

Slip 5A Peninsula
Restoration Completion Report
Ashtabula, Ohio

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Norfolk Southern Railway Company

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Acronyms and Abbreviations

ACM:	Asbestos-containing material
amsl:	above mean seal level
CERCLA:	Comprehensive Environmental Response, Compensation and Liability Act
DeNovo:	DeNovo Group
ENVIRON:	ENVIRON International Corporation
GLLA:	Great Lakes Legacy Act
GLNPO:	Great Lakes National Program Office
GLRI:	Great Lakes Restoration Initiative
H:	Horizontal
HASP:	Health and Safety Plan
M&M Plan:	Monitoring and Maintenance Plan
NOAA:	National Oceanic and Atmospheric Administration
NPDES:	National Pollutant Discharge Elimination System
NSRC:	Norfolk Southern Railway Company
Ohio EPA:	Ohio Environmental Protection Agency
PCB:	Polychlorinated biphenyl
TSCA:	Toxic Substances Control Act
USDA:	United States Department of Agriculture
USEPA:	United States Environmental Protection Agency
USFWS:	United States Fish and Wildlife Service
V:	Vertical

1 Introduction

On behalf of Norfolk Southern Railway Company (NSRC), ENVIRON International Corporation (ENVIRON) has prepared this restoration completion report in accordance with the requirements of the Consent Decree regarding the Ashtabula River Area Natural Resource Damages between United States of America and the State of Ohio (ex rel. Michael DeWine, Ohio Attorney General), and Cabot Corporation et. al., filed July 12, 2012 (Case number 1:12-cv-01097-DCN). This report documents completion of all work required pursuant to the approved Work Plan included as Appendix G of the Consent Decree. The technical specifications and design details necessary to implement the restoration are described in *Slip 5A Peninsula Restoration Design Document, Ashtabula, Ohio* prepared by ENVIRON in October 2012 and approved in January 2013 (i.e., the design document). The restoration activities described in this report resolve specified claims relating to alleged natural resource damages at the lower Ashtabula River and Harbor Site in northeastern Ohio.

1.1 Site Background

The Slip 5A peninsula is located west of the active NSRC Ashtabula Terminal and Coal Facility, along the shoreline of the lower Ashtabula River in Ashtabula, Ohio. The peninsula is defined by the river on the west and Slip 5A on the east. The lower Ashtabula River and harbor are one of 43 Areas of Concern (AOCs) in the Great Lakes region defined by the U.S.-Canada Great Lakes Water Quality Agreement (Figure 1). A cleanup of the lower Ashtabula River was completed in 2008 during which approximately 630,000 cubic yards of contaminated sediment was removed from the river. The lower Ashtabula River is a lacustuary (i.e., freshwater estuary) and the water level in river and slip is generally the same as the water level in Lake Erie. For the purposes of this restoration, the mean water level in Lake Erie is assumed to be 570.7 feet above mean sea level (amsl).

The lower Ashtabula River is located within the Erie Lake Plain Section of the Central Lowland Physiographic Province in northeastern Ohio. The Erie Lake Plain Section is a 3 to 5.5 mile wide stretch of land that lies immediately adjacent to Lake Erie. This section is characterized by lacustrine sand, silt, and clay deposits and wave-planed glacial till overlying Devonian-age shale. According to the Soil Survey of Ashtabula County, Ohio, published by the United States Department of Agriculture (USDA), the peninsula and surrounding area are composed of “made land” (USDA 1973). The USDA describes made land as areas of earth fill, of 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 extensively altered. Previous studies indicate that beneath the made land, the restoration area is underlain by clay and sandy clay, less than 30 feet thick, overlying the shale.

The Slip 5A peninsula is owned by NSRC and has been owned by railroad entities since approximately 1873. Initially, the peninsula was used as a dock, rail yard, and storage area for goods and products carried by marine vessels and/or railroad cars. Docks were located along the western side of the peninsula to provide access to the river and along

the eastern side of the peninsula to provide access to Slip 5A. According to historic aerial photographs and topographic maps, railroad tracks were present across the entire length of the peninsula from before 1905 until sometime between 1968 and 1971. Upon cessation of railroad activities, the peninsula was leased to the Acme Scrap Iron and Metal Company (1959 - 1977) and the Triad Salvage Company (1977 - 1988) for use as a ship salvaging facility. Approximately 40 vessels were completely or partially scrapped at the peninsula during that time period. The peninsula has not been used for any ship salvaging or railroad activities since circa 1988.

1.2 Previous Site Remediation and Restoration Activities

In May 1988, the United States Environmental Protection Agency (USEPA) initiated a Clean Air Act enforcement action addressing asbestos-containing material (ACM) on the Slip 5A peninsula. A two-part asbestos decontamination project was conducted from December 1988 to March 1989. The project included removing readily accessible ACM from the surface of the peninsula and disposing of this material at an offsite facility. In addition, two ACM containment areas were designated on the peninsula as part of the project. The two ACM containment areas were reportedly covered with geotextile filter fabric and 24 inches of compacted soil to prevent the possible migration or emission of any residual ACM (Figure 2). These two ACM containment areas were further addressed as part of the current project.

Additionally, in April 1991, Conrail Inc. (a former owner of the property) notified the USEPA Office of Pesticides and Toxic Substances Branch of a non-emergency collection and disposal of capacitors and other associated material at the peninsula. Reportedly, the capacitors were filled with oil containing polychlorinated biphenyls (PCBs). Conrail Inc. notified USEPA even though the quantities of PCBs released did not qualify for reporting under the Toxic Substances Control Act (TSCA) and/or the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Limited excavation was also conducted in targeted areas to remove soil contaminated with PCBs. Subsequent sampling of the peninsula conducted in 2005 and 2007 identified a small area where near-surface soil contained low concentrations of PCBs. This area was addressed as part of the current project (Figure 2).

Two restoration projects were recently conducted along the western shoreline of the Slip 5A peninsula and on land south of the peninsula (i.e., along the river). In 2009 and 2010, a restoration project was conducted on the northwestern section of the peninsula, along the shoreline of the river (Figure 3). Funding was provided by the Great Lakes Legacy Act (GLLA) with a local share provided by the Ashtabula City Port Authority, Ohio Environmental Protection Agency (Ohio EPA), the Ashtabula River Coordination Group II (a group of private companies), and NSRC. The GLLA restoration project was administered by USEPA's Great Lakes National Program Office (GLNPO). The project included the excavation of approximately 800 linear feet shoreline to below water level and the placement of in-stream habitat structures (e.g., rock mounds and gravel beds) to create fish shelves in the river along the western side of the peninsula. Soil excavated during the project was transported offsite and disposed of in a licensed facility. The project also included debris removal, seeding, and the planting of native species along

the shoreline. Additionally, GLNPO conducted a community outreach program in which an Ashtabula 6th grade after-school program planted native seedlings at the project site.

In 2011 and 2012, a second restoration project was conducted along the river's shoreline starting near the southern end of the GLLA restoration project area and ending near the southern end of NSRC's Ashtabula Terminal and Coal Facility (Figure 3). Project funding was provided by the Great Lakes Restoration Initiative (GLRI), and Ohio EPA served as the local sponsor. The project included the excavation of approximately 1,400 linear feet shoreline to below water level and the placement of in-stream habitat structures to create additional fish shelves in the river. Soil excavated from the shoreline during the creation of the fish shelves was placed onsite along the eastern side of the GLRI restoration area. The project also included debris removal, seeding, and the planting native vegetation.

1.3 Project Scope of Work

The Slip 5A peninsula contains some of the only soft shoreline along the lower Ashtabula River in Ashtabula harbor making it ideal for the fish shelves created during the GLLA and GLRI restoration projects. However, the plant community on the peninsula was characterized by a disturbed understory and canopy prior to the current restoration project. The tree layer was dominated by black locust (*Robinia pseudoacacia*) and black willow (*Salix nigra*). A small number of the invasive tree-of-heaven (*Ailanthus altissima*) had begun to colonize the peninsula. A few native trees were located on the southern half of the peninsula. Where possible, these native trees were left undisturbed by restoration activities. Invasive shrubs were also present, including amur honeysuckle (*Lonicera maackii*) and multiflora rose (*Rosa multiflora*). However, more significantly, much of the restoration area was dominated by a single invasive grass species, identified as *Phragmites australis*. This invasive species forms dense, monospecific stands that tend to exclude native vegetation.

The current project included remediation and restoration activities conducted to: (1) eliminate potential exposure pathways to existing contamination and debris and (2) create emergent wetland, riparian streambank, and upland forest habitat on the peninsula (Figure 4). Potential exposure pathways were eliminated by increasing the cover over the two existing asbestos-containing material (ACM) containment areas and by excavating the small area of soil containing low concentrations of PCBs. The two existing ACM containment areas were covered with a minimum of 1 foot of imported soil and then by several feet of soil generated onsite during restoration activities. The near-surface soil containing low concentrations of PCBs was excavated and transported offsite for disposal at a licensed facility. The pit created by the excavation was backfilled with clean, imported soil and then covered by several feet of soil generated onsite during restoration activities.

Restoration activities included: (1) removing existing invasive species on the peninsula; (2) excavating a hydraulic connector and emergent wetlands through the center of the peninsula; (3) creating riparian streambank and upland habitat on the peninsula through

the excavation and placement of soil; (4) stabilizing the streambank along the southern end of the slip; and (5) planting native vegetation appropriate for each created habitat.

The native vegetation was planted in the following zones:

- Emergent Wetlands. Emergent wetlands are areas where soil is saturated with moisture either permanently or seasonally and are dominated by herbaceous plants that are adapted to flooded conditions. Emergent wetlands are biologically diverse ecosystems that support a variety of wildlife including amphibians, reptiles, birds, invertebrates, and mammals. An emergent wetland (and hydraulic connector) was constructed through the center of the peninsula. The construction of the wetlands connected the Ashtabula River and Slip 5A near the slip's southern end and made the northern end of the peninsula into an island (Figures 5, 6, and 7).
- Riparian Streambanks. Riparian streambanks are vegetated corridors adjacent to stream channels that are inundated during periods of high water. Riparian zones can support a diverse assemblage of trees, shrubs and herbaceous vegetation. Riparian zone widths are often defined by vegetation, since plants that are tolerant of the wet soils that characterize riparian zones usually differ from those in the surrounding areas. Riparian zones provide habitat for amphibians, reptiles, birds, mammals, and invertebrates. Riparian streambanks were created along the edges of the peninsula adjacent to Slip 5A, the lower Ashtabula River, and the newly created emergent wetlands.
- Upland Forest. Upland forests are located at an elevation greater than the riparian streambank and are infrequently inundated. The upland forest supports plant communities dominated by trees and shrubs that are not very tolerant of flooding and prefer soils that have better drainage. This habitat is valuable as refuge for wetland-related wildlife and for nesting. The upland forest was created at the center of the northern and southern halves of the peninsula using soil excavated during the construction of the emergent wetlands, hydraulic connector, and the riparian streambanks.
- Protected Streambank. A protected streambank is a bank that is protected from erosion by the installation of large boulders at the base of the streambank. The thoughtful placement of these large boulders may also enhance aquatic habitat. A protected streambank was constructed around the southern tip of Slip 5A and planted with live stakes cut from native species.

The area addressed during the Slip 5A peninsula restoration project is approximately 5.6 acres in size. The planting schedule for each zone is included as Appendix A.

1.4 M&M Plan Summary

A maintenance and monitoring plan (M&M Plan) was prepared for the current restoration project. The M&M Plan describes procedures to be followed for the regular inspection and monitoring of the structures and planting zones comprising the restoration project and outlines possible maintenance and contingency actions that may be necessary to ensure that the project achieves its objectives and goals (Section 2). A detailed

description of inspection and monitoring procedures and possible maintenance and contingency actions can be found in the approved *Slip 5A Peninsula Restoration Monitoring and Maintenance Plan, Ashtabula, Ohio, Revision 1* prepared by ENVIRON in September 2013 Activities required by the plan will begin following the approval of the Restoration Completion Report.

1.5 Project Timeline

The project timeline began with the approval of *Slip 5A Peninsula Restoration Design Document, Ashtabula, Ohio* (i.e., the design document) in January 2013 and ends with the completion of planting activities in 2014.

2 Restoration Goals and Objectives

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

Goal 1: Eliminate potential exposure pathways for soils.

- Objective 1.1. Removal of debris, wastes, and scrap material from the Slip 5A peninsula.
- Objective 1.2. Excavation and off-site disposal of PCB-contaminated soil (0-2 feet below ground surface) from a small area near the southern end of the peninsula.
- Objective 1.3. Placement of clean soil to further eliminate exposure pathways for the two existing asbestos containment areas.

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

- Objective 2.1. Modification of topography to create a downstream hydraulic connection (i.e., a hydraulic connector) between the lower Ashtabula River and Slip 5A.
- Objective 2.2. Modification of topography and the installation of native vegetation to encourage wetland formation adjacent to the new hydraulic connector.

Goal 3: Enhance new and existing native plant communities through structural habitat diversity and increased 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. Exclusion of white-tailed deer (*Odocoileus virginianus*) from the peninsula prior to supplemental planting and native species establishment.
- Objective 3.3. Installation of native overstory and understory trees and shrubs in the upland forest to establish canopy cover, create a diverse forest plant community, and to provide habitat, including the future creation of large woody debris.
- Objective 3.4. Installation of native grasses, sedges, and forbs within the emergent wetland to establish a diverse native plant community, and provide habitat for aquatic organisms.
- Objective 3.5. Installation of native trees and shrubs in the riparian streambanks to provide bank stability, create a diverse plant community, and provide food and habitat for wildlife.
- Objective 3.6. Enhancement of the riparian streambank adjacent to aquatic habitat by slope reduction and bank stabilization and by planting native vegetation.

Goal 4: Protect shoreline and create aquatic habitat along the southern end of Slip 5A using a protected streambank structure.

- Objective 4.1. Placement of rock (i.e., boulders) and rounded river rock to create a protected streambank structure to provide erosion protection to the steeply sloped streambank along the southern end of the slip, and to enhance aquatic habitats.

- Objective 4.2. Installation of live stakes of native trees and shrubs in the structure to further enhance bank stability and wildlife habitat.

The goals and objectives of this restoration project are to enhance habitat diversity and condition (e.g., by providing shade, reducing siltation, and promoting structural and biological diversity), eliminate exposure pathways, improve the hydraulic connection between the river and slip, improve bank stability at the southern end of the slip, and stabilize streambank soils.

3 Project Organization and Responsibility

ENVIRON, on behalf of NSRC, had the responsibility for the design, implementation, and management of the Slip 5A peninsula restoration project. ENVIRON also directed construction quality assurance inspections, managed inspection data, and determined the need for any additional measures, as appropriate.

3.1 Management Responsibilities

Management responsibilities, including those of the NSRC Project Team, the ENVIRON Project Team, and the Project Team from the restoration contractor are described below.

3.1.1 NSRC Project Team

The NSRC Project Coordinator was Christopher Oakes, Manager Environmental Remediation, and the NSRC onsite representative was Valois Ochoa, Terminal Trainmaster for the Ashtabula Terminal and Coal Facility. The NSRC Project Coordinator ensured that technical, financial, and scheduling objectives of the restoration were achieved successfully. The NSRC Project Coordinator had the authority to commit the resources necessary to meet project objectives and requirements. The NSRC Project Coordinator approved all external reports (deliverables) before their submission to the U.S. Fish and Wildlife Service (USFWS), National Oceanic Atmospheric Administration (NOAA), and Ohio EPA.

3.1.2 ENVIRON Project Team

The ENVIRON Project Team included Dr. Tim Barber, Principal-in-Charge, and Bruce Patterson, Project Manager, and technical staff as necessary. Dr. Barber had responsibility for ensuring that the project met the objectives of ENVIRON's quality standards. Dr. Barber reported directly to the NSRC Project Coordinator and was responsible for technical quality control and project oversight. Mr. Patterson monitored restoration activities, approved construction material for use upon delivery, and oversaw soil excavation and placement, habitat creation, and health and safety activities.

3.2 DeNovo Group Project Team

DeNovo Group (DeNovo) was retained by NSRC as the contractor to implement the restoration of the Slip 5A peninsula. Rob Weber was the project supervisor and John Kerschner and Mark Breyman were the onsite project managers for DeNovo. Mr. Weber was responsible for project schedule maintenance, day-to-day project performance, and cost tracking and scheduling. Messrs. Kerschner and Breyman were responsible for directing and supervising field crews, subcontractor oversight and coordination (e.g., Meadville Land Service, Inc.), equipment allocations and resource coordination, and transportation and disposal operations.

During the restoration project DeNovo:

- Cleared and grubbed the peninsula after herbicide treatment.
- Imported rounded river rock, rock, and soil.

- Installed site control features including the turbidity curtain.
- Excavated soil to create the riparian streambanks, emergent wetlands and hydraulic connector.
- Placed and graded excavated soil on the peninsula to create upland habitat.
- Excavated near-surface soil containing low concentrations of PCBs.
- Imported soil to backfill the pit generated by the excavation of soil containing PCBs and to cover the existing ACM containment areas.
- Constructed the protected streambank structure using imported rounded river rock and rock.
- Lined hydraulic connector with imported river rock and placed rock at both ends of the connector.

Weekly Summary Reports prepared by DeNovo during the course of the restoration project are included as Appendix B.

3.3 DeNovo Group Subcontractors

Subcontractors were retained by DeNovo as necessary to complete the restoration of the peninsula. Subcontractors retained included:

Crowley Vegetation Management — Crowley Vegetation Management treated the entire Slip 5A peninsula with approved herbicide in an effort to reduce the dominance of invasive plant species on the peninsula. Limited herbicide treatments were also performed in the GLRI restoration area to control invasive species.

Meadville Land Service, Inc. — Meadville Land Service, Inc. planted trees and shrubs on the peninsula, installed live stakes in the protected streambank structure, installed live branch layering near the southwestern corner of the emergent wetlands, seeded the peninsula, planted the wetlands, and installed habitat structures including standing snags and rootwads.

Environmental Waste Solutions LLC. — Environmental Waste Solutions LLC. arranged for the transportation and disposal at a licensed facility of soil, debris, and waste generated during the clearing and grubbing of the peninsula. The debris and waste included: tires, rubber hoses, vegetation, abandoned railroad ties, and wooden beams and planks. Soil included the near-surface soil containing low concentrations of PCBs.

D.B. Kosie & Associates — D.B. Kosie & Associates conducted the surveying necessary to complete the restoration of the peninsula. Activities conducted by D.B. Kosie & Associates included: the initial survey of the peninsula to define the project boundary and the boundaries of the various restoration planting zones (e.g., riparian streambanks, emergent wetlands), grade checks during the excavation of the emergent wetlands and riparian streambanks, final grade

check after the excavation of soil containing low-concentrations of PCBs, and the surveys required to prepare the as-built drawings included as Appendix C.

4 Preparation, Remediation, and Restoration

4.1 Site Preparation

Primary activities conducted as part of the site preparation included mobilization, herbicide application to control invasive species, surveying, and clearing and grubbing. In addition, a pre-construction meeting was held at the site on September 19, 2013. The meeting was attended by representatives of USFWS, Ohio EPA, DeNovo, Meadville Land Service, Inc., and ENVIRON.

4.1.1 Mobilization

The mobilization for the restoration work included the following activities:

- Obtaining the Necessary Permits.

  The following permits were obtained as part of the preparation for the project: (1) General Permit Authorization to Discharge Pesticides In, Over or Near Waters of the State Under the National Pollutant Discharge Elimination System (NPDES Permit No.: OHG870001); (2) General Permit Authorization for Storm Water Discharges Associated with Construction Activity Under the National Pollutant Discharge Elimination System (Ohio EPA Permit No.: OHC000004); and (3) Nationwide Permit No. 27 (Department of the Army Permit No. 2013-00548). Copies of the permits are included as Appendix D.

- Procuring Restoration Materials.

  Samples of rounded river rock and rock were inspected prior to importation to the project site. The rounded river rock and rock met the requirements outlined in the technical specifications included as part of the design document. Samples of the soil to be used in the covers of the two existing ACM containment areas were collected and submitted to a laboratory for grain size analysis by sieve and hydrometer methods prior to importation to the site. The results of the grain size analysis are included as Appendix E.

- Installing Site Control Features.

  A turbidity curtain was installed across the northern end of Slip 5A prior to the start construction activities (e.g., soil excavation and placement). In addition, security signage was installed at the entrance to the peninsula and United States Coast Guard-approved ring buoys with rope bags were installed approximately every 200 feet along the shoreline of the river and the slip prior to the start of near-water activities.

- Procuring Equipment and Facilities.

  The construction contractor procured and had delivered to the project site a field office, storage trailer, and portable toilet.

- Site Inspection and Notification.

  Prior to the start of construction activities, the construction contractor inspected the project area and examined existing working conditions. In addition, the construction contractor contacted the Ohio Utility Protection Service to mark utilities at the site as part of the preparation for the project.

Vehicular access to the Slip 5A peninsula is from East 6th Street, via NSRC's Ashtabula Terminal and Coal Facility. Mobilization activities were conducted in August and September 2013.

4.1.2 Invasive Species Control

The project began by treating the Slip 5A peninsula with approved herbicides in an effort to reduce the dominance of invasive plant species on the peninsula. Treatment methodologies included low-volume foliar sprays for herbaceous species (e.g., *Phragmites australis)* and griddling and paint applications or cut and paint-the-stump applications for trees (e.g., *Robinia pseudoacacia* and *Ailanthus altissima*) and woody shrubs. In addition, a small part of the GLRI restoration area was treated with approved herbicides in an effort to control *Phragmites australis*.

4.1.3 Initial Survey

The initial survey of the peninsula was conducted to define the boundaries of the project including the project's exclusion zone and the required 100-foot buffer from the nearest active rail line. The initial survey also included defining the boundaries of the remediation areas (i.e., ACM Containment Area A, ACM Containment Area B, and the PCB soil excavation area) and the boundaries of each restoration area and planting zone (i.e., emergent wetlands, hydraulic connector, riparian streambanks, upland forest, and protected streambank). The boundaries of the these areas and zones were marked with stakes and the stakes were marked with surveyor's flagging (or tape). The color of the flagging was different for each type of restoration area and planting zone.

4.1.4 Clearing and Grubbing

The peninsula was cleared and grubbed after herbicide application (excluding the shoreline along the western side of the peninsula which was planted during GLLA restoration activities in 2009 and 2010). Clearing and grubbing included:

- Removing miscellaneous debris and waste (e.g., scrap metal, tires, braided metal cable, rubber hoses, steel piping, abandoned railroad ties, and wooden beams and planks) that had been placed throughout the peninsula by previous occupants;
- Mechanically removing trees and stumps treated with herbicide as part of the control of invasive species; and
- Mechanically removing the *Phragmites* aboveground biomass and below ground root mat in order to prevent its re-establishment and its competition with the native species planted during restoration activities.

The top six to twelve inches of surface material was mechanically removed and graded using a bulldozer and a hydraulic excavator. Scrap metal and other metal debris were collected in a roll-off box and transported to Lincoln Recycling in Ashtabula for recycling. Tires were collected and taken to Liberty Tire Recycling in Minerva, Ohio. Other waste material was loaded into trucks and transported offsite for disposal at Republic Services' Carbon Limestone Landfill in

Lowellville, Ohio. Non-hazardous waste manifests for material transported offsite are included as Appendix F.

4.1.5 Design Modifications and Contingency Actions

During the treatment to control invasive species on the peninsula, herbicide was accidentally applied to plantings located along the lower Ashtabula River shoreline on western side of the peninsula. This vegetation was planted as part of the GLLA restoration project conducted in 2009 and 2010. Some of these plantings were killed and some were damaged by the herbicide. Dead and damaged plants were replaced in the spring of 2014 concurrently with the planting of the emergent wetlands. A memorandum describing the accidental application of herbicide to this area was prepared by ENVIRON on November 12, 2013, and is included as Appendix G.

The results of the grain size analysis of the soil to be imported and used as the cover over the two existing ACM containment areas indicated that the clay content of the soil was less than the amount specified in the technical specifications for the cover. A second sample of the imported soil was collected and again analyzed for grain size. The clay content of the second sample was higher (when compared to the first sample) but still less than required by the technical specifications. However, it was determined that the additional placement of several feet of clay (generated during onsite excavation activities) on top of the imported soil (to create the upland in this area) would provide the performance specified in the design document for the covers. Therefore, the soil was imported and used in the covers. The results of the grain size analyses of the imported soil and of a sample of onsite clay are included as Appendix E.

4.2 Site Remediation

As noted above, remediation activities conducted as part of the project included placing a cover of imported soil over each of the two existing ACM containment areas and excavating and disposing of a small area of soil containing low concentrations of PCBs. Site remediation activities were conducted in the fall of 2013.

4.2.1 ACM Containment Area Covers

The two existing ACM containment areas are located on the southern half of the peninsula, south of the emergent wetlands (Figures 2 and 5). The boundaries of the two areas were located during the initial survey of the project site. After clearing and grubbing was completed, a minimum one-foot cover of imported soil was placed over the two existing containment areas to minimize any future exposures of ACM to human or ecological receptors. The imported soil was placed near each of the two existing containment areas and then spread over these areas using a bulldozer. These areas were later covered with an additional 2 to 4 feet of clay generated during the excavation and construction of the emergent wetlands, hydraulic connector, and riparian streambanks. The two ACM containment areas were later planted with trees, shrubs, and a herbaceous seed mix as part of the restoration activities.

4.2.2 Soil Excavation

On October 21, 2013, after clearing and grubbing was completed, a small area of near-surface soil (approximately 0 to 2 feet below the ground surface) containing low concentrations of PCBs was excavated and the excavated soil was transported offsite for disposal. This area was located on the southern half of the peninsula, south of the emergent wetlands and east of ACM

containment area B (Figures 2 and 5). The boundary of this area was located and marked during the initial survey of the peninsula. Soil excavated during this remediation activity was disposed of at Republic Services' Carbon Limestone Landfill in Lowellville, Ohio. The waste profile and the non-hazardous waste manifests for the soil are included as Appendix F.

The soil excavation was performed using a hydraulic excavator. As specified in the design document, the soil was removed to an elevation of 577 feet amsl or lower within the defined boundaries of the PCB soil area. Approximately 100 cubic yards of soil were excavated during this remediation activity. Upon completion of the excavation, the contractor placed the excavator's bucket on plastic sheeting, removed loose soil from the bucket using a scraper and then cleaned the bucket with soap and water. Material generated during the cleaning of the bucket and the plastic sheeting were transported offsite for disposal at Republic Services' Carbon Limestone Landfill. After the excavation was completed, the surveyor measured the elevation of the bottom of the excavation pit to be between 575.6 and 576.5 feet amsl and confirmed that soil had been removed to the elevation specified in the design document (i.e., 577 feet amsl or lower). The contractor then backfilled the excavation pit with imported soil. Following backfilling, the excavation area was covered with a minimum of 4 feet of clay generated during the excavation of the hydraulic connector, emergent wetlands and riparian streambanks. The area was later planted with trees, shrubs, and an herbaceous seed mix as part of the restoration activities.

4.3 Site Restoration

Primary restoration activities included: (1) excavating a hydraulic connector and emergent wetlands through the peninsula, from the river to the slip; (2) excavating and grading soil to create riparian streambank habitat along the edges of the peninsula; (3) placing and grading excavated soil along the center of the peninsula to construct upland forest habitat; (4) stabilizing the bank along the southern end of the slip; and (5) planting native vegetation appropriate for each habitat. Restoration activities began after clearing and grubbing was completed. Most site restoration activities were conducted in the fall of 2013 (see Section 4.3.6).

4.3.1 Emergent Wetlands and Hydraulic Connector

The hydraulic connector and emergent wetlands were created by excavating soil from an area of the south-central portion of the peninsula, extending from the lower Ashtabula River on the west to Slip 5A on the east (Figures 6 and 7). The emergent wetlands and hydraulic connector were excavated to elevations below the mean water level of Lake Erie (i.e., below 570.7 feet amsl), creating a connection between the lower Ashtabula River and Slip 5A near the slip's southern end and providing a second, downstream route for water to flow into Slip 5A from the river. The creation of the emergent wetlands and hydraulic connector also made the northern end of the peninsula into an island.

The excavation to create the emergent wetlands and hydraulic connector was performed using hydraulic excavators. In general, the excavation was done in the dry by leaving narrow berms between the construction area in the south-center part of the peninsula and Slip 5A on the east and the river on the west. Soil excavated during the construction of the emergent wetlands and hydraulic connector was placed on the northern and southern halves of the peninsula, near the wetlands, to help create the upland forest habitat. Most of the excavation required to create the

emergent wetlands and hydraulic connector was completed while the berms were in place. The removal of the berms on November 14 and 15, 2013, allowed the hydraulic connector and emergent wetlands to flood with water, creating the second connection between the river and the slip and creating an island out of the northern end of the peninsula. This required that the restoration of the northern end of the peninsula (grading, planting, etc.) be completed before the berms were removed.

The hydraulic connector (or channel) was excavated inside of the wetland area starting at the river near the southwestern corner of the emergent wetlands and extending through the center of the wetlands to Slip 5A (Figure 5). The hydraulic connector is approximately 20 feet wide at the top of its channel and 5 feet wide at the bottom of its channel, with the sides of the channel graded to a slope of approximately 3H:1V (3 feet horizontal to 1-foot vertical). The elevation of the bottom of the channel is between approximately 567 and 568 feet amsl (3.7 to 2.7 feet below the mean water level of the lake) and the top of channel is between 569 and 570 feet amsl (approximately 0.7 to 1.7 feet below mean water level). Imported rounded river rock was placed in the channel to provide additional habitat and imported rock (i.e., boulders) was placed at the ends of the channel to discourage boat traffic from entering this habitat. The path of the hydraulic connector across the wetlands is sinuous and the area of the hydraulic connector is approximately 0.1 acres.

The emergent wetlands were constructed by excavating soil from the edge of the hydraulic connector to the north, towards the northern half of the peninsula and from the edge of the hydraulic connector to the south, towards the southern half of the peninsula. The elevation of the emergent wetlands increased gently from between 569 and 570 feet amsl at its boundary with the top of the hydraulic connector to approximately 570.7 feet amsl (i.e., mean water level of the lake) at its boundary with the riparian streambank at the edges of the northern and southern halves of the peninsula. The emergent wetlands are approximately 0.7 acres in size, with a width of approximately 110 feet along the river and approximately 260 feet along the slip. The shoreline areas of the emergent wetlands were planted with native herbaceous wetland vegetation in June 2014. The planting schedule for the emergent wetlands is included as Appendix A.

4.3.2 Riparian Streambank

Riparian streambank habitat provides a transition from the aquatic habitat of the slip, river, and emergent wetlands to the upland forest habitat. The riparian streambank habitat was created:

- Along the eastern side of the peninsula adjacent to Slip 5A. The riparian streambank habitat extends from the northern end of the protected streambank structure along the eastern side of the peninsula to the emergent wetlands and from the emergent wetlands to the tip of the peninsula.

- On the western side of the Slip 5A peninsula adjacent to the lower Ashtabula River. The riparian streambank habitat along the western side of the peninsula included the GLLA restoration area and the northern (peninsula) portion of the GLRI restoration area.

- At the peninsula's northern and southern boundaries with the newly created emergent wetlands (Figure 5).

The riparian streambank habitat along the eastern side of the peninsula adjacent to the slip was created by excavating soil from the existing steeply-sloped streambank to decrease the slope of the streambank (to approximately 3H:1V or less) and stabilize the bank. Soil was excavated using a hydraulic excavator and was placed on the northern and southern portions of the peninsula to help create the upland forest habitat.

Excavation and/or soil placement was not required to create the riparian streambank habitat in the GLLA restoration area and in the northern portion of the GLRI restoration area along the western side of the peninsula because the existing slope of these areas was appropriate for this habitat. Riparian streambank habitat was created by planting these areas with vegetation appropriate for this habitat.

Riparian streambank habitat was constructed north and south of the emergent wetlands to provide a transition from the wetlands to the upland forest habitat by grading placed soil to a slope of 3H:1V or less. The slope was graded using the bulldozer.

After grading was completed (but prior to planting trees and shrubs), the riparian streambanks were planted with seeds appropriate for this habitat. After seeding, coir fiber matting consisting of 100% coconut fiber was installed along the water's edge in this habitat, extending approximately 3 meters inland (the width of the roll measured perpendicular to the shoreline). Each roll of matting was unrolled parallel to the shoreline and secured with wooden stakes. Ends of adjacent sheets of matting were overlapped a minimum of 6 inches with the upstream sheet on top of the downstream sheet. Biodegradable straw blankets were installed adjacent to and upslope of the coir fiber matting. The straw blankets were secured with wooden stakes. Next, these areas were planted with trees and shrubs appropriate for riparian streambanks. The planting schedule for this habitat is included as Appendix A.

Coir fiber matting was not installed adjacent to the water's edge in the riparian streambank habitat adjacent to the emergent wetlands along northern (island) portion of the peninsula. At the time when the matting was installed the emergent wetlands habitat had not been constructed and flooded and there was no water's edge to guide the placement of the matting. Instead, the coir fiber matting was installed upslope from the water's edge.

Approximately 1.2 acres of riparian streambank habitat was created.

4.3.3 Upland Forest

Upland forest habitat was constructed by placing and grading soil generated during the construction of the hydraulic connector, emergent wetlands, and riparian streambank habitats. A majority of the soil was generated during the excavation of the emergent wetlands and hydraulic connector. In general, the excavated soil was placed by a hydraulic excavator onto the centers of northern and southern halves of the Slip 5A peninsula near the emergent wetlands and then graded using the bulldozer. The edges of the upland forest habitat were graded to a slope of approximately 3H:1V or less to provide a transition between the upland and the riparian streambank habitat (Figure 5).

The upland forest habitat on the northern half of the peninsula was highest (i.e., 585 feet amsl) near the emergent wetlands (the creation of which was the source of most of the soil used to create the uplands), gentling sloping to the north, east, and west. The upland forest habitat on the southern half of the peninsula was again highest (i.e., 587 feet amsl) near the emergent wetlands, sloping to the south, east, and west. The upland forest on the southern half of the peninsula included several large trees preserved during the clearing and grubbing of the peninsula. The upland was graded and contoured to avoid damaging these existing trees with the placed soil. This upland area also included the two existing ACM containment areas and the PCB soil excavation area. As part of the construction of the upland, clay generated during the creation of other restoration habitats (e.g., emergent wetlands) was placed on top of the covers installed over the two containment areas and on top of the backfilled pit created during the excavation of soil containing PCBs. The upland forest habitat on the northern and southern halves of the peninsula was later planted with trees, shrubs, and an herbaceous seed mix appropriate for this habitat. The planting schedule for this habitat is included as Appendix A.

Approximately 3.5 acres of upland forest habitat was created.

4.3.4 Protected Streambank

A protected streambank structure was constructed at the southern end of Slip 5A to protect the steep streambank in this portion of the slip from erosion and to enhance aquatic habitat in the slip (Figure 5). The J-shaped structure starts at the southern end of an existing concrete erosion control structure located on the eastern bank of Slip 5A, extends around the southern tip of the slip, and ends approximately 100 feet to the north along the western bank of the slip. To create the structure, a land-based hydraulic excavator located on top of the bank first placed imported rock (i.e., large boulders) in the water at the base of the existing steep streambank. Next, smaller rounded river rock was placed on the streambank, from the top of the large boulders to the top of the streambank. After the rock and rounded river rock were installed, the structure was planted with live stakes of native vegetation on approximate 2-foot centers. Upland areas adjacent to the protected streambank structure were planted with native trees and shrubs and seeded with native herbaceous vegetation. The planting schedule for this habitat is included as Appendix A.

The size of the protected streambank structure is approximately 0.2 acres.

4.3.5 Standing Snag, Rootwads, and Live Branch Layering

Five standing snags were installed in the riparian streambank habitat adjacent to the emergent wetlands (Figure 5). Standing snags are dead trees that provide shelter, food, and/or nesting habitat for a variety of organisms. It is anticipated that birds and insects may be drawn to these types of structures due to the scarcity of such structures along the lower Ashtabula River. The standing snags were a minimum of 15 inches in diameter and between approximately 14 feet and 22 feet in length. In general, the branches were cut back to within 36 to 48 inches of the trunk. The growing end of the tree was ‘broken’ or ‘snapped’ off and not clean cut. Two standing snags were installed in the riparian streambank habitat north of the emergent wetlands and three were installed in the riparian streambank habitat south of the emergent wetlands. The standing snags were installed in small holes dug using the hydraulic excavator. The excavator was used to place the snag in the hole, place rock around the base of the snag’s trunk, and

place soil on top of the rock. Approximately one-third of the length of each snag was buried in the ground during installation.

Five rootwads were installed in Slip 5A adjacent to the riparian streambank to enhance aquatic habitat in the slip (Figure 5). Three rootwads were installed adjacent to the riparian streambank habitat on the northern half of the peninsula and two rootwads were installed adjacent to the riparian streambank habitat on the southern half of the peninsula. The rootwads were created from trees with a minimum diameter at breast height of 15 inches and with all branches on the trees cut back to within 6 inches of the trunk. The trees were a minimum of 12 feet in length and still contained their rootball. Each rootwad was installed in a trench cut into the riparian streambank using the hydraulic excavator. Approximately three quarters of the trunk of the tree was placed in the trench on top of a footer log in such a way that the rootball extended into the water in the slip. Anchor rocks (i.e., large boulders) were then placed on top of the trunk and the trench was backfilled with soil.

Two rows of live branch layering were installed (one on top of the other) in the riparian streambank on the southern half of the peninsula, adjacent to the southwestern corner of the emergent wetlands. The live branch layering was installed in an area that was too narrow for the creation of riparian streambank habitat because of an existing stone stability rock pile constructed as part of GLLA restoration project. Therefore, the live branch layering was installed to provide erosion control for the streambank in this area of the peninsula.

The live branch layering was installed on a bench cut into the peninsula approximately 1 foot above the water level in the emergent wetlands. The bench was approximately 25 feet long and 5 feet wide. To create the lower row of the live branch layering, one end of a sheet of coir fiber matting was placed on the bench and secured with wooden stakes. A lift of soil was placed on top of this end of the sheet of coir fiber matting. Next, the other end of this sheet was folded over the placed soil and secured with stakes before live branches were placed on top of the matting. The live branches were cut from native vegetation (e.g., *Cornus amomum*) and were approximately 4 to 5 feet long. The live branches were placed so the tips of the branches protruded out of the streambank, extending over the wetlands. Imported topsoil was next placed on top of the live branches. To create the upper row of the live branch layering, one end of a second sheet of coir fiber matting was placed on top of the topsoil and secured with stakes. A lift of soil was placed on top of this end of the second sheet of coir fiber matting and the other end of the second sheet was folded over the placed soil. Next, an upper row of live branches was placed on top of this matting and topsoil was placed on top of these branches. Finally, a third sheet of coir fiber matting was placed on top of the topsoil and secured with stakes. Photographs of the construction of the live branch layering can be found in the Photolog included as Appendix H.

4.3.6 Vegetation

The Slip 5A peninsula was characterized by low plant diversity and by the dominance by non-native species prior to restoration. A primary objective of the Slip 5A peninsula restoration project was to establish native plant communities on the peninsula and improve the aquatic habitat of the adjacent water bodies.

Following excavation and re-grading of the peninsula, native vegetation was planted in the following restoration and planting zones to create:

- Emergent Wetlands Habitat. Approximately 0.7 acres of wetlands were excavated as part of the project. The nearshore area of the wetlands was planted with native herbaceous plants appropriate for the expected soil and hydrologic conditions to create this habitat. In addition, the approximately 0.1 acres of river shoreline affected by the accidental application of herbicide was replanted with native emergent vegetation concurrently with the planting of the wetlands. This 0.1 acre area is located along western side of the peninsula adjacent to the river and was originally planted as part of the GLLA restoration project.
- Riparian Streambank Habitat. Approximately 1.2 acres of riparian streambank was constructed, seeded, and planted with trees and shrubs appropriate to create the riparian streambank habitat.
- Upland Forest Habitat. Approximately 3.5 acres of upland forest was constructed, seeded, and planted with trees and shrubs appropriate to create the upland forest habitat.
- Protected Streambank Structure. In addition, the approximately 0.2 acre protected streambank structure was planted with live stakes of native species.

Species Selection. The plantings included native graminoids, forbs, shrubs, and understory and/or overstory trees appropriate for each restoration area and planting zone. Species were assigned to each planting zone based primarily on water tolerance and the following criteria:

- Species are native to northeastern Ohio;
- Species are geographically appropriate to the lower Ashtabula River and harbor area;
- Species are adapted to the expected hydrologic regime and corresponding soil conditions; and
- Species are able to root and grow rapidly and, for the riparian streambank habitat, help control erosion and stabilize the streambank.

Wetland species selection also incorporated recommendations provided by Ohio EPA (2007).

Planting Specifications. In each planting zone except for the emergent wetlands, planting occurred in the following sequence:

- Seeding. Graminoids and forbs were planted via broadcast seeding. Broadcast seeding tends to be more efficient when using a native seed mix with irregularly shaped seeds. Straw mulch was spread over the ground surface after seeding.
- Installing coir fiber matting and biodegradable straw blankets. Coir fiber matting and straw blankets were installed adjacent to the water in the riparian streambank habitat after seeding (except where noted).
- Digging planting holes to sufficient depths and widths. Trees were planted individually in a single hole excavated using a small hydraulic excavator. Shrubs were planted in clusters of three in a single hole. An hole was cut into the coir fiber matting and biodegradable

straw blankets to allow the planting holes to be excavated and the trees and shrubs to be planted in the riparian streambank habitat.

- Adding soil amendments and fertilizer to each planting hole.
- Backfilling the planting hole. The planting holes were backfilled with the soil removed during the excavation of the hole.
- Adding mulch and tree guards. Hardwood mulch was spread around the base of the planted trees and shrubs. A guard was placed around each tree to provide protection from deer and beaver and each tree was supported by wooden stakes.

The riparian streambank, upland forest, and the protected streambank were planted with vegetation in the fall of 2013. The emergent wetland and the area affected by the accidental application of herbicide were planted with individual plugs of wetland plant species in the spring of 2014.

Design Modifications and Contingency Actions. The following problems were encountered during site restoration activities:

1. Water levels in Lake Erie (and, therefore, in the river and slip) were higher than expected in 2014 reducing the portion of the emergent wetlands that could be planted. Plants were installed from the shoreline of the northern half of the peninsula (i.e., the island) south approximately 20 feet into the wetlands and from the shoreline of the southern end of the peninsula north approximately 20 to 25 feet into the wetlands. The extent of plant growth into the wetlands will be evaluated as part of the activities conducted in accordance with the Monitoring and Maintenance Plan. Additional plants will be installed as part of monitoring and maintenance activities if plant growth into the wetlands is evaluated to be inadequate.
2. An estimated 654 trees, 421 shrubs, and 534 live stakes were evaluated to be dead during site inspections conducted in 2014. This relatively high mortality rate was most likely caused by the extremely cold winter of 2013-2014. Technical Specification Section 3013 (*Planting Native Trees, Shrubs, and Herbaceous Plants*) requires that the contractor maintain a one year 80 percent care and replacement warranty for all trees, shrubs, and plants (Appendix A of the design document). This requires that the contractor replace 404 trees, 51 shrubs, and 534 live stakes. The replacement trees, shrubs, and live stakes were planted in October 2014 (Appendix I).
3. Over 100 trees and shrubs located on the southern half of the peninsula were identified during the 2014 inspections as requiring repair or re-planting (e.g., re-covering root balls and root masses with soil and mulch, re-staking trees etc.). The repair and re-planting activities were completed in the spring of 2014. No trees or shrubs located on the northern half of the peninsula (i.e., the island) required repair or re-planting
4. Insufficient seedling establishment was observed in the spring of 2014. Therefore, the peninsula was subsequently re-seeded in the spring of 2014. Improved seedling establishment was observed after re-seeding.

5 Health and Safety

The *Slip 5A Peninsula Restoration Health and Safety Plan* prepared by ENVIRON and included as Appendix F of the design document was prepared to inform all ENVIRON personnel of known or reasonably anticipated potential hazards present at the site and included provisions for health and safety monitoring and emergency procedures. Work conducted during the implementation of the Slip 5A restoration project was conducted using personnel protective equipment appropriate for Level D protection.

DeNovo developed and compiled with its own health and safety plan (HASP). Subcontractors either followed DeNovo's HASP or developed and compiled with their own HASP.

No significant accidents, incidents, or injuries were reported in conjunction with the implementation of the restoration project.

6 Demobilization

Primary demobilization activities occurred in December 2013 and included:

- Removal and proper disposal of trash and debris generated during the restoration project.
- Removal of site control features including the turbidity curtain and the ring buoys with rope bags.
- Removal of all contractor structures (e.g., temporary office and storage trailers, sanitary facilities, and signs) and construction equipment from the site. All excavation equipment and tools used in the excavation of the soil containing low concentrations of PCBs were placed on plastic sheeting and cleaned with soap and water immediately after use and prior to demobilization from the site. Material generated during the cleaning of the excavation equipment and tools and the plastic sheeting were transported offsite for disposal at Republic Services' Carbon Limestone Landfill.
- Construction of the gravel-covered driveway and parking area at the southern end of the project area for use during future maintenance and monitoring activities.
- Installation of the gate at the eastern end of the gravel-covered driveway to limit access to the peninsula.

A second limited mobilization and demobilization occurred in May and June 2014 in order to install plants in the nearshore area of the emergent wetlands, replant the accidental herbicide overspray area, and replant trees in areas of high mortality. No significant contractor equipment or structures were required for this activity. In addition, a post-construction inspection was conducted at the site on July 10, 2014. The inspection was attended by representatives of USFWS, NOAA, Ohio EPA, DeNovo, and ENVIRON. No additional concerns were noted as a result of the inspection.

7 Request for Acknowledgement of Final Completion

Pursuant to Section VII of the Consent Decree (Case number 1:12-cv-01097-DCN), NSRC has completed construction activities associated with the restoration of the Slip 5A peninsula.

> To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: R.P. Russell 12/11/14

Name: Richard P. Russell

Title: System Director Environmental Protection

8 References

ENVIRON. 2009. *Restoration Work Plan.* Appendix G of the Consent Decree Regarding Ashtabula River Area Natural Resource Damages, United States of America and the State of Ohio (ex rel. Michael DeWine, Ohio Attorney General), and Cabot Corporation et. al., filed July 12, 2012 (Case number 1:12-cv-01097-DCN).

ENVIRON. 2012. *Slip 5A Peninsula Restoration Design Document, Ashtabula, Ohio*. Prepared for the Norfolk Southern Railway Company. October 2012.

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Ohio EPA. 2007. *Characteristic Ohio Plant Species for Wetland Restoration Projects v.1.0*. Ohio EPA Technical Report WET/2007-1. Ohio Environmental Protection Agency, Wetland Ecology Group, Division of Surface Water, Columbus, Ohio. Available online at: www.epa.state.oh.us/dsw/wetlands/WetlandEcologySection.html.

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