Appendix G

Railroads Restoration Project Workplan

RESTORATION WORK PLAN

Slip 5A Peninsula
Ashtabula, Ohio

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Acronyms and Abbreviations

ACM	Asbestos containing material
AVS-SEM	Acid volatile sulfide – simultaneously extracted metals
Biohabitats	Biohabitats, Inc.
CEC	Cation exchange capacity
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
cm	Centimeter
DOT	Department of Transportation
ENVIRON	ENVIRON International Corporation
ESL	Ecological Screening Level
GLLA	Great Lakes Legacy Act
HzW	HzW Environmental Consultants, LLC
M&M Plan	Monitoring and Maintenance Plan
mg/kg	Milligrams per kilogram
NSRC	Norfolk Southern Railway Company
OEPA	Ohio Environmental Protection Agency
PAH	polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyl
PPE	Personal protection equipment
SRV	Sediment reference value
SSL	Soil Screening Level
SVOC	Semi-volatile organic compound
TCLP	Toxicity characteristic leaching procedure
TEC	Threshold Effect Concentration
TSCA	Toxic Substances Control Act
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile organic compound

1. INTRODUCTION

This restoration Work Plan describes natural resource restoration activities that will be undertaken by the Railroads pursuant to Section VII of the Consent Decree in *United States and State of Ohio, ex rel. Richard Cordray, Attorney General of Ohio v. Cabot Corp., et al.* (N.D. Ohio) that resolves specified claims relating to alleged natural resource damages at the Ashtabula River and Harbor Site. This restoration Work Plan provides for implementation of natural resource restoration projects in a portion of an area known as the "Slip 5A peninsula," which is currently owned by Norfolk Southern Railway Company (NSRC). The restoration projects to be implemented by the Railroads pursuant to this restoration Work Plan occupy approximately 6.45 acres. In addition, the restoration area includes an additional area, up to approximately 0.70 acres, along the eastern edge of the northern part of the Slip 5A peninsula, where NSRC has authorized the United States Environmental Protection Agency (USEPA) and its contractors to create and enhance fish habitat as part of a habitat mitigation project that is a component of an Ashtabula River dredging project previously initiated pursuant to the Great Lakes Legacy Act (GLLA). See Figure 4. Apart from providing access to EPA and its contractors for purposes of implementing the GLLA habitat mitigation project, the Railroads' only obligation with respect to the GLLA habitat mitigation area is to establish an Environmental Covenant. Due to the security requirements of the active bridge yard, the restoration area is at least 100 feet from the tracks. The Slip 5A peninsula is some of the only soft shoreline along this portion of the Ashtabula River. Therefore, the restoration of this ecological habitat can provide significant ecological value as a refuge area from heavy boat traffic and propeller wash. The limited human use of the restoration area presents an opportunity to enhance ecological uses.

This work plan describes the basis for restoration design, installation, monitoring and maintenance. Background information, including physical and ecological setting, historical land use and cleanup actions, and current soil and sediment conditions, is provided below.

1.1 Physical Setting

The restoration area is located within the Erie Lake Plains of the Central Lowland province. The Erie Lake Plains ecoregion is comprised of the approximately 3 to 5.5 mile wide stretch of land that lies immediately adjacent to Lake Erie. This ecoregion is characterized by lacustrine deposits. The restoration area is underlain by clay and sandy clay, less than 30 feet thick, overlying shale. According to the Soil Survey of Ashtabula County, Ohio, published by the United States Department of Agriculture, the restoration area is underlain by a single soil type, "Made land." This soil type consists of areas of earth, fill, borrow pits, and of areas where much of the soil surface is covered by streets, homes, factories, or docks. In all of these areas, the original soils have been greatly altered.

Bedrock in the vicinity consists of Devonian shales of the Ohio and Olentangy groups. The bedrock surface slopes to the north towards Lake Erie. According to the 1960 (photorevised 1988) Ashtabula North, Ohio quadrangle United States Geological Survey (USGS) 7.5 minute topographic map, the Slip 5A peninsula is sloping with an elevation of approximately 590 feet above National Geodetic Vertical Datum.

Ashtabula experiences seasonal temperature changes with an average temperature of 57 degrees Fahrenheit. Ashtabula County receives lake effect snow and is considered part of the Southeastern Lake Erie Snowbelt. The lake-modified climate of this area extends the annual growing season by several weeks in comparison to inland areas.

An aerial survey was conducted in 2007 to provide one foot contours of the Slip 5A vicinity. Kucera International, Inc. compiled these contours to national map accuracy standards using photogrammetric methods from aerial photography taken in April 2007 and ground-truthed by a ground survey crew in May 2007.

1.2 Historical Land Use

According to local historical resources, the Slip 5A peninsula has been owned by railroad entities since approximately 1873. Initially, the peninsula was utilized as a dock area for the loading and/or unloading of goods/products carried by marine vessels into the railroad cars located on the tracks. According to historic aerial photographs and topographic maps, railroad tracks were present across the entire length of the peninsula from before 1905 until some time between 1968 and 1971.

The Slip 5A peninsula was leased to the Acme Scrap Iron and Metal Company (1959 - 1977) and the Triad Salvage Company (1977 - 1988) as a ship salvaging yard. Approximately 40 vessels were completely or partially scrapped at the peninsula during that time. The Slip 5A peninsula has not been used for any ship salvaging or railroad activities since circa 1988.

1.3 Previous Site Remediation Activities

In May 1988, the USEPA initiated a Clean Air Act enforcement action addressing asbestos-containing material (ACM) on the Slip 5A peninsula. Two permitted ACM containment areas were created during a two-part Environmental Asbestos Decontamination Project, conducted from December 1988 to March 1989. In Phase IA, ACMs from rubble piles were dismantled and decontaminated. A general cleaning of ACMs from the surface in designated areas was conducted in Phase IB. The two asbestos containment areas were covered with geotextile filter fabric (to prevent the migration or emission of ACM) followed by 24 inches of compacted soil cover.

Additionally, in April 1991 Conrail notified the USEPA Office of Pesticides and Toxic Substances Branch of a non-emergency collection and disposal of polychlorinated biphenyl- (PCB) containing capacitors and associated material, even though the quantities of PCBs released did not qualify for reporting under the Toxic Substances Control Act (TSCA) and/or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Selective soil excavation was conducted in targeted areas until soil sample PCB concentrations were below detection limits.

Directly south of the Slip 5A peninsula, along the eastern bank of the Ashtabula River, is an undeveloped piece of land that is referred to as the dredge spoil area. In 1993, the U.S. Army Corps of Engineers dredged approximately 35,000 cubic yards of sediment from the Ashtabula River in order to maintain enough depth to allow recreational boating. This material was placed in the dredge spoil area with the understanding the City of Ashtabula would be responsible for the disposal when a disposal facility for the larger remediation was established. The material was trucked to the confined disposal facility on State Road in early 2008.

1.4 Current Ecological Conditions

ENVIRON staff conducted a site visit on November 8, 2006 to develop a preliminary characterization of the Slip 5A peninsula and surrounding area. ENVIRON and Biohabitats, Inc. (Biohabitats) conducted an additional site visit on May 2, 2007 to collect additional technical input for the development of this Work Plan. Observations are described below.

The Slip 5A peninsula is located along the eastern shore of the Ashtabula River in Ashtabula, Ohio. The sole vehicular access to the Slip 5A peninsula is via the active Norfolk-Southern bridge yard facility. The southern limit of the peninsula is fenced with a 6 foot chain link fence. A single gate in the chain link fence allows access to a dirt/grass access road that is located approximately 10 feet from the bank and runs approximately halfway to the tip of the peninsula. This access road was likely created during the removal of an abandoned tugboat and is not regularly maintained. An "asbestos hazard" sign is posted on the entrance gate to the Slip 5A peninsula.

Several miscellaneous debris piles consisting of concrete blocks, metal scrap, tires, braided metal cable, plastic hoses, steel piping, abandoned rail siding, wood beams, and wood planks were observed throughout the peninsula. In addition, all of the banks are littered with miscellaneous debris deposited by the Ashtabula River during high water levels.

Portions of the peninsula shoreline have been modified (hardened) over time. The eastern tip of the peninsula is characterized by large rock slabs that provide erosion control and fish habitat. Additionally, portions of the eastern bank of the slip (adjacent to the bridge yard) contain miscellaneous concrete and scrap material along the shoreline.

At the southeastern extent of the Slip 5A peninsula, banks are very steep with a 3-6 foot, nearly vertical drop-off. This grade gradually decreases to a 2-3 foot drop near the mid-point of the eastern peninsula bank. A small (5-10 foot) riparian zone is located along the eastern bank of the Slip 5A peninsula. This riparian zone is characterized predominately by grasses at the southern extent and trees and shrubs at the northern extent. The western bank of the Slip 5A peninsula is characterized by a large levee that is located parallel to the Ashtabula River bank along the entire length of the peninsula. A small (5-10 foot) wooded riparian zone is located between the levee and the river. This riparian zone is limited in functionality due to the high slope along the levee.

Within the Slip 5A peninsula, several areas of raised elevation exist. In some areas, the raised topography is due to a historical remedial event (e.g., on-site consolidation and asbestos cap, scrap material consolidation). There are also low-lying areas within the peninsula that are characterized by standing water following rain events.

Overall, the plant community is characterized by a disturbed understory and canopy. The tree layer is dominated by black locust (*Robinia pseudoacacia*) and black willow (*Salix nigra*). Invasive species are a significant issue in the shrub stratum, crowding out native shrubs, tree saplings, and herbaceous plants. In the northern extent of the peninsula, Amur honeysuckle (*Lonicera maackii*) is becoming established. This exotic invasive shrub can quickly dominate the floodplain understory. Another invasive shrub, multiflora rose (*Rosa multiflora*) is also present, but with lower frequency. A small number of the invasive tree-of-heaven (*Ailanthus altissima*) has colonized the northern portion of the Slip 5A peninsula.

Significantly, much of the restoration area is dominated by a single grass species, identified as *Phragmites australis*. This invasive species forms dense, monospecific colonies that tend to exclude native species in the middle and southern portions of the peninsula. These areas are characterized by a few stands of mature trees and significant portions of *Phragmites*.

1.5 Current Soil and Sediment Conditions

Previous investigations have included chemical analyses of soils and sediments within and adjacent to the Slip 5A peninsula. Soil samples were collected from 0-2 feet and 2-4 feet intervals at 32 sample locations on the Slip 5A peninsula in April 2005 (Figure 1). Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs), PCBs, metals, volatile organic compounds (VOCs), and asbestos. The soil chemistry data were compared to Region 5 Ecological Screening Levels (ESLs) for soil (USEPA, 2003), Ecological Soil Screening Levels (SSLs) (USEPA, 2007) and background concentrations for metals in the eastern United States (Shacklette and Boerngen, 1984). Results of the soil screening indicated that five locations exceeded screening levels for naphthalene and/or benzo(a)pyrene in the subsurface (2-4 foot) soil. Additionally, multiple locations contained surface and/or subsurface soil metal concentrations in exceedance of screening levels. All sample locations with exceedances were evaluated to determine appropriate actions necessary to address potential ecological exposures. A site-specific determination was made that subsurface locations (2-4 foot) do not pose a significant risk to ecological receptors. Surface locations will be covered with clean soil to restrict the potential exposure pathway (discussed in detail in Section 2.3).

Detectable concentrations of PCBs were reported from only two soil sample locations, specifically locations 311 and 314 (Table 1). At location 314, PCBs were detected only in subsurface soil (1.4 milligrams per kilogram or mg/kg). However, at location 311, a concentration of approximately 20 mg/kg was reported for surface soil. Therefore, additional sampling was conducted in April 2007 to delineate the horizontal and lateral extent of PCBs in the vicinity of sampling location 311 (Figure 2). Samples were collected from 21 locations at 15-foot grid intervals north, east, and south of sample location 311. No samples were collected from the west of sample location 311 due to the presence of an asbestos cover area. Results from this sampling indicated that none of the sample locations approach PCB levels reported from surface soil at location 311 (Table 2). Therefore, soil excavation will be limited to sample location 311.

Soil sampling was also conducted in April 2007 to assess deeper subsurface soils in the proposed connected emergent wetland excavation area. Three locations were sampled at 4-6 feet and analyzed for PAHs, PCBs, and metals (Figure 1). Chemistry data from these three locations indicate that all contaminants of concern are below screening levels (Table 1).

Agricultural soil tests were conducted on samples collected from the Slip 5A restoration area to identify the existing pH and fertilizer requirements for the soil. Soil test sampling points are depicted on Figure 1, and test results are tabulated in Table 3. Samples were collected from a depth of 0-2 feet, 2-4 feet, and 4- 6 feet. Reported pH levels were similar between the depth intervals sampled. In general, soil pH was between 6.7 and 7.5 pH units, indicating that no soil amendments are necessary based on pH.[1]

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[1] The typical pH for eastern Ohio (subsoils derived from shale and sandstone) should be above 6.5 and below 7.0 (Ohio State University Extension, 2007).

Soil organic matter was also evaluated to determine soil fertility. A high soil cation exchange capacity (CEC) buffers the soil against changes in pH. A high CEC can also alter soil fertility by enhancing the binding of negatively charged organic matter with positively charged organic compounds to make micronutrients soluble and bioavailable to plants. Cation exchange is a major source of nutrients like K^{+}, Ca^{2+}, and Mg^{2+}, as well as NH^{4+} and micronutrient trace metals like Zn^{2+}, Mn^{2+}, and Cu^{2+} (Ohio State University Extension, 2007). Soil organic matter at the Slip 5A peninsula ranged from 0.6 to 2.2% with the CEC ranging from 12.5 to 18.7 meq/100 g soil. These organic matter and CEC values indicate that no organic matter enrichment is necessary[2].

HzW Environmental Consultants, LLC (HzW) conducted sediment sampling in Slip 5A in April 2007. The top 10-15 centimeters (cm) of substrate was collected from 6 sediment sample locations (Figure 1, Table 4) and analyzed for PAHs, PCBs, metals, and acid volatile sulfide and simultaneously extracted metals (AVS/SEM). Results were screened against Ohio Environmental Protection Agency (OEPA) Sediment Reference Values (SRVs) for metals and against Consensus-based Threshold Effect Concentrations (TECs) for PAHs and PCBs. Sampling locations 2 and 3 exceeded SRVs for multiple metals. However, the AVS/SEM ratio at the site indicates that these metals are not bioavailable and, therefore, do not pose a significant ecological risk.

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[2]In Ohio, typical soil organic matter ranges between 1 and 6% organic matter (Ohio State University Extension, 2007). The typical CEC for silty soils in Ohio is 6 to 20 meq/100 g soil (Ohio State University Extension, 2007).

2. CONCEPTUAL RESTORATION DESIGN

Restoration is intended to eliminate potential exposure pathways and to create emergent wetland, connected riparian streambank, and connected shrub habitat. Connected emergent wetlands are areas where soil is saturated with moisture either permanently or seasonally and are dominated by herbaceous plants that are adapted to flooding. Emergent wetlands are biologically diverse ecosystems that support a variety of wildlife including amphibians, reptiles, birds, and mammals. Connected riparian streambanks consist of vegetated corridors adjacent to stream channels. Riparian zones can support an assortment of trees along with other plants and in a healthy environment, the plants will be extremely diverse. Riparian zone widths are often simply defined by the vegetation, since plants requiring the wet soils characteristic of riparian zones usually differ from those in the surrounding areas. Riparian zones provide habitat for waterfowl, small mammals, and invertebrates. The connected shrub habitat is the upland area that extends above the riparian zone and is infrequently inundated. Otherwise known as the upland zone, it supports plant species dominated by shrubs that are not tolerant of flooding and that take advantage of better drainage. This habitat is valuable as refuge for wetland-related wildlife and nesting.

Restoration projects are commonly implemented to compensate for natural resource damages. The proposed restoration projects are presented in Figures 3 and 4, respectively. Details of the conceptual restoration described in the following subsections may be refined during the final design phase.

2.1 Restoration Objectives

The following restoration goals and objectives describe the main focus of the restoration projects.

Goal 1: Eliminate potential exposure pathways for soils exceeding relevant screening values.

- Objective 1.1. Removal of debris and scrap material from Slip 5A peninsula.
- Objective 1.2. Excavation and off-site disposal of PCB-contaminated soil (0-2 feet) in the vicinity of sample location 311.
- Objective 1.3. Placement of clean soil to eliminate exposure pathways for asbestos areas and certain soils.

Goal 2: Create connected emergent wetland habitat and a new hydraulic connector.

- Objective 2.1. Modify topography and vegetation to create a hydraulic connection between the Ashtabula River and Slip 5A.

- Objective 2.2. Install native vegetation to encourage wetland formation adjacent to the new hydraulic connection.

Goal 3: Enhance new and existing native plant communities through structural and species diversity.

- Objective 3.1. Targeted suppression of dominant invasive plant species including *Phragmites australis*, *Ailanthus altissima*, *Rosa multiflora* and *Lonicera* species.
- Objective 3.2. White-tailed deer (*Odocoileus virginianus*) exclusion from Slip 5A peninsula prior to supplemental planting and native species establishment.
- Objective 3.3. Install native overstory and understory tree species to establish canopy cover and to provide future large woody debris.
- Objective 3.4. Install native grasses, sedges, and small shrubs within the wetland and along banks.
- Objective 3.5. Install native shrub, grasses, and forb species in to supplement the connected shrub habitat.
- Objective 3.6. Enhance the connected riparian streambank adjacent to aquatic habitat by bank stabilization and planting native vegetation.

The goals and objectives of this restoration project are expected to enhance habitat diversity and condition (e.g., by providing shade, reducing siltation, and promoting ecosystem biological diversity), improve bank stability adjacent to Slip 5A, and stabilize floodplain soils along the bank.

2.2 Site Preparation

The existing access road will be maintained for construction activities. A staging area will be constructed at the southern end of the Slip 5A peninsula to provide areas onto which equipment, scrap, and excavated material can be placed prior to use or disposal. The staging area will be located on NSRC property and will be placed to minimize disturbance of habitat. Upon completion of construction activities, the staging area and access road will be removed. To the extent practical, staging areas and access roads for the GLLA mitigation project and the restoration work described herein will be coordinated to minimize potential construction impacts.

Mobilization will include: identifying and marking underground utilities, coordinating the planned site operations with NSRC personnel, procuring materials and equipment, constructing the staging area, and moving materials and equipment to the site. A pre-construction meeting will be held at the site prior to the commencement of construction activities. At this time, relevant personnel will review the project plan, permits, scheduling, and the site-specific health and safety requirements.

Prior to implementation of other restoration activities, the entire Slip 5A peninsula north of the existing chain link fence and the selected planting areas along the eastern shore of Slip 5A will be treated with approved herbicide(s) in an effort to reduce the dominance of invasive plant species on the site. Treatments will be consistent with species-specific recommendations developed by conservation organizations (e.g., The Nature Conservancy). It is anticipated that a minimum of two applications will be undertaken prior to land disturbance, including scrap and debris removal, PCB excavation, soil regrading, and vegetation planting. At least one application will be made during the late summer/early fall period in order to maximize translocation of herbicide materials into the root systems of target plants. Treatment methodology will be in the form of low-volume foliar sprays for herbaceous species and cut and treat stump applications for woody species. Woody and foliar debris generated by this site preparation will be left in-situ to aid in soil retention and nutrient recycling. Desirable native trees and vegetation selected for retention will be identified and flagged prior to invasive plant intervention.

The current heavy occupation of the site by whitetail deer poses a potential challenge to the establishment and long-term viability of a native plant community. Non-lethal methods will be employed in an effort to discourage deer from utilizing and remaining habituated to this site. These will include the removal of refugia/cover via invasive *Phragmites* and bush honeysuckle suppression and the closure and extension of the existing chain link fence across the base of the Slip 5A peninsula.

2.3 Soil Excavation

Miscellaneous scrap and debris are piled throughout the Slip 5A peninsula and the slip shoreline. The scrap and debris within the restoration area will be removed using standard construction equipment and, when practicable, manual labor. All scrap will be consolidated within the staging area prior to disposal in a landfill or reuse on NSRC property.

Excavation will be accomplished by removing soil to the specified depths to encompass the lateral and vertical extent of contaminated soil in the vicinity of sample location 311. It is anticipated that the vertical extent of excavation will include the top two feet of soil. The horizontal extent of the excavation is presented in Figure 3 and incorporates the results of the soil chemistry data collected in April 2007. The design documents will provide information on the vertical and horizontal excavation depths.

Excavation of soil will be performed using standard excavation equipment (e.g., backhoe). Land-based excavators contain an arm and bucket which are used to remove the soil in targeted area. Buckets may be either open scoops or two-sided (closed) clamshell buckets. Bucket size will be determined based on input from the contractor, production, and mobility. In either case, the equipment operator lowers the bucket to the soil and scoops or digs the material into the bucket. The bucket of soil is then deposited into a truck bed for transport to the staging area. Dewatering is not anticipated based on the low water content of the soils. Excavated soils will be disposed of in accordance with the procedures described in Section 4.

As described in Section 1.5, additional areas in the Slip 5A peninsula (Figure 3) were selected to receive a soil cover to limit potential ecological exposure to surface soils. Soil for the cover material will be excavated from the proposed hydraulic connection and connected emergent wetland area. These soils will be placed in targeted areas and spread to at least a depth of one foot. Performance standards for the soil cover will be specified in the design documents. Following the placement of the clean soil, native vegetation will be installed as described in Section 2.6.

2.4 Hydraulic Connection and Connected Emergent Wetland Grading

A channel will be excavated to establish a new hydraulic connection between the Ashtabula River and Slip 5A (Figure 4). This component of the restoration plan will facilitate connected emergent wetland creation in the adjacent area and may increase the value of Slip 5A as a refuge for aquatic life in the heavily used Ashtabula River. The area immediately adjacent to the hydraulic connector will be excavated and graded to create a mosaic of emergent and forested wetlands. Soil excavated during the creation of the hydraulic connector and wetland areas will be placed on-site to enhance the upland connected shrub habitat.

The hydraulic connection will be created by removing targeted soil to approximately two feet below surface water elevation to create a connection between the Ashtabula River and Slip 5A. Soil removal to this depth should match the surface water elevations of the Ashtabula River and Slip 5A, creating the potential for free flow of water. It is anticipated that the hydraulic connection will be approximately four feet wide. The final depth and width of the connection will be refined during the final design phase. Excavation of soil will be performed using standard excavation equipment (e.g., backhoe) as described in Section 2.3. The excavated soil will be deposited into a truck bed for transport either to the staging area or to the nearest upland connected shrub area for use as clean cover.

Adjacent to the hydraulic channel, connected emergent wetland habitat will be created by removing targeted soil to approximately one foot below surface water elevation, creating a low-lying elevation with direct connection to the hydraulic connector. This targeted depth is based on Ohio wetland conditions which best support emergent vegetation (Sherman et al., 1996). The connected emergent wetland will have a width of approximately 20 feet and may be characterized by a very slight (target 4:1) slope or steeper slopes (3:1) with a terraced structure. The target width and slopes of the emergent wetland area incorporate the existing topography, proposed soil excavation depths, and add diversity to the restored connected emergent wetland by providing varying levels of inundation to support a variety of wetland plant species. The final depth, slope, and width of the connected emergent wetland zone will be refined during the final design phase. Excavation of soil will be performed using standard excavation equipment (e.g., backhoe) as described in Section 2.3. The excavated soil will be deposited into a truck bed for transport either to the staging area or to the nearest upland area for use as clean cover.

2.5 Bank Stabilization

Bank stabilization measures (Figure 5) will be implemented near the created hydraulic connection and wetland area and along the targeted connected riparian streambank (Figure 4), to reduce the possibility of erosion. The specific locations requiring bank stabilization will be identified in the design phase. Erosion issues can be addressed by regrading the banks and planting soil-stabilizing vegetation. A 3:1 slope will be considered the target where adjacent land use and conditions permit (FISWRG, 1998). Where the 3:1 target is not attainable, erosion control matting may be placed to stabilize the slope until vegetation is fully established.

Self-launching rock may also be used in some of the riparian area immediately adjacent to Slip 5A. Self-launching rock is a general term for armoring with various size gradations of rock. By using small boulders, large rocks, cobble, and gravel, the larger structures can provide the firm foundation and force deflection while the smaller structures can move within the bank to fill holes and provide microhabitat complexity. Performance standards will be specified in the design document.

The proposed bank stabilization measures may require pre-construction notification of the U.S. Army Corps of Engineers and, as appropriate, a permit under Section 404 of the Clean Water Act and certification from OEPA pursuant to section 401 of the Clean Water Act.

2.6 Native Vegetation

Three planting zones (i.e., connected emergent wetland, connected riparian streambank, and connected shrub) will be determined based on elevation (Figure 4). Preliminary estimates indicate that the connected emergent wetland, connected riparian streambank, and connected shrub areas are approximately 1 acre, 1.83 acres, and 3.62 acres, respectively. Currently the Slip 5A peninsula is characterized by low plant diversity and high density of non-native species. Enhancing the native vegetation along the riparian corridor will increase filtration of surface water runoff; decrease erosion, contaminant, and nutrient loading; and enhance overall stream water quality. The plant community in each zone will be established using selected grasses, forbs, shrubs, and understory and overstory trees. Tables 5 and 6 provide example herbaceous seed mixes and tree/shrub species compositions for each zone. The selection of plant species will be based on the following criteria:

- Species shall be native to northeastern Ohio;
- Species shall be geographically appropriate to the Ashtabula River and Harbor area;
- Species shall be adapted to the appropriate hydrologic regime and corresponding soil conditions; and
- Species shall be able to root and grow rapidly and, where appropriate, help stabilize the connected riparian streambank habitat.

Wetland species will be selected based on additional recommendations provided by OEPA (2007).

Plant material is available in a variety of forms, ranging from bioengineered cuttings to large saplings (FISRWG, 1998). A combination of tree sizes will be used in the installation in order to balance the higher growth rates and quicker establishment of smaller stock with the need for immediate visual impact. Insertion of "live stakes" (i.e., cuttings of certain species that can successfully form roots from branch tissues) will be utilized where appropriate to enhance tree growth along the steep primary stream bank. For example, various dogwood and willow species root rapidly from cuttings and can be planted in this manner.

Revegetation drawings and specifications will be developed prior to planting. The revegetation plans will illustrate planting zones and will include a planting schedule listing plant species, density, quantities, size, and form and specified in the design document(s). Initial review of the agricultural soil test results (Table 3) indicates that nitrogen and phosphorous amendments may be necessary.

Tree and shrub planting will most likely take place in the fall or spring, during the early root growth period. Transplant timing will be determined after consideration of seasonal rainfall/ice-melt variability to reduce the likelihood of washout, as flood events could occur before tree roots became established. To afford added support, trees may be staked and anchored with wooden stakes and biodegradable twine. The planting schedule will be coordinated with restoration activities in an effort to minimize physical disruption of the planting area. Performance standards will be specified in the design document. As described below, plant survival and condition will be periodically monitored. In the event that significant loss is identified, alternative species and/or propagation methods may be utilized.

3. MONITORING, MAINTENANCE, AND REPORTING

Compliance monitoring and general maintenance of the restoration area will be implemented following installation. A Monitoring and Maintenance Plan (M&M Plan) will be submitted to the Trustees for approval prior to construction completion. The M&M Plan will include the type of monitoring in each habitat zone (i.e., connected emergent wetland, connected riparian streambank, connected shrub), monitoring locations, monitoring data to be collected, any contingency actions to be considered, and required maintenance for the restoration area. Effectiveness and functionality of the restoration project will be determined based on stability of the hydraulic channel and establishment of native vegetation.

3.1 Compliance Monitoring

Compliance monitoring during the establishment phase will include surveillance of designated areas to address the following issues:

- *Plant Condition and Threats*: Individual specimens will be examined during the growing season to determine if there has been any damage from animals, insects, or disease. If significant threats are identified, preventative and/or curative measures will be undertaken. Care will be given not to contaminate the area with herbicides/pesticides. Any damage by trespassers will also be noted and addressed as appropriate.
- *Erosion*: During the inspections, erosion controls installed during restoration efforts will be monitored to ensure integrity. If significant erosion as specified in the M&M Plan is identified, correction measures will be undertaken.
- *Invasive Plant Control*: The presence of invasive plant populations will be visually monitored in conjunction with plant inspections. If significant impacts as specified in the M&M Plan are identified, appropriate intervention efforts will be undertaken.
- *Hydraulic Connection:* The hydraulic connection will be inspected and maintained for consistency with the design specifications, as specified in the M&M Plan, unless the Railroads demonstrate that maintenance of the long-term viability of the channel is not practicable.

Compliance monitoring will be conducted in Years 3 and 5 after restoration project installation or as specified in the M&M Plan to ensure that the ecological habitat has become established. Any need for corrective actions, such as replanting, additional erosion control, and protection against threats, will be determined by the data collected during the compliance monitoring of the establishment phase.

3.2 General Maintenance

Maintenance of the area will be performed annually for a period of five years to ensure that the ecological value of the project is maintained. General maintenance will include:

- Trash and debris removal;
- Maintenance of deer exclusion fencing;
- Maintenance of the soil cover; and
- Maintenance of the hydraulic connection, as appropriate.

3.3 Reporting

Reports will be provided to the Trustees after Years 3 and 5 after restoration project installation or as specified in the M&M documenting the results of the monitoring and maintenance activities, problems encountered, and any corrective actions taken. NSRC has no further reporting obligations beyond the Year 3 and Year 5 reports.

4. WASTE CHARACTERIZATION AND MANAGEMENT

Waste material generated at the site includes fluids generated during equipment decontamination; any disposable sampling equipment and personal protective equipment (PPE); solids removed during soil excavation in the vicinity of location 311; and any other wastes generated during the conduct of work. All wastes will be properly characterized, containerized, and labeled for disposal in accordance with applicable federal, state, and local regulations. Decontamination fluids and residual solids and fluids will be placed into Ohio Department of Transportation (DOT)-approved 55-gallon steel drums. Other solid waste will be placed into roll-off boxes or other suitable containers. Drums will be placed on plastic sheeting covering a staging area maintained on-site. Separate containers will be used for fluids and solids, and each container will be clearly labeled with the start date and contents.

A representative composite sample of each waste media type will be collected. Sample containers will be supplied by the analytical laboratory and will be certified as pre-cleaned. For fluids, numerous grab samples will be collected using a coliwasa or drum thief to ensure that a representative sample of sufficient volume is obtained from each container. If separate phases are present, each phase will be sampled separately. For solids, samples will be collected directly from each container for analysis of VOCs. For other analytes, at least three soil samples will be collected from different locations (e.g., top, middle, and bottom) and composited to ensure a representative sample is obtained from each container. Water and soil samples will be submitted to a certified laboratory for full Toxicity Characteristic Leaching Procedure (TCLP) analysis (SW-846 1311), including VOCs (SW-846 8240/8260), semi-volatile organic compounds (SVOCs) (SW-846 8270), metals (SW-846 6010), and mercury (SW-846 7470). PCB-Aroclors will also be analyzed by SW-846 3520/8082 for fluids and 3545/8082 for solids.

Once the fluids and solids have been characterized, an off-site disposal facility will be identified. A waste profile form and manifest will be completed and submitted to the disposal facility. A manifest will accompany each load of waste taken off-site. Each shipment of waste will be thoroughly tracked and recorded (e.g., number of loads, dates of shipment, media shipped, and containers shipped). Signed manifests will be obtained from the receiving facility.

No generation of waste soil or fluids is anticipated during installation or monitoring of the Slip 5A restoration components. Any soil dug as part of tree planting will be placed within the connected shrub zone of the restoration area.

5. PROJECT DELIVERABLES

The following reports will be prepared and submitted to the Trustees for approval as per the schedule below:

- A Preliminary Design Document, detailing construction specifications and establishing performance standards and schedules for the restoration activities described in Sections 2.2 to 2.6 of the Work Plan. These restoration activities include but are not limited to: creation and establishment of the hydraulic connection and emergent wetland, riparian, and upland areas; bank stabilization; installation of the clean soil cover system; and re-vegetation and planting of the wetland, riparian, and upland areas.
- A Final Design Document addressing Trustee comments on the Preliminary Design Document. If there are no Trustee comments on the Preliminary Design Document, the Preliminary Design Document will be re-titled and considered the Final Design Document.
- Progress Reports, in accordance with the schedule in the approved Final Design Document. At a minimum, monthly Progress reports are due during the implantation of the Work Plan and approved Final Design Document.
- A Construction Completion Report, including as-build drawings and topographical surveys, as necessary to document compliance with the design performance standards.
- A Monitoring and Maintenance Plan establishing compliance and long-term monitoring activities, schedule and reporting requirements, as specified in Section 3 of the Work Plan will be submitted to the Trustees for review and approval within 30 days after construction has been completed in accordance with the schedule established in the (final) Design Document.
- Periodic Reports, as established in the Monitoring and Maintenance Plan.
- A Restoration Completion Report as described in Section VII.28 of the Consent Decree, documenting that all restoration activities have been completed as required under Section VII of the Consent Decree.

DELIVERABLE	DUE DATE
Preliminary Design Document	Due 90 days after the effective date of the Consent Decree.
Final Design Document	Due 30 days after receipt of Trustee comments on the Preliminary Design Document or in accordance with an alternate schedule approved by the Trustees.
Progress Reports	In accordance with the schedule set forth in the approved Final Design Document. At a minimum, monthly Progress Reports are due during implementation of the Work Plan and approved Final Design Document.
Construction Completion Report	In accordance with the schedule set forth in the approved Final Design Document.
Maintenance and Monitoring Plan	Due 30 days after construction has been completed, in accordance with the schedule established in the approved Final Design Document.
Restoration Completion Report	Due 30 days after the final Maintenance and Monitoring Report.

6. REFERENCES

FISRWG. 1998. Stream Corridor Restoration Principles, Processes, and Practices. Federal Interagency Stream Restoration Work Group.

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Sherman, D.E., R.W. Kroll, and T.L. Engle. 1996. Flora of a diked and an undiked southwestern Lake Erie wetland. Ohio Journal of Science 96(1): 4-8.

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USEPA. 2007. Ecological Soil Screening Levels (Eco-SSLs). U.S. EPA, Office of Emergency and Remedial Response. Available online at: http://www.epa.gov/ecotox/ecossl/.

Table 1. Soil Chemistry Data
Slip 5A Peninsula, Ashtabula, Ohio

	297		298		299		300		301		302	303	
	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-4 feet	0-2 feet	2-4 feet
Sample Collection Date	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005
Polychlorinated Biphenyls (mg/kg)													
Aroclor 1016	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1221	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1232	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1242	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1248	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1254	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1260	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Metals (mg/kg)													
Cadmium	<0.5	0.702	0.755	<0.5	<0.5	0.872	1.27	<0.5	<0.5	<0.5	0.875	0.743	0.733
Chromium	26.7	49.9	50	12.7	26.9	53.8	33.7	18.3	121	16.8	44.7	47	50.1
Copper	35.9	33	23.3	15.4	40.7	36.2	520	24.7	52.2	21.2	34.6	40.1	36.9
Lead	42.2	44.4	38	19.7	50.4	41.4	420	15.5	149	15.6	42.8	57.8	41.8
Nickel	24.6	29.7	25.1	16.7	24.8	31.7	37.3	32.2	152	30.1	30.5	29.1	39.1
Zinc	160	237	134	64.1	121	261	632	69.9	166	59.2	270	234	250
Mercury	0.384	0.562	0.278	<0.1	0.199	0.202	0.271	<0.1	<0.1	<0.1	0.213	0.214	0.251
Polycyclic Aromatic Hydrocarbons (mg/kg)													
Acenaphthene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Anthracene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)anthracene	0.228	0.422	<0.2	<0.2	<0.2	<0.2	0.462	<0.2	<0.2	<0.2	0.254	0.335	0.272
Benzo(a)pyrene	0.264	0.422	0.214	<0.2	<0.2	<0.2	0.393	<0.2	<0.2	<0.2	0.29	0.38	0.282
Benzo(b)fluoranthene	0.332	0.531	0.23	<0.2	<0.2	<0.2	0.536	<0.2	<0.2	<0.2	0.461	0.384	0.408
Benzo(ghi)perylene	<0.2	0.248	<0.2	<0.2	<0.2	<0.2	0.255	<0.2	<0.2	<0.2	0.221	0.216	0.201
Benzo(k)fluoranthene	<0.2	0.214	<0.2	<0.2	<0.2	<0.2	0.358	<0.2	<0.2	<0.2	<0.2	0.306	<0.2
Chrysene	0.293	0.412	0.211	<0.2	<0.2	<0.2	0.539	<0.2	<0.2	<0.2	0.358	0.437	0.386
Dibenz(a,h)anthracene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fluoranthene	0.403	0.749	0.452	0.417	0.228	0.29	0.722	<0.2	<0.2	<0.2	0.406	0.85	0.351
Fluorene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-cd)pyrene	0.214	0.293	<0.2	<0.2	<0.2	<0.2	0.302	<0.2	<0.2	<0.2	0.209	0.24	<0.2
Naphthalene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Phenanthrene	<0.2	0.224	0.266	<0.2	<0.2	<0.2	<0.2	<0.2	0.214	<0.2	0.211	0.451	<0.2
Pyrene	0.332	0.605	0.316	0.214	<0.2	0.228	0.681	<0.2	<0.2	<0.2	0.376	0.622	0.335

Table 1. Soil Chemistry Data
Slip 5A Peninsula, Ashtabula, Ohio

	304		305		306	307		308		309		310	
	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet
Sample Collection Date	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005
Polychlorinated Biphenyls (mg/kg)													
Aroclor 1016	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1221	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1232	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1242	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1248	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1254	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1260	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Metals (mg/kg)													
Cadmium	<0.5	<0.5	0.512	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.57	<0.5	<0.5	<0.5
Chromium	7.62	46.5	29.5	16	14.9	12.4	16.8	19.3	19.6	67.4	15.8	16.5	17.1
Copper	13.8	35.1	175	23.9	29	20.8	23.1	61.4	43.8	4680	30.5	29.5	22.9
Lead	21.8	26.5	516	14	39.2	11.2	15.6	53.1	45	1160	23.6	28.6	13.9
Nickel	7.39	28.7	28.5	27.1	11.4	23.2	30.6	31.4	31.2	47.2	28	29.3	32.1
Zinc	59.7	80.9	328	68.2	55.9	54.6	69.9	116	132	1190	75.7	91	64.5
Mercury	0.118	<0.1	1.37	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.317	<0.1	<0.1	<0.1
Polycyclic Aromatic Hydrocarbons (mg/kg)													
Acenaphthene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.212	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Anthracene	<0.2	<0.2	0.329	<0.2	<0.2	<0.2	<0.2	<0.2	0.314	<0.2	<0.2	<0.2	<0.2
Benzo(a)anthracene	0.361	<0.2	1.1	<0.2	<0.2	<0.2	<0.2	0.505	2.21	0.954	<0.2	<0.2	<0.2
Benzo(a)pyrene	0.436	<0.2	1.18	<0.2	<0.2	<0.2	<0.2	0.456	1.85	0.79	<0.2	<0.2	<0.2
Benzo(b)fluoranthene	0.473	<0.2	1.53	<0.2	<0.2	<0.2	<0.2	0.727	2.79	1.16	<0.2	<0.2	<0.2
Benzo(ghi)perylene	0.269	<0.2	0.761	<0.2	<0.2	<0.2	<0.2	0.27	1.11	0.8	<0.2	<0.2	<0.2
Benzo(k)fluoranthene	0.245	<0.2	0.605	<0.2	<0.2	<0.2	<0.2	0.268	0.871	0.551	<0.2	<0.2	<0.2
Chrysene	0.381	<0.2	1.26	<0.2	<0.2	<0.2	<0.2	0.635	2.24	0.845	<0.2	<0.2	<0.2
Dibenz(a,h)anthracene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.417	<0.2	<0.2	<0.2	<0.2
Fluoranthene	0.786	<0.2	2.41	<0.2	0.255	<0.2	<0.2	0.992	6.9	1.36	<0.2	<0.2	<0.2
Fluorene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.286	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-cd)pyrene	0.322	<0.2	0.948	<0.2	<0.2	<0.2	<0.2	0.311	1.37	0.838	<0.2	<0.2	<0.2
Naphthalene	<0.2	<0.2	<0.2	<0.2	0.502	<0.2	<0.2	<0.2	0.344	0.342	<0.2	<0.2	<0.2
Phenanthrene	0.551	<0.2	1.71	<0.2	0.415	<0.2	<0.2	0.406	2.31	0.752	<0.2	<0.2	<0.2
Pyrene	0.59	<0.2	1.59	<0.2	<0.2	<0.2	<0.2	0.757	4.48	1.11	<0.2	<0.2	<0.2

Table 1. Soil Chemistry Data
Slip 5A Peninsula, Ashtabula, Ohio

	311		312		313		314		315		316	
	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet
Sample Collection Date	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005
Polychlorinated Biphenyls (mg/kg)												
Aroclor 1016	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1221	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1232	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1242	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1248	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1254	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<1.0
Aroclor 1260	19.7	3.07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Metals (mg/kg)												
Cadmium	2.98	5.25	1.33	<0.5	<0.5	<0.5	3.59	13.7	<0.5	<0.5	<0.5	<0.5
Chromium	32.3	46.4	63.9	14.7	18.9	19.4	72.9	347	19.3	19.9	12.9	16.9
Copper	156	504	151	23.1	23.6	24.3	205	556	18.7	42.7	17.6	23.9
Lead	893	449	806	13.5	15.5	14.7	906	423	12.5	17.1	12	14.8
Nickel	31.2	73.6	70.9	30.3	33.2	34.4	58.3	220	38.5	35.5	22	31.6
Zinc	462	853	521	69	89.1	72.7	846	923	77.7	84.9	57.1	81.8
Mercury	1.37	3.26	0.709	<0.1	<0.1	<0.1	0.521	4.05	<0.1	<0.1	<0.1	<0.1
Polycyclic Aromatic Hydrocarbons (mg/kg)												
Acenaphthene	0.276	0.483	<4.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	0.492	0.203	<4.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Anthracene	1.46	1.97	<4.0	<0.2	<0.2	<0.2	0.259	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)anthracene	4.79	3.87	<4.0	<0.2	0.767	<0.2	1.5	0.653	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	4.36	2.79	<4.0	<0.2	0.576	<0.2	1.7	0.562	<0.2	<0.2	<0.2	<0.2
Benzo(b)fluoranthene	5.92	3.9	<4.0	<0.2	0.8	<0.2	1.74	0.857	<0.2	<0.2	<0.2	<0.2
Benzo(ghi)perylene	2.49	1.42	<4.0	<0.2	0.37	<0.2	0.863	0.407	<0.2	<0.2	<0.2	<0.2
Benzo(k)fluoranthene	2.42	1.62	<4.0	<0.2	0.243	<0.2	0.793	<0.2	<0.2	<0.2	<0.2	<0.2
Chrysene	4.85	3.6	4.99	<0.2	0.745	<0.2	1.79	0.63	<0.2	<0.2	<0.2	<0.2
Dibenz(a,h)anthracene	1	0.568	<4.0	<0.2	<0.2	<0.2	0.299	<0.2	<0.2	<0.2	<0.2	<0.2
Fluoranthene	7.13	9.72	4.7	<0.2	1.76	<0.2	2.83	1.42	<0.2	<0.2	<0.2	<0.2
Fluorene	0.382	0.707	<4.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-cd)pyrene	3.02	1.73	<4.0	<0.2	0.404	<0.2	1.06	0.428	<0.2	<0.2	<0.2	<0.2
Naphthalene	0.668	0.832	<4.0	<0.2	0.291	<0.2	0.352	0.366	<0.2	<0.2	<0.2	<0.2
Phenanthrene	4.35	8.21	10.5	<0.2	0.665	<0.2	0.906	0.725	<0.2	<0.2	<0.2	<0.2
Pyrene	7.21	6.78	10.5	<0.2	1.32	<0.2	2.81	1	<0.2	<0.2	<0.2	<0.2

Table 1. Soil Chemistry Data
Slip 5A Peninsula, Ashtabula, Ohio

	317		318		319		320		321		322	
	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet
Sample Collection Date	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005
Polychlorinated Biphenyls (mg/kg)												
Aroclor 1016	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1221	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1232	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1242	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1248	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1254	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1260	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Metals (mg/kg)												
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	13.5	13.3	14.2	14.1	19.8	18	19.5	15.4	19.9	14	57.5	15.8
Copper	152	22.1	21.8	23.1	44	23.1	43.9	13.1	37.3	13.8	40	11.5
Lead	51.1	13.5	14.6	14.5	56.5	13.1	67.3	8.93	53.5	9.74	57.8	8.54
Nickel	21.4	26.4	18.2	26.4	29.6	30.3	27.1	23.3	30	21.9	24.9	21.6
Zinc	101	63.8	72.7	61.6	126	61.3	126	68.3	119	54.9	106	62.8
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.106	<0.1
Polycyclic Aromatic Hydrocarbons (mg/kg)												
Acenaphthene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.225	<0.2
Acenaphthylene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Anthracene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.269	<0.2	<0.2	<0.2	0.47	<0.2
Benzo(a)anthracene	<0.2	<0.2	<0.2	<0.2	0.62	<0.2	1.33	<0.2	0.359	<0.2	1.29	<0.2
Benzo(a)pyrene	<0.2	<0.2	<0.2	<0.2	0.463	<0.2	1.31	<0.2	0.277	<0.2	1.3	<0.2
Benzo(b)fluoranthene	<0.2	<0.2	<0.2	<0.2	0.567	<0.2	1.58	<0.2	0.32	<0.2	1.39	<0.2
Benzo(ghi)perylene	<0.2	<0.2	<0.2	<0.2	0.32	<0.2	0.738	<0.2	<0.2	<0.2	0.765	<0.2
Benzo(k)fluoranthene	<0.2	<0.2	<0.2	<0.2	0.544	<0.2	0.785	<0.2	0.284	<0.2	0.778	<0.2
Chrysene	0.203	<0.2	<0.2	<0.2	0.6	<0.2	1.43	<0.2	0.333	<0.2	1.5	<0.2
Dibenz(a,h)anthracene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.245	<0.2	<0.2	<0.2	0.216	<0.2
Fluoranthene	0.258	<0.2	<0.2	<0.2	0.796	<0.2	3.02	<0.2	0.473	<0.2	3.32	<0.2
Fluorene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-cd)pyrene	<0.2	<0.2	<0.2	<0.2	0.387	<0.2	0.86	<0.2	0.209	<0.2	0.836	<0.2
Naphthalene	0.253	<0.2	<0.2	<0.2	0.299	<0.2	0.628	<0.2	0.217	<0.2	0.213	<0.2
Phenanthrene	0.245	<0.2	<0.2	<0.2	0.369	<0.2	1.43	<0.2	0.267	<0.2	1.7	<0.2
Pyrene	0.206	<0.2	<0.2	<0.2	0.73	<0.2	2.11	<0.2	0.421	<0.2	3.19	<0.2

Table 1. Soil Chemistry Data
Slip 5A Peninsula, Ashtabula, Ohio

	323		324		325		326		327		328	
	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet	0-2 feet	2-4 feet
Sample Collection Date	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005	June 2005
Polychlorinated Biphenyls (mg/kg)												
Aroclor 1016	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1221	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1232	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1242	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1248	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1254	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aroclor 1260	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Metals (mg/kg)												
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.44	<0.5
Chromium	19.7	17.2	25.9	19.4	11.4	3.55	15.9	17.3	15.5	14.6	48.1	16.6
Copper	41.4	27.2	58.5	59.6	62.4	5.28	68.2	23.7	25.7	22.6	31.1	27.5
Lead	55.7	14.7	71.3	85.4	893	9.24	17.1	19.3	15.3	11.9	48.9	18.3
Nickel	25.6	29.8	28.9	24.6	26.7	4.65	26.6	32.2	27.7	25.7	31.8	33.8
Zinc	152	62.8	146	119	82.4	11.3	56.9	80.7	69.5	56.7	132	74
Mercury	<0.1	<0.1	0.107	0.119	0.15	<0.1	<0.1	<0.1	<0.1	<0.1	0.415	<0.1
Polycyclic Aromatic Hydrocarbons (mg/kg)												
Acenaphthene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Anthracene	<0.2	<0.2	0.622	0.251	0.299	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)anthracene	0.921	<0.2	2.73	1.58	2.38	<0.2	<0.2	<0.2	<0.2	<0.2	0.595	<0.2
Benzo(a)pyrene	0.944	<0.2	2.9	1.76	2.24	<0.2	<0.2	<0.2	<0.2	<0.2	0.58	<0.2
Benzo(b)fluoranthene	1.32	<0.2	3.1	1.79	3.35	<0.2	<0.2	<0.2	<0.2	<0.2	0.894	<0.2
Benzo(ghi)perylene	0.612	<0.2	1.5	0.88	1.43	<0.2	<0.2	<0.2	<0.2	<0.2	0.352	<0.2
Benzo(k)fluoranthene	0.495	<0.2	1.56	1.18	1.42	<0.2	<0.2	<0.2	<0.2	<0.2	0.28	<0.2
Chrysene	1.12	<0.2	3.03	1.83	2.83	<0.2	<0.2	<0.2	<0.2	<0.2	0.609	<0.2
Dibenz(a,h)anthracene	0.268	<0.2	0.59	0.332	0.589	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fluoranthene	2.5	<0.2	5.14	2.57	10.1	<0.2	<0.2	<0.2	<0.2	<0.2	1.06	<0.2
Fluorene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-cd)pyrene	0.702	<0.2	1.82	1.05	1.72	<0.2	<0.2	<0.2	<0.2	<0.2	0.425	<0.2
Naphthalene	0.396	<0.2	0.478	0.356	1.09	<0.2	0.24	<0.2	<0.2	<0.2	0.24	<0.2
Phenanthrene	1.1	<0.2	2.29	0.683	2.65	<0.2	0.223	<0.2	<0.2	<0.2	0.529	<0.2
Pyrene	1.77	<0.2	4.27	2.24	4.53	<0.2	<0.2	<0.2	<0.2	<0.2	0.867	<0.2

Table 1. Soil Chemistry Data
Slip 5A Peninsula, Ashtabula, Ohio

	HB-01 4-6 feet	HB-02 4-6 feet	HB-03 4-6 feet
Sample Collection Date	**April 2007**	**April 2007**	**April 2007**
Polychlorinated Biphenyls (mg/kg)			
Aroclor 1016	<1.0	<1.0	<1.0
Aroclor 1221	<1.0	<1.0	<1.0
Aroclor 1232	<1.0	<1.0	<1.0
Aroclor 1242	<1.0	<1.0	<1.0
Aroclor 1248	<1.0	<1.0	<1.0
Aroclor 1254	< 0.05	< 0.05	< 0.05
Aroclor 1260	< 0.05	< 0.05	< 0.05
Total Metals (mg/kg)			
Cadmium	< 0.3	< 0.3	< 0.3
Chromium	17.5	16.2	18
Copper	15.9	16.2	13.5
Lead	9.8	11.1	9.8
Nickel	24.1	25.4	24.8
Zinc	68	77.5	71.6
Mercury	< 0.1	0.036	0.019
Polycyclic Aromatic Hydrocarbons (mg/kg)			
Acenaphthene	< 0.01	< 0.01	< 0.01
Acenaphthylene	< 0.01	< 0.01	< 0.01
Anthracene	< 0.01	0.037	0.044
Benzo(a)anthracene	< 0.01	0.023	0.041
Benzo(a)pyrene	< 0.01	0.048	0.061
Benzo(b)fluoranthene	< 0.01	0.061	0.087
Benzo(ghi)perylene	< 0.01	< 0.01	0.052
Benzo(k)fluoranthene	< 0.01	0.034	0.038
Chrysene	< 0.01	0.06	0.071
Dibenz(a,h)anthracene	< 0.01	< 0.01	< 0.01
Fluoranthene	0.038	0.078	0.075
Fluorene	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	< 0.01	< 0.01	0.053
Naphthalene	< 0.01	0.018	0.032
Phenanthrene	< 0.01	0.044	0.059
Pyrene	0.031	0.066	0.068

Table 2. April 2007 PCB Grid Chemistry Data
Slip 5A Peninsula, Ashtabula, Ohio

Sample Location	PCBs (mg/kg) 0-2 feet	PCBs (mg/kg) 2-4 feet
SB-1	0.6	<0.04
SB-2	Debris on surface	<0.04
SB-3	0.3	0.42
SB-4	0.3	1.2
SB-5	2.4	5.5
SB-6	0.93	1.9
SB-7	0.21	<0.04
SB-8	2.8	<0.04
SB-9	0.92	1.4
SB-10	0.18	<0.04
SB-11	3.0	<0.04
SB-12	0.1	0.25
SB-13	0.09	<0.04
SB-14	<0.04	<0.04
SB-15	<0.04	<0.04
SB-16	<0.04	<0.04
SB-17	0.15	<0.04
SB-18	1.1	<0.04
SB-19	<0.04	<0.04
SB-20	0.4	0.18
SB-21	0.19	<0.04

Notes:
Grid was laid out parallel to or east of Location 311 to avoid nearby asbestos disposal area.
All measured PCBs are Aroclor 1254 with the exception of SB-17 which was Aroclor 1260.

Table 3. Agricultural Soil Test Results
Slip 5A Peninsula, Ashtabula, Ohio

				Nutrient Concentrations (lb/acre)					Percent Base Saturation		
Sample Location	Sample Depth	Soil pH	Organic Matter %	Phosphorus P	Potassium K	Magnesium Mg	Calcium Ca	Cation Exchange Capacity (meq/100g)	% K	% Mg	% Ca
HB-01	0-2 feet	7.4	0.6	15	95	261	5513	17.1	1.2	11.2	87.6
HB-01	2-4 feet	7.2	0.7	12	111	353	4919	18.7	1.3	13.8	80.1
HB-01	4-6 feet	7	1.2	23	80	364	2711	15	1.2	17.8	68
HB-02	0-2 feet	7.5	2.2	4	109	272	6552	17.2	1.4	11.6	87.1
HB-02	2-4 feet	7.5	1.4	3	111	236	5543	17	1.4	10.2	88.4
HB-02	4-6 feet	7.1	1.3	23	75	218	3346	15.7	1	10.2	79.7
HB-03	0-2 feet	7.3	1.8	3	123	171	4916	16.5	1.6	7.6	90.8
HB-03	2-4 feet	7.2	1.6	4	115	146	9674	17.1	1.4	6.2	87.5
HB-03	4-6 feet	6.7	1.2	12	95	154	2370	12.5	1.6	9.1	71.3

Table 4. April 2007 Sediment Chemistry Data
Slip 5A Peninsula, Ashtabula, Ohio

	SP1		SP2		SP3		SP4		SP5		SP6	
	Result	Qualifer	Result	Qualifer	Result	Qualifer	Result	Qualifer	Result	Qualifer	Result	Qualifer
Polychlorinated Biphenyls (mg/kg)												
Arochlor 1016	< 0.14	RL	< 0.11	RL	< 0.13	RL	< 0.1	RL	< 0.1	RL	< 0.087	RL
Arochlor 1221	< 0.14	RL	< 0.11	RL	< 0.13	RL	< 0.1	RL	< 0.1	RL	< 0.087	RL
Arochlor 1232	< 0.14	RL	< 0.11	RL	< 0.13	RL	< 0.1	RL	< 0.1	RL	< 0.087	RL
Arochlor 1242	< 0.14	RL	< 0.11	RL	< 0.13	RL	< 0.1	RL	< 0.1	RL	< 0.087	RL
Arochlor 1248	0.19		0.27		0.38		0.3		0.39		0.36	
Arochlor 1254	< 0.14	RL	< 0.11	RL	< 0.13	RL	< 0.1	RL	< 0.1	RL	< 0.087	RL
Arochlor 1260	0.091	J	0.1	J	0.2		0.091	J	0.16		0.15	
Total Metals (mg/kg)												
Silver	< 2.1	RL	3.6		< 1.9	RL	< 1.6	RL	< 1.6	RL	< 1.3	RL
Arsenic	6.3		13.9		13.3		8.6		4.9		6.8	
Cadmium	0.29	B	1.5		0.55	B	0.54	B	0.21	B	0.2	B
Chromium	14.9		40.9		30.7		26.3		15		19.5	
Copper	30.1		87.5		59.4		45.9		24.2		25.3	
Lead	53.3		296		79.8		46.5		18		21.7	
Nickel	17.7		40.5		34.7		30		17.7		24	
Zinc	121		384		207		167		86.7		106	
Mercury	< 0.42	RL	0.38		0.17	B	0.13	B	0.058	B	0.12	B
Polycyclic Aromatic Hydrocarbons (mg/kg)												
Acenaphthene	< 0.028	RL	0.083		< 0.026	RL	< 0.021	RL	< 0.021	RL	< 0.018	RL
Acenaphthylene	< 0.028	RL	0.025		< 0.026	RL	0.04		< 0.021	RL	0.022	
Anthracene	< 0.028	RL	0.1		0.04		0.043		< 0.021	RL	0.19	
Benzo(a)anthracene	0.028		0.47		0.2		0.21		0.039		0.48	
Benzo(a)pyrene	< 0.028	RL	0.33		0.18		0.22		0.041		0.31	
Benzo(b)fluoranthene	0.041		0.61		0.28		0.35		0.077		0.39	
Benzo(ghi)perylene	< 0.028	RL	0.29		0.12		0.15		0.032		0.12	
Benzo(k)fluoranthene	< 0.028	RL	0.21		0.1		0.13		< 0.021	RL	0.16	
Chrysene	0.032		0.5		0.22		0.28		0.058		0.44	
Dibenz(a,h)anthracene	< 0.028	RL	0.08		0.038		0.043		< 0.021	RL	0.05	
Fluoranthene	0.057		0.92		0.3		0.45		0.097		1	
Fluorene	< 0.028	RL	0.074		< 0.026	RL	< 0.021	RL	< 0.021	RL	0.073	
Indeno(1,2,3-cd)pyrene	< 0.028	RL	0.26		0.11		0.14		0.025		0.13	
Naphthalene	0.028		0.21		0.19		0.073		< 0.021	RL	0.027	
Phenanthrene	< 0.028	RL	0.47		0.19		0.11		0.033		0.6	
Pyrene	0.044		0.77		0.3		0.42		0.082		0.67	
Acid Volatile Sulfide in Sediment (umoles/g)	54.4		19.2		26.5		7.1		8.5		6.9	
Simultaneously Extractable Metals (umoles/g)	3.2		7.4		3.8		1.9		2.4		2.1	
SEM - AVS (umoles/g)	-51.2		-11.8		-22.7		-5.2		-6.1		-4.8	
SEM/AVS Ratio	0.1		0.4		0.1		0.3		0.3		0.3	
Total Residue (% Solids)	23.6		30.6		25.9		31.6		32.1		37.7	

Notes:
RL = reporting limit; not detected
Results and reporting limits have been adjusted for dry weight.
B Estimated Result. Result is less than RL.
J Estimated result. Result is less than RL.
Simultaneously extractable metal result is sum of silver, cadmium, copper, nickel, lead, and zinc

Table 5. Example Tree and Shrub Species Composition of Planting Zones.
Slip 5A Peninsula, Ashtabula, Ohio

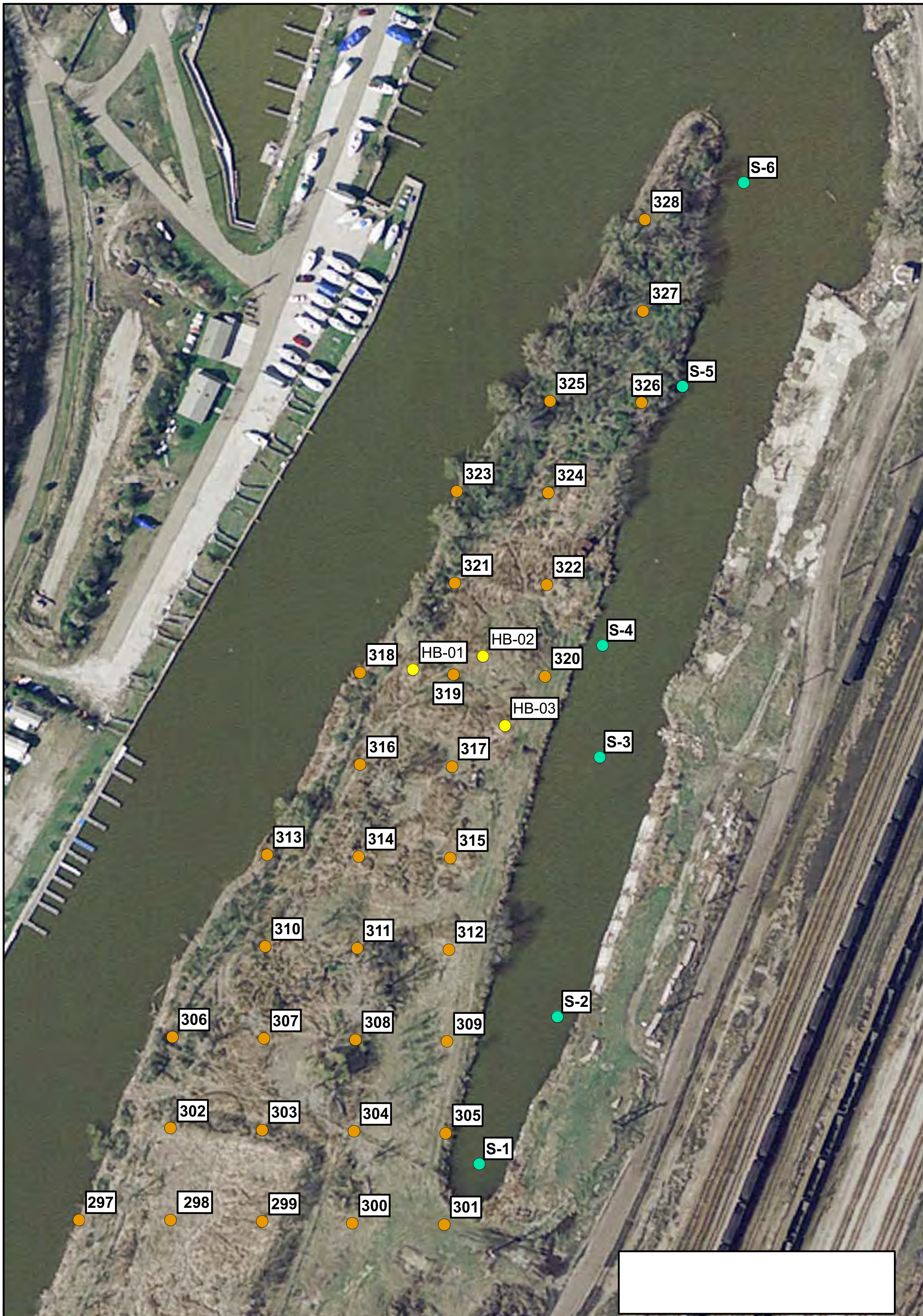
Planting Zone	Species	Common Name	Type
Connected Emergent Wetland	*Salix nigra*	Black Willow	Trees
	Salix interior	Sandbar Willow	Trees
	Salix lucida	Shining Willow	Trees
	Cornus stolonifera	Redosier Dogwood	Trees
	Cornus amomum	Silky Dogwood	Trees
	Populus deltoides	Eastern Cottonwood	Trees
	Physocarpus opulifolius	Common Ninebark	Shrubs
	Cephalanthus occidentalis	Buttonbush Shrubs	
	Ilex verticillata	Winterberry Shrubs	
	Alnus serrulata	Common Alder	Shrubs
	Alnus incana	Hazel Alder	Shrubs
	Rosa palustris	Swamp Rose	Shrubs
Connected Shrub	*Salix nigra*	Black Willow	Trees
	Platanus occidentalis	Sycamore Trees	
	Acer negundo	Boxelder Trees	
	Celtis occidentalis	Hackberry Trees	
	Juglans nigra	Black Walnut	Trees
	Morus rubra	Red Mulberry	Trees
	Gleditsia triacanthos	Honeylocust Trees	
	Cercis canadensis	Eastern Redbud	Trees
	Crataegus phaenopyrum	Washington Hawthorn	Trees
	Crataegus crusgalli	Cockspur Hawthorn	Trees
	Populus deltoides	Eastern Cottonwood	Trees
	Ulmus americana	American Elm	Trees
	Quercus bicolor	Swamp White Oak	Trees
	Quercus palustris	Pin Oak	Trees
	Acer saccharinum	Silver Maple	Trees
	Carya cordiformis	Bitternut Hickory	Trees
	Nyssa sylvatica	Black Tupelo	Trees
	Ulmus rubra	Slippery Elm	Trees
	Cornus racemosa	Gray Dogwood	Shrubs
	Staphylea trifolia	Bladdernut Shrubs	
	Sambucus canadensis	American Elder	Shrubs
	Ilex verticillata	Winterberry Shrubs	
	Lindera benzoin	Northern Spicebush	Shrubs
Connected Riparian Streambank	*Salix nigra*	Black Willow	Trees
	Platanus occidentalis	Sycamore Trees	
	Acer negundo	Boxelder Trees	
	Populus deltoides	Eastern Cottonwood	Trees
	Ilex verticillata	Winterberry Shrubs	
	Cephalanthus occidentalis	Buttonbush Shrubs	
	Cornus racemosa	Gray dogwood	Shrubs
	Physocarpus opulifolius	Common Ninebark	Shrubs
	Rosa palustris	Swamp Rose	Shrubs
	Sambucus canadensis	American Elder	Shrubs
	Staphylea trifolia	Bladdernut Shrubs	

Note:
Final species composition will be determined in the Final Design Document.

Table 6. Example Seed Mixes: Herbaceous Species
Slip 5A Peninsula, Ashtabula, Ohio

Planting Zone	Species	Common Name	Mix Composition	Type
Connected Emergent Wetland	*Carex comosa*	bristly sedge	0.39%	Sedge/Rush/Grass
	Carex lurida	bottlebrush sedge	1.51%	Sedge/Rush/Grass
	Carex vulpinoidea	brown fox sedge	2.27%	Sedge/Rush/Grass
	Juncus effusus	common rush	0.09%	Sedge/Rush/Grass
	Leersia oryzoides	rice cut grass	0.18%	Sedge/Rush/Grass
	Scirpus acutus	hard stemmed bulrush	0.39%	Sedge/Rush/Grass
	Scirpus atrovirens	dark green bulrush	0.09%	Sedge/Rush/Grass
	Scirpus validus creber	great bulrush	0.39%	Sedge/Rush/Grass
	Acorus calamus	sweet flag	0.39%	Forbs
	Angelica atropurpurea	great angelica	0.18%	Forbs
	Asclepias incarnata	swamp milkweed	0.18%	Forbs
	Eupatorium maculatum	spotted joe pie weed	0.09%	Forbs
	Hibiscus palustris	swamp rose mallow	0.39%	Forbs
	Iris virginica shrevei	blue flag iris	0.39%	Forbs
	Peltandra virginica	arrow arum	3.03%	Forbs
	Pontederia cordata	pickerel weed	0.39%	Forbs
	Sagittaria latifolia	common arrowhead	0.27%	Forbs
	Sparganium eurycarpum	common bur reed	1.51%	Forbs
	Lolium multiflorum	annual rye	9.84%	Sedge/Rush/Grass
	Secale cereale	winter rye	9.84%	Sedge/Rush/Grass
	Avena sativa	seed oats	68.14%	Sedge/Rush/Grass
	TOTAL LBS. SEED MIX		22.45	
Connected Shrub	*Carex cephaloidea*	rough clustered sedge	1.14%	Sedge/Rush/Grass
	Hystrix patula	bottlebrush grass	3.03%	Sedge/Rush/Grass
	Elymus villosus	silky wild rye	1.14%	Sedge/Rush/Grass
	Bromus pubescens	woodland brome	1.52%	Sedge/Rush/Grass
	Diarrhena americana	beak grass	2.28%	Sedge/Rush/Grass
	Geranium maculatum	wild geranium	0.19%	Forbs
	Podophyllum peltatum	may-apple	0.05%	Forbs
	Polygonatum canaliculatum	smooth solomon's seal	0.38%	Forbs
	Smilacina racemosa	feathery false solomon's sea	0.38%	Forbs
	Cryptotaenia canadensis	honewort	1.52%	Forbs
	Campanula americana	tall bellflower	0.19%	Forbs
	Rudbeckia hirta	black-eyed susan	0.19%	Forbs
	Lolium multiflorum	annual rye	9.86%	Sedge/Rush/Grass
	Secale cereale	winter rye	9.86%	Sedge/Rush/Grass
	Avena sativa	seed oats	68.28%	Sedge/Rush/Grass
	TOTAL LBS. SEED MIX		21.42	

Note:
Final species composition will be determined in the Final Design Document.



Legend

VAP Soil Sample Locations

Data Sources:
CT Consultants Plate of Survey Control, Slip 5A. 06-01-05;
HZW Consultants, Slip5AGrid.dwg

N

0 100
Feet

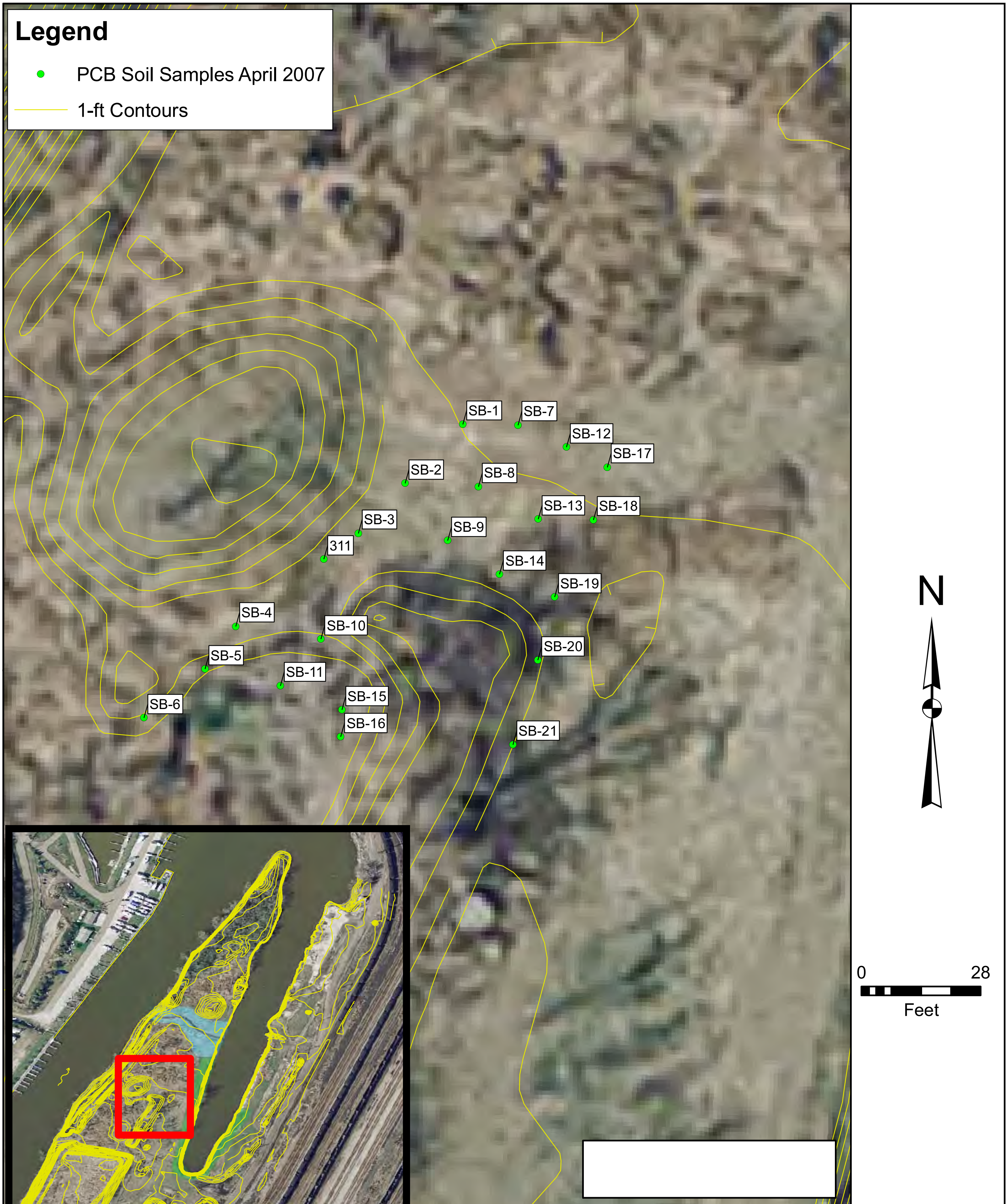
ENVIRON

Previous Soil and Sediment Sample Locations
Slip 5A
Ashtabula, Ohio

Figure
1

Project Number: 21-16542A

Thursday, October 8, 2009 3:27:51 PM
\\mesrv02\Client_Files\Ashtabula\GIS\Projects\Fig1_VAP_ Sediment_SampleLocations.mxd



ENVIRON

Sample Location Grid at Location 311
Slip 5A
Ashtabula, Ohio

Figure
2

Project Number: 21-16542A

Tuesday, June 26, 2007 3:52:13 PM
\\Mesrv01\Client_Files\Ashtabula\GIS\Projects\Apr07_Soil_Samples.mxd

Sample Data Source:
CT Consultants
Plate of Survey
Control, Slip 5A.
06-01-05

N

0 100
Feet

ENVIRON

Proposed Primary Restoration of Slip 5A Peninsula
Ashtabula, Ohio

Figure
3

Drafter: A. Glessner Project Number: 21-16542A

Tuesday, October 13, 2009 4:57:10 PM
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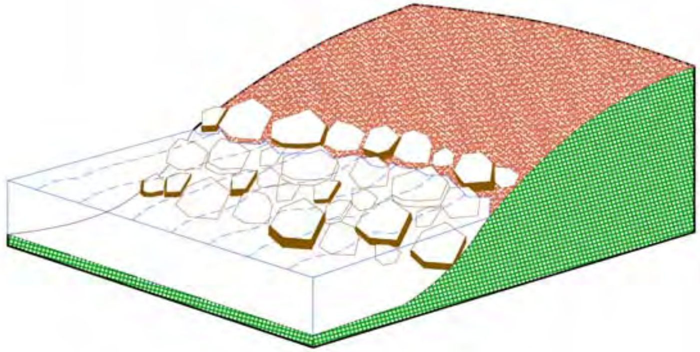
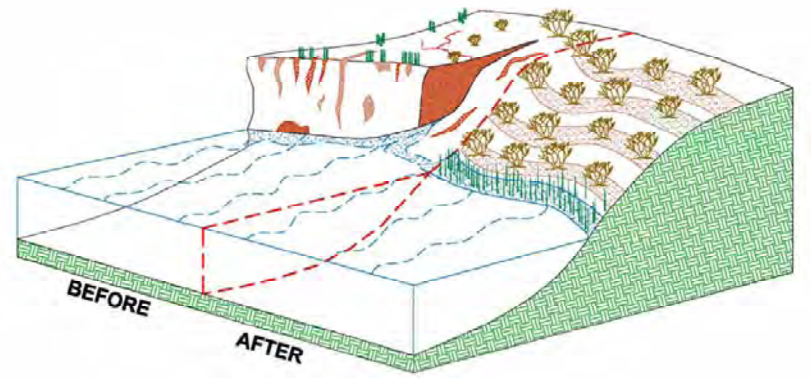
13801 West Center Street, Burton, Ohio 44021

Proposed Compensatory Restoration of Slip 5A Peninsula

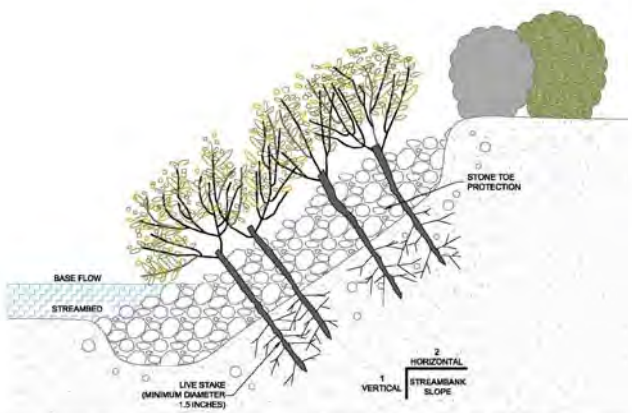
Figure 4



STONE TOE PROTECTION



BANK REGRADING

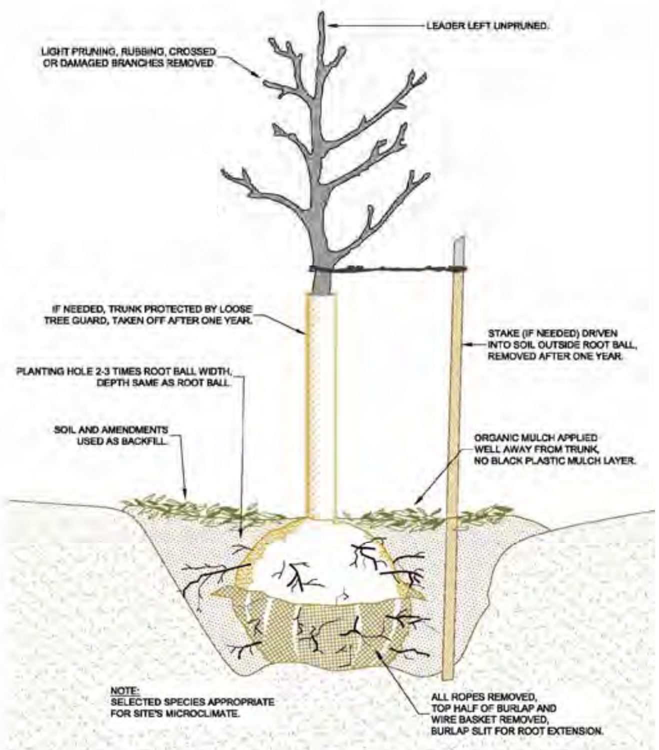


DRAWING NOT TO SCALE.

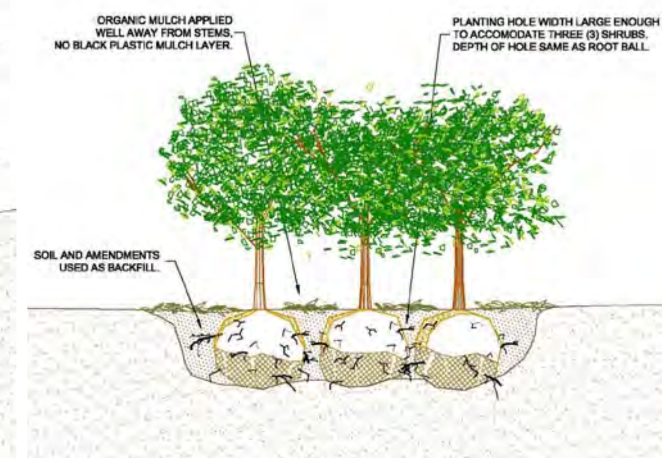
NOTES:

1. PLACE STONE TOE PROTECTION MECHANICALLY OR BY HAND ACROSS FULL HEIGHT OF BANK TO ENSURE UNIFORM DISTRIBUTIONOF ROCK PARTICLE SIZES ACROSS DISTURBED AREA.
2. STAKES PLACED RANDOMLY BETWEEN ROCKS (ONE STAKE EVERY 2 TO 3 FEET) DURING OR AFTER ROCK INSTALLATION.
3. THE BOTTOM END OF CUTTINGS TO EXTEND INTO SOIL AND PROTRUDE SLIGHTLY FROM ROCKS. BUDS PLACED UPWARD WHEN PLANTED AND CUTTINGS TO REMAIN UNDAMAGED.

JOINT PLANTING DETAIL



TREE PLANTING DETAIL



SHRUB PLANTING DETAIL

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Conceptual Design Schematics for Slip 5A Restoration Components

Figure 5