ATTACHMENT I

SOIL EROSION AND SEDIMENTATION POLLUTION CONTROL PLAN

MAHONING CREEK HYDROELECTRIC COMPANY LLC
MAHONING CREEK HYDROELECTRIC PROJECT
(FERC NO. 12555)

WATER OBSTRUCTION AND ENCROACHMENT APPLICATION

ATTACHMENT I
SOIL EROSION AND SEDIMENTATION POLLUTION CONTROL PLAN

TABLE OF CONTENTS

List of Tables

List of Figures

List of Photos

List of Appendices

MAHONING CREEK HYDROELECTRIC COMPANY LLC
MAHONING CREEK HYDROELECTRIC PROJECT
(FERC NO. 12555)

WATER OBSTRUCTION AND ENCROACHMENT APPLICATION

ATTACHMENT I
SOIL EROSION AND SEDIMENTATION POLLUTION CONTROL PLAN

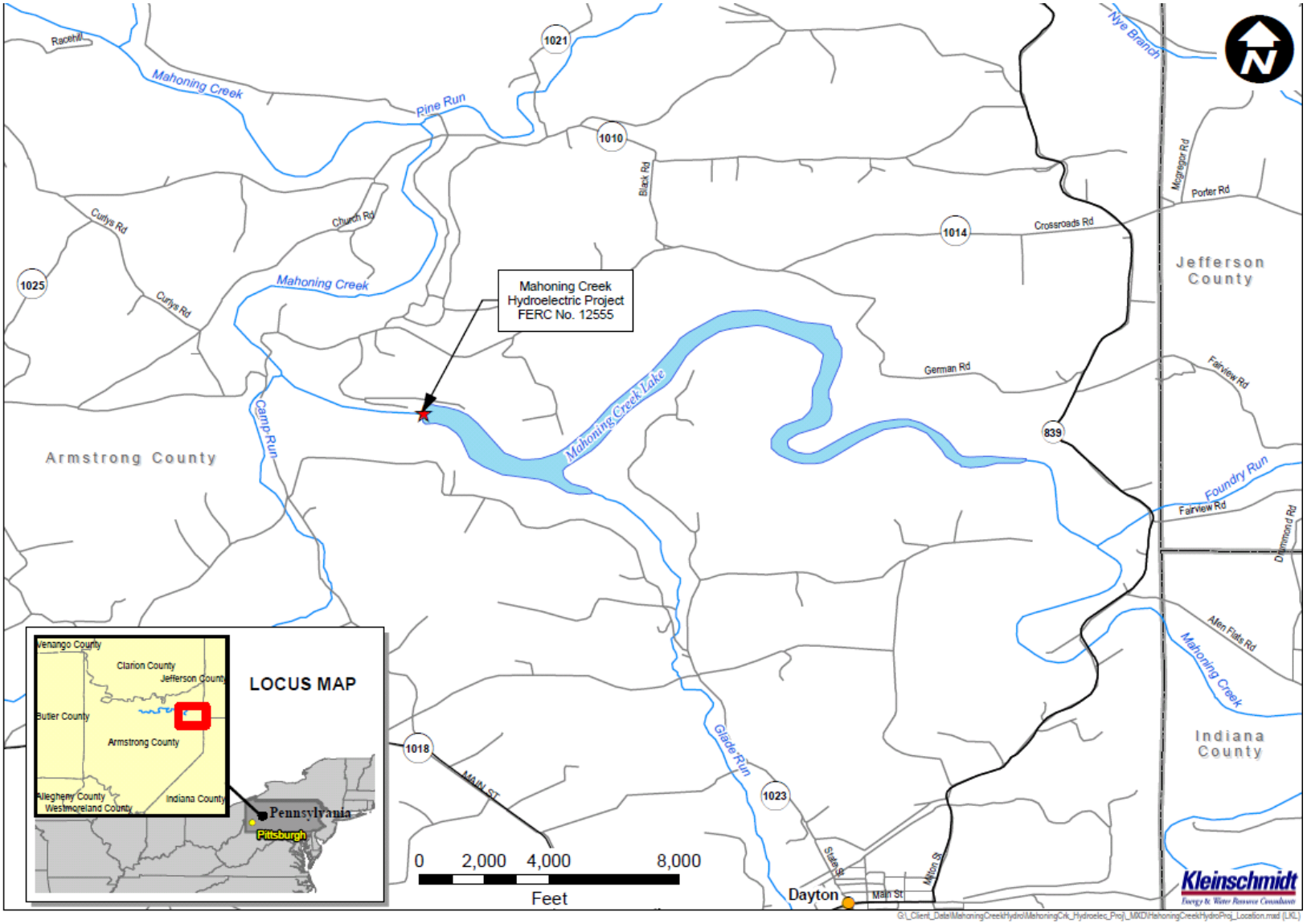
1.0 INTRODUCTION

Mahoning Creek Hydroelectric Company, LLC (MCHC or Applicant) proposes to construct a new powerhouse 1,200 ft downstream from the existing US Army Corps of Engineers (USACE) Mahoning Creek Dam to accommodate a turbine generating system with a gross head which varies from 75 to 96 ft, an estimated hydraulic capacity of 875 cfs, and an installed capacity of 6.0 MW (Figure 1-1).

The Project provides a clean and renewable source of energy and serves to displace nonrenewable fossil-fueled generation, and would help meet both the short- and long-term need for power in the Mid-Atlantic region.

MCHC and its contractor (to be determined), will be responsible for the implementation and maintenance of all erosion and sediment controls that will be installed as a result of this plan.

Figure 1-1. Project Location Map



2.0 PROJECT DESCRIPTION

Mahoning Creek Dam is located on Mahoning Creek, 22.9 river miles upstream from the confluence of Mahoning Creek with the Allegheny River, in Redbank Township in Armstrong County, Pennsylvania (Figure 1-1). .Mahoning Creek Dam is a concrete gravity dam (Photo 2-1) with an overall length of 926 ft and a maximum height above the creek bed of 162 ft. The spillway section of the dam is 192 ft long and is a concrete gravity ogee section. Flow over the spillway is controlled by five vertical lift gates, each 29 ft high by 30 ft long. Flow through the dam is controlled by three main sluice gates and one 36 inch and one 24 inch valve. Two electrically driven traveling cranes run along the service bridge atop the dam to operate the taintor gates. There are four concrete piers between the spillway gates; each are 10.5 ft wide making the effective spillway length 150 ft. The dam right abutment is 326.5 ft long and the left abutment is 407.5 ft long.

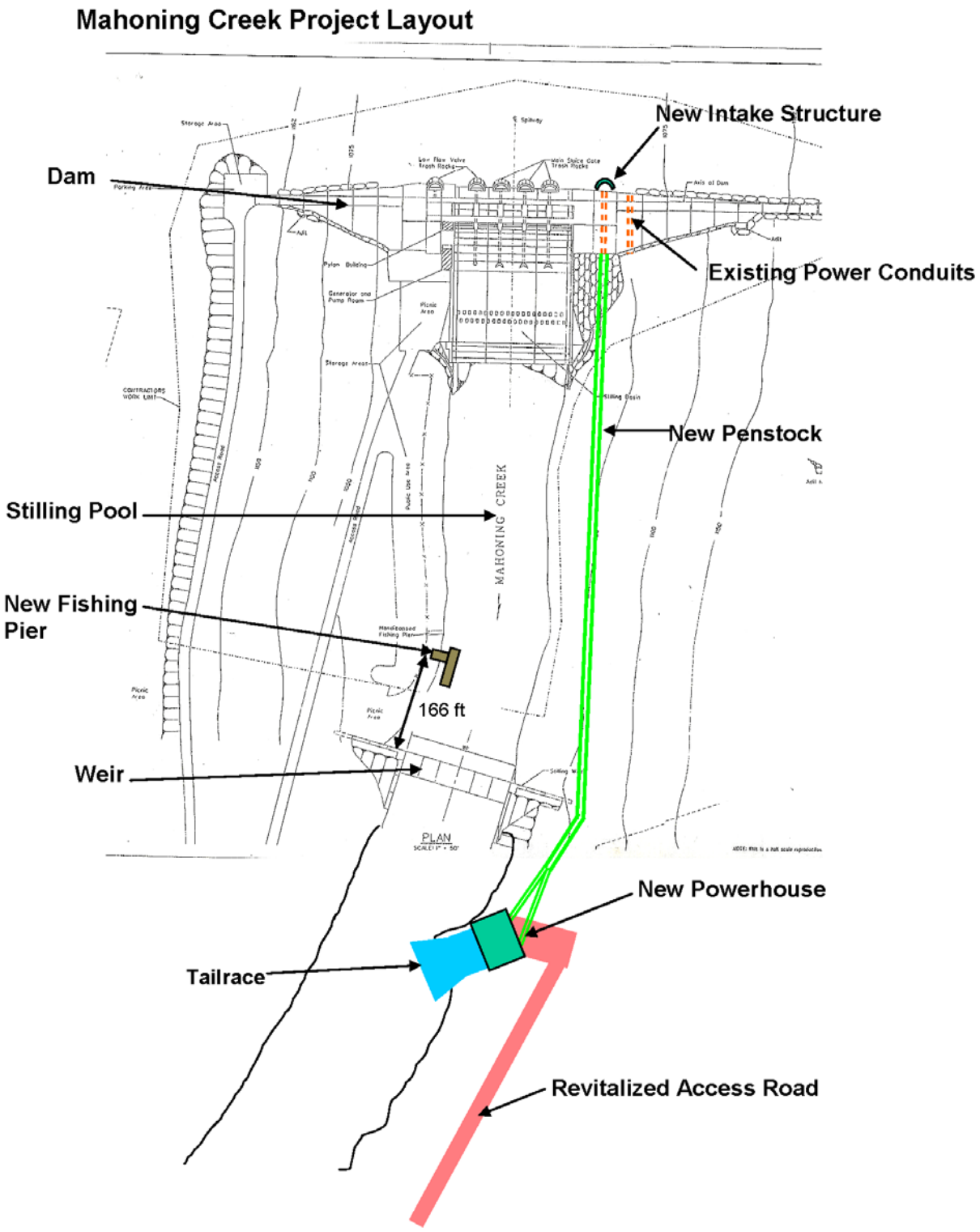
Photo 2-1. Mahoning Creek Dam

The proposed Project includes modifications at the USACE dam to provide hydroelectric generation facilities. The proposed hydroelectric project would include the following design modifications and construction (Figure 2-1):

- Construct a 50-ft-high steel intake structure attached to the upstream face of the dam, protruding 14 ft with 3 off 9 ft by 30 ft removable trashracks and dewatering bulkhead panels;
- Install vertical slide gate attached to the upstream face of the dam to isolate the penstock of the upstream pool;
- Construct steel lining of the existing plugged, 108-inch-diameter penetration through the dam monolith 15;
- Modify steel penstock expansion from 108-inch to 120-inch, and 1,200-foot-long, 120-inch-diameter, buried steel penstock running from the dam to the proposed powerhouse on the left (south) bank, with vent and access manholes;
- Develop bifurcation of the 120-inch-diameter penstock to two 96-inch-diameter penstocks, with turbine shut-off valves;
- Construct reinforced concrete powerhouse containing two vertical generating units on the left (south) bank, approximately 100 feet downstream of the stilling basin weir;
- Upgrade an existing 2.2-mile-long, transmission line from 12.5 kv to 25 kv within the existing Allegheny Power transmission line right-of-way;
- Refurbished an existing 0.5-mile-long access road;
- Install a new 100 ft-long bridge or ford to span a small stream on the entrance of the access road;

- Install two new vertical Kaplan type turbine generator units each with an installed capacity of 3,000 kW. The turbine runner diameter will be 1500 mm and will operate at 450 rpm. Each generator will have a rated capacity of 3,333 kVA at 0.9 power factor.

Figure 2-1. Project Plan View



3.0 CONSTRUCTION PLAN

This is a large and complex construction project that requires a number of Federal, State, and local approvals before proceeding. MCHC has developed this erosion and sediment control plan as an overall guidance document that will govern the development of more specific construction implementation plans and details that will be developed in consultation with the Armstrong County Conservation District (ACCD) and the Pennsylvania Department of Environmental Protection (PADEP) as more refined construction schedules and procedures are developed. Construction specifications detailing the requirement for the contractor to develop the erosion and sediment control plan details, as well as numerous other construction work plan documents will be developed.

A contractor for the Project has not yet been selected. As such, the specific details regarding the construction techniques for installation of the intake structure, penstock and powerhouse are as yet to be determined. However, the proposed Project, as designed, will likely include the following construction techniques:

- Construction of access roads and cross drainage pipes as shown in Figure 2-1.
- Concrete demolition and earth excavation with heavy excavating equipment (bulldozers, backhoes, etc).
- The powerhouse is set back from the normal stream bank. A rock plug will be maintained between the powerhouse and the river to allow for powerhouse excavations without cofferdams. Raising of the rock plug by 6 feet may be required to allow for isolation up to the 100 yr river flow.
- Installation of cofferdams to allow portions of the work to be performed in the dry to the extent possible thereby decreasing the work's environmental impact.

- One of these potential cofferdam types is the placement of clean rock with an impervious membrane on the upstream face to provide for shallow bedrock excavation within the project tailrace.
- Another potential temporary cofferdam type is the installation of braced panels along crest of the rock plug to raise the level of protection and allow for powerhouse excavation and construction during high river flows.

- Tailrace excavations could also potentially be completed in the wet (behind silt barriers). A typical technique for excavations in shallow water is to first place clean fill over the excavated area to raise a pad above water level, then drill and blast through the gravel pad and excavate all the material as you back out of the river.
- Drilling and blasting of bedrock in upland areas with traditional drilling equipment.
- Drilling and blasting of bedrock within the water way utilizing traditional drilling equipment from a raise gravel pad.
- The concept design of the intake is currently above the documented sediment level. However, dredging of sediments and soils from the forebay via crane with a clamshell bucket mounted on a floating barge may be used if sediment is higher than anticipated.
- Clearing and grubbing of vegetated areas needed for the access road and ford to provide access to the Project. The cross drainage pipes under the access road will require some minor rip rap protection and removal of organic materials.

- Placement of concrete via pumps and hose and via a bucket hanging from a crane.

- Redistribution of 5,000 CY of excavated rock and earth to fill an eroded area on the left descending bank of the stilling basin and to create a parking and turnaround area next to the power house.

3.1 Site Access

The proposed Project will utilize an existing abandoned access road, originally used for dam construction, for construction and maintenance of the new project facilities. The road is approximately 0.5 miles long and 12 ft wide, but is currently overgrown with invading brush. The road is also eroded in some places and would be refurbished to provide access to the project site from McCrea Furnace Road (Road T754). The proposed unpaved service road will cross Camp Run, a small tributary. The installation of a rock ford or a culvert will be required to re-establish the service road connection with Route T754. Approximately 2,500 ft of this service road to the west of the USACE property is on private land which will require easements. Improvements to make the road serviceable would include the removal of invading brush, placement of a rock ford or culverts where the road crosses Camp Run near McCrea Furnace Road, grading of the roadbed, repair of eroded areas, stabilization of the road embankments, and installation of culverts at natural drainage locations. After construction, the road will terminate at the powerhouse and a security gate will be installed near the western end of the road.

3.2 Intake Structure

The Intake Structure will consist of vertical slot channels designed to hold either trashrack panels or dewatering bulkhead panels which will be operated by the crane mounted on top of the dam. The pre-fabricated intake structure will be floated into place, upended and attached to the dam with anchor bolts by

divers. The dewatering bulkheads will be initially installed to allow the intake structure to serve as a cofferdam during removal of the concrete plug in the dam conduit. After construction, the dewatering bulkheads will be replaced with trashrack panels.

3.3 Penstock

The existing 108 inch diameter conduit in Monolith 15 of the Mahoning Creek Dam is planned to be used for the powerhouse intake. The concrete plug will be removed, with the intake structure providing a temporary cofferdam, and a steel liner installed. A 120-inch diameter penstock will extend about 1,050 feet from the base of the non-overflow dam to the bifurcation. The penstock will be welded, steel construction below grade with cross-drainage toward Mahoning Creek.

The penstock excavation will be balanced to allow for the excavated material to be used to cover the top of the penstock. The final grading will allow for normal surface drainage to continue to flow downhill without concentration into cross drainage structures.

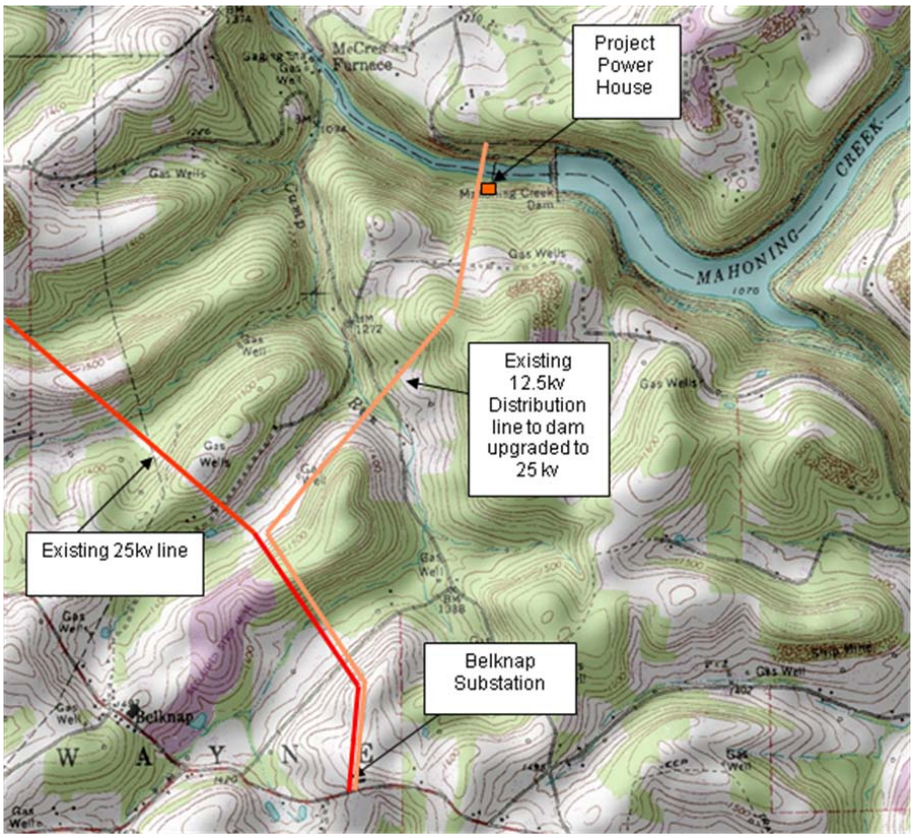
3.4 Powerhouse

The powerhouse will consist of a reinforced cast-in-place concrete structure with two vertical Kaplan turbine/generator units. Due to the apparent shallow bedrock, the structure will be supported by a mat foundation. The powerhouse will be angled at a 45-degree angle to minimize impacts to the embankment. A concrete retaining wall with a top elevation of 1,030.0 will be constructed adjacent of the powerhouse to allow for a local parking area.

3.5 Transmission Line

The existing 12.5 kv transmission line, owned by Allegheny Power, runs from a system substation at Belknap (see map below) and will be upgraded by

them to 25 kv and terminated in a new interconnection substation adjacent to the power house. This will require, by their standards, an increase in the existing easements from a 50 to 60 foot corridor. It is not expected that any significant disturbance of new pole placement will be required.



4.0 TOPOGRAPHIC FEATURES OF PROJECT AREA

The Mahoning Creek Project is located on the Appalachian Plateau Province in west central Pennsylvania (MCHC, 2005). The Mahoning Creek basin topography is rugged and characterized by deep, steep-sided stream valleys (MCHC, 2005). The Mahoning Creek Valley in the vicinity of the Project Area is a deep, narrow, steep-walled canyon, which rises up to 600 ft above the canyon.

The Project generally lies between 660 and 2,340 ft above sea level within the Pittsburgh Low Plateau physiographic section (PDCNR, 2009). The section covers much of western and southwestern Pennsylvania, including all of Greene, Washington, and Armstrong Counties, most of Beaver, Butler, Clarion, Jefferson, Clearfield, Westmoreland, and Indiana Counties, and parts of Lawrence, Venango, Elk, Cambria, and Fayette Counties. The province is generally characterized by narrow, relatively shallow valleys with a smooth to irregular undulating landscape. Strip mines and reclaimed land also constitute a sizeable portion of the landscape. The underlying rock type consists of shale, siltstone, and sandstone (PDCNR, 2009).

Mahoning Creek is a narrow stream, measuring approximately 50 ft across in the upstream reaches up to 150 ft at the downstream portion, with a maximum width of 250 ft (MCHC, 2005). Streambanks in the project area vary on average from 5 to 10 ft in height on the main stream. Development along the shorelines of Mahoning Creek Lake is minimal, with the exceptions of recreational facilities and the existing Army Corps dam. Approximately 70% of land in the Mahoning Creek watershed upstream of the dam is wooded. Brush and woodlands have replaced abandoned farmlands in the basin due to increased mining and residential development (MCHC, 2005). Timber harvest also occurs along the slopes of the perimeter of USACE lands, which has resulted in the clearing of the reservoir area to elevation 1,080 ft.

The construction activities will cause a temporary disturbance of less than 0.25 acres of wetlands (construction roads), and a no permanent disturbance.

5.0 TYPES, DEPTHS, SLOPE, LOCATIONS AND LIMITATIONS OF SOIL

The dominant soils of the Pittsburgh Plateau are developed in acid clay shales and interbedded shales and sandstones (PSU, 2009). The soils typically contain substantial amounts of rock fragments and contain more clay and silt than those derived from sandstone. The soil groups in the vicinity of the Project Area are typically those occurring on steep hillsides, generally the area flanking the sides of the Winter Pool or the floodplains, the areas adjacent to Mahoning and Little Mahoning Creeks of the Summer Pool (MCHC, 2005). Soils that typically dominate the Project Area are the Weikert and Gilpin Series. The Weikert Series consist of shallow, well-drained soils formed in material that weathered from interbedded gray and brown acid shale, siltstone, and fine-grained sandstone on gently sloping to very steep areas on uplands (USDA, 2009). The Gilpin Series consists of moderately deep, well-drained soils, typically located on gently sloping to steep, convex, dissected uplands (USDA, 2009). There is some minor influence from the transition soils, which are occurring on the gently sloping areas between the steep hillsides and the floodplains. The soils related to the steep hillsides consist mainly of the DeKalb Series. They are moderately deep, well-drained soils formed in material weathered from acid gray sandstone and siltstone on the uplands. Bedrock occurs at depths of 1 -1/2 to 3-1/2 ft and most usage problems are related to the depth of bedrock and steep slopes (MCHC, 2005).

The floodplains, in the reaches above Mahoning Creek Lake along Mahoning and Little Mahoning Creeks, consist mainly of soils grouped into the Monongahela-Allegheny-Pope soils of this association (MCHC, 2005). The Monongahela soils are the predominant soils of this association and are characterized as deep, moderately well-drained terrace soils formed in sediments washed from shale and siltstone uplands. This series exhibits seasonal wetness, flooding, and moderate permeability.

Appendix A provides a full soil mapping of the project area including the access road (NRCS, 2009). The mapping shows that the soils located within the project area (including the access road, powerhouse and penstock) are Weikert and Gilpin (WkF)

soils. These soils are generally well drained with more than 80 inches depth to the water table and moderately high to high capacity to transmit water (0.60 to 2.00 in/hr). These soils are generally 20 to 40 inches depth to lithic bedrock and 12 to 20 inches depth to paralithic bedrock. NRCS analysis of the risk of corrosion of steel, with respect to the buried steel penstock on the southern shore from the dam to the new powerhouse, is low as a result of the WkF soils' moisture content, acidity, electrical conductivity and particle size distribution (Appendix A).

The NRCS database was queried with respect to the suitability of these soils to support a "natural surface" gravel roadway. The suitability of the WkF soils' indicates this soils series is "poorly suited" for road development with a significant potential for erosion based on the slope of the soil class. However, these ratings do not preclude road construction in this location but rather indicate the soil complex has one or more properties that would require special design, extra maintenance, and alterations. Further, the depth to water table and occurrence of flooding and ponding are favorable for road construction (Appendix A). The access road currently exists in this location with some improvements proposed to address connectivity to the McCrea Furnace Road (Route T754), eroded areas, vegetation encroachment and a stream crossing.

5.1 Construction Activities on Erosion and Sedimentation

The construction of this Project requires more than 5,000 CY of earth and rock excavation from the site that will occur over the span of nine months to one year. Excavated native blast rock will be used to stabilize the project area and provide the new final site topography, whenever possible. When not possible, other best management practices (BMPs) will be utilized, including cofferdams, riprap placement and temporary and permanent seeding/mulching. The types of BMPs expected to be used are further discussed below.

Soil disturbances will be mostly associated with construction of the powerhouse, the new penstock, refurbishment of the unpaved service road, and

transmission cabling. Minimizing the footprint of the project will mitigate soil impacts. This will be done by using existing facilities as much as possible and by implementing BMPs during construction to prevent soil erosion and to control sedimentation. Pennsylvania state law and the Federal Clean Water Act both require National Pollutant Discharge Elimination System (NPDES) for construction activities, which will require prudent soil erosion and sedimentation control measures and inspections to ensure these measures are properly implemented and are effective.

5.2 Project Operations on Erosion and Sedimentation

Erosion within the proposed project boundary and downstream is a concern because it can result in damage to adjacent properties, have negative ecological effects, and cause sediment and debris inputs within the Project reservoir. A two-dimensional numerical hydraulic model was used to evaluate existing and proposed conditions based on operations of the proposed hydroelectric facility on Mahoning Creek downstream from the Mahoning Creek Dam stilling basin weir.

Two hydrologic scenarios with total flows of 905 and 2,000 cfs were evaluated with the numerical model (Stantec, 2008). The results of the analysis suggest that the discharge current from the proposed facility will have minimal effects on the far streambank. To avoid potential erosion of streambanks, particularly on the left bank immediately downstream from the excavated tailrace, some armoring will be installed as recommended in the Study Report.

The Hydraulic Study also assessed the effects proposed conditions may have on the streambed. The results suggest that the proposed facility will cause an increase in stream power, and therefore some potential for erosion on the streambed along the discharge current (Stantec, 2008). In addition, the Study addressed the effects the proposed facility may have on the excavated tailrace.

The results indicate that relatively high speed flows will occur in the proposed excavated tailrace, particularly for the 905 cfs scenario. These high-speed flows may result in the erosion and scour of the proposed excavated tailrace. Armoring, hardening, and/or modifying the geometry of the proposed excavated tailrace is expected to reduce the potential for erosion and scour in this area. High calculated flow speeds along the right (upstream) in the creek immediately adjacent to the right (upstream) side of the proposed excavated tailrace were also observed. A training wall may be appropriate to reduce erosion and scour in this area of the creek (Stantec, 2008).

6.0 LAND USE CHARACTERISTICS

The Mahoning Creek Dam and Lake lies within Armstrong County, which covers approximately 653 square miles and had a population of approximately 69,000 people in 2007 (US Census, 2009). Mahoning Creek Lake is surrounded by areas of steep terrain along the Mahoning Creek and its tributaries. Lands located within and adjacent to the project boundary are mostly woodland, with some farmland. The land is used mainly for floodwater retention, agriculture, and recreation (MCHC, 2005). The area surrounding the Project is dominated by predominantly deciduous forest (approximately 54 percent of the land cover). Agricultural lands including crops and pasture comprise 20 percent of the land cover (Armstrong County, 2005). Residential development is limited to sporadic small towns, consisting of typically fewer than 2,000 people. The only town with a population greater than 5,000 people in the watershed is Punxsutawney (MCHC, 2005).

The Project will make use of the existing Mahoning Creek Dam which was authorized by the Flood Control Acts of 1936 and 1938 (one of 16 flood control projects of the USCOE's Pittsburgh District). Construction of the dam was started in February 1939 and was completed in1941. The dam is presently and will continue to be owned and operated by the USACE. The dam also has a downstream stilling basin with a weir that maintains the water elevation in the tailrace pool.

The specific alterations for project construction are discussed above in Section 3.0. A total of approximately 10 acres of upland area will be disturbed during construction and excavation in the area near the proposed powerhouse and approximately less than 1 acre of wetted area, including the location of the intake structure and the excavated project tailrace. The proposed Project will not have a significant effect on land use because the project area is small, less than 10 acres, and the dam, impoundment, service road, and transmission line corridor already exist. The additional structures proposed are not significant in terms of overall land use and are consistent with the historical, existing, and intended uses of the stilling basin and

tailwater area downstream of Mahoning Creek Dam. It is not expected that improvements to the existing service road will cause significant secondary changes in land use of the southern shore of the river, such as commercial or residential development, because that area is already in private ownership.

7.0 AMOUNT OF RUNOFF FROM THE PROJECT AREA AND UPSTREAM WATERSHED

The Project is located in the Mahoning Creek Watershed with a drainage area of approximately 444 mi^2 (PADEP, 2009). Mahoning Dam Lake, impounded by the USACE Mahoning Creek Dam at which the Project is proposed, is located approximately 22 miles upstream of the confluence of Mahoning Creek with the Allegheny River and has a watershed area of approximately 340 square miles.

The volume of runoff from the upland project area is not expected to increase because the development of additional new impervious areas is generally limited to the footprint of the powerhouse. The majority of the construction project will occur along the banks of Mahoning Creek (excavation/dredging for the intake structure, tailrace excavation, powerhouse construction, access road improvements). These construction activities will have to be coordinated with the natural flow of the river, as well as, the existing USACE dam operations, which will remain operational during construction. The in-river work will be scheduled to coincide with lower flow months, when feasible.

8.0 LOCATION OF WATER OF THE COMMONWEALTH

The project site is located in the Ohio River Basin, Drainage List S, Stream 3-Mahoning Creek. The Clean Water Act specifies designated uses for all surface waterbodies in Pennsylvania. The Mahoning Creek mainstem, from its origin at the confluence of the East Branch Mahoning Creek and Stump Creek (upstream of the impounded portion of Mahoning Creek Lake) to its confluence with the Allegheny River, is classified as a Warm Water Fisheries (WWF). WWF is defined as "maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat." (25 Pa. Code §93.9s)

The proposed MCHC Project would be the only hydropower use on Mahoning Creek, though six licensed hydroelectric projects are in the larger Allegheny Basin, including the privately owned Piney Dam peaking hydropower station on the Clarion River, and five USACE related projects. Discharge from Mahoning Creek Lake is used in conjunction with seven other USACE Pittsburg District reservoir projects to control adverse water quality conditions on the lower Allegheny River. Low flow augmentation and water quality benefits are realized in lower Mahoning Creek, Lower Allegheny River, and the upper Ohio River from releases at Mahoning Creek Dam.

Overall discharges downstream of the Project will not change under the proposed action as the development of the power project will not affect USACE operations at Mahoning Dam.

9.0 LOCATION AND TYPE OF BMP'S

Drawings provided in Appendix B show general overview plans and details to control erosion and sediment during construction. Due to the number of simultaneous construction activities that will be occurring at the same time and the fact that a contractor for the Project has not yet been selected, the construction sequence and details of the erosion and sedimentation control plans have not been finalized at this time. However, the following sections describe the types of BMPs that may be utilized for this Project.

9.1 Powerhouse and Penstock Construction

- Placement of riprap materials around the powerhouse for erosion and scour protection. The size, type of filter, dimensions, and engineering properties of the riprap and filter materials will be determined as part of the final design in accordance with the USACE design criteria.
- Armoring of the banks consistent with the recommendations of the MCHC Hydraulic Study Report.
- Silt barrier fence, reinforced with hay-bales if necessary, to intercept and retain sediment from disturbed areas.
- Sediment filter bags to control pumped silt from trenching and excavation activities.
- Temporary and permanent seeding and mulching to protect soils from erosion.
- Riprap aprons at pipe outlets to reduce discharge velocities and reduce erosion.

9.2 Tailrace excavation

- Rock excavations behind silt barriers to prohibit silt leavened water from entering the river.

10.0 STAGING OF EARTH MOVING ACTIVITIES

The specific sequence of construction has not been developed in detail at this time, as this will need to be determined by the Contractor MCHC selects for this Project. However, a listing of preliminary year-by-year activities determined during the planning stages of this project is shown below. Due to overlapping construction activities, the construction bid documents require that the contractor will be responsible for developing and updating Erosion and Sedimentation Control plans for MCHC approval every six months.

Table 10-1. Preliminary Construction Schedule

2010	2011
Mobilization	Powerhouse substructure concrete placement
Access Road Improvements including ford through stream near McCrea Furnace intersection	Intake plug removal, installation of roller gate, bulkhead panel removals and replacement with screens
Intake installation	Penstock installation
Earth and Rock Excavation near the new powerhouse	Powerhouse superstructure construction and equipment installation
	Tailrace excavation during periods of lower river flow
	Transformer Installation. Startup and testing of new powerhouse
.	Site grading and cleanup

11.0 SUPPORTING CALCULATIONS

The soil and erosion control calculations will be developed for six-month Erosion & Sediment Control Plan in accordance with a schedule to be developed in coordination with the ACCD and PADEP.

12.0 PLAN DRAWINGS

Plan drawings and details for the excavation and site work are attached in Appendix B.

13.0 MAINTENANCE PROGRAM

The selected Contractor will be required to develop specific details, obtain MCHC and ACCD approval before the work can begin, and will be required to provide maintenance plans and periodic inspection reports for all erosion and sediment controls implemented during construction. These final detailed plans will be shown on the erosion and sediment control drawings, and the specifications require the Contractor to submit inspection reports of all features such as of all silt fencing, turbidity curtains, and other controls every seven calendar days and within 24 hours after a 0.5 inch rain storm event.

14.0 WASTE DISPOSAL/RECYCLING

Excavated native blast rock will be used to stabilize the project area and provide the new final site topography, whenever possible. The majority of all acceptable excavated material will be utilized to repair the stream bank below the dam and around the power house. Any waste materials not suitable for disposal that will be generated by this Project will be taken off-site and disposed of in a permitted landfill or recycled, as appropriate, in accordance with the Pennsylvania Code. Other environmental measures and requirements such as hazardous material control, petroleum products, fuel tanks, accidental spills, dust control, and noise will be specified in the Construction Specifications.

15.0 QUALIFIED PREPARERS

Plan Preparer's Name, Address, and Telephone Number:

Kim Arvid Hansen
Mead & Hunt
6501 Watts Road
Madison, WI 53719
608-273-6380

Formal Education:
College: University of New Hampshire
Date of Graduation: April, 1979
Degree Received: B.S. Civil Engineering, Structural

Professional Licensure:
PA PE9847
Also FL, HI, IL, MN, NY, OR, WA, WI
Pending MD, WV

Plan Preparer's Name, Address, and Telephone Number:

Kelly Maloney
141 Main Street
PO Box 650
Pittsfield, Maine 04967
207-416-1271

Formal Education:
College: Unity College
Date of Graduation: December, 1994
Degree Received: B.S.S, Environmental Policy

College: University of Maine, Orono
Date of Graduation: December, 2001
Degree Received: M.S., Resource Economics

Professional Licensure:
None.

16.0 LIST OF REFERENCES

Armstrong County Comprehensive Plan (ACCP). 2005. [Online] URL: http://co.armstrong.pa.us/files/pd/accp_2005.pdf. Accessed December 31, 2009.

Federal Energy Regulatory Commission. 1989. Environmental Assessment for Mahoning Creek Dam Project (FERC No. 10521). Accession No.: 19890614-0159. Issued May 18, 1989.

Federal Energy Regulatory Commission. 1990. Order Issuing License, May 7, 1990. Mahoning Hydro Associates, FERC Project No. 10521-000.

Hull & Associates, Inc. 2007a. Natural Resource and Wetland Study. Prepared for Advanced Hydro Solutions. October 2007.

Mahoning Creek Hydroelectric Company, LLC (MCHC). 2005. Pre-Application Document for the Mahoning Creek Hydroelectric Project (FERC No. 12555). Accession No.: 20051229-0063 Filed: December 27, 2005.

Pennsylvania Department of Environmental Protection (PDEP). 2009. The Central Allegheny Watershed. [Online] URL: http://images.google.com/imgres?imgurl=http://www.dep.state.pa.us/dep/DEPUTATE/Watermgt/WC/Subjects/WSNoteBks/basin.gif&imgrefurl=http://www.dep.state.pa.us/dep/DEPUTATE/Watermgt/WC/Subjects/WSNoteBks/shedtable.htm&usg=__S9_io4zfQ48fghGmsgynGzVj7zs=&h=343&w=452&sz=14&hl=en&start=13&um=1&tbnid=uBNyELObhFL8yM:&tbnh=96&tbnw=127&prev=/images%3Fq%3Dupper%2Bmahoning%2Bcreek%2Bbasin%26hl%3Den%26sa%3DN%26um%3D1. Accessed December 30, 2009.

Pennsylvania Department of Environmental Protection (PDEP). 2009b. State Water Plan Principles Executive Summary. [Online] URL: http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-73426/3010-BK-DEP4227.pdf. Accessed December 28, 2009.

Stantec. 2008. Hydraulic Modeling Study Plan Addition Mahoning Creek Hydroelectric Project Armstrong County, Pennsylvania. (November 5th 2008, FERC Accession No. 20081105-5039)

U.S. Army Corps of Engineers (USACOE). 1994. Project Operational Management Plan (POMP) for Mahoning Creek Lake. Pittsburg District.

U.S. Army Corps of Engineers (USACE). 2008. Mahoning Creek Lake. [Online] URL: http://www.lrp.USACOE.army.mil/pubs/celrpp_1130_1_6.pdf. Accessed December 27, 2009.

U.S. Census Bureau. 2009. Armstrong County Quick Facts. [Online] URL: http://quickfacts.census.gov/qfd/states/42/42005.html. Accessed December 27, 2009.

U.S. Department of Agriculture (USDA). 2009. Soil Classifications. [Online] URL: http://www2.ftw.nrcs.usda.gov. Accessed December 27, 2009.

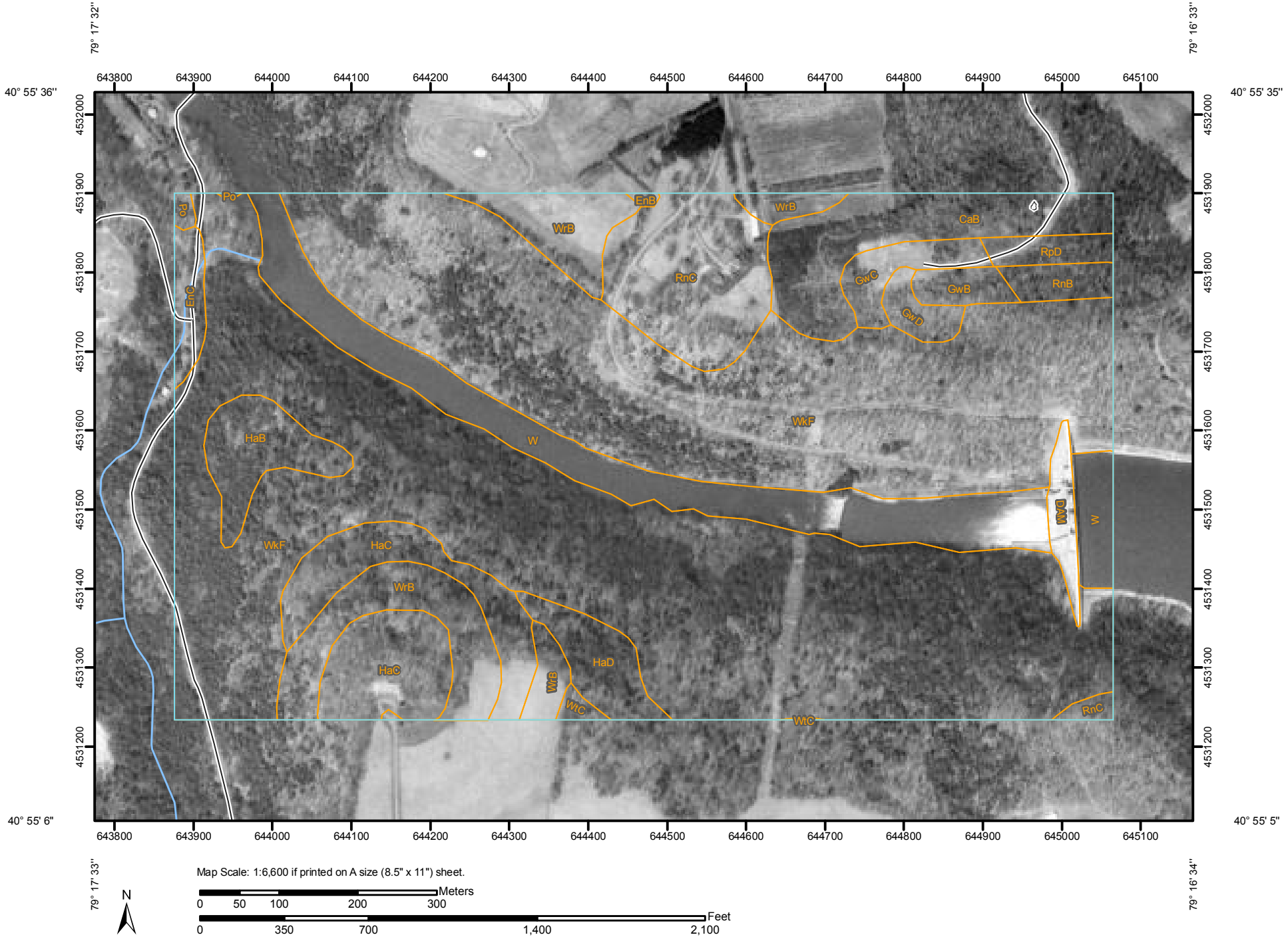
U.S. Department of Agriculture, Natural Resources Conservation Service. 2009. Web Soil Survey. [Online] URL: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm. Accessed December 31, 2009.

U.S. Fish and Wildlife Service (FWS). 2009. Wetlands Map for the Lower 48 States. [Online] URL: http://wetlandsfws.er.usgs.gov/wtlnds/launch.html). Accessed December 31, 2009.

SOIL EROSION AND SEDIMENTATION POLLUTION CONTROL PLAN

APPENDIX A
NRCS SOIL MAPPING

Soil Map—Armstrong County, Pennsylvania
(Mahoning Hydroelectric Project)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:6,600 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

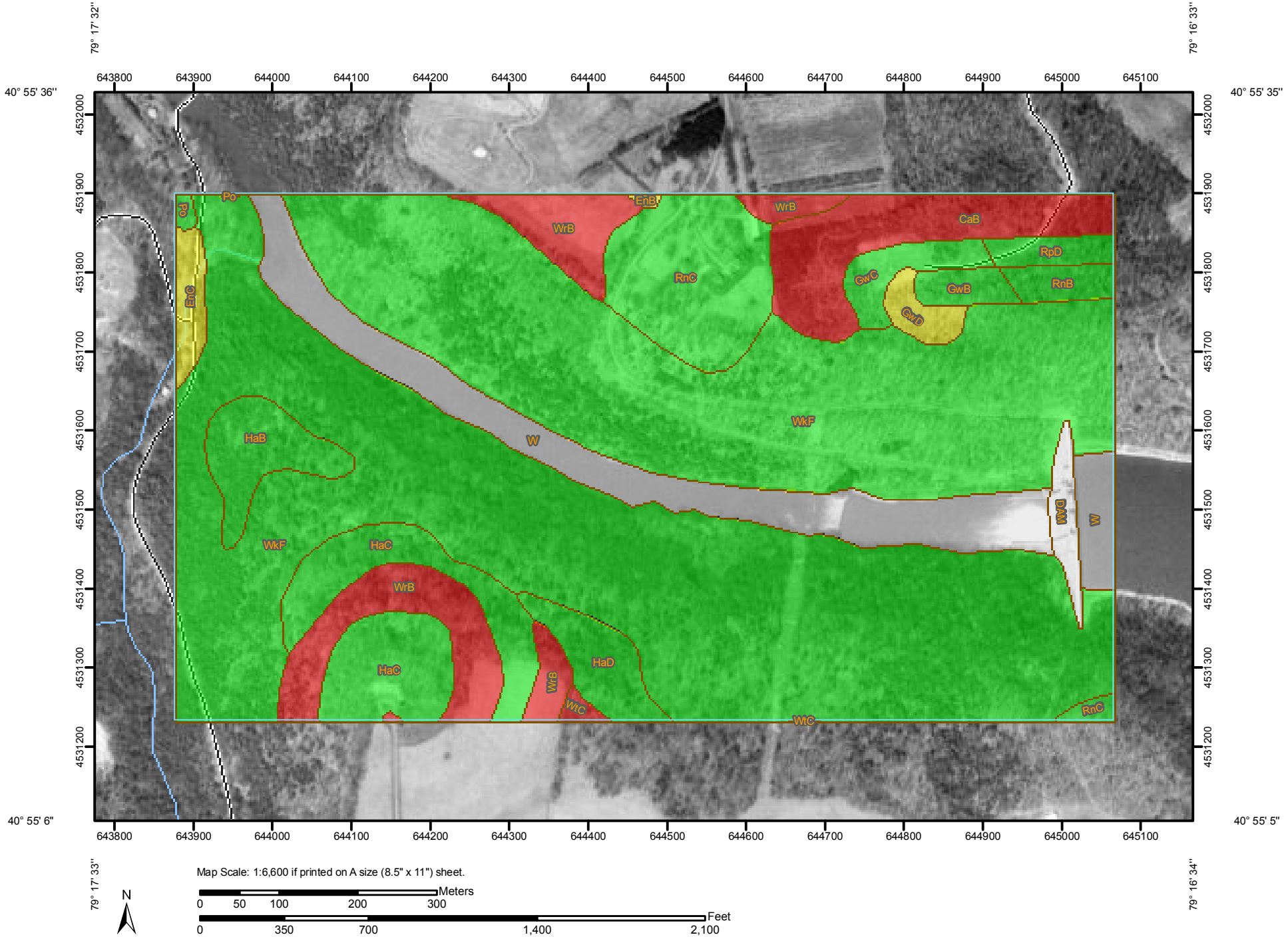
Soil Survey Area: Armstrong County, Pennsylvania
Survey Area Data: Version 4, May 7, 2008

Date(s) aerial images were photographed: 4/11/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Armstrong County, Pennsylvania (PA005)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
CaB	Cavode silt loam, 3 to 8 percent slopes	8.6	4.4%
DAM	Dams and impoundment structures	1.5	0.8%
EnB	Ernest silt loam, 3 to 8 percent slopes	0.1	0.1%
EnC	Ernest silt loam, 8 to 15 percent slopes	1.7	0.9%
GwB	Gilpin-Weikert complex, 3 to 8 percent slopes	1.4	0.7%
GwC	Gilpin-Weikert complex, 8 to 15 percent slopes	2.3	1.2%
GwD	Gilpin-Weikert complex, 15 to 25 percent slopes	1.3	0.7%
HaB	Hazleton channery loam, 3 to 8 percent slopes	4.0	2.1%
HaC	Hazleton channery loam, 8 to 15 percent slopes	10.6	5.4%
HaD	Hazleton channery loam, 15 to 25 percent slopes	3.2	1.6%
Po	Pope loam	0.3	0.2%
RnB	Rayne silt loam, 3 to 8 percent slopes	1.5	0.8%
RnC	Rayne silt loam, 8 to 15 percent slopes	9.7	4.9%
RpD	Rayne-Gilpin very stony silt loams, 8 to 25 percent slopes	1.4	0.7%
W	Water	16.4	8.4%
WkF	Weikert and Gilpin soils, 25 to 70 percent slopes	120.0	61.2%
WrB	Wharton silt loam, 3 to 8 percent slopes	11.7	5.9%
WtC	Wharton-Gilpin silt loams, 8 to 15 percent slopes	0.4	0.2%
Totals for Area of Interest		**196.2**	**100.0%**


79° 17' 32"
79° 16' 33"
40° 55' 36"
40° 55' 35"
40° 55' 6"
40° 55' 5"
643800
643900
644000
644100
644200
644300
644400
644500
644600
644700
644800
644900
645000
645100
4532000
4531900
4531800
4531700
4531600
4531500
4531400
4531300
4531200
Po
EnB
WrB
CaB
RpD
RnC
GwC
GwB
RnB
GwD
EnC
WkF
W
HaB
DAM
HaC
HaD
WtC
Map Scale: 1:6,600 if printed on A size (8.5" x 11") sheet.
N
Meters
0 50 100 200 300
Feet
0 350 700 1,400 2,100
79° 17' 33"
79° 16' 34"

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- High
- Moderate
- Low
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:6,600 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Armstrong County, Pennsylvania
Survey Area Data: Version 4, May 7, 2008

Date(s) aerial images were photographed: 4/11/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Corrosion of Steel

Corrosion of Steel— Summary by Map Unit — Armstrong County, Pennsylvania				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
CaB	Cavode silt loam, 3 to 8 percent slopes	High	8.6	4.4%
DAM	Dams and impoundment structures		1.5	0.8%
EnB	Ernest silt loam, 3 to 8 percent slopes	Moderate	0.1	0.1%
EnC	Ernest silt loam, 8 to 15 percent slopes	Moderate	1.7	0.9%
GwB	Gilpin-Weikert complex, 3 to 8 percent slopes	Low	1.4	0.7%
GwC	Gilpin-Weikert complex, 8 to 15 percent slopes	Low	2.3	1.2%
GwD	Gilpin-Weikert complex, 15 to 25 percent slopes	Moderate	1.3	0.7%
HaB	Hazleton channery loam, 3 to 8 percent slopes	Low	4.0	2.1%
HaC	Hazleton channery loam, 8 to 15 percent slopes	Low	10.6	5.4%
HaD	Hazleton channery loam, 15 to 25 percent slopes	Low	3.2	1.6%
Po	Pope loam	Low	0.3	0.2%
RnB	Rayne silt loam, 3 to 8 percent slopes	Low	1.5	0.8%
RnC	Rayne silt loam, 8 to 15 percent slopes	Low	9.7	4.9%
RpD	Rayne-Gilpin very stony silt loams, 8 to 25 percent slopes	Low	1.4	0.7%
W	Water		16.4	8.4%
WkF	Weikert and Gilpin soils, 25 to 70 percent slopes	Low	120.0	61.2%
WrB	Wharton silt loam, 3 to 8 percent slopes	High	11.7	5.9%
WtC	Wharton-Gilpin silt loams, 8 to 15 percent slopes	High	0.4	0.2%
Totals for Area of Interest			**196.2**	**100.0%**

Description

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie.

The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

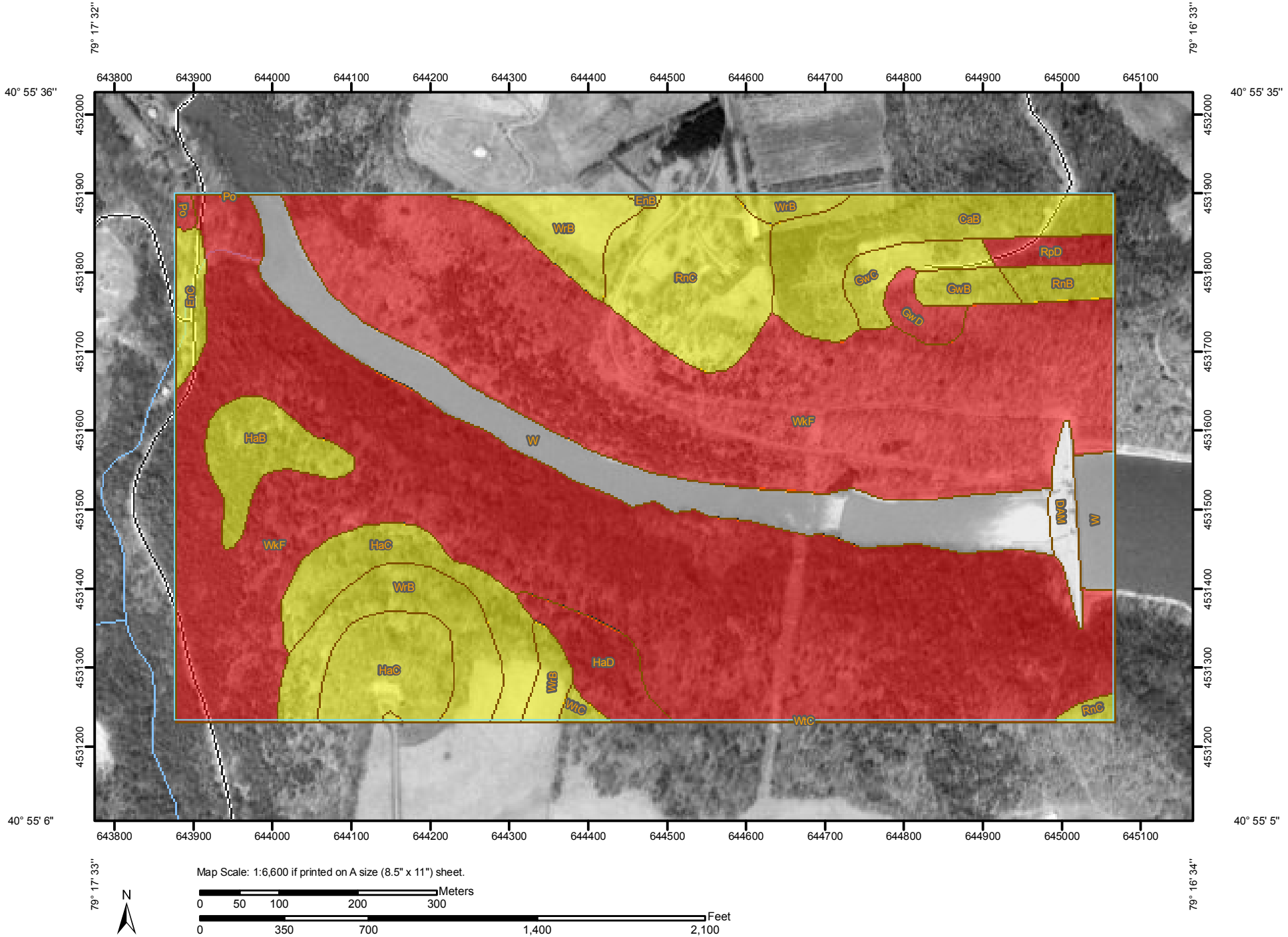
Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Suitability for Roads (Natural Surface)—Armstrong County, Pennsylvania
(Mahoning Hydroelectric Project)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- Poorly suited
- Moderately suited
- Well suited
- Not rated or not available

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:6,600 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Armstrong County, Pennsylvania
Survey Area Data: Version 4, May 7, 2008

Date(s) aerial images were photographed: 4/11/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Suitability for Roads (Natural Surface)

Suitability for Roads (Natural Surface)— Summary by Map Unit — Armstrong County, Pennsylvania						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
CaB	Cavode silt loam, 3 to 8 percent slopes	Moderately suited	Cavode (85%)	Wetness (0.50)	8.6	4.4%
				Low strength (0.50)		
DAM	Dams and impoundment structures	Not rated	Dams (100%)		1.5	0.8%
EnB	Ernest silt loam, 3 to 8 percent slopes	Moderately suited	Ernest (85%)	Low strength (0.50)	0.1	0.1%
				Wetness (0.50)		
				Slope (0.50)		
EnC	Ernest silt loam, 8 to 15 percent slopes	Moderately suited	Ernest (85%)	Slope (0.50)	1.7	0.9%
				Low strength (0.50)		
				Wetness (0.50)		
GwB	Gilpin-Weikert complex, 3 to 8 percent slopes	Moderately suited	Gilpin (60%)	Low strength (0.50)	1.4	0.7%
				Slope (0.50)		
			Weikert (30%)	Low strength (0.50)		
				Slope (0.50)		
GwC	Gilpin-Weikert complex, 8 to 15 percent slopes	Moderately suited	Gilpin (50%)	Slope (0.50)	2.3	1.2%
				Low strength (0.50)		
			Weikert (40%)	Slope (0.50)		
				Low strength (0.50)		
GwD	Gilpin-Weikert complex, 15 to 25 percent slopes	Poorly suited	Weikert (45%)	Slope (1.00)	1.3	0.7%
				Low strength (0.50)		
			Gilpin (45%)	Slope (1.00)		
				Low strength (0.50)		
HaB	Hazleton channery loam, 3 to 8 percent slopes	Moderately suited	Hazleton (85%)	Slope (0.50)	4.0	2.1%
HaC	Hazleton channery loam, 8 to 15 percent slopes	Moderately suited	Hazleton (80%)	Slope (0.50)	10.6	5.4%
HaD	Hazleton channery loam, 15 to 25 percent slopes	Poorly suited	Hazleton (80%)	Slope (1.00)	3.2	1.6%
Po	Pope loam	Poorly suited	Pope (90%)	Flooding (1.00)	0.3	0.2%
				Low strength (0.50)		
			Atkins (6%)	Flooding (1.00)		
				Wetness (1.00)		
				Low strength (0.50)		

Suitability for Roads (Natural Surface)— Summary by Map Unit — Armstrong County, Pennsylvania						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
RnB	Rayne silt loam, 3 to 8 percent slopes	Moderately suited	Rayne (90%)	Low strength (0.50)	1.5	0.8%
				Slope (0.50)		
RnC	Rayne silt loam, 8 to 15 percent slopes	Moderately suited	Rayne (90%)	Slope (0.50)	9.7	4.9%
				Low strength (0.50)		
RpD	Rayne-Gilpin very stony silt loams, 8 to 25 percent slopes	Poorly suited	Rayne (55%)	Slope (1.00)	1.4	0.7%
				Low strength (0.50)		
			Gilpin (35%)	Slope (1.00)		
				Low strength (0.50)		
W	Water	Not rated	Water (99%)		16.4	8.4%
WkF	Weikert and Gilpin soils, 25 to 70 percent slopes	Poorly suited	Gilpin (45%)	Slope (1.00)	120.0	61.2%
				Low strength (0.50)		
				Landslides (0.10)		
			Weikert (40%)	Slope (1.00)		
WrB	Wharton silt loam, 3 to 8 percent slopes	Moderately suited	Wharton (80%)	Low strength (0.50)	11.7	5.9%
				Wetness (0.50)		
WtC	Wharton-Gilpin silt loams, 8 to 15 percent slopes	Moderately suited	Wharton (40%)	Slope (0.50)	0.4	0.2%
				Low strength (0.50)		
			Gilpin (40%)	Slope (0.50)		
				Low strength (0.50)		
Totals for Area of Interest					**196.2**	**100.0%**

Suitability for Roads (Natural Surface)— Summary by Rating Value		
Rating	**Acres in AOI**	**Percent of AOI**
Poorly suited	126.2	64.3%
Moderately suited	52.0	26.5%
Null or Not Rated	17.9	9.1%
Totals for Area of Interest	**196.2**	**100.0%**

Description

The ratings in this interpretation indicate the suitability for using the natural surface of the soil for roads. The ratings are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification of the soil, depth to a water table, ponding, flooding, and the hazard of soil slippage.

The ratings are both verbal and numerical. The soils are described as "well suited," "moderately suited," or "poorly suited" to this use. "Well suited" indicates that the soil has features that are favorable for the specified kind of roads and has no limitations. Good performance can be expected, and little or no maintenance is needed. "Moderately suited" indicates that the soil has features that are moderately favorable for the specified kind of roads. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. "Poorly suited" indicates that the soil has one or more properties that are unfavorable for the specified kind of roads. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie.

The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

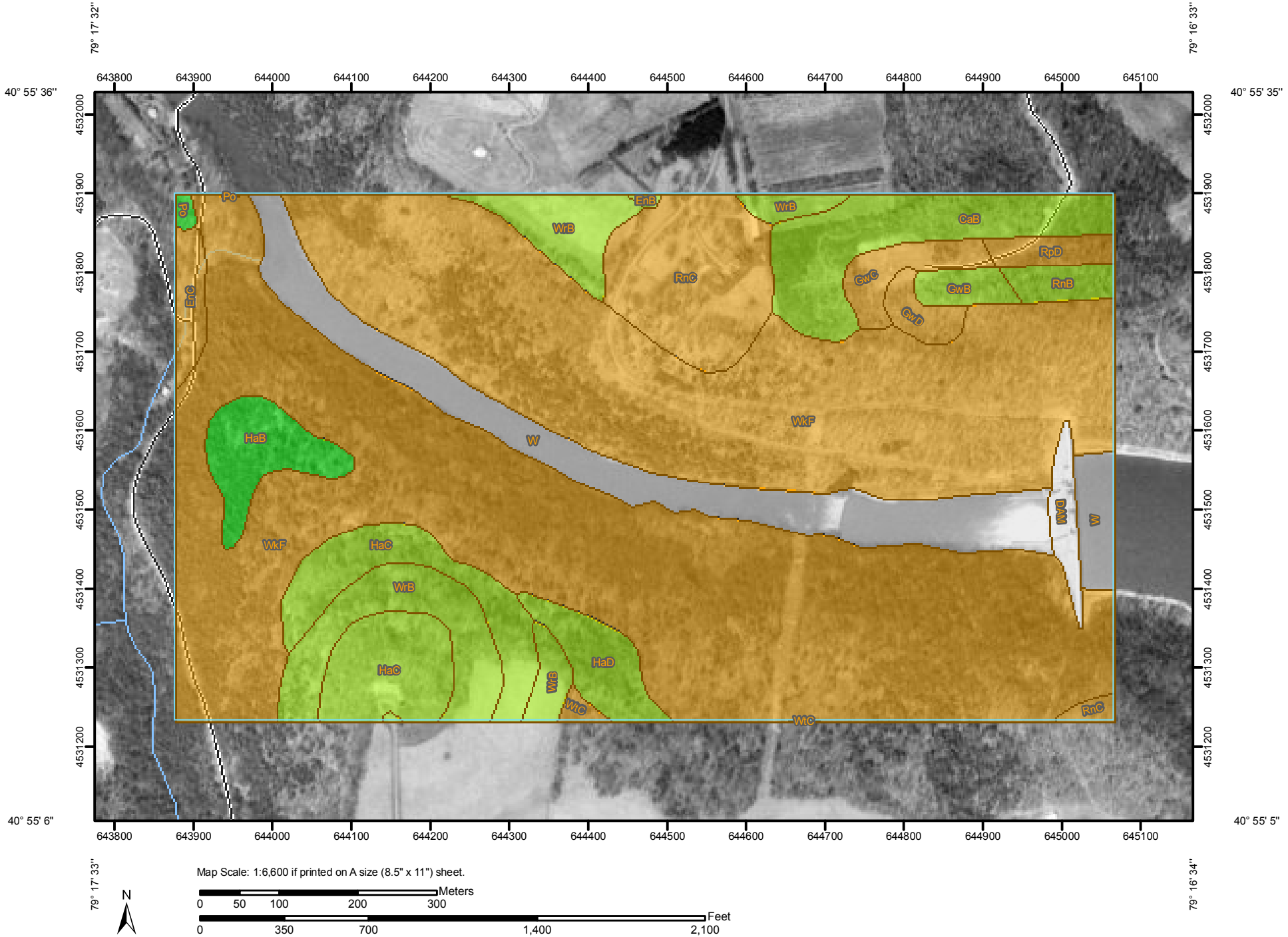
Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Erosion Hazard (Road, Trail)—Armstrong County, Pennsylvania
(Mahoning Hydroelectric Project)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:6,600 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Armstrong County, Pennsylvania
Survey Area Data: Version 4, May 7, 2008

Date(s) aerial images were photographed: 4/11/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Erosion Hazard (Road, Trail)

Erosion Hazard (Road, Trail)— Summary by Map Unit — Armstrong County, Pennsylvania						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
CaB	Cavode silt loam, 3 to 8 percent slopes	Moderate	Cavode (85%)	Slope/erodibility (0.50)	8.6	4.4%
			Brinkerton (5%)	Slope/erodibility (0.50)		
DAM	Dams and impoundment structures	Not rated	Dams (100%)		1.5	0.8%
EnB	Ernest silt loam, 3 to 8 percent slopes	Moderate	Ernest (85%)	Slope/erodibility (0.50)	0.1	0.1%
			Brinkerton (5%)	Slope/erodibility (0.50)		
EnC	Ernest silt loam, 8 to 15 percent slopes	Severe	Ernest (85%)	Slope/erodibility (0.95)	1.7	0.9%
GwB	Gilpin-Weikert complex, 3 to 8 percent slopes	Moderate	Gilpin (60%)	Slope/erodibility (0.50)	1.4	0.7%
			Weikert (30%)	Slope/erodibility (0.50)		
GwC	Gilpin-Weikert complex, 8 to 15 percent slopes	Severe	Gilpin (50%)	Slope/erodibility (0.95)	2.3	1.2%
GwD	Gilpin-Weikert complex, 15 to 25 percent slopes	Severe	Weikert (45%)	Slope/erodibility (0.95)	1.3	0.7%
			Gilpin (45%)	Slope/erodibility (0.95)		
HaB	Hazleton channery loam, 3 to 8 percent slopes	Slight	Hazleton (85%)		4.0	2.1%
HaC	Hazleton channery loam, 8 to 15 percent slopes	Moderate	Hazleton (80%)	Slope/erodibility (0.50)	10.6	5.4%
HaD	Hazleton channery loam, 15 to 25 percent slopes	Moderate	Hazleton (80%)	Slope/erodibility (0.50)	3.2	1.6%
Po	Pope loam	Slight	Pope (90%)		0.3	0.2%
			Atkins (6%)			
RnB	Rayne silt loam, 3 to 8 percent slopes	Moderate	Rayne (90%)	Slope/erodibility (0.50)	1.5	0.8%
RnC	Rayne silt loam, 8 to 15 percent slopes	Severe	Rayne (90%)	Slope/erodibility (0.95)	9.7	4.9%
RpD	Rayne-Gilpin very stony silt loams, 8 to 25 percent slopes	Severe	Rayne (55%)	Slope/erodibility (0.95)	1.4	0.7%
			Gilpin (35%)	Slope/erodibility (0.95)		
W	Water	Not rated	Water (99%)		16.4	8.4%
WkF	Weikert and Gilpin soils, 25 to 70 percent slopes	Severe	Gilpin (45%)	Slope/erodibility (0.95)	120.0	61.2%
			Weikert (40%)	Slope/erodibility (0.95)		
WrB	Wharton silt loam, 3 to 8 percent slopes	Moderate	Wharton (80%)	Slope/erodibility (0.50)	11.7	5.9%
			Brinkerton (2%)	Slope/erodibility (0.50)		

Erosion Hazard (Road, Trail)— Summary by Map Unit — Armstrong County, Pennsylvania						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
WtC	Wharton-Gilpin silt loams, 8 to 15 percent slopes	Severe	Wharton (40%)	Slope/erodibility (0.95)	0.4	0.2%
			Gilpin (40%)	Slope/erodibility (0.95)		
Totals for Area of Interest					**196.2**	**100.0%**

Erosion Hazard (Road, Trail)— Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Severe	136.8	69.8%
Moderate	37.1	18.9%
Slight	4.3	2.2%
Null or Not Rated	17.9	9.1%
Totals for Area of Interest	**196.2**	**100.0%**

Description

The ratings in this interpretation indicate the hazard of soil loss from unsurfaced roads and trails. The ratings are based on soil erosion factor K, slope, and content of rock fragments.

The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," or "severe." A rating of "slight" indicates that little or no erosion is likely; "moderate" indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and "severe" indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie.

The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.