FINDING OF NO SIGNIFICANT IMPACT
SOUTHAMPTON CREEK ECOSYSTEM RESTORATION PROJECT
SECTION 206, AQUATIC ECOSYSTEM RESTORATION
BUCKS COUNTY, PENNSYLVANIA

OVERVIEW

The United States Army Corps of Engineers (Corps), Philadelphia District has evaluated the restoration of a suburban stream in Upper Southampton Township, Bucks County, Pennsylvania.

PURPOSE AND SPECIFICATIONS

The goal of this project is to restore bank stability, improve the aquatic and riparian habitat, and improve sediment transport (sediment movement during normal and storm flows) in Southampton Creek. This will be accomplished by applying the principles of fluvial geomorphology to the stream restoration design. Fluvial geomorphology is the study of landforms, water, and the processes that shape them. This facilitates the understanding of river systems and the sediment that they move in order to predict future changes to the river. Proposed design features for the project include in-stream structures such as log vanes, channel plugs, rock cross vanes, and mud sills. These features are designed to provide stream stability or improve fish and wildlife habitat.

Restoration of the stream banks and riparian buffer will reduce the amount of pollutants entering the creek. The riparian buffer will act as a sponge and filter to runoff from nearby streets and yards before it can reach the creek. Stream restoration features and wetlands will be incorporated into the design to retain and absorb stormwater. Healthy vegetation surrounding the creek (the riparian buffer) and on the stream banks will filter stormwater runoff, reducing sediment and pollutants from running into the creek. The vegetation will also stabilize eroding stream banks and provide habitat for various riparian species such as, invertebrates, amphibians, reptiles, and small mammals.

COORDINATION

The project was developed in partnership by the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service (Pennsylvania Field Office), the University of New Hampshire, and Upper Southampton Township.

The Environmental Assessment (EA) for the project was forwarded to the U.S. Environmental Protection Agency (EPA), Region II, the U.S. Fish and Wildlife Service (FWS), the National Marine Fisheries Service (NMFS), Pennsylvania Department of Environmental Protection (PADEP), Pennsylvania Game Commission (PGC), Pennsylvania Fish and Boat Commission (PFBC), Bucks County Conservation District (BCCD), and all other known interested parties.

ENDANGERED SPECIES IMPACT

The Environmental Assessment has determined that the selected plan, if implemented, would not jeopardize the continued existence of any species or the critical habitat of any fish, wildlife or plant, which is designated as endangered or threatened pursuant to the Endangered Species Act of 1973 as amended by P.L. 96-159.

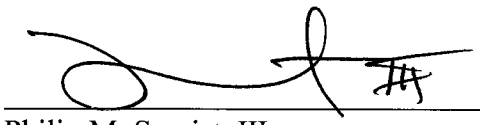
WATER QUALITY COMPLIANCE
Pursuant to Section 401 of the Clean Water Act, a Water Quality Certificate will be obtained from PADEP prior to project construction.

WETLANDS
Wetlands are found in the project area; however, the selected project design will avoid impacts to all wetlands.

COASTAL ZONE
Based on the information gathered during the preparation of the Environmental Assessment, the project is not located in the area defined under the Coastal Zone Management Act of 1972. Therefore, the project will not need a federal consistency determination in regards to the Coastal Zone Management Program of Pennsylvania.

CULTURAL IMPACTS
It is not anticipated that the proposed project will affect any historic or archaeological sites eligible or listed on the National Register of Historic Places. As such, no impacts are expected on historic or archaeological resources. Consultation with the Pennsylvania Historic Museum Commission, under Section 106 of the National Historic Preservation Act, will be completed prior to construction of this project.

RECOMMENDATION
Because the Environmental Assessment concludes that the work described is not a major Federal action significantly affecting the human environment, I have determined that an Environmental Impact Statement is not required.



Philip M. Secrist, III
Lieutenant Colonel, Corps of Engineers
District Commander

27 JUL 2010
Date

ENVIRONMENTAL ASSESSMENT
SOUTHAMPTON CREEK ECOSYSTEM RESTORATION PROJECT
SECTION 206, AQUATIC ECOSYSTEM RESTORATION
BUCKS COUNTY, PENNSYLVANIA

PREPARED BY:
PHILADELPHIA DISTRICT
U.S. ARMY CORPS OF ENGINEERS
PHILADELPHIA, PENNSYLVANIA 19107

July 2010

ENVIRONMENTAL ASSESSMENT
SOUTHAMPTON CREEK ECOSYSTEM RESTORATION PROJECT
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1.0 Project Location and Description

The project site is located along Southampton Creek in Upper Southampton Township, Bucks County, Pennsylvania. The project area begins from the intersection of Davisville Road and Street Road and extends down stream to the bridge on County Line Road (Figure 1). From Davisville Road, Southampton Creek flows 3,200 feet to the Toll Road stream crossing. This stream length is referred to in this document as the northern project reach. Approximately 500 feet upstream of Toll Road is the Southampton Estates Dam. Southampton Creek flows from Toll Road another 4,000 feet downstream until it reaches the County Line Road stream crossing. This stream section is referred to in this document as the southern project reach. The project ends immediately upstream of the County Line Road bridge.

Southampton Creek is the northeastern tributary of the Pennypack Watershed, which is part of the lower Delaware River basin. The creek flows through the southwestern portion of Upper Southampton Township and has a total drainage area of 6.1 square miles.

2.0 Study Authority

The authority for this project is Section 206 of the Water Resources Development Act (WRDA) of 1996, which is used for aquatic ecosystem restoration that will improve environmental quality and is in the public interest.

3.0 Purpose and Need for Action

The goal of this project is to restore bank stability, improve the aquatic and riparian habitat, and improve sediment transport (sediment movement during normal and storm flows) in Southampton Creek. This will be accomplished by applying the principles of fluvial geomorphology to the stream restoration design. Fluvial geomorphology is the study of landforms, water, and the processes that shape them. This facilitates the understanding of river systems and the sediment that they move in order to predict future changes to the river. Proposed design features for the project include in-stream structures such as log vanes, channel plugs, rock cross vanes, and mud sills. These features are designed to provide stream stability or improve fish and wildlife habitat.

In the southern reach of the project, approximately 2,210 feet of gabions were placed in the 1980s for stream bank protection and flood proofing measures. Today, much of the gabions are in disrepair, either by undercutting and erosion, basket breaching, or complete failure. The gabion stone released by the gabions tend to armor much of the lower portion stream bed. Also along the downstream portion are seven stream crossings constructed by private landowners in order to access their property across the stream from their homes. Many of these homeowners actively care for their property that straddles the stream (gardens, mowing, etc.). These existing gabions and active mowing by the residents provide very little riparian cover for resident fish populations.

Restoration of the stream banks and riparian buffer will reduce the amount of pollutants entering the creek. The riparian buffer will act as sponge and filter to runoff from nearby streets and yards before it can reach the creek. Stream restoration features and wetlands will be incorporated into the design to retain and absorb stormwater. Healthy vegetation surrounding the creek (the riparian buffer) and on the stream banks will filter stormwater runoff, reducing sediment and pollutants from running into the creek. The vegetation will also stabilize eroding stream banks and provide habitat for various riparian species such as, invertebrates, amphibians, reptiles, and small mammals.

Figure 1. Aerial photo depicting the project area in Bucks County, PA.

4.0 Alternatives

4.1 Alternative 1 - The no action alternative would leave Southampton Creek and the riparian area surrounding in its current unstable, impaired state. This would result in the unstable stream continuing to degrade (through incision and channel widening), the failure of the existing gabion system, and continued existence of large rubble in the streambed, all of which contribute to the further loss of fish and wildlife habitat. This alternative was eliminated from consideration because it does not accomplish the goal of improving the ecological functions and values of Southampton Creek.

4.2 Alternative 2 - Stream Restoration - Within the Existing Channel – This alternative would involve restoring the stream within the existing channel. This would mean that the dimensions of the channel and the radius of the meanders would basically remain unchanged from the existing stream configuration. Erosion protection to the banks would be accomplished by log and rock structures. The existing streambed would have to be raised so that the depth of the channel was approximately 1.5 ft. to 2 ft. deep (upstream to downstream) and /or a floodplain would need to be excavated thereby removing existing valuable (for their root mass) large trees. In addition, much of the southern project reach would need to be widened at the location of the gabions. Based on fluvial geomorphic principles and an analysis of the local reference reaches, a stream depth of 1.5 ft. to 2 ft. would be ideal for this section of Southampton Creek. This alternative would entail the placement of fill in the existing channel, as well as, complicated stream grade transitions at Toll Road and other urban infrastructure. Significant amounts of fill would be needed to obtain the appropriate streambed elevation in the floodplain. Furthermore, this alternative would also include the partial removal of Southampton Estates dam, which is located in the northern project reach. Further description of the dam removal can be found in Section 4.6.1.

4.3 Alternative 3- Stream Restoration – New Alignment A - This alternative would re-align sections of Southampton Creek to restore the stream to the elevation of the floodplain. A new channel would be constructed in these realigned reaches and connected at various locations to the existing channel. The newly aligned channel would have different dimensions (width, depth, etc.) than the current stream channel and would allow for the movement of water and sediment through the system. The proposed width and depth of the new channel were determined through a geomorphic analysis of the stream, as well as, research on existing local reference reaches. Design features of this restoration would include log vanes and rock structures. In addition, a vegetated riparian buffer would be restored as part of this alternative. Restoration of the riparian buffer will help to minimize pollutants entering the ecosystem and potential design features, such as rock vanes, will reduce streambank erosion along stretches of the stream. Approximately 0.5 acres of wetlands would be impacted (converted to stream channel) from this proposed alignment. Real estate easements will be needed in order to implement the riparian buffer improvements. See Appendix A for design alignments. Furthermore, this alternative would also include the partial removal of Southampton Estates dam, which is located in the northern project reach. Further description of the dam removal can be found in Section 4.6.1.

4.4 Alternative 4 - Stream Restoration – New Alignment B - This alternative would re-align sections of Southampton Creek to restore the stream to the elevation of the floodplain. A new channel would be constructed in these realigned reaches and connected at various locations to the existing channel. The newly aligned channel would have different dimensions (width, depth, etc.) than the current stream channel and would allow for the movement of water and sediment through the system. The proposed width and depth of the new channel were determined through a geomorphic analysis of the stream, as well as, research on existing local reference reaches. Design features of this restoration would include log vanes and rock structures. In addition, a vegetated riparian buffer would be restored as part of this alternative. Restoration of the riparian buffer will help to minimize pollutants entering the ecosystem and potential design features, such as rock vanes, will reduce streambank erosion along stretches of the stream. In preference over Alignment A, all wetlands in the project area would be avoided with this

proposed alignment. Real estate easements will be needed in order to implement the riparian buffer improvements. See Appendix A for design alignments. Furthermore, this alternative would also include the partial removal of Southampton Estates dam, which is located in the northern project reach. Further description of the dam removal can be found in Section 4.6.1.

4.5 Alternative 5 - Stream Restoration – New Alignment B without Dam Removal - This alternative would be the same as described above in Alternative 4, but would not include the partial removal of the Southampton Estates dam. This is the selected plan. See Appendix A for design alignments. In addition, Table 1 summarizes the costs and benefits associated with each alternative and highlights why Alternative #5 (Stream Restoration – New Alignment B without Dam Removal) is the selected plan. Further description of the why the Southampton Estates dam cannot be removed can be found in Section 4.6.1.

Table 1. Alternative Analysis					
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
	No Action	**Stream Restoration - Within the Existing Channel**	**Stream Restoration - New Alignment A**	**Stream Restoration – New Alignment B**	**Stream Restoration – New Alignment B without Dam Removal**
Benefits	● None	● Limited benefits to fish and wildlife.	● Restore the stability of the stream and improve the riparian ecosystem for fish and wildlife resources. ● Significantly less fill will be needed by moving the stream to the floodplain as opposed to raising the streambed as described in Alternative #2.	● Restore the stability of the stream and improve the riparian ecosystem for fish and wildlife resources. ● Significantly less fill will be needed by moving the stream to the floodplain as opposed to raising the streambed as described in Alternative #2.	● Restore the stability of the stream and improve the riparian ecosystem for fish and wildlife resources. ● Significantly less fill will be needed by moving the stream to the floodplain as opposed to raising the streambed as described in Alternative #2. ● This is the selected plan.
Potential issues	● Stream remains in unstable condition and	● Real estate easements needed	● Real estate easements needed from local	● Real estate approval from dam owner.	● Real estate easements

	continues to degrade. ● Ecosystem gets more degraded for local fish and wildlife populations.	from local landowners ● Stream sediment transport can't be corrected without realigning the existing channel. In addition, more structures would be needed to stabilize the stream in-place. ● Considerable amount of fill would be needed for this alternative to raise the existing streambed to the current floodplain to create a stable, better functioning stream.	landowners. ● Potential mitigation issues for wetland impacts. ● Potential historic resources issues with dam removal and associated structures.	● Real estate easements needed from local landowners for stream work. ● Potential historic resources issues with dam removal and associated structures.	needed from local landowners for stream work.
Maintenance costs	No cost	High	Medium	Medium	Medium
Wetland impacts	0	0	0.5 acres (permanent)	0	0
Construction Cost	No cost	High	Medium - High	Medium	Medium

4.6 Project Construction Information

4.6.1 Dam Removal

As a component of Alternatives 2, 3, and 4, a dam owned by Southampton Estates, will be partially removed to improve Southampton Creek (Figure 2). The small pool behind the dam (Figure 3) will be filled with excavated sediment from the new stream channel and the top two feet of the masonry dam structure itself will be removed and buried on site. Due to potential historic resource issues associated with this structure, this component of Alternatives 2, 3, and 4 may be eliminated if significant historic resource or cost issues arise during further project planning. After release of the draft Environmental Assessment, through further analysis it was determined that due to funding and real estate issues, the dam removal will not be part of any alternative.

Figure 2. Southampton Estates dam located along Southampton Creek.

Figure 3. Pool area behind the dam that will be filled with sediment from new stream channel.

4.6.2 Staging Areas

Staging areas for materials, equipment, and personnel exist at either end of the project as well as in the downstream portion off of Charles Road. These staging areas are identified as cross hatched areas in Alignment B figures in Appendix A. Staging areas are located on Upper Southampton Township properties: off of Davisville Road (637 Davisville Road property); off of County Line Road are two more properties owned by the Township, on either side of the stream (the Carr and Duff property, and the wastewater pumping station). There is also Township property available off of Charles Street near the intersection with Dogwood Drive, where there are detention ponds. There are other small pockets of Township property that may also be used for staging, however these have limited access, primarily along the stream corridor rather than from the streets. One such parcel is by the Southampton Estates Dam and another is just downstream of Toll Road by the sewer line. These latter areas will be useful for parking heavy equipment overnight.

4.6.3 Construction Access

The primary access for the construction of this project is at either end of the project area limits on Township properties (Davisville Road and County Line Road). There is limited access elsewhere because of private property ownership. Access is possible at two locations along Charles Street, and also at the previously cited Township owned properties. Access alongside the stream is possible on the downstream end along the sewer line right of way. For the entire length of the stream, access is possible by traversing down the actual stream itself.

Much of the stream restoration work proposed in this design is new channel excavation, and as such, access for this work will be along floodplain areas. Channel blocks will be constructed at various locations along the old channel. Access between old and new channels will occur either over private property (not preferred) or at crossover points using the old and new stream intersections (preferred).

Best management practices will be used during excavation to minimize any disturbance to the project area during the construction of the new channel. In addition, the new channel will be excavated in the dry to minimize impacts on the water quality of Southampton Creek. The new channel will be connected to the existing channel only after the new channel is excavated between intersections with the existing channel. Log and rock structures will be constructed in the wet. Stream banks and floodplain will be seeded and mulched soon after each stretch of stream is completed.

4.6.4 Proposed Design Structures (see Appendix B for figures)

Structures will be constructed to train the flow in order to minimize shear stress on the banks and stabilize grades. In general, these structures are considered temporary in nature, and are meant to hold the constructed channel alignment and grade until the roots of woody vegetation take over. Log structures will degrade over time and be replaced by vegetation. In the existing channel, channel blocks are proposed to prevent water from short-circuiting the new designed stream alignment. In the new channel, log and rock structures are proposed. All structures will be discussed in this section and draft structure designs can be found in Appendix B.

CHANNEL PLUG (CHANNEL BLOCK)
A channel plug is a large earthen berm constructed perpendicular to the existing channel. Along the channel, the berm will have a top width of twenty (20) feet and side slopes of 4:1. Its height will be one foot lower than the existing channel top of banks. The old channel will have to carry stormwater runoff, and so the intention of the channel blocks is not to prevent water flow altogether. At the location of the channel plug, first any gabions will be removed, the cages opened, and the rock deposited in the old channel downstream of the channel plug location. The gabion metal basket will be crushed, removed, and disposed of properly as construction debris. Excavation will then occur at least five feet into either side of the existing channel banks at the location of the channel plug. Excavation material from the new channel will then be used to construct the channel plug, laying the material in 12-18 inch lifts and compacting to 95% compaction. The channel plug will be constructed to within 18 inches of its final height. An 18-inch deep trench will then be dug on the upstream and downstream sides and a geotextile fabric placed from the upstream trench over the top of the channel plug to the downstream trench. The last lift of cover over this geotextile should be lightly compacted, seeded, and mulched.

At a minimum, the channel plugs are necessary to ensure that the new channel does not migrate to the old channel location. In between channel plugs, the old channel will be filled in as much as there is excavated material. Low spots will act as vernal pools or seasonal wetlands. As the new channel overflows its banks every year, sediments will fill-in these low spots.

LOG VANE
A log vane is structure constructed from tree logs that deflect the stream flow away from the stream banks. In general, a log vane should appear at every meander bend. For the Southampton Creek project, two or three will be placed at each meander bend. Logs “point” upstream. The logs will make a 20 to 30 degree angle off of the channel bank, and have a vertical angle of two to seven per cent. Hemlock or Larch trees are recommended for the logs. Log length varies since channel width, and log angles vary along the stream. In general, log lengths are between 25 and 35 feet and have a minimum diameter of 12 inches.

Tree removed in the excavation of the new channel may be used for log vanes. After trimming to size with a chain saw, the root ball is placed in the bank to help anchor the log. This should be the top log in any log vane structure. The trench for the log is first excavated. Landward of the log vane should be at least 10 feet of large (>400 lb) rock that sit in a line (no gaps between rocks) one foot below grade. A trench is first excavated for these rocks. These rocks form a bank sill (rock sill here) that prevents high

flows from cutting around the log vane at the bank. The alignment of these rocks can be along the same alignment as the log to almost perpendicular to the stream.

The upstream side of the log vane and the rock sill are backfilled and the material compacted by track-walking over it with the excavator or with the excavator bucket, taking great care not to get too close to the logs with the tracks. On the downstream side of the log vane, for the first five feet off of the bank, large rock (100-400lb) should be placed from the channel bed up to the bottom of the top log. At high flows, water overtopping the log in this location is very aggressive, and this rock prevents excessive scour at the bank foundation of the log vane. Seeding and mulching for the disturbed locations above the bankfull depth can occur with general seeding of disturbed floodplain areas, and need not be done for each log vane individually.

LOG CROSS VANE

The cross vane is two log vanes that meet in the center of the channel. Often the structure is symmetric, but it need not be if it is desired to steer the water to one side of the channel or the other. The intention of the cross vane is a grade control structure. As such, cross vanes are recommended upstream and downstream of Toll Road. Cross vanes are also planned to be five feet downstream of any sewer or pipeline utility crossing below the channel.

MUD SILL

A mud sill is a small overhang on one side of the stream that provides shaded and refugia for smaller fauna (fish, insect larvae, etc). The mud sill is typically located on the outer bend of a meander, but can be placed in other locations. An important sill site consideration is that it does not fill with sediment in the short term. For Southampton Creek, mud sills should be considered where there is little tree cover.

The foundation for the mud sill is constructed of logs. Trenches are dug 5 – 10 feet into the bank, and slightly sloping downward away from the channel. Angled bracing logs are placed at the upstream and downstream ends. Logs perpendicular to the bank are spaced 8 to 20 feet on centers, with spacing a function of the planking strength used on top of the log foundation. The log foundation is secured by driving rebar through the logs into the bed and banks. Planking for the mud sill can be wood, plastic lumber or logs. Planking is nailed to the log foundation. Soil is then placed on the mudsill and lightly compacted. In the case of Southampton Creek, soil can be placed in one lift up to the bankfull elevation at the stream, and slowly increasing towards the floodplain. The soil is then seeded above the mud sill planking to encourage vegetation establishment on the sill.

ROCK CROSS VANE

The rock cross vane is very similar to the log cross vane. Rock cross vanes may be needed in the upstream portion of the project. The two rock cross vane legs are constructed of a two-row high set of rocks (top rock and bottom rock). Both rocks are nearly the same size, but the bottom rock can be slightly smaller. Rock size should be approximately 2 ft X 3 ft X 3 ft in size (approximately one ton quarrystone). An area is excavated for the bottom rock and then the bottom rock is placed, slightly farther downstream than the alignment for the top rock, and sloped to lean upstream at 5 – 15 degrees. The top rock is then set. Bottom and top rocks are to be set with no gaps between them. Any large gaps should be filled with smaller rock on the upstream side so that they do not move all the way through the gaps and out the front the structure. The rock sill into the floodplain is added exactly as was for the log vane. Geotextile is placed on the upstream side of the rock structure, from thalweg to rock sill (draped over the sill), and then the upstream side backfilled and lightly compacted. As with the log vanes, large rock (400-1,220 lb) should be placed on the downstream side of the rock structure from the stream bank to about halfway along the structure. When the first side of the rock cross vane is completed, the other side can be constructed in similar fashion.

5.0 Existing Environment

5.1 Air Quality

Ambient air quality is monitored by the Pennsylvania Department of Environmental Protection (PADEP) and is compared to the National Ambient Air Quality Standards (NAAQS) throughout the state, pursuant to the Clean Air Act of 1970. Six principal "criteria" pollutants are part of oxides of nitrogen (NO_x), particulate matter (PM_{10} and $PM_{2.5}$), and lead (Pb). Stationary sources include power plants that burn fossil fuels, factories, boilers, furnaces, manufacturing plants, gasoline dispensing facilities, and other industrial facilities. Mobile sources include vehicles such as cars, trucks, boats, and aircraft.

The Southampton Creek project is located within Bucks County, which is included in the Philadelphia-Wilmington-Atlantic City Nonattainment Area, PA-NJ-MD-DE (Philadelphia-Wilmington-Atlantic City Area) moderate ozone nonattainment for the 1997 8-hour ozone (oxides of nitrogen [NOx] and hydrocarbons [HC]) NAAQS. In addition, in April 2005, EPA designated the Philadelphia-Wilmington Area, PA-NJ-DE (Philadelphia-Wilmington Area) as a nonattainment area for the 1997 $PM_{2.5}$ NAAQS; and this area was subsequently designated in December 2009 as a nonattainment area for the 2006 24-hour $PM_{2.5}$ NAAQS.

5.2 Water Quality

The study area is in a highly developed suburban section of Upper Southampton Township. Southampton Creek is classified as an urban stream on the EPA and the State list of impaired streams. There are excessive levels of nutrients, suspended solids, pathogens and metals in the stream water. It is polluted by both point and non-point sources.

The Southampton Creek sub watershed basin drains approximately 6.1 square miles. This sub watershed basin was assessed under PADEP's Unassessed Waters Program in 1999. Over 95% of the sub-basin was determined to be impaired; out of a total of 114 miles of assessed streams within the sub watershed basin, only 1.85 miles were determined to be unimpaired.

The Southampton sub watershed basin suffers from some of the adverse impacts that often accompany urbanization. This has resulted in point and nonpoint source pollution from urban stormwater runoff, hydro-modification, combined sewer overflows (CSO), heavy industry, and commercial and residential development along the creek. Impairments on Southampton Creek have resulted from water, flow and habitat alterations; water/flow fluctuations; excessive algae growth from stormwater/urban runoff; and small residential development. (U.S. Environmental Protection Agency 2008)

5.3 Wetlands

A wetland delineation of the project area was completed in April 2010 by staff from the Corps and PADEP. The delineation identified large intact wetlands in the project area. Both forested and emergent wetlands were identified during the delineation (Figures 4 and 5). This delineation also confirmed the NWI maps by identifying forested and emergent wetlands in the project area. Further details on the wetland delineation can be found in Appendix D.

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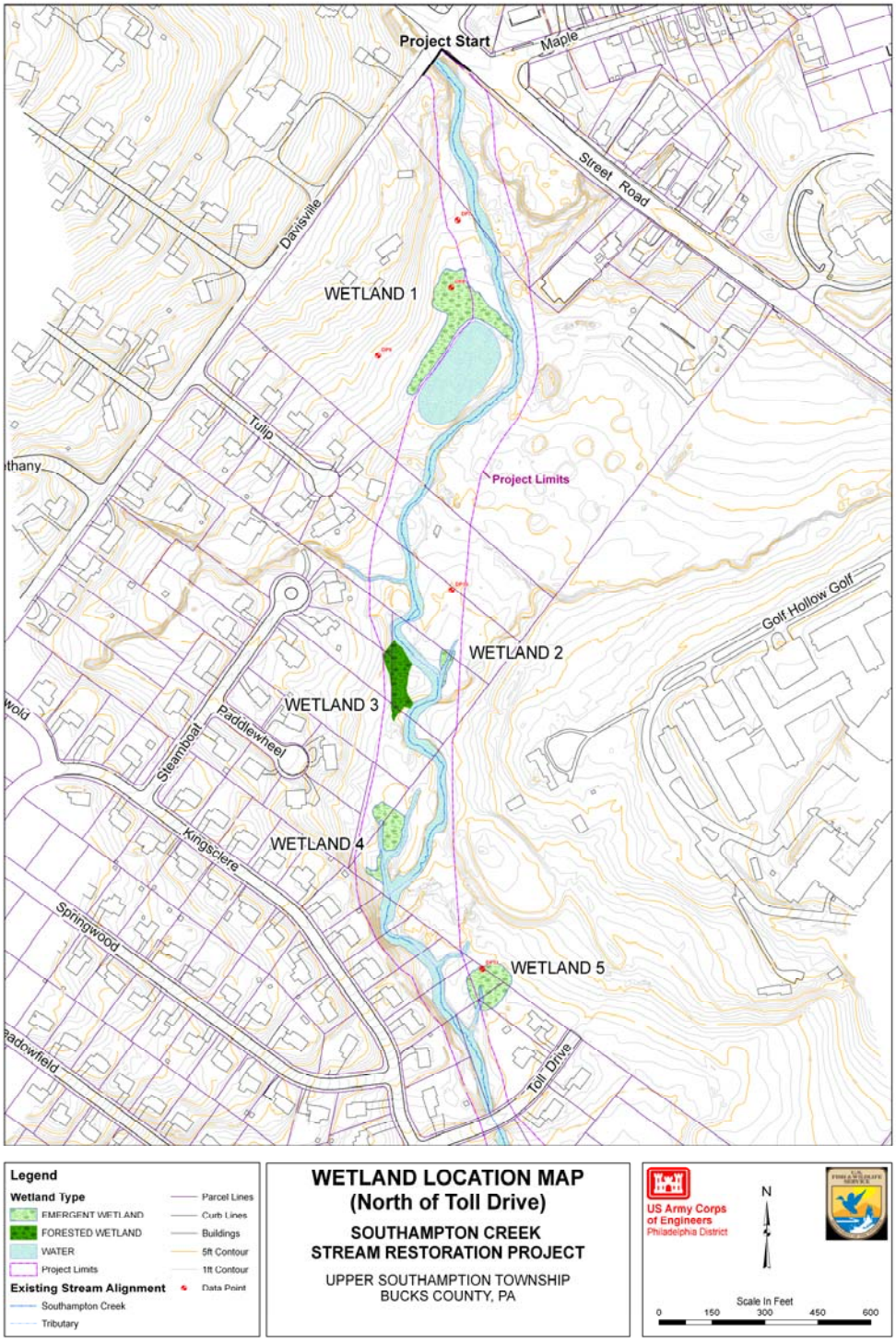

Figure 4. Wetland location map for the northern section of project area.

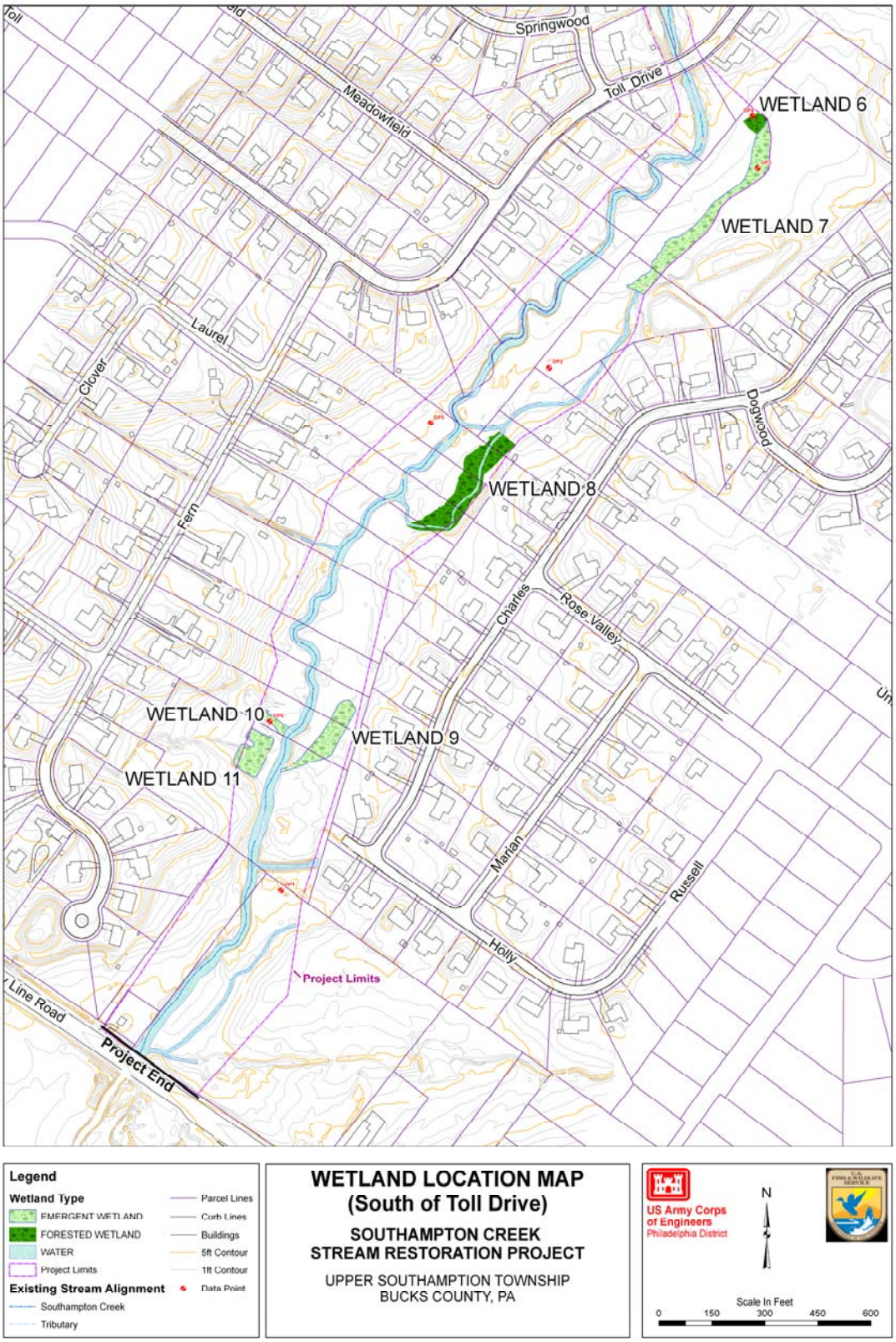

Figure 5. Wetland location map for the southern section of project area.

5.4 Fisheries

The stream is classified by PADEP as trout-stocked waters; however, the Pennsylvania Fish and Boat Commission (PFBC) chooses not to stock this creek with trout since certain parameters they require for stocking (stream width, depth, access, etc.) are not met in Southampton Creek (Kaufman – PFBC, personal communication, 2010)

In 2007, Philadelphia Water Department (PWD) biologists performed multiple surveys along the Pennypack watershed to assess the overall fish population diversity. At collection station PP1680 (Figure 6), which was the closest station to the Southampton Creek, biologists caught and surveyed 1,006 individual fish. There were 16 species found at this site, with the five dominant species {satinfin shiner (*Cyprinella analostana),* white sucker (*Catostomus commersonii)*, pumpkinseed sunfish (*Lepomis gibbosus)*, green sunfish (*Lepomis cyanellus)*and spottail shiner (*Notropis hudsonius)*} totaling 80% of the fish surveyed. Furthermore, nearly 80% of fish surveyed were classified as pollution tolerant. In addition, there was a high prevalence of fish with deformities, lesions, tumors, or anomalies, and a high percentage of pollutant tolerant species such as white suckers This site received a "poor" B-IBI (Benthic Index of Biological Intergrity) score of 28 out of 50.

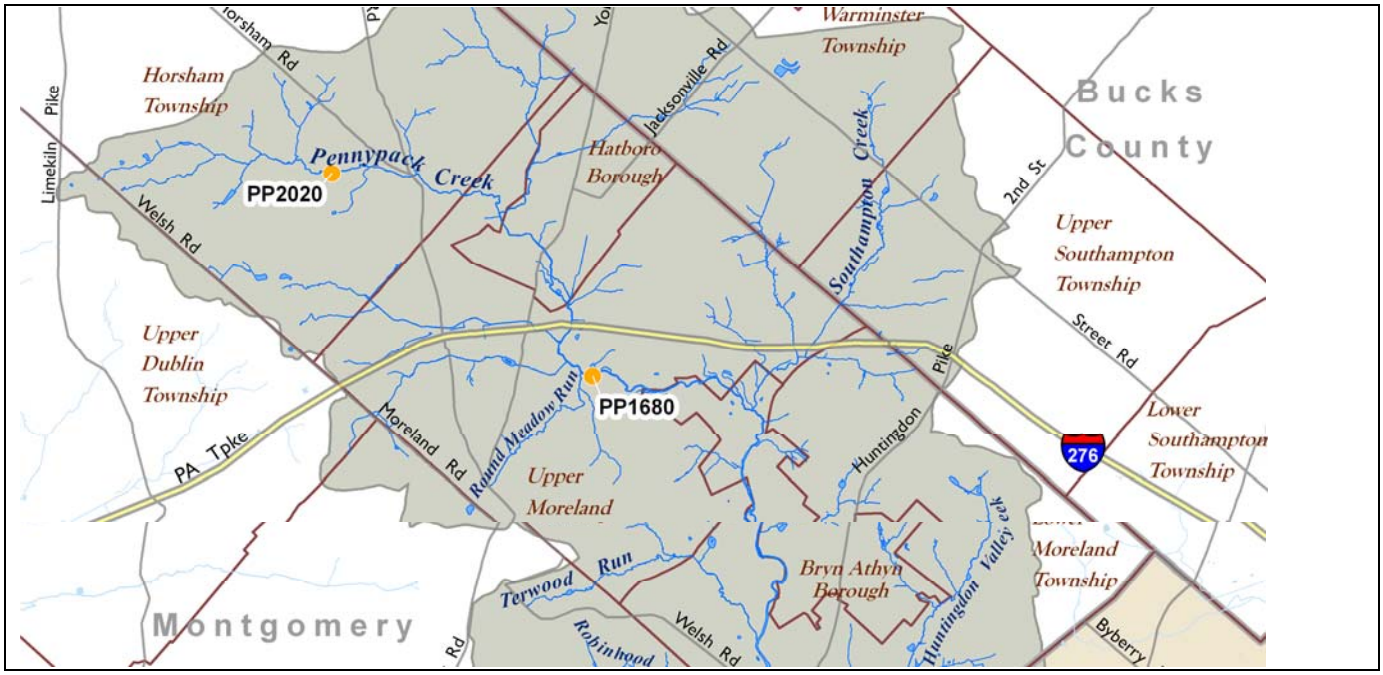

Figure 6. Philadelphia Water Department 2007 fish survey locations.

5.5 Wildlife Resources

The white-tailed deer (*Odocoileus virginianus*), chipmunk (*Tamias striata*), woodchuck (*Marmota monax*), opossum (*Didelphis virginiana*), skunk (*Mephitis mephitis*), red fox (*Vulpes vulpes*), eastern cottontail (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), northern flying squirrel (*Glaucomys sabrinus*), muskrat (*Ondatra zibethicus*), eastern mole (Scalopus aquaticus), deer mouse (*Peromyscus maniculatus*), and the gray squirrel (*Scirus carolinensis*) are common mammalian species that occur throughout the Southampton Creek Watershed. These species are also common throughout the rest of Pennsylvania. In addition to the aforementioned mammals, reptiles and amphibians that exist in the area include the eastern box turtle (*Terrapene c. carloina)* and snapping turtle (*Chelydra serpentina*).

The following species of bird are likely to be found within the project area: turkey vulture (*Cathartes*

aura), red-tailed hawk (*Buteo jamaicensis*), American crow (*Corvus brachynrynchos*), robin (*Turdus migratorius*), northern cardinal (*Richmondena cardinalis*), blue jay (*Cyanocitta cristata*), and various species of sparrows.

5.6 Threatened and Endangered Species

According to a Pennsylvania National Diversity Inventory (PNDI) study, there will be no threatened or endangered species that are regulated by the PA Game Commission (PGC), the PA Fish and Boat Commission (PFBC), or the U.S. Fish and Wildlife Service that will be impacted by this project. There is however, according to the PA Department of Conservation and Natural Resources, a State-listed endangered plant called the Serviceberry (*Amelanchier canadensis)* that exists within the project area. Please refer to Appendix C for the PNDI information.

5.7 Cultural Resources

There have been few archaeological investigations performed in the Southampton Creek study area. A search of the Pennsylvania Cultural Resources GIS (CRGIS) database was conducted by the USACE in November 2009. One resource, the Davisville Historic District, is located at the north end of the study area, on the north and south sides of Street Road near Maple Avenue. The historic resource information indicates that the Davisville Historic district is not eligible for inclusion in the National Register of Historic Places (NRHP). No in-depth archaeological or historical investigations have been conducted yet in the study area or along Southampton Creek.

There is a potential for prehistoric archeological sites adjacent to Southampton Creek, and possible historic structures and districts within the study area that may be potentially eligible for the NRHP.

5.8 Hydrology

A hydraulic evaluation of Southampton Creek was completed to determine water surface elevations, velocities, and shear stresses. The first step was to thoroughly review the original 1976 FIS hydraulic analysis. The original study was performed using computer program HEC-2, and these hydraulics have not been updated.

The 1976 Flood Insurance Study (FIS) for Bucks County completed by the Federal Emergency Management Agency (FEMA) included flood flows for Southampton Creek in Upper Southampton Township. Although this flood study was updated various times (the latest in 2004), Southampton Creek hydrology has not been updated. This is an important consideration since at the time of the original flood study, the watershed had much less impervious area that it exhibits today. There is little stormwater management in the Southampton Creek watershed aimed at reducing stormwater runoff volume and only some strategies at reducing stormwater runoff flood peaks. As such, over the last four decades, Southampton Creek has been reacting to higher peak flows and more runoff, by incising: some infrastructure installed in the 1960s and 1970s now sits three or more feet above the streambed today. The flood hydrology from the flood insurance studies may be found in Table 2. Because of the increased impervious area, as a rough estimate, these flood flows are on the order of 20% higher than when they were first developed in the 1970s.

A recent study by the Center for Sustainable Communities at Temple University (Meenar, 2006) demonstrated the dramatic changes to the 100-year floodplain, in part due to land modifications, in part due to increased rainfall, and in part due to increased impervious areas.

Table 2. Flood Flows for Southampton Creek (FEMA, 1976 Flood Insurance Study).

Flooding Source and Location	Drainage Area (mi2)	Peak Discharge (cfs)			
		10-year	50-year	100-year	500-year
County Line Road	5.80	1,100	2,000	2,425	3,075
Davisville Road	1.10	825	1,050	1,500	1,900

6.0 Environmental Impacts

6.1 Air quality
As stated previously, Bucks County, Pennsylvania within which the Federal Action will take place is located in the Philadelphia-Wilmington-Atlantic City Area moderate 8-hour ozone nonattainment area and the $PM_{2.5}$ Philadelphia-Wilmington Area.

Construction of the stream restoration project would cause temporary reduction of local ambient air quality due to fugitive dust and emissions generated by construction equipment. These temporary reductions in air quality would not have a significant impact on the long term air quality of the surrounding area.

General Conformity Review and Emission Inventory
Southampton Creek

The 1990 Clean Air Act Amendments include the provision of Federal Conformity, which is a regulation that ensures that Federal Actions conform to a nonattainment area's State Implementation Plan (SIP) thus not adversely impacting the area's progress toward attaining the National Ambient Air Quality Standards (NAAQS). In the case of the Southampton Creek, the Federal Action is to complete a 2 mile stream restoration project. The U.S. Army Corps of Engineers, Philadelphia District would be responsible for construction.

There are two types of Federal Conformity: Transportation Conformity and General Conformity (GC). Transportation Conformity does not apply to this project because the project is not funded by the Federal Highway Administration and it does not impact the on-road transportation system. GC however is applicable. Therefore, the total direct and indirect emissions associated with the Southampton Creek project must be compared to the GC trigger levels presented below.

General Conformity

Pollutant	Trigger Levels (tons per year)
NOx	100
HC	50

$PM_{2.5}$	100

To conduct a general conformity review and emission inventory for the Southampton Creek project, a list of equipment necessary for construction was identified. Table 1 (Appendix E) lists these pieces of equipment along with the number of engines, engine size (hp), and duration of operation. A Load Factor (LF) was also selected for each engine, which represents the average percentage of rated horsepower used during a source's operational profile. Load factors were taken from other General Conformity Reviews and Emission Inventories.

Table 1 (see Appendix E) shows the estimated hp-hr required for each equipment/engine category. Hp-hr was calculated using the following equation:

hp-hr = # of engines*hp*LF*hrs/day*days of operation

The second calculation is to derive the total amount of emissions generated from each equipment/engine category by multiplying the power demand (hp-hr) by an emission factor (g/hp-hr). The following equations were used:

emissions (g) = power demand (hp-hr) * emission factor (g/hp-hr)

emissions (tons) = emissions (g) * (1 ton/907200 g)

Tables 2, 3, and 4 (see Appendix E) presents the emission factors and emission estimates for NOx, HC, and $PM_{2.5}$ respectively. The tables present the emissions from each individual equipment/engine category and the combined total.

The total estimated emissions that would result from construction of the stream restoration project is 7.5 tons of NOx, 1.9 tons of HC, and 0.41 $PM_{2.5}$. Construction of the project will be completed in 8 months. These emissions are below the General Conformity trigger levels of 100 tons of NOx and $PM_{2.5;}$ and 50 tons of HC per year. General Conformity under the Clean Air Act, Section 176 has been evaluated for the project according to the requirements of 40 CFR 93, Subpart B. The requirements of this rule are not applicable to this project because the total direct and indirect emissions from the project are below the conformity threshold values established at 40 CFR 93.153 (b) for ozone (NOx and HC) in a Moderate Nonattainment Area (100 tons and 50 tons of each pollutant per year) and 100 tons for $PM_{2.5}$. The project is not considered regionally significant under 40 CFR 93.153 (i).

6.2 Water quality

Implementation of this project will have temporary impacts to water quality. All necessary best management practices will be used during construction, but in-stream work to restore the stream will result in turbid water conditions around these activities. For all new stream sections, the new channel will be constructed in the dry. Once completed and stabilized, flow will be allowed to enter the new channel. In addition, all construction debris will be disposed of in an appropriate manner. The proposed project will not have any long-term adverse impacts on water quality in Southampton Creek. It is likely that the project will result in a long-term positive impact on the stream as a new riparian buffer is established which will filter more stormwater and pollutants from entering the creek.

6.3 Wetlands

The selected alternative (Stream Alignment B) will avoid impacts to all wetlands in the project area. In addition, channel plugs in the old stream channel will eventually capture enough sediment and flow to create wetlands in these old channel areas.

6.4 Fisheries

There is no essential Essential Fish Habitat under the 1996 Magnuson-Stevens Act found in the project area. There will be temporary minor impacts to resident fish populations in Southampton Creek during the construction of this project during in-stream construction. However, the project will provide a long-term positive impact to fish populations in Southampton Creek with improved water quality, habitat, cover, and temperature.

6.5 Wildlife

No long-term impacts to the wildlife resources in Southampton Creek area are anticipated as result of this project. There will be noise and general disturbances in the stream area as a result of construction activities, but these will be temporary in nature and should not have a long term negative effect on wildlife in the area. The project will provide a long-term positive impact to the wildlife in the Southampton Creek with a restored stream and improved riparian corridor.

6.6 Threatened and Endangered Species

Consultation with the U.S. Fish and Wildlife Service, under Section 7 of the Endangered Species Act, has been completed. In addition, the National Marine Fisheries Service stated that there were no federally listed species under their jurisdiction found in Southampton Creek (see Appendix F).

In addition, letters from the PGC and PFBC indicated that no species under their purview were found in the project area. We do not anticipate any impacts to federal or state-listed species as a result of this project.

6.7 Cultural Resources

In accordance with Section 106 of the National Historic Preservation Act, as amended, a Phase I Cultural Resources Investigation was conducted by AD Marble, Inc. within the project's Area of Potential Effect (APE). No sites were recommended as eligible for the National Register of Historic Places and no further work was recommended.

A draft report and a determination of No Historic Properties Affected in compliance with 36CFR800.4(d)(1) will be coordinated with the Pennsylvania Historical and Museum Commission/Bureau for Historic Preservation, serving as the Pennsylvania State Historic Preservation Office (SHPO) and this consultation will be completed prior to project construction.

6.8 Hydrology

The hydraulic analyses for this stream restoration project employed computer program HEC-RAS (the successor to HEC-2). The floodplain roughness (Manning's n) values used in the FIS model (0.1) were also used in the present day model. The results were then compared to the 100-year flood water surface elevations found in the latest FIS. This first round of analysis demonstrated that at County Line Road, the FIS elevations were much higher than those of the existing system topography modeled in HEC-

RAS. At Toll Road, the HEC-RAS model gave water surface elevations higher than the FIS elevations. None of the seven homeowner stream crossings (private bridges) were modeled in the FIS or this study. These structures increase the flood water surface elevations because they act as restrictions in each of their locations.

The reason for the lower HEC RAS water surface elevation at County Line Road compared to the FIS water surface was because the size of the bridge opening in the HEC-2 FIS model was 29.5 feet wide by 5 feet high. The bridge opening as of last summer was 30 ft wide by 7 ft high, with an open bottom, The difference is that the 1976 cross sectional area was 145.5 ft2 and today it is approximately 250 ft2, an increase of 65%. This larger bridge open area is more hydraulically efficient than the former, and therefore dramatically decreases the upstream flood flow water surface elevations. The discrepancy at Toll Road seems to arise from the fact that the Toll Road culvert was not modeled in the original FIS. In the original HEC-2 input file, the closest cross sections to Toll Road are hundreds of feet upstream or downstream, but no cross sections at Toll Road. Modeling the 18 ft wide by 7.9 ft high Toll Road results in a significant increase in the 100-year flood water surface elevation compared to the FIS value.

Given these discrepancies in modeling, flow, and geometry between the FIS and the system as it exists today, it was decided to model the existing system in HEC-RAS, as accurately as possible and to compare the results of stream restoration with the intent of: not increasing the 100-year flood elevations along the Creek in the southern reach, and being within one foot of the existing 100-year flood elevation along the northern reach. The reason for this latter metric is that in the upstream portion the proposed channel everywhere sits higher than the existing channel. The existing system exhibits extreme incision, and rather than carve out a geomorphically-sized floodplain around the existing channel, there is less excavation in creating a new channel on the floodplain. Hydraulically, there is little effect in the downstream portion of the project where the new channel is located because the slope is flatter (0.27%) and the County Line Road culvert dominates the hydraulics. Upstream, the slope is much steeper (1.11%) and so the thalweg more or less defines the water surface elevation as the channel is close to critical depth here. The existing channel conveyance and the proposed channel conveyance are within 9% of each other, with the difference compensated in that the proposed channel slope is slightly steeper, than the existing slope. The hydraulic simulations reveal that: a.) flooding does not get worse in the downstream portion of the project, and b.) water surface elevations depend on the stream thalweg (center-line) elevation in the upstream portion. In general water will go out of banks at lower flows for the new channel compared to the existing channel for flows up to about the 5-year flood. For flows higher than this, the new channel will exhibit lower water surface elevations than the existing channel. Figure 7 plots the comparison of the 100-year flood water surface elevations for the FIS, the existing system today, and the proposed restoration. Table 3 contains the values for these plots. The proposed restoration project will not change the expected water surface elevations of the project area during a 100-year storm.

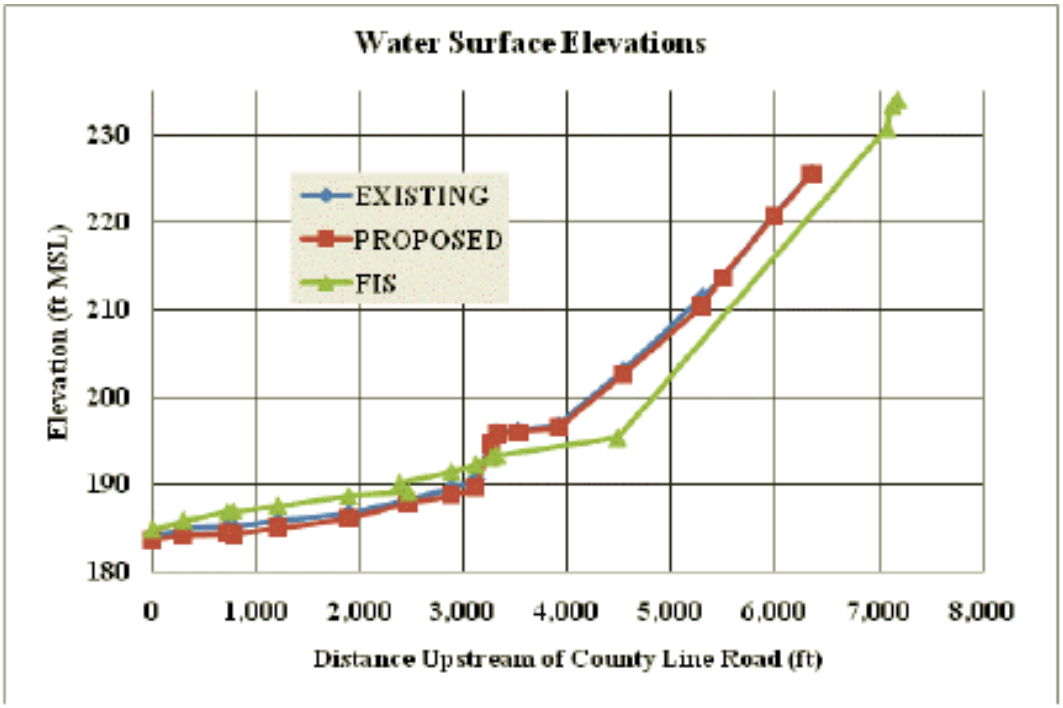

Figure 7. Comparison of FIS and Modeled Water Surface Elevations for the 100-year Flood.

Distance Upstream from County Line Road	FIS Water Surface Elevation	Water Surface Elevation for the Existing Stream	Water Surface Elevation for the Restored Stream
6351	229.7	225.52	225.52
5986	225.2	220.66	220.66
5497	218.4	220.8	213.62
5296	215.9	213.57	210.38
4527	203.4	211.44	202.52
3911	194.9	202.9	196.46
3520	194.0	196.72	195.9
3314	193.3	196.03	195.78
3263	193.0	195.92	194.63
3111	192.2	194.63	189.61
2882	191.4	190.5	188.78
2468	190.1	189.52	187.78
1887	188.6	188.26	186.01
1208	187.5	186.63	185.03
781	186.9	185.64	184.24
723	186.8	184.93	184.38
299	185.8	184.97	184.17
0	184.8	184.81	183.63

Table 3. Comparison of 100-year flood (2,425 cfs) Water Surface Elevations.

7.0 Environmental Justice

All of the alternatives evaluated for this project, including the selected plan, are expected to comply with Executive Order 12989-Environmental Justice in Minority Populations and Low-Income Populations, dated February 11, 1994. The selected plan is not located in close proximity to a minority or low-income community, and no impacts are expected to occur to any minority or low-income communities in the area.

8.0 Relationship of Selected Plan to Environmental Requirements, Protection Statutes, and Other Requirements

Compliance with environmental quality protection statutes and other environmental review requirements is ongoing. Table 4 provides a listing of compliance with environmental statutes. The Corps will obtain all necessary approvals from PADEP, including a Section 401 state water quality certificate, prior to project construction. A Section 404(b)(1) analysis of the Clean Water Act, as amended (Public Law 92-500), was completed for this project based and included in this document.

TABLE 4. Compliance with Appropriate Environmental Quality Protection Statutes and other Environmental Review Requirements.

STATUTE	COMPLIANCE STATUS
Clean Water Act	Partial*
Coastal Zone Management Act	N/A
Endangered Species Act	Full
Fish and Wildlife Coordination Act	Full
National Historic Preservation Act	Partial*
National Environmental Policy Act	Full
Clean Air Act	Full

NOTE:
Full Compliance: Having met all requirements of the statute, E.O., or other environmental requirements for the current stage of planning.
Partial Compliance: Some requirements of the statute, E.O., or other policy and related regulations remain to be met.
*All applicable laws and regulations will be fully complied with upon completion of the environmental review, obtaining state water quality certification, coastal zone consistency determination, and concurrence with our determination on cultural resources.
Noncompliance: None of the requirements of the statute, E.O., or other policy and related regulations remain to be met.

9.0 Section 404(b)(1) Analysis

A review of the impacts associated with discharges to waters of the United States for the Southampton Creek Ecosystem Restoration Project in Bucks County, PA is required by Section 404(b)(1) of the Clean Water Act, as amended (Public Law 92-500).

I. PROJECT DESCRIPTION

A. Location. The project area is located in Upper Southampton Township, Bucks County, PA.

B. General Description. The project site is located along Southampton Creek in, Bucks County, Pennsylvania. The project area begins from the intersection of Davisville Road and Street Road and extends downstream to the bridge on County Line Road (Figure 1). Southampton Creek is the northeastern tributary of the Pennypack Watershed, which is part of the lower Delaware River basin.

The creek flows through the southwestern portion of Upper Southampton Township and has a total drainage area of 6.1 square miles.

C. Purpose. The goal of this project is to restore bank stability, improve the aquatic and riparian habitat, and improve sediment transport (sediment movement during normal and storm flows) in Southampton Creek. This will be accomplished by applying the principles of fluvial geomorphology to the stream restoration design. Proposed design features for the project include in-stream structures such as log vanes, channel plugs, rock cross vanes, and mud sills. These features are designed to provide stream stability or improve fish and wildlife habitat.

D. General Description of Dredged or Fill Material.

1. General Characteristics of Material:
   Upstream project reach – bedrock/concrete slabs/cobbles/gravel
   Downstream project reach - sand/soil/clay

2. Quantity of Discharge: The selected stream alignment alternative involves filling the pool behind the dam, as well as channel plugs in the old stream channel, with excavated material from the new stream channel alignment. Estimated quantity of fill is 9,000 cu yds.

3. Source of Material: excavation of the new stream channel.

E. Description of Discharge Sites.

2. Location: The excavated material will be used for channel plugs and filling behind the old dam.

3. Size (acres): The project site is 2 miles in length, but the actual amount of fill to be used within the old channel will be approximately 9,000 cubic yards.

3. Type of Sites: Floodplain/Riparian Corridor

4. Type of Habitat: Floodplain/Riparian Corridor

5. Timing and Duration of Discharge: Intermittent over an 8 month construction period.

F. Description of Discharge Method. Excavation of the new channel and plugging of the existing channel at various locations.

II. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations.

1. Substrate Elevation and Slope: varies

4. Sediment Type: Upstream project reach – bedrock/concrete slabs/cobbles/gravel
   Downstream project reach - sand/soil/clay

3. Fill Material Movement: Significant, excavate a new channel and use the material to plug existing the channel opening. Additional material excavated will be used to

fill the pool behind the dam.

4. Physical Effects on Benthos: Temporary, significant effect on flow and patterns during construction (i.e., when the old channel is being plugged). The new channel will be excavated in the dry and when completed, connected with parts of the existing channel. The area should reach a stabilized equilibrium in a relatively short time period.

5. Actions taken to Minimize Impacts: Best management practices will be used during excavation to minimize any disturbance to the project area during the construction of the new channel. In addition, the new channel will be excavated in the dry to minimize impacts on the water quality of Southampton Creek. The new channel will be connected to the existing channel only after the new channel is excavated between intersections with the existing channel. Log and rock structures will be constructed in the wet. Stream banks and floodplain will be seeded and mulched soon after each stretch of stream is completed.

B. Water Circulation, Fluctuation and Salinity Determinations.

1. Water:

   a. Salinity – No effect

   b. Water Chemistry – Temporary, minor effect.

   c. Clarity – Temporary, minor effect

   d. Color - No effect

   e. Odor – No effect.

   f. Taste - No effect.

   g. Dissolved Gas Levels – Temporary, minor effect

   h. Nutrients – Temporary, minor effect

   I. Eutrophication - No effect.

   j. Temperature- Temporary, minor effect

2. Current Patterns and Circulation:

   a. Current Patterns and Flow – Temporary, significant effect on flow and patterns when the new stream channel is connected with the existing channel. The area should reach a stabilized equilibrium in a relatively short time period.

   b. Velocity - Temporary, significant effect on flow and patterns when the new channel is connected with the existing channel.. The area should reach a stabilized equilibrium in a short time period.

c. Stratification - No effect.

3. Normal Water Level Fluctuations – Temporary, significant effect on flow and patterns when the new stream channel is connected with the existing channel. The area should reach a stabilized equilibrium in a short time period.

4. Salinity Gradients – no effect.

5. Actions That Will Be Taken To Minimize Impacts: Best management practices will be used during excavation to minimize any disturbance to the project area during the construction of the new channel. In addition, the new channel will be excavated in the dry to minimize impacts on the water quality of Southampton Creek. The new channel will be connected to the existing channel only after the new channel is excavated between intersections with the existing channel. Log and rock structures will be constructed in the wet. Stream banks and floodplain will be seeded and mulched soon after each stretch of stream is completed.

C. Suspended Particulate/Turbidity Determinations.

1. Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Fill Site: Temporary, major effect during the construction of the new channel and channel plugs.

2. Effects on Chemical and Physical Properties of the Water Column:

a. Light Penetration: No effect.

b. Dissolved Oxygen: Minor effect.

c. Toxic Metals and Organics: No effect.

d. Pathogens: No effect.

e. Aesthetics: Minor adverse and temporary effects limited to the construction period.

f. Temperature: Temporary, minor effect.

3. Effects on Biota:

a. Primary Production, Photosynthesis: Temporary, significant effect on flow and patterns when the new channel is connected with the existing channel. The area should reach a stabilized equilibrium in a short time period.

b. Suspension/Filter Feeders: Temporary, significant effect on flow and patterns when the new channel is connected with the existing channel. The area should reach a stabilized equilibrium in a short time period.

c. Sight feeders: Temporary, significant effect on flow and patterns when the new channel is connected with the existing channel. The area should

reach a stabilized equilibrium in a short time period.

4. Actions Taken to Minimize Impacts: Best management practices will be used during excavation to minimize any disturbance to the project area during the construction of the new channel. In addition, the new channel will be excavated in the dry to minimize impacts on the water quality of Southampton Creek. The new channel will be connected to the existing channel only after the new channel is excavated between intersections with the existing channel. Log and rock structures will be constructed in the wet. Stream banks and floodplain will be seeded and mulched soon after each stretch of stream is completed.

D. Contaminant Determinations.

No testing was done on the sediment in or around the Southampton Creek. All excavated sediment from the new channel will be used on site for either channel plugs for the old channel or to fill in the pool behind the dam.

E. Aquatic Ecosystem and Organism Determinations.

1. Effects on Plankton: No effect.

2. Effects on Benthos: Temporary, significant effect on flow and patterns when the new channel is connected with the existing channel. The area should reach a stabilized equilibrium in a short time period.

3. Effects on Nekton: No effect

4. Effects on Aquatic Food Web: Temporary, significant effect on flow and patterns when the new channel is connected with the existing channel. The area should reach a stabilized equilibrium in a short time period. .

5. Effects on Special Aquatic Sites:

(a) Sanctuaries and Refuges: None.

(b) Wetlands: the selected plan will have no impacts to wetlands in the project area. In addition, the selected plan may result in the natural development of additional wetlands in the old stream channel.

(c) Tidal flats: None.

(d) Vegetated Shallows: None.

6. Threatened and Endangered Species: No effect.

7. Other Wildlife: Temporary, minor effect.

8. Actions to Minimize Impacts: Best management practices will be used to minimize any disturbance to only the area necessary to construct the new channel.

F. Proposed Disposal Site Determinations (N/A – no dredging will be conducted)

1. Mixing Zone Determinations:

a. Depth of water:
b. Current velocity:
c. Degree of turbulence:
d. Stratification:
e. Discharge vessel speed and direction:
f. Rate of discharge:
g. Dredged material characteristics:

2. Determination of Compliance with Applicable Water Quality Standards:
A section 401 Water Quality Certificate will be obtained from PADEP for this project prior to construction.

3. Potential Effects on Human Use Characteristics:

a. Municipal and Private Water Supply: No anticipated effect.

b. Recreational and Commercial Fisheries: Temporary, minor effect during construction.

c. Water Related Recreation: Temporary, minor effect.

d. Aesthetics: Temporary, minor effect.

e. Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves: No effect.

G. Determination of Cumulative Effects on the Aquatic Ecosystem.
No significant adverse effects are anticipated.

H. Determination of Secondary Effects on the Aquatic Ecosystem.
No significant secondary effects are anticipated.

III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

A. Adaptation of the Section 404(b)(1) Guidelines to this evaluation - No significant adaptation of the guidelines were made relative to this evaluation.

B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem - The selected plan was determined from a detailed evaluation of alternatives to have the least amount of environmental impacts and the best chance for success.

C. Compliance With Applicable State Water Quality Standards - The selected plan is not expected to violate any applicable state water quality standards in Pennsylvania.

D. Compliance With Applicable Toxic Effluent Standards or Prohibition Under Section 307 of the Clean Water Act - The proposed discharge is not anticipated to violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

E. Compliance With Endangered Species Act of 1973 -The selected plan will comply with the

Endangered Species Act of 1973. Informal Section 7 consultation with the U.S. Fish and Wildlife Service will be completed on this project prior to construction.

F. Compliance With Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972 - No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are located within the project area.

G. Evaluation of Extent of Degradation of Waters of the United States - The selected plan will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, and recreational and commercial fishing, plankton, fish and shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and wildlife will not be adversely affected. Significant adverse impacts on aquatic ecosystem diversity, productivity and stability, and recreation, aesthetics and economic values will not occur as a result of the project.

H. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem - Appropriate steps (as described above) will be taken to minimize potential adverse impacts of discharging material in the aquatic ecosystem.

10.0 References

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11.0 CLEAN AIR ACT STATEMENT OF CONFORMITY

CLEAN AIR ACT STATEMENT OF CONFORMITY
SOUTHAMPTON CREEK ECOSYSTEM RESTORATION PROJECT
BUCKS COUNTY, PENNSYLVANIA

I have determined that the selected plan conforms to the applicable State Implementation Plan (SIP). The Environmental Protection Agency had no adverse comments under their Clean Air Act authority. Comments from the State air quality management district were received during coordination of the draft environmental assessment and addressed in the final environmental assessment. The selected plan would comply with Section 176 (c)(1) of the Clean Air Act Amendments of 1990.

27 JUL 2010
Date

Philip M. Secrist, III
Lieutenant Colonel, Corps of Engineers
District Commander