50 0100	9.5 917	acre	s -	S - S -	S -	S -	s - s -	s - s -	\$ 5,617.88 \$ 13.86	\$ 53,370 \$ 12,705
Install Guard Rails along Haul Road, corr steel, steel box beam	34 71 13.26 1120	350 20	lf hrs	s -	s -	\$ - \$170	\$ - \$ 3,400	s -	s -	\$ 69.74	\$ 24,409 \$ 3,400
2 laborers, 2 hrs per day, 10 days for controlled release of beaver dams Dewatering			nrs	5 -	3 -			3 -	5 -	3 -	
Installation of gravity pipe (2x18"corr metal pipe) Outlet protection (Class II rip-rap for slope and channel protection)	31 23 19.20 1400 Recent Bids	3,600 20	lf cy	\$ 14.42 \$ -	\$ 51,912 \$ -	\$ 11.92 \$ -	\$ 42,912 \$ -	\$ 3.62 \$ -	\$ 13,032 \$ -	\$ - \$ 78.75	\$ 107,856 \$ 1,575
Misc erosion and sediment control (silt fences, stockpiles, etc)	Engineer's Estimate	1	LS	s -	s -	s -	s -	s -	s -	\$ 50,000.00	\$ 50,000
Amendment	Enginaar'e Estimata										
Eco-Bond® or similar Gypsum/Apetite Amendment	Engineer's Estimate - Recent Bids	25,905	ton	s -	s -	s -	s -	s -	s -	\$ 29.95	\$ 775,783
Spread amendment (via hydroseeder and mulch)	Ripping, adverse	260	msf	S -	\$ -	3 -	S -	\$ -	S -	\$ 49.50	\$ 12,852
Chisel plow/rip ammendment into soil, 4 passes, assume a cubic yard per square	conditions, 31 23 16.32 2800 till,		cay								
yard depth Subgrade preparation (muddy or otherwise inaccessable areas)	boulder and clay Allowance	28,848 1	SY LS	s -	\$ - \$ -	s -	S -	\$ - \$ -	s -	\$ 0.37 \$ 5,000.00	\$ 10,674 \$ 5,000
Haul Road Maintenance Stabilization of Site	31 23 23.20 2600	104	day	s -	S -	s -	S -	S -	s -	\$ 1,141.04	\$ 118,668
Wetland Seeding by hydroseeder with feritilizer and lime	32 92 19.14 5800 with adjustment for										
Riffle Grade Controls for Stability and Habitat Restoration	native species Recent Bids		msf EA	\$ 61.30 \$ -	\$ 15,914 \$ -	\$ 8.90 \$ -	\$ 2,311 \$ -	\$ 8.39 \$ -	\$ 2,178 \$ -	\$ - \$ 20,740	\$ 20,403 \$ 103,700
Grade Stream Channel Through Cap	Recent Bids	3,300	LF	s -	s -	s -	s -	\$ -	s -	\$ 21.00	\$ 69,300
Sod and Log Structures to maintain stream pattern	Recent Bids	25	EA	S -	\$ -	3 -	S -	\$ -	\$ -	\$ 7,500.00	\$ 187,500
Mobilization and Demobilization											\$ 53,055
5% of Total Costs of Site Work, Treatment										\$1,061,108	\$ 53,055
G											\$ 261,823
Contingency										\$1,745,487	\$ 261,823
15% of Total Construction Activities											
15% of Total Construction Activities Professional/Technical Services										\$1 692 432	\$ 287,713 \$ 84,622
15% of Total Construction Activities Professional/Technical Services 5% Project Management 6% Remedial Design										\$1,692,432	\$ 84,622 \$ 101,546
15% of Total Construction Activities Professional/Technical Services 5% Project Management								ANNUAL LTM	COST (YRS		\$ 84,622
15% of Total Construction Activities Professional/Technical Services 5% Project Management 6% Remedial Design 6% Construction Management								ANNUAL LTM	COST (YRS	1-5)	\$ 84,622 \$ 101,546 \$ 101,546 \$ 4,000 \$2,000
15% of Total Construction Activities Professional/Technical Services 5% Project Management 6% Remedial Design 6% Construction Management									COST (YRS	1-5)	\$ 84,622 \$ 101,546 \$ 101,546 \$4,000
Professional/Technical Services 5% Project Management 6% Renedial Design 6% Construction Management LONG TERM MONITORING Monitoring, Sampling, Testing and Analysis (Per Event) Assume 20% of combined sampling event for OU1 and OU2								ANNUAL LTM	COST (YRS	1-5)	\$ 84,622 \$ 101,546 \$ 101,546 \$ 4,000 \$2,000
15% of Total Construction Activities		4	samples	\$ -	\$ -	\$ -	S -	ANNUAL LTM	COST (YRS	1-5)	\$ 84,622 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400
15% of Total Construction Activities Professional/T echnical Services 5% Project Management 6% Remedial Design 6% Construction Management LONG TERM MONITORING Monitoring, Sampling, Testing and Analysis (Per Event) Assume 20% of combined sampling event for OU1 and OU2 Site Monitoring Surface water sampling for 1 event Materials Mobilization/Demobilization of Field Sampling Crew		1	samples event	\$ - \$ 10 \$ -	\$ - \$ - \$ -	S - S -		ANNUAL LTM LIFETIME LT	COST (YRS	1-5)	\$ 84,622 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$92 \$10 \$17
Professional/Technical Services 5% Project Management 6% Remedial Design 6% Construction Management LONG TERM MONITORING Monitoring, Sampling, Testing and Analysis (Per Event) Assume 20% of combined sampling event for OUI and OU2 Site Monitoring Surface water sampling for I event Materials		1	event	\$ - \$ 10 \$ - \$ 85.00	S - S - S - S - S - S - S - S - S - S -	s -	\$ - \$ -	ANNUAL LTM LIFETIME LT! \$ 22.91 \$ -	COST (YRS (M (NPV)) \$ 91.63	1-5) 6-30) S - S -	\$ 84,622 \$ 101,546 \$ 105,546 \$4,000 \$2,000 \$39,400 \$1,804 \$1,804
15% of Total Construction Activities	Life Science Laboratories	1	event	S -		S - S -	\$ - \$ -	ANNUAL LTM LIFETIME LT! \$ 22.91 \$ -	COST (YRS (M (NPV)) \$ 91.63	1-5) 6-30) S - S -	\$ 84,622 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$92 \$10 \$17
Professional/Technical Services 5% Project Management 6% Renedial Design 6% Construction Management 1. CONG TERM MONITORING Monitoring, Sampling, Testing and Analysis (Per Event) Assume 20% of combined sampling event for OU1 and OU2 Site Monitoring Surface water sampling for 1 event Materials Mobilization Demobilization of Field Sampling Crew Reporting Laboratory analysis Metals and VOCs Lifetime Long Term Monitoring (Net Present Value)		1 10	event	S -		S - S -	\$ - \$ -	ANNUAL LTM LIFETIME LT! \$ 22.91 \$ -	COST (YRS (M (NPV)) \$ 91.63	\$ - \$ 17.00 \$ -	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804
Professional/Technical Services 5% Project Management 6% Rendeid Design 6% Construction Management LONG TERM MONITORING Monitoring, Sampling, Testing and Analysis (Per Event) Assume 20% of combined sampling event for OUI and OU2 Site Monitoring Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Laboratory analysis Metals and VOCs Lifetime Long Term Monitoring (Net Present Value) 5 Years of Semi-Annual Monitoring 25 Years of Annual Monitoring 25 Years of Annual Monitoring		1 10	event	S -		S - S -	\$ - \$ -	ANNUAL LTM LIFETIME LT! \$ 22.91 \$ -	COST (YRS (M (NPV)) \$ 91.63	\$ - \$ 17.00 \$ -	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804
Professional/Technical Services 5% Project Management 6% Rendendi Design 6% Construction Management LONG TERM MONITORING Monitoring, Sampling, Testing and Analysis (Per Event) Assume 20% of combined sampling event for OUI and OU2 Site Monitoring Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Laboratory analysis Metals and VOCs Lifetime Long Term Monitoring (Net Present Value) 5 Years of Semi-Annual Monitoring		1 10	event	S -		S - S -	\$ - \$ -	ANNUAL LTM LIFETIME LT! \$ 22.91 \$ -	COST (YRS (M (NPV)) \$ 91.63	\$ - \$ 17.00 \$ -	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804
Professional/Technical Services 5% Project Management 6% Rendeid Design 6% Construction Management LONG TERM MONITORING Monitoring, Sampling, Testing and Analysis (Per Event) Assume 20% of combined sampling event for OUI and OU2 Site Monitoring Surface water sampling for I event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Laboratory analysis Metals and VOCs Lifetime Long Term Monitoring (Net Present Value) 5 Years of Semi-Annual Monitoring 25 Years of Annual Monitoring 25 Years of Annual Monitoring	Laboratories	1 1 1 10 5	event event hr	\$ - \$ 85.00	\$ 850	S - S -	\$ - \$ -	ANNUAL LTM LIFETIME LT! \$ 22.91 \$ -	COST (YRS (M (NPV)) \$ 91.63	\$ - \$ 17.00 \$ -	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804
Professional/Technical Services 5% Project Management 6% Rendeid Design 6% Construction Management 10% Monitoring, Sampling, Testing and Analysis (Per Event) 10% Assume 20% of combined sampling event for OUT and OU2 10% Surface water sampling for I event 10% Monitoring 10% Monitoring 10% Monitoring 10% Monitoring 10% Version of Semi-Annual Monitoring 10% Ve	Laboratories	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	event event hr ca	\$ - \$ 85.00 \$ -	\$ 850 \$ -	\$ - \$ - \$ -	S - S - S - S - S - S - S - S - S - S -	S 2291 S - S - S - S -	COST (YRS (M (NPV)) \$ 91.63	\$ - \$ 17.00 \$ -	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$12,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804
Professional/Technical Services 5% Project Management 6% Rendendi Design 6% Construction Management 10% Rendendi Design 6% Construction Management 10% Construction Manag	Laboratories	1 1 1 10 10 5 5 E O&M +	event event hr ca Post Ren	\$ - \$ 85.00 \$ -	\$ 850 \$ -	\$ - \$ - \$ - \$ -	S - S - S - S - S - S - S - S - S - S -	ANNUAL LTM LIFETIME LT! \$ 22.91 \$ -	COST (YRS (M (NPV)) \$ 91.63	\$ - \$ 17.00 \$ -	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$12,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804
Professional/Technical Services 5% Project Management 6% Renedial Design 6% Construction Management 1. CONG TERM MONITORING Monitoring, Sampling, Testing and Analysis (Per Event) Assume 20% of combined sampling event for OU1 and OU2 8ite Monitoring Surface water sampling for 1 event Materials Mobilization Demobilization of Field Sampling Crew Reporting Laboratory analysis Metals and VOCs Lifetime Long Term Monitoring (Net Present Value) 5 Years of Semi-Annual Monitoring 25 Years of Annual Monitoring 5% Discount Factor (per NYSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST (CASsumptions: Working condition is Safety Level:	Laboratories	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	event event hr ca Post Ren (Labor pro (not applic)	\$ - \$ 85.00 \$ -	s sso	\$ - \$ - \$ - \$ -	S - S - S - S - S - S - S - S - S - S -	S 2291 S - S - S - S -	COST (YRS (M (NPV)) \$ 91.63	\$ - \$ 17.00 \$ -	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$12,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804 \$1,804
Professional/Technical Services 5% Project Management 6% Renedial Design 6% Construction Management 10NG TERM MONITORING Monitoring, Sampling, Testing and Analysis (Per Event) Assume 20% of combined sampling event for OU1 and OU2 Site Monitoring Surface water sampling for 1 event Materials Mobilization/Demobilization of Field Sampling Crew Reporting Laboratory analysis Metals and VOCs Lifetime Long Term Monitoring (Net Present Value) 5 Years of Semi-Annual Monitoring 25% Discount Factor (per NYSDEC) TOTAL ESTIMATED NPV TECHNOLOGY COST (C Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Buffalo, NY) Costs are loaded with a profit factor	Laboratories	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	event event hr ca Post Ren	S - S 85.00 S - C C C C C C C C C C C C C C C C C C	\$ 850 \$ - Monitoring) 82% erived from vendor	S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	S 22.91	COST (YRS (M (NPV)) \$ 91.63	S - S - S - S - T - S	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$17 \$17 \$850 \$850 \$835 \$835
Professional/Technical Services 5% Project Management 6% Rendeid Design 6% Construction Management 10% Constructi	Laboratories Capital + Lifetime Table A (per CWM)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	event event hr ca Post Ren (Labor pro (not applie) per year samples per samples	\$ - \$ 85.00 \$ -	S 850 S - Monitoring) 82% erived from vendor	S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	S 22.91 S - S - S - 100%	COST (YRS (M (NPV)) \$ 91.63	S - S - S - S - T - S	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Renedial Design 6% Construction Management 10% Construct	Laboratories Capital + Lifetime	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	event event hr ca Post Ren (Labor pro (not applic per year samples per sample	S - S 85.00 S - C C C C C C C C C C C C C C C C C C	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC s.	S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	S 22.91	COST (YRS (M (NPV)) \$ 91.63	S - S - S - S - T - S	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Renedial Design 6% Construction Management 10% Construct	Laboratories Capital + Lifetime Table A (per CWM)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	event event hr ca	S - S 85.00 S S 85.00 S S 85.00	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC s.	S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	S 22.91	COST (YRS (M (NPV)) \$ 91.63	S - S - S - S - T - S	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Remedial Design 6% Construction Management 10% Construct	Laboratories Capital + Lifetime Table A (per CWM)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	event event hr ca (Labor pro (not applic per year samples per sample for material per ton	S - S 85.00 S S 85.00 S S 85.00	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC s.	S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	ANNUAL LTM LIFETIME LT! \$ 22.91 \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ worker sample worker sampling	COST (VRS M (NPV) S 91.63 S -	S - S 174.00 S 174.00	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Revokali Design 6% Construction Management 16% Remedial Design 6% Construction Management 16% Construction Manag	Laboratories Capital + Lifetime Table A (per CWM)	D 10.4% 3% 5507.00 550.50 5275	event event hr ea (Labor pro (not applie per year sample per sample for material per ton	S - S 85.00 S S 85.00 S S 85.00	S 850 S - Monitoring 82% erived from vendor dimes sampled added for QA/QC scooks, etc.)	S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	ANNUAL LTM LIFETIME LT! \$ 22.91 \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ worker sample worker sampling	S 91.63 S - S - S -	S - S 174.00 S 174.00	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Remedial Design 6% Construction Management 10% Construct	Laboratories Capital + Lifetime Table A (per CWM)	D 10.4% 10.3% 10.4% 10.4% 10.55 10.5	event event hr ca (Labor pro (not applic per year samples per sample for material per ton	S - S 85.00 S S 85.00 S S 85.00	S 850 S - Monitoring 82% erived from vendor times sampled added for QA/QC scooks, etc.)	S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	ANNUAL LTM LIFETIME LT! \$ 22.91 \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ worker sample worker sampling	COST (VRS M (NPV) S 91.63 S -	S - S 174.00 S 174.00	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Renedial Design 6% Construction Management 10% Construct	Laboratories Capital + Lifetime Table A (per CWM)	D 10.4% 10.4% 10.4% 10.4% 10.55 10.4% 10.4	event event hr ea (Labor pro (not applic) per year samples per sample per sample for material per ton lbs per cy per day	S - S 85.00 S S 85.00 S S 85.00	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC scooks, etc.)	S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	S 22.91	COST (VRS M (NPV)	S	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Remedial Design 6% Construction Management 10% Construct	Laboratories Capital + Lifetime Table A (per CWM)	D 101.4%	event be event be event be event be event be event be event	S - S 85.00 S S 85.00 S S 85.00	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC scooks, etc.)	S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	S 22.91	COST (VRS M (NPV)	1-5	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Renedial Design 6% Construction Management 10% Construct	Laboratories Capital + Lifetime Table A (per CWM)	D 10.4% 10.4% 10.4% 10.4% 10.55 10.4% 10.4	event be event be event be event be event be event be event	S - S 85.00 S S 85.00 S S 85.00	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC scooks, etc.)	S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	S 22.91	COST (VRS M (NPV)	S	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Remedial Design 6% Construction Management 10% Construct	Laboratories Capital + Lifetime Table A (per CWM)	D 101.4%	event be even be event be even	S - S 85.00 S S 85.00 S S 85.00	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC scooks, etc.)	S - S - S - S - S - S - S - S - S - S -	s - s - s - s - s - s - s - s - s - s -	S 22.91	Loads for haz disjonds for non-haz doads per day working days per homoths for site of months for site of the month	S	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Renedial Design 6% Construction Management 10% Construct	Laboratories Capital + Lifetime Table A (per CWM) TAL Metals 0.65%	D 101.4% 3% 3% 35 55 55 5275 539.87 3.300 596.08 570.74	event be even be event be event be event be event be event be event be even	S - S 85.00 S S - S - S - S - S - S - S - S - S	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC scooks, etc.)	s - S - S - S - S - S - S - S - S - S -	s - s - s - s - s - s - s - s - s - s -	S 22.91	COST (VRS M (NPV)	S	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Remedial Design 6% Construction Management 10% Construct	Laboratories Capital + Lifetime Table A (per CWM) TAL Metals 47,997 889 1,333	D 101.4% 10.8% 10.	event be even be event be even	S - S 85.00 S S - S - S - S - S - S - S - S - S	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC scooks, etc.)	s - S - S - S - S - S - S - S - S - S -	s - S - S - S - S - S - S - S - S - S -	S 22.91 S - S - S - S - S - S - S - S - S - S -	loads for haz dis loads for non-haz loads for no	S - S 174.00 S	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 576 Project Management 676 Remedial Design 678 Construction Management 679 Construction Management 679 Construction Management 670 Constr	Laboratories Capital + Lifetime Table A (per CWM) TAL Metals 0.05% 47,997 889	D 101.4% 10.8% 10.	event be even be event be event be event be event be event be event be even	S - S 85.00 S S - S - S - S - S - S - S - S - S	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC scooks, etc.)	s - S - S - S - S - S - S - S - S - S -	s - S - S - S - S - S - S - S - S - S -	ANNUAL LTM LIFETIME LTI \$ 22.91 \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ -	loads for haz dis loads for non-haz loads for no	SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SSS SSS SSS SSS SSS SSS SS SS SS SS SS SS SS	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Renedial Design 6% Construction Management 10% Construct	Table A (per CWM) TAL Metals 0.05% 47,997 889 1,333	D 101.4%	event be even be event be event be event be event be event be event be even	S - S 85.00 S S - S - S - S - S - S - S - S - S	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC scooks, etc.)	s - S - S - S - S - S - S - S - S - S -	s - S - S - S - S - S - S - S - S - S -	S 22.91	loads for haz dis loads for naz dis loads for naz dis loads for non-haz loads for non-haz loads per day working days per horurs per work months for site p months to completing Profit \$159.00	SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SS SSS SSS SSS SSS SSS SSS SSS SS SS SS SS SS SS SS	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Remedial Design 6% Construction Management 10% Construction Construction Management 10% Construction Constructio	Table A (per CWM) TAL Metals 0.05% 47,997 889 1.333 12	D 101.4% 10% 3% 113 5 5 101.4% 10% 3% 13% 575.00 \$575.	event be event	S - S 85.00 S	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC scooks, etc.)	S - S - S - S - S - S - S - S - S - S -	s - S - S - S - S - S - S - S - S - S -	S 22.91 S - S - S - S - S - S - S - S - S - S -	COST (VRS M (NPV) S 91.63 S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 5% Project Management 6% Remedial Design 6% Construction Management 10% Construct	Laboratories	1 1 1 1 1 1 1 1 1 1	event be event eve	S - S 85.00 S	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC scooks, etc.)	s - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	S 22.91 S - S - S - S - S - S - S - S - S - S -	COST (VRS M (NPV) S 91.63 S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835
Professional/Technical Services 576 Project Management 676 Remedial Design 678 Construction Management 679 Construction Management 679 Construction Management 679 Construction Management 670 Construction Management 670 Construction Management 670 Construction Management 671 Construction Management 672 Construction Management 673 Construction Management 674 Construction Management 675 Constr	Table A (per CWM) TAL Metals 0.0% 48999 13.333 12	1 1 1 1 1 1 1 1 1 1	event be event eve	S - S 85.00 S	S 850 S - Monitoring) 82% erived from vendor times sampled added for QA/QC scooks, etc.)	s - S - S - S - S - S - S - S - S - S -	s - S - S - S - S - S - S - S - S - S -	ANNUAL LTM LIFETIME LTI S 22.91 S - S - S - S - S - S - S - S - S - S -	COST (VRS M (NPV) S 91.63 S - S - S - S - S - S - S - S - S - S -	S - S - S - S - S - S - S - S - S - S -	\$ 84,022 \$ 101,546 \$ 101,546 \$4,000 \$2,000 \$39,400 \$1,804 \$157 \$592 \$10 \$17 \$850 \$835

REMEDIAL ALTERNATIVE		LOCATION			MED	IA		ed Cost to Imp	•	\$4,638,000 \$5,239,000	
OU 2 Alternative 4		Old Upper Mountain Road Lockport, NY			Sediment	- OU2	Estimate		nstruction Time		months
Complete Removal Dredging (Mechanical) with Dewatering as	nd On-site Disposal								Operation Time ation Monitorin	- 0	months years
		Quan	itities			Cost Break	down (if available			Combined Unit Costs	
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
REMEDIAL ACTION		TOTAL C			D						\$4,638,000
Construction Autolitics		(totals ro	inucu to i	earest thou			6200 02/		6122.7/5	600 420	6 2 402 247
Construction Activities Pre-Construction		- 1			\$1,571,652		\$209,826		\$133,765	\$80,430	\$ 3,482,346
Apply for wetland permits	Engineer's Estimate	1	LS	s -	s -	s -	S 5,000	s -	s -	s -	s 5,000
Hydrology and Hydraulics study, no FEMA LOMR	Engineer's Estimate	1	LS	s -	s -	s -	S 40,000	s -	s -	s -	\$ 40,000
Fluvial Geomorph Investigation	Engineer's Estimate	1	LS	s -	s -	s -	S 10,000	s -	s -	s -	\$ 10,000
Apply for discharge permits Site Preparation		1	LS	s -	s -	s -	S 25,000	s -	s -	s -	\$ 25,000
Survey 1-foot contours	Recent bids		acres	S -	s -	s -	s -	s -	s -	\$ 4,400.00	
Utility Locator (based on recent bids) Grub stumps, trees to 12" diameter along creek for dredging	recent quote 31 11 10.10 0200	0.5 10		S -	S -	s -	S -	s -	s -	\$ 2,475.00 \$ 5,617.88	\$ 1,238 \$ 53,370
Cut and chip light trees to 6" dia. Along road and in staging area	31 11 10.10 0020 ECHOS Crew		acre	S -	s -	\$ -	S -	s -	s -	\$ 3,945.16	\$ 3,945
Debris Removal by excavator (2 cy)- separation into trash and woody debris Haul Road Upgrades, Roads. 8" gravel (From ravine to upper staging area)	CODE1 01 55 23.50 0100	40 917	hours	S -	s -	\$ 46	S 1,845	\$ 139	\$ 5,567	\$ - \$ 13.86	\$ 7,412 \$ 12,705
Install Guard Rails along Haul Road, corr steel, steel box beam	34 71 13.26 1120	350		s -	s -	\$ -	s -	\$ -	s -	\$ 69.74	\$ 24,409
Beaver Trapping and Relocation Controlled release of beaver dams by hand		20 20	hours hours	S -	s -	\$ 85 \$ 85		s -	S -	s -	\$ 1,700 \$ 1,700
Preparation of streamside staging area (50' x 50') Silt Fence	31 25 13.10 1000	200		\$ 0.23	\$ 46			•	9	\$	S 136
Sift Fence 30 mil HDPE Liner	31 25 13.10 1000 33 47 13.53 1100	2,500	sf	\$ 0.23 \$ 0.30	\$ 46 \$ 750	\$ 0.45 \$ 0.85		s -	s -	s -	\$ 136 \$ 2,875
3/4" Gravel Fill	ECHOS 17 03 0300	46	cy	s 26.26	\$ 1,216	\$ 3.63	S 168	\$ 1.28	s 59	s -	\$ 1,443
Downstream Silt Curtain	www.silt- barriers.com, labor from 31 25 13.10 1000	250	lf.	\$ 6.50	\$ 1,625	\$ 0.45	\$ 113				\$ 1,738
Stream Dewatering											
Installation of gravity pipe (2x18"corr metal pipe) Outlet protection (Class II rip-rap for slope and channel protection)	31 23 19.20 1400 Recent Bids	3,600 20	lf cy	S 14	\$ 51,912 \$ -	\$ 11.92 \$ -	\$ 42,912 \$ -	\$ 3.62 \$ -	\$ 13,032 \$ -	\$ 78.75	\$ 107,856 \$ 1,575
Misc erosion and sediment control (silt fences, stockpiles, etc)	Engineer's Estimate	1	LS	s -	s -	s -	s -	s -	s -	\$ 50,000.00	\$ 50,000
Dredging Haul Road Upgrades (During sediment dredging, where possible)	01 55 23.50 0100	2.222	sv	\$ 8.61	\$ 19,124	\$ 2.93	s 6,502	\$ 0.59	\$ 1,315	s .	\$ 26,942
Crane mats (for narrow lower reach) 4- 20' mats	Hanes Supply	4	ea	S -	\$ -	\$ -	S -	\$ -	\$ -	\$ 850.00	\$ 3,400
Track excavator loadout into dumps Soil-Excavator, hydraulic, crawler mtd. 2 CY cap = 165 CY/hr	31 23 16.42 0260	18,133	bcy	s -	s -	\$ 0.65	\$ 18,677.32	\$ 1.03	\$ 18,677.32	s -	\$ 37,355
12 CY truck, 15 mph average, cycle 2 miles, 10 min wait/ld/unld	31 23 23.20 1218 32 01 16.71 5400. 03	20,853	ley	S -	s -	\$ 1.83	\$ 38,162	\$ 3.11	\$ 64,854	s -	\$ 103,015
Addition of stabilizer/dewatering agent Haul Road Maintenance	05 13.30 0240	18,133	cy	S 78	\$ 1,414,399	\$ 0.09	S 1,632	\$ 0.07	\$ 1,269	s -	\$ 1,417,301
Haul Road Maintenance Sediment Stockpiling for Dewatering	31 23 23.20 2600	119	day	S -	S -	s -	S -	\$ -	S -	\$ 1,141.04	\$ 135,784
Stockpile Pad with Sump - 40,000 SF											
Silt Fence	31 25 13.10 1000	1,000	lf .	S 0.23	\$ 230	\$ 0.45		s -	s -	s -	\$ 680
30 mil HDPE Liner 3/4" Gravel Fill (9")	33 47 13.53 1100 ECHOS 17 03 0300	80,000 2,222		\$ 0.30 \$ 26.26	\$ 24,000 \$ 58,349	\$ 0.85 \$ 3.63		\$ - \$ 1.28	S 2,839	s -	\$ 92,000 \$ 69,255
Pumping, 8 hr., attended 2 hrs. per day, including 20 If of suction hose and 100 discharge hose, 4" diaphragm pump	lf 31 23 19.20 0650	79	dav	s -	s -	S 119.18	S 9.415	s 33.56	S 2.651	s .	S 12.066
2- 20,000 gallon tanks	rain4rent	79		s -	s -	s -	s -	s -	s -	\$ 92.00	\$ 7,268
Water Treatment facility	Engineer's Estimate	4	month	s -	s -	s -	s -	s -	s -	\$1,250	\$ 4,938
Water Treatment facility- mob/demob	Engineer's Estimate	1	ea	s -	s -	s -	s -	s -	s -	\$10,000	\$ 10,000
Carbon	Engineer's Estimate	15,000	lbs	s -	s -	s -	s -	s -	s -	\$1.00	S 15,000
Bag filter housing Bag filters, pack of 20	Grainger Grainger	3 8	ea ea	S -	s -	s -	S -	s -	s -	\$275 \$175	\$ 825 \$ 1,396
Maintain Stockpile, 700HP Dozer, 50ft Haul	31 23 16.46 6010 31 23 16.42 1600	10,880	bcy	S -	S -	\$ 0.16 \$ 0.60		\$ 1.52 \$ 0.64		s -	\$ 18,278 \$ 13,491
FEL, wheel mount, 2 1/4 CY cap. loadout into dumps from stockpiles Spotter at Loadout	31 23 16.42 1600 31 23 23.20 2310	10,880		s -	s -	\$ -	s 6,528	\$ -	\$ 6,963	\$ - \$ 45.96	\$ 13,491 \$ 22,980
Landfill Placement and Sediment Stabilization Excavator Loadout, 4.5 CY bucket, 80% fill factor	31 23 16.43 4700	12,512	lcy	s -	s -	s -	s -	s -	s -	\$ 1.14	\$ 14,264
Portland Cement, for sediment stabilization prior to compaction	31 23 23.20 1016 03 05 13.30 0300	12,512 41,164	ley	s -	S -	s -	S -	\$ -	S -	\$ 3.35 \$ 9.01	\$ 41,915 \$ 370,892
Portland Cement, for sediment stabilization prior to compaction Mixing material in windrow, 180 H.P. grader, including added 15% for portland	32 01 16.71 5400		Cwt	S -	5 -	3 -	5 -	\$ -	3 -		
compaction, riding, vibrating roller, 2 passes, 12" lifts	31 23 23.23 5060	14,389 12,512	cy ecy							\$ 0.16 \$ 0.55	\$ 2,302 \$ 6,882
Finishing grading slopes, steep	31 22 16.10 3310	12,000	sy	s -	s -	s -	s -	\$ -	s -	\$ 0.21	\$ 2,520
Confirmation Sediment Sampling Grab Samples- 12 per acre plus 20% QA/QC		86	sample	S -	\$ 50	\$ 21	S 1,824	\$ 67	\$ 5,727	s -	\$ 7,601
Lab Analyses - TAL Metals	Life Science Laboratories	86	sample	s -	s -	s -	s -	s -	s -	\$ 82.50	\$ 7,081
Stabilization of Site											
Topsoil 6"	Recent quote- ESG from Seven Springs	4,808	CY	s 45.00	\$ 216,360	s -	s -	s -	s -	s -	\$ 216,360
Spreading Topsoil 6* Lifts	ECHOS 2006 18 05 0301	4,808	CY	s .	\$.	\$.		٠ .	s .	s 9.43	\$ 45,339
Wetland Seeding by hydroseeder with feritilizer and lime	32 92 19.14 5800 with adjustment for	4,008			-				-	9.43	- 40,335
Wetland Seeding by hydroseeder with terithizer and time Riffle Grade Controls for Stability and Habitat Restoration	native species	237	msf	\$ 61.30	\$ 14,520	\$ 8.90	S 2,108	\$ 8.39	\$ 1,987	s -	\$ 18,615
Grade Stream Channel Through Cap	Recent Bids Recent Bids	3,300	EA LF	s -	S -	s -	S -	s -	s -	\$ 20,740 \$ 21.00	\$ 103,700 \$ 69,300
Sod and Log Structures to maintain stream pattern	Recent Bids	25	EA	S -	s -	s -	S -	s -	s -	\$ 7,500.00	
Mobilization and Demobilization										,	\$ 36,338
5% of Total Costs of Site Work, Treatment										\$726,765	\$ 36,33
Contingency 15% of Total Construction Activities								-		\$3,518,684	\$ 527,803 \$ 527,80
										22,218,084	
		1	1							1	\$ 591,999
Professional/Technical Services 5% Project Management										\$3,482,346	\$ 174,11

REMEDIAL ALTERNATIVE			LOCATION			DIA		ed Cost to Im	\$4,638,000			
ave							Estimate	ed Cost for Off-Site			239,000	
OU 2 Alternative 4		Old Upper Mountain Road Lockport, NY			Sediment	- OU2	Construction Time:				months	
							Operation Time:			- months		
Complete Removal Dredging (Mechanical) with Dewatering and	l On-site Disposal						Post Remediation Monitorin				years	
		Quantities				Cost Break	down (if available)			Combined Unit Costs		
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost	
TOTAL ESTIMATED NPV TECHNOLOGY COST (Capital + Lifetime O&M + Post Remediation Monitoring) \$4,638,000												
Assumptions:												
Working condition is Safety Level:		D	(Labor pro		82%	; Equipment p	roductivity:	100%)			
Weighted Average of city cost index (Buffalo, NY)		101.4%	(not applica	ble for costs	derived from vend	or quotes).						
Costs are loaded with a profit factor		10%										
Inflation		3%	per year								Labor	
Estimated number of sediment samples		72	samples	1	times sampled		0.25	hrs/sample		\$85	Cost per hr	
			1	20%	added for QA/QC s	samples	1	worker sampling				
Characterization Cost	Table A (per CWM)		per sample									
Analytical cost	TAL Metals		per sample									
For each sampling event, assumed:		\$50	for material	s (gloves, note	books, etc.)							
Disposal						_						
Lead contaminated sediment as a "listed" waste- incineration		\$275	per ton				lous (assume 43%	hazardous)	_			
		•			22	tons per load		63	loads for haz dis	posal		
Lead contaminated sediment as non-haz		\$39.87	per ton		12,485	tons soil for no	n-haz disposal	599	loads for non-ha	z disposal		
					691	tons debris for	non-haz disposal					
Typical Rental Rates - Includes G&A and 10% Profit												
Mini-Rae Survey Mode PID		607.00	per day					14	5 loads per day			
Truck/SUV (1/2 ton or smaller)			per day						working days pe			
Truck/SO v (1/2 ton or smaller)		3/0./4	per day) working days pe) hours per workir			
W 1.1		10	1.									
Work day consists of:		10	hrs						3 months for site p			
									1 months to compl			
Dredging Area	250 (22	1.0							Days sediment le			
Excavation Area:	259,632	1	40.0						Days sediment le		1	
Excavation Volume:	17,270	cy	19,860	icy				10	Days debris load	tout for diposal		
Excavated Weight:	25,905											
Roll-off dumpster can hold approximately:	22	tons										
Notes												
sy square yard	mo	month										
cy cubic yard	ls	lump sum										
lcy loose cubic yard	O&M	Operation and	d maintenane	e								
bey bank cubic yard	H&S	Health and S										
If linear feet												
sf square feet												
msf 1.000 square feet												
j .j												

REMEDIAL ALTERNATIVE		LOCATION			MEDIA			ed Cost to Imp		. ,	\$3,887,000 \$4,603,000	
OU 2 Alternative 5 Mass Removal Dredging with On-site Disposal and Multi-	Media Residual		er Mountai ckport, NY		Sediment	- OU2	Estimate	Cor	nstruction Time: Operation Time:	- 12	months months	
Capping		Quantit	ties		l	Cost Break	down (if available		tion Monitoring	Combined Unit	years	
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Costs Unit Cost	Option Total Cost	
REMEDIAL ACTION	(canal a cana)	TOTAL CAPI	TAL COST	r	Total Cost	Cint Cost	Total Cost	Cint Cost	Total Cost	Chir Cost	\$3,875,000	
		(totals rounded	d to neares	t thousand)								
Construction Activities Pre-Construction		1			\$1,433,875		\$152,574		\$105,467	\$13,076	\$ 2,908,058	
Apply for wetland permits Hydrology and Hydraulics study, no FEMA LOMR	Engineer's Estimate Engineer's Estimate	1	LS LS	s -	s -	s -	\$ 5,000 \$ 40,000	s -	s -	s -	\$ 5,000 \$ 40,000	
Fluvial Geomorph Investigation	Engineer's Estimate	1	LS	s -	s -	s -	\$ 10,000	s -	s -	s -	\$ 10,000	
Apply for discharge permits	Engineer's Estimate	1	LS	S -	S -	S -	\$ 2,500	s -	s -	\$ -	\$ 2,500	
Site Preparation Survey 1-foot contours	Recent bids	10.0	acres	s -	s -	s -	s -	s -	s -	\$ 4,400.00	\$ 44,000	
Utility Locator (based on recent bids) Grub stumps, trees to 12" diameter along creek for dredging	recent quote 31 11 10.10 0200	0.5 10	day acre	S -	S -	S -	S -	s -	s -	\$ 2,475.00 \$ 5,617.88	\$ 1,238 \$ 56,179	
Cut and chip light trees to 6" dia. Along road and in staging area Debris Removal by excavator (2 cy)- separation into trash and woody debris	31 11 10.10 0020 ECHOS Crew	1	acre	s -	s -	S -	\$ -	\$ -	s -	\$ 3,945.16	\$ 3,945	
Haul Road Upgrades, Roads. 8" gravel (From ravine to upper staging area)	CODE1 01 55 23.50 0100	40 917	hours sy	S -	S -	\$ 46 \$ -	\$ 1,845 \$ -	S 139	\$ 5,567 \$ -	\$ - \$ 13.86	\$ 7,412 \$ 12,705	
Install Guard Rails along Haul Road, corr steel, steel box beam Beaver Trapping and Relocation	34 71 13.26 1120	350 20	lf hours	s -	S -	\$ - \$ 85	\$ - \$ 1,700	s - s -	s - s -	\$ 69.74 \$ -	\$ 24,409 \$ 1,700	
Controlled release of beaver dams by hand Preparation of streamside staging area (50' x 50')		20	hours	S -	S -	\$ 85	\$ 1,700	S -	s -	s -	\$ 1,700	
Silt Fence 30 mil HDPE Liner	31 25 13.10 1000 33 47 13.53 1100	200 2,500	lf of	\$ 0.23 \$ 0.30	\$ 46 \$ 750	\$ 0.45 \$ 0.85	\$ 90 \$ 2,125	s -	s -	s -	\$ 136 \$ 2,875	
3/4" Gravel Fill	ECHOS 17 03 0300	2,500	cy	\$ 26.26	s 1,216	\$ 3.63	\$ 168	s 1.28	\$ 59	s -	s 1,443	
Downstream Silt Curtain	www.silt- barriers.com, labor from 31 25 13.10											
Stream Dewatering	1000	250	lf	\$ 6.50	\$ 1,625	\$ 0.45	\$ 113	s -	s -	s -	\$ 1,738	
Installation of gravity pipe (2x18"corr metal pipe) Outlet protection (Class II rip-rap for slope and channel protection)	31 23 19.20 1400 Recent Bids	1,700 20	lf cy	\$ 14 \$ -	\$ 24,514 \$ -	\$ 11.92 \$ -	\$ 20,264 \$ -	\$ 3.62 \$ -	\$ 6,154 \$ -	\$ 78.75	\$ 50,932 \$ 1,575	
Misc erosion and sediment control (silt fences, stockpiles, etc)	Engineer's Estimate	1	LS	s -	s -	s -	s -	s -	s -	\$ 50,000.00	\$ 50,000	
Dredging Haul Road Upgrades (During sediment dredging, where possible)	01 44 23.50 0100	2,222	sy	\$ 8.61	\$ 19,124	\$ 2.93	\$ 6,502	\$ 0.59	\$ 1,315	s -	\$ 26,942	
Track excavator loadout into dumps Soil-Excavator, hydraulic, crawler mtd. 2 CY cap = 165 CY/hr	31 23 16.42 0260	17,200	bev	s -	s -	\$ 0.65	\$ 17,716.05	\$ 1.03	\$ 17,716.05	s -	\$ 35,432	
12 CY truck, 15 mph average, cycle 2 miles, 10 min wait/ld/unld	31 23 23.20 1218 32 01 16.71 5400, 03	19,780	lcy	s -	s -	\$ 1.83	\$ 36,198	\$ 3.11	\$ 61,516	s -	\$ 97,713	
Addition of stabilizer/dewatering agent Haul Road Maintenance	05 13.30 0240 31 23 23.20 2600	17,200 75	day	S 78	\$ 1,341,604 \$ -	\$ 0.09 \$ -	\$ 1,548 \$ -	S 0.07	\$ 1,204 \$ -	\$ - \$ 1,141.04	\$ 1,344,356 \$ 85,578	
Sediment Stockpiling for Dewatering						-				,		
Stockpile Pad with Sump - 40,000 SF Silt Fence	31 25 13.10 1000	1,000	lf.	\$ 0.23	S 230	\$ 0.45	\$ 450	\$	e	•	S 680	
30 mil HDPE Liner	33 47 13.53 1100	80,000	sf	\$ 0.30	\$ 24,000	\$ 0.45	\$ 68,000	s -	s -	\$ -	\$ 92,000	
3/4" Gravel Fill (9") Pumping, 8 hr., attended 2 hrs. per day, including 20 lf of suction hose and 10t	ECHOS 17 03 0300	2,222	cy	\$ 21.99	\$ 48,867	\$ 3.04	\$ 6,756	\$ 1.07	\$ 2,378	s -	\$ 58,000	
If discharge hose, 4" diaphragm pump 2- 20,000 gallon tanks	31 23 19.20 0650 rain4rent	75 75	day day	s -	s -	\$ 119.18	\$ 8,939	\$ 33.56	\$ 2,517	\$ - \$ 92.00	\$ 11,456 \$ 6,900	
2- 20,000 garion tanks Water Treatment facility	Engineer's Estimate	4	month	s -	s -	s -	s -	s -	s -	\$ 92.00 \$1,250	\$ 4,688	
Water Treatment facility- mob/demob	Engineer's Estimate	1	ea	s -	s -	s -	s -	s -	s -	\$10,000	s 10,000	
Carbon	Engineer's Estimate	15,000	lbs	s -	s -	s -	s -	s -	s -	\$1	\$ 15,000	
Bag filter housing Bag filters, pack of 20	Grainger Grainger	3 8	ea ea	S -	S -	S -	S -	S -	s -	\$275 \$175	\$ 825 \$ 1,396	
Maintain Stockpile, 700HP Dozer, 50ft Haul FEL, wheel mount, 2 1/4 CY cap. loadout into dumps from stockpiles	31 23 16.46 6010 31 23 16.42 1600	6,552 6,552	bcy bcy	s -	S -	\$ 0.16 \$ 0.60	\$ 1,048.38 \$ 3,931	\$ 1.52 \$ 0.64	\$ 9,959.65 \$ 4,194	s -	\$ 11,008 \$ 8,125	
Spotter at Loadout Landfill Placement and Sediment Stabilization	31 23 23.20 2310	500	hrs	s -	s -	S -	s -	\$ -	s -	\$ 45.96	\$ 22,980	
Excavator Loadout, 4.5 CY bucket, 80% fill factor 12 CY truck, 15 mph average, cycle 1 mile, 15 min wait/ld/unld	31 23 16.43 4700 31 23 23.20 1016	7,535 7,535	ley lev	s -	S -	s -	s -	s - s -	s -	\$ 1.14 \$ 3.35	\$ 8,590 \$ 25,243	
Portland Cement, for sediment stabilization prior to compaction Mixing material in windrow, 180 H.P. grader, including added 15% for portlan	03 05 13.30 0300	24,791	Cwt	s -	s -	S -	s -	s -	s -	\$ 9.01	\$ 223,367	
cement Compaction, riding, vibrating roller, 2 passes, 12" lifts	d 32 01 16.71 5400 31 23 23.23 5060	8,666 7,535	cy ecy							\$ 0.16 \$ 0.55	\$ 1,386 \$ 4,144	
Finishing grading slopes, steep	31 22 16.10 3310	12,000	sy	s -	s -	S -	s -	s -	s -	\$ 0.21	\$ 2,520	
Confirmation Soil Sampling Grab Samples- 12 per acre plus 20% QA/QC		70	sample	s -	S 50	S 21	\$ 1,487	66.73	\$ 4,668	s -	\$ 6,205	
Lab Analyses - TAL Metals	Life Science Laboratories	70		s -	s -	s -	s -	s -	\$ -	\$ 82.50	\$ 5,772	
Site Restoration												
Topsoil	Recent quote- ESG from Seven Springs	889	cy	S 45	\$ 39,554	s -	s -	s -	s -	s -	\$ 39,554	
Residuals Cap 3" Sand Layer	Recent bids	444	cv	s 9	\$ 3,778	\$ 13	\$ 5,809	s -	s	s	\$ 9,586	
3" Gravel Layer	Recent bids ECHOS Crew	444	cy	\$ 28		\$ 13		s -	s -	\$ -	\$ 9,586 \$ 18,030	
Excavator for cap placement- assume three full weeks	CODE1 ECHOS Crew	120	hours	s -	s -	\$ 46	\$ 5,536	\$ 139	\$ 16,701	s -	\$ 22,237	
Laborer for grade stake placement 12 CY truck, 15 mph average, cycle 2 miles, 10 min wait/ld/unld	COELD 31 23 23.20 1218	40 1,067	hours lcy	S -	s - s -	\$ 33 \$ 1.83	\$ 1,327 \$ 1,952	S - S 4.94	\$ - \$ 5,269	s - s -	\$ 1,327 \$ 7,221	
Maintain Stockpile, 700HP Dozer, 50ft Haul Stabilization of Site	31 23 16.46 6010	711		S -	s -	\$ 0.16	\$ 113.77	\$ 1.52		\$ -	\$ 1,195	
Wetland Seeding by hydroseeder with feritilizer and lime	32 92 19.14 5800 with adjustment for											
Riffle Grade Controls for Cap Stability and Habitat Restoration	native species Recent Bids	237 5	msf EA	S 61	\$ 14,520 \$ -	\$ 9 \$ -	\$ 2,108.23 \$ -	S 8	\$ 1,987.42 \$ -	\$ - \$ 20,740	\$ 18,615 \$ 103,700	
Grade Stream Channel Through Cap Sod and Log Structures to maintain stream pattern	Recent Bids Recent Bids	3,300 25	LF EA	S -	S -	S - S -	s - s -	s - s -	s - s -	\$ 21.00 \$ 7,500.00	\$ 69,300 \$ 187,500	
Mobilization and Demobilization											\$ 31,310	
5% of Total Costs of Site Work, Treatment										\$626,200	\$ 31,310	
Contingency 15% of Total Construction Activities										\$2,939,368	\$ 440,905 \$ 440,905	
Professional/Technical Services										. 15.2.5,000	\$ 494,370	
5% Project Management										\$2,908,058	\$ 145,403	
6% Remedial Design 6% Construction Management											\$ 174,483 \$ 174,483	
LONG TERM MONITORING								ANNUAL LTM LIFETIME LT?		1-30)	\$760 \$11,700	
Cap Inspection, 4 per year, 4 hrs each event, mob/demob with monitoring	3	,	ca	s	,	\$340	\$ 340.00	\$75.00	\$ 75.00	s	\$415	
event Mobilization/Demobilization of Field Sampling Crew			event			\$340	\$ 540.00	\$13.00	, /3.00	\$ 340.00	\$ 340	
Lifetime Long Term Monitoring (Net Present Value)						-		-	-	J40.00	- 540	
25 Years of Annual Monitoring 5% Discount Factor (per NYSDEC)												

REMEDIAL ALTERNATIVE		L	OCATION		MED	IA	Estimat	ted Cost to Im	\$3,887,000		
							Estimate	Estimated Cost for Off-Site Disposal			,603,000
OU 2 Alternative 5		Old Upp	er Mountai	n Road	Sediment	- OU2	Construction Time:			12	months
Mass Removal Dredging with On-site Disposal and Multi-	Media Residual	Lockport, NY							Operation Time:	-	months
Capping							Post Remediation Monitoring			0	years
		Quanti	ities		Cost Breakdown (if ava			n (if available)			
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
TOTAL ESTIMATED NPV TECHNOLOGY COST (Capital + Lifetime O&M + Post Remediation Monitoring) \$3,887,000											
Assumptions: Working condition is Safety Level:		D	(Labor pro		82%		productivity:	100%	<u></u>		
Weighted Average of city cost index (Buffalo, NY)		101.4%		able for costs d	erived from vendor	quotes).					
Costs are loaded with a profit factor		10%									
Inflation Estimated number of soil samples			per year samples		times sampled		0.25	hrs/sample		605	Labor Cost per hr
Estimated number of soil samples		3	samples	20%	added for QA/QC s	amples	0.25	worker sampling		363	Cost per nr
Characterization Cost	Table A (per CWM)	\$507.0	per sample	20 /6	added for QACQC's	ampies		worker sampling			
Analytical cost	TAL Metals		per sample								
For each sampling event, assumed:				s (gloves, noteb	ooks, etc.)						
Disposal											
Lead contaminated soil as a "listed" waste- incineration		\$27	5 per ton		1,316 22	tons soil haza	rdous (assume 43%		loads for haz dis	nosal	
Lead contaminated soil as non-haz		\$39.8	7 per ton		11,842		on-haz disposal		loads for non-ha		
Concrete		3,300	lbs per cy		655	tons debris fo	r non-haz disposal				
Typical Rental Rates - Includes G&A and 10% Profit											
Mini-Rae Survey Mode PID		\$96.0	8 per day					1	5 loads per day		
Truck/SUV (1/2 ton or smaller)		\$70.7	4 per day					2	0 working days pe	r month	
								1	0 hours per work	ing day	
Work day consists of:		10	hrs						2 months for site p	rep/restoration	
									9 months to compl	etion	
Excavation With Concrete and Asphalt:		_			Backfill 2:1 Slopes				5 Days sediment le		
Concrete and Asphalt:	0.0%	% of excavation v	olume		0	cy			0 Days sediment le		ıl
Excavation Area:	211,635	sf			0	lcy		1	0 Days debris load	lout for disposal	
Excavation Volume:	16,381	cy	18,838	lcy							
Excavated Weight:	24,572	tons									
Roll-off dumpster can hold approximately:	22	tons									
Notes											
Sy square yard	mo	month									
cy cubic yard	ls	lump sum									
lcy loose cubic yard	O&M	Operation and mai	intenance								
bcy bank cubic yard	H&S	Health and Safet									
If linear feet			*								
sf square feet											
mef 1 000 square feet											