DRAFT ENVIRONMENTAL ASSESSMENT AND PLANNING DESIGN ANALYSIS
SECTION 14 EMERGENCY STREAMBANK PROTECTION PROJECT
WALTON ELEMENTARY AND MIDDLE SCHOOL
ROANE COUNTY, WEST VIRGINIA

U.S. Army Corps of Engineers
Huntington District
Huntington, West Virginia

May 2012

DRAFT FINDING OF NO SIGNIFICANT IMPACT
SECTION 14 EMERGENCY STREAMBANK PROTECTION PROJECT
WALTON ELEMENTARY/MIDDLE SCHOOL
ROANE COUNTY, WEST VIRGINIA

1. Members of my staff have conducted an environmental assessment, in the overall public interest, which considers the environmental impacts of the proposed Walton Elementary/Middle School Emergency Streambank Protection Project in Roane County, West Virginia. The purpose of this project is to provide a cost-effective means to prevent further endangerment to the school foundation. The Preferred Alternative includes design and construction of height of bank stone slope protection with stone blanket. The proposed project is authorized under Section 14 of the Flood Control Act of 1946 (PL 79-526) as amended.

2. The possible consequences of the project have been studied for environmental, cultural and social well-being effects.

3. The Preferred Alternative and the No Action Alternative were the only alternatives carried forward for detailed evaluation. The Preferred Alternative is the most cost effective and is both environmentally and socially acceptable. The No Action Alternative would not be in the public's best interest and would have continued negative impacts on the natural resources of the area.

4. An evaluation of the Preferred Alternative and the No Action Alternative produced the following pertinent conclusions:

a. Environmental Considerations. The Huntington District has taken reasonable measures to assemble and present the known or foreseeable impacts of the Preferred Alternative to the human and natural environment in the Environmental Assessment (EA). All potential adverse impacts of the proposed action are insignificant.

b. Social Well-Being Considerations. No significant economic or social well-being impacts that are both adverse and/or unavoidable are foreseen as a result of the Preferred Alternative. The human community would benefit from the proposed action. The proposed action will ensure residents of Walton continue to have access to the public facility and provide safety to students and staff. The Preferred Alternative will not have any impact on sites of significant archeological or historical importance. The Phase 1 Hazardous, Toxic, and Radioactive Waste (HTRW) assessment documented in the EA recommends certain procedures during construction to avoid HTRW impacts; following these recommendations will prevent HTRW impacts on the site.

c. Coordination with Resource Agencies. Coordination with the following agencies has been performed: West Virginia Department of Environmental Protection Division of Surface Water and the West Virginia State Historic Preservation Office. The U.S Army Corps of Engineers (USACE) will coordinate with the U.S. Fish and Wildlife, West Virginia Division of Natural Resources, County Floodplain Coordinator, interested parties, and the general

public to address any concerns or recommendations during the 30-day public review period. Appropriate measures and best management practices have been identified and incorporated into the plan.

d. Other Pertinent Compliance. The Preferred Alternative is also in compliance with Section 401 of the Clean Water Act meeting Nationwide Permit 13 conditions, EO 11988 (Floodplain Management), and EO 11990 (Protection of Wetlands). The District has determined under Section 7 of Endangered Species Act that the project may affect, but is not likely to adversely affect the Indiana Bat. The Preferred Alternative is not expected to have significant impact on prime or unique farmland under the Farmland Protection Policy Act (FPPA). National Pollutant Discharge Elimination System (NPDES) permit may be required for construction storm water.

e. Other Public Interest Considerations. There has been no significant opposition to the Preferred Alternative. Comments received during the public review period will be included in the EA.

f. Section 176(c) Clean Air Act. The Preferred Alternative has been analyzed for conformity and applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act (CAA). The Preferred Alternative will not exceed *de minimis* levels or direct emissions of a criteria pollutant or its precursors and is exempted by 40 CFR Part 93.153. Any future indirect emissions are generally not within the District's continuing program responsibility and generally cannot be practicably controlled by the District. For these reasons a conformity determination is not required for the action.

5. I find the Walton Elementary/Middle School Emergency Streambank Protection Project has been planned in accordance with current authorization as described in the EA. The Preferred Alternative is consistent with national policy, statues and administrative directives. This determination is based on thorough analysis and evaluation of the Preferred Alternative and the alternative courses of action. In conclusion, I find the proposed Walton Elementary/Middle School Emergency Streambank Protection Project will have no significant impact or adverse effect on the quality of the human environment.

_____
Date

_____
Robert D. Peterson
Colonel, Corps of Engineers
District Engineer

DRAFT PLANNING DESIGN ANALYSIS AND ENVIRONMENTAL ASSESSMENT
SECTION 14 WALTON ELEMENTARY/MIDDLE SCHOOL
ROANE COUNTY, WEST VIRGINIA

RESPONSIBLE AGENCY: U.S. Army Corps of Engineers, Huntington District, West Virginia

ABSTRACT: In accordance with the National Environmental Policy Act (NEPA), the U.S. Army Corps of Engineers (USACE) Huntington District has prepared this Environmental Assessment (EA) and Planning Design Analysis (PDA) to evaluate the potential environmental impacts of a streambank protection project in Roane County, West Virginia. Studies for this project were initiated under Section 14 of the Flood Control Act of 1946 (PL 79-526) as amended; Emergency Streambank Protection. This law provides authority for the USACE to implement streambank erosion protection projects to protect public facilities, including public works, that are open to all people on equal terms. The Huntington District's review and analysis of economic, human and natural environments, and engineering designs has determined that the Preferred Alternative is the most environmentally and economically sound alternative that best meets the Proposed Action's purpose and need.

The Preferred Alternative for the Walton Elementary/Middle School Emergency Streambank Protection Project includes design and construction of height of bank stone slope protection with stone blanket to protect the school's foundation from failure from further flood' related bank erosion and failures along the Pocatalico River. Continued bank failure would result in failure of the building foundation and would result in safety issues for students, staff, and the community who utilize the public facility. The school, a public facility, serves approximately 400 students and consists of approximately 45 staff members. The purpose of this project is to provide a cost-effective means to prevent further endangerment to the school.

Information gathered for the preparation of the EA was derived from Federal and State agencies. Areas of concern, including aquatic and terrestrial ecosystems; wetlands; socioeconomic, and Hazardous, Toxic, and Radioactive Waste (HTRW) were evaluated for potential adverse impacts. Impacts associated with the project area are anticipated to be minimal. During project construction, there would likely be minor, localized, and temporary increase in turbidity to the Pocatalico River. However, the majority of resources would realize long-term benefits from project implementation.

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SECTION 14 WALTON ELEMENTARY/MIDDLE SCHOOL
EMERGENCY STREAMBANK PROTECTION PROJECT
ROANE COUNTY, WEST VIRGINIA

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SECTION I. SUMMARY

This Draft Environmental Assessment (EA) and Planning Design Analysis (PDA) is being prepared to identify the most cost-effective alternative while minimizing environmental, economic, and social impacts that may result from the proposed streambank protection project located on the Pocatalico River near Walton, West Virginia. Erosion and bank failures from flood events have endangered Walton Elementary/Middle School. The proposed project consists of protecting the school from further encroachment by the Pocatalico River.

SECTION II. PURPOSE AND NEED

The purpose of this project is to provide a cost-effective means to prevent the failure of school building foundation. The proposed project is in accordance with guidelines established for Section 14 of the Flood Control Act of 1946 (PL 79-526) as amended; Emergency Streambank Protection. The Section 14 program is designed to implement streambank erosion protection projects to public facilities, including public works that are open to all people on equal terms. The Board of Education of the County of Roane, Spencer, West Virginia, is the Non-Federal sponsor and the project cost share is 65% Federal and 35% Non-Federal.

Approximately 460 linear feet of riverbank is in active failure, endangering the foundation of the Walton Elementary/Middle School building due to recent flood- related bank erosion and failures along the Pocatalico River (Figure 1). Basic retreat consists of numerous slope failures with resulting unstable over steepened slopes, erosion features, and sink holes from piping of alluvial soils within the bank. Reaches of erosion and failure are within 20-feet of the school building foundation (Figure 2). Soil failures are causing settlement of the sidewalk adjoining the building and have resulted in endangerment to the building foundation.

Figure 1- *Flood erosion along the Pocatalico River has led to bank failure endangering the adjacent school.*

Figure 2-*Bank failure within 20-feet of the school foundation.*

SECTION III. DESCRIPTION OF ALTERNATIVES

1. Alternatives considered

Height of Bank Stone Slope Protection with Stone Blanket (see cross sections in Appendix A)

Processes which have caused failure, erosion and top of bank retreat and piping failures would be addressed by construction of height of bank stone slope protection and a stone blanket. The proposed treatment would be the least costly alternative that would provide required extent of protection to prevent the eventual failure of the school foundation. The proposed treatment would consist of constructing height of bank stone slope protection using 18-inch top size stone. This alternative would require excavation of failed bank soils, clearing and grubbing of vegetation, drift, rubble, and debris which currently exists. The existing bank would then be excavated to a stable geometry upon which a geotextile fabric would be placed and would generally extend from the toe of the river bank to the top of slope. Stone thickness may vary throughout the project reach but would generally be approximately 3-feet thick.

Due to the terraced morphology of the stream throughout the project and the close proximity of the stream to the school in the most upstream 100-foot reach, the treatment in this area will consist of height of lower bank stone slope protection with a separate stone blanket along the upper bank slope (See Appendix A). Downstream of this 100-foot reach, the treatment will transition into a full height of bank treatment for a 120-feet reach where the most critical bank erosion exists and where building foundation is in closest proximity to the failing bank. Further downstream, the treatment then transitions to a height of lower terrace stone slope protection

inclusive of spoil placement area, spoil disposal area A, which extends approximately 240-feet to and including the downstream transition. Up and downriver transitions would be required to address potential flood flow outflanking of these treatments. A sinkhole area within the project boundary will be excavated and stabilized with fill, geotextile fabric, and graded stone. The Operation and Maintenance Manual will require continued monitoring and additional placement of graded stone within this sinkhole area as necessary. Total length of this bank and slope erosion related stabilization treatment would be approximately 460-feet.

Spoil generated from the excavation of failed soils in lower terrace areas would be placed within an additional disposal area, spoil disposal area B, on school property adjacent to the football field. In spoil disposal area B, the spoil will be placed above the 100 year flood inundation zone, to stable geometries. Both spoil disposal areas will be reseeded, allowing vegetation to reestablish. The fully funded total project cost (Oct 2011) is estimated to be $816,000. This is considered the Preferred Alternative.

No Action

Under the No Action Alternative, there would be no Federal funds expended to provide streambank stabilization on this reach of the stream. The cost to address this problem would be borne by the State and/or Roane County Schools. Failure to protect this reach would result in the failing of the school foundation. The foundation failure would cause differential settlement, resulting in severe cracking in the building walls and roof trusses displacement, ultimately leading to abandonment due to safety issues at Walton Elementary/Middle School, which enrolls approximately 400 students and consists of approximately 45 staff members.

2. Alternatives Dismissed from Further Consideration

Alternatives considered but dismissed from further consideration include H Pile and Lagging, Gabion, Mat, or Block Treatment, Vegetative Cover, and Relocation. A brief description of each alternative is provided below.

H Pile and Lagging

Installation of this alternative would require the excavation of failed soil, fill, debris, and vegetation to expose a suitable installation surface. Piling would then be driven, drilled and lagging installed. Stone would be placed to construct transitions at up and downriver limits of treatment. Cost for construction of this treatment is estimated to be $1,440,000. This alternative provides protection for the school similar to the Height of Bank Stone Slope Protection with Stone Blanket option but with greater construction disruption and safety concerns due to vertical nature of the constructed pile and lagging wall. With these considerations and the fact that this alternative was significantly less cost-effective; it was eliminated from further consideration.

Gabion/Mat/Block Treatment

Requirements for the construction of this plan would be the excavation of failed soil, fill, debris, and vegetation and placement of free-draining granular fill and geotextile filter, and mat or block treatment on stable slopes for height of bank. This treatment would use a pre-manufactured interlocking concrete block mat anchored within in place soils or stone filled gabion baskets.

Stone would be placed to construct transitions at up and downriver limits of treatment, as well as to armor the treatment. Cost for construction of this treatment is estimated to be $1,010,000. This alternative provides protection for the school similar to the Height of Bank Stone Slope Protection with Stone Blanket option but at higher cost. Therefore, the Gabion/Mat/Block treatments are eliminated from further consideration.

Vegetative Cover
Vegetative cover cannot be implemented at the project site because there is not sufficient horizontal distance to grade the slope to a stable geometry. This type of treatment was therefore eliminated from further consideration.

Relocation
The relocation of the school would cost approximately $13,500,000. Relocation would include acquisition of real estate, construction of a new school building and appurtenant facilities, and relocation of utilities. This alternative provides protection of a public school but is less cost-effective and was therefore not further considered.

SECTION IV. GEOGRAPHICAL ASPECTS

1. Location

This project is located on the right descending bank of the Pocatalico River near Walton, West Virginia (Figure 2). The project is located at 38°37'59.79"N latitude, - 81°24'0.70"W longitude (WGS84). See Figure 3 below. The Pocatalico River is a tributary of the Kanawha River. The Pocatalico River rises in Roane County and flows to meet the Kanawha River at the town of Poca. The ordinary high water level (OHWL) at the project location is about 687-feet.

Figure 3 (above)-*Location of Roane County, West Virginia*

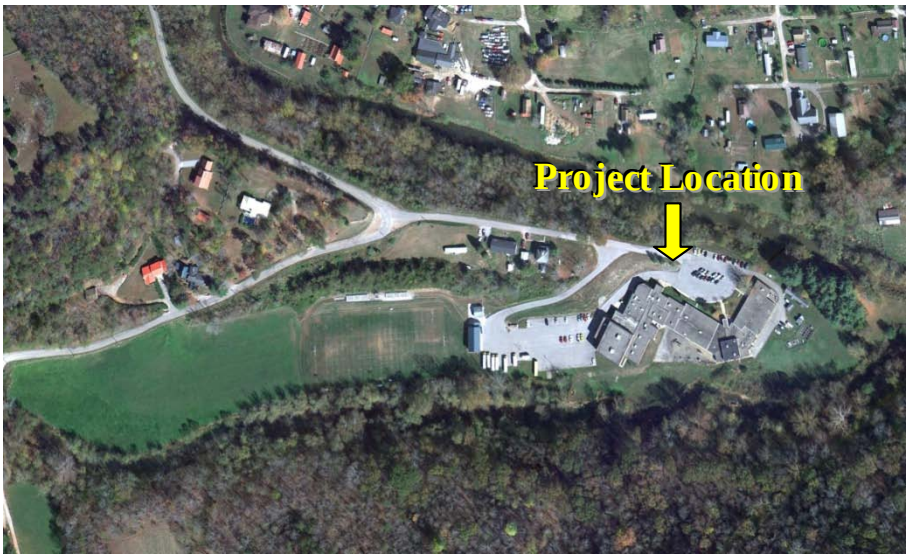


Figure 4 (right) -Location of proposed Streambank Protection Roane County, West Virginia. *The area depicted above is shown in more detail in the Construction Work Limit (CWL) map located in Appendix A.*

2. Physical Features

The proposed project area is located in the Appalachian Plateau Physiographic Province. The area is characterized by steep hills and valleys. Adjacent riverbanks are actively eroding and failing.

3. Climate

Using the Köppen climate classification system, the proposed project area is located in the temperate mesothermal climate region. The majority of precipitation occurs in the summer months. Since the project is not located near large bodies of water that moderate temperature, the project location experiences large, seasonal temperature differences (Rohli et al., 2008).

SECTION V. EXISTING CONDITIONS AND IMPACTS OF ALTERNATIVES

1. Cultural Resources

In order to aid the Huntington District (District) of USACE to meet its obligations under Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing language 36 CFR 800, the District took into account the effects the proposed stream bank protection project, will have on historic properties.

The proposed undertaking will take place on land exclusively owned by Roane County Schools. The undertaking will include removing unstable material from the riverbank of Walton Elementary and Middle School, the placement of stone slope protection, and the disposal of excess materials in an agricultural field adjacent to the school's football field.

As defined by 36 CFR 800.4(a)(1) and 36 CFR 800.16(d), the District defines the Area of Potential Effect (APE) from the Project as the location of ground-disturbing activities, or the construction work limits (CWL), and the surrounding view-shed. A search of West Virginia State Historic Preservation Office (WVSHPO) files conducted on June 17, 2011 failed to discover any previously identified cultural resources within the Project APE. An archeological site is reported to be located within close proximity to the project area. No evidence of the site was noted in the CWL and its charted location corresponds to the current location of the Walton Elementary and Middle School. A review of early twentieth century topographic mapping also failed to identify any development within the APE.

Due to the proximity to Site 46RO4, as well as the potential for archeological sites to exist at or below the surface that could qualify as historic properties, the APE was subject to archeological testing. Shovel tests were systematically excavated at 33 to 49 feet intervals to test for intact archeological deposits within the stone slope protection area as well as the disposal area. The proposed stone slope protection area also included five hand-excavated bucket auger tests that were completed to depths of 9.8 feet. Failing banks were also trowel cleaned and inspected for evidence of archeological material. No evidence of archeological deposits was encountered throughout systematic testing conducted in either area.

The view-shed consists primarily of modern development. Exceptions include the school, which was constructed in the late 1960's, and has had several additions over the decades, and a bridge located on Roane County Route 35/1, approximately 610 feet west of the proposed disposal area. This bridge is a 1910, single lane, double arch concrete bridge. The bridge is visible from the project area but will not encounter adverse effects as the disposal material will only elevate a 225 foot by 131 foot portion of the low terrace by approximately 1.7 feet. The disposal material will be reseeded and the area will continue to function in its current agricultural capacity, only at a slightly higher elevation. Therefore, in accordance with 36 CFR 800.4(d)(1), it is the District's opinion that no historic properties will be affected by the proposed undertaking in association with either the ground disturbing activities or the surrounding view-shed. The District is engaged in ongoing coordination with WVSHPO regarding the Districts effects determination.

2. <u>Aesthetic Resources</u>

The project area contains limited quantity of low quality riparian vegetation near the bankline. A portion of the project is mowed/maintained up to the failed streambank; therefore, there is no existing riparian vegetation in this reach. Along the small portion of the project that is vegetated, trees have been uprooted due to the failing riverbank soils. The aesthetic quality of the project is further diminished by the presence of litter and debris from recent flood events deposited along the river's edge and concrete rubble. Vegetation removal is a necessary component of the project and the stone treatment will introduce an unnatural appearing structure. The essential difference between aesthetics of the area before and after the project would be lack of vegetation. However, due to the lack of significant vegetation existing in the project area, this is expected to be a minor change. The spoil disposal area B is composed primarily of grasses and forbs which is maintenance mowed by the county. There will be no impacts to aesthetic resources at the spoil disposal area B site since spoil material will be reestablished in grass. Due to these existing conditions, there will be a minimal impact to aesthetic resources with the Preferred Alternative.

Under the No Action alternative, erosion and continued deterioration of the riverbank may result in a compromised school foundation which may result in substantial adverse effects to the viewshed.

3. <u>Recreation Resources</u>

The Pocatalico River is a small tributary of the Kanawha River and is inaccessible for recreational resources in the project area with the exception of shoreline fishing. The location and remoteness of the area make this area undesirable for land-based recreational activities. The restrictiveness and shallowness of the river channel also makes this area undesirable for water-based activities.

Project implementation would have no negative impacts to fishing. The disposal area is a vacant field owned by Roane County that is not utilized for recreational purposes. The Preferred Alternative would therefore have no significant effect on recreational resources.

The No Action Alternative would have no direct effect on recreation in the near term. However, fishing opportunities would continue to be limited at the Project because of the safety concerns caused by the steep and unstable banks.

4. Economic Resources

The proposed site is currently maintained by Roane County. Project implementation would protect the school and allow continued use of the facilities for students and the public. Furthermore, temporary economic benefits would be acquired through the use of the local labor force during the construction period.

The No Action Alternative would result in decreased economic benefits associated with higher maintenance and replacement costs.

5. Environmental Resources

a. General

Environmental resources at the site are very limited due to extensive flood-related bank erosion. Project implementation would have inconsequential overall adverse impacts on environmental resources.

The No Action alternative would result in continued erosion and eventual failure of the school foundation.

b. Aquatic Resources

Water quality conditions adjacent to a severely eroded streambank typically include high turbidity and high sedimentation rates. Stabilizing the eroding bank would provide long-term benefits to the Pocatalico River ecosystem by reducing siltation and highly turbid waters associated with severe streambank erosion. The spoil disposal areas A and B will not impact aquatic resources due to the lack of proximity to aquatic habitat. An elevation in suspended sediments during construction and placement of stone slope protection is expected; however, Best Management Practices (BMPs) would be used to prevent unnecessary erosion and sedimentation associated with construction. The project, as designed, would likely provide an overall benefit to the aquatic organisms. Silt can harm sensitive mussel species, which are filter feeders and live in the benthic substrate. Fish that breed, feed and find shelter near riparian habitat are also impacted by excess sedimentation. The Preferred Alternative would reduce excess silt and sediment releases into the aquatic ecosystem, protecting fish and mussels.

The No Action Alternative would allow for continued streambank deterioration resulting in perpetuation of high levels of suspended sediment adjacent to the failed areas. Further erosion of the riverbank and endangerment of the school foundation would eventually require repairs or relocation, leading to similar temporary elevations in emissions from construction equipment. These repairs would likely consist of temporary fills, consisting of end-dumping stone, or other

cost-effective, yet temporary measure to address the most critical reaches. These activities would result in long-term repetitive impact on water quality associated with these activities.

c. Terrestrial Resources

Terrestrial resources in the Project reach are relatively sparse due to the eroding streambank conditions. A portion of the project is maintenance mowed to top of bank and consists of predominately invasive herbaceous and woody shrubs species including, but not limited to the tree-of-heaven (*Ailanthus altissima*) and Japanese knotweed (*Fallopia japonica*). One large sycamore (*Platanus occidentalis*) and maple tree (*Acer* sp.), both native species, also exist within the project reach. The spoil disposal areas A and B are dominated by forbs and grasses and mowed periodically by the county. Project impacts would take the form of removal of all vegetation within the project reach. Spoil disposal areas A and B would be reseeded with an approved mix which would have only temporary impacts to aesthetic resources in these areas. Therefore, only minor impacts to terrestrial resources are anticipated at the site as existing resources are limited due to the highly unstable nature of the streambank. As terrestrial vegetation and habitat is very limited and dominated by invasive species the impacts to terrestrial resources is considered minor.

The No Action Alternative would allow for continued streambank deterioration resulting in loss of vegetation since the bank would continue to encroach inland as flood-related erosion occurs.

d. Threatened and Endangered (T&E) Species

The Endangered Species Act of 1973 requires Federal agencies to consider the effects of actions on Federally listed endangered, threatened, and/or candidate species. There are 28 threatened or endangered species found within West Virginia as listed by the U.S. Fish and Wildlife Service (USFWS). Of these, two species could potentially be found within Roane County. These include the Federally endangered Indiana Bat (*Myotis sodalis*) and the Eastern Cougar (*Felis concolor cougar*).

One of the Indiana Bat's primary habitat requirements consists of suitable roost trees. Limited tree removal and vegetation clearing will occur at the site. None of the trees present were observed to have exfoliating bark or to be standing-dead, characteristics favorable to this species. The trees were observed to have trunk diameters in the five inch diameter at breast height (DBH) range or less, with the exception of one tree with a DBH of approximately 25 inches. The District has determined that the proposed project may affect, but is not likely to adversely affect the Indiana Bat. Woody vegetation that needs to be removed from the proposed site will be limited to the dormant season (September 31 through April 1) to avoid disturbing roosting Indiana Bats. Any clearing actions proposed outside of the dormant season will require appropriate consultation with the USFWS by the District prior to any cutting or clearing action.

According to the USFWS, the Eastern Cougar may reside in West Virginia. However, there have been no sited occurrences within the state for over 100 years. Therefore, the District has determined that the proposed project will have no effect on the Eastern Cougar.

Under the No Action Alternative, no impacts to threatened or endangered species are anticipated to occur.

e. Water Quality

In general, industrial pollutants, municipal sewers, urban runoff, and loss of riparian buffer have resulted in long-term impacts on water quality in the Pocatalico River. The Preferred Alternative would reduce local siltation caused by active erosion of the riverbank. Jurisdictional waters of the U.S. extend to the OHWL which is about two feet above the normal water line above which the proposed height of bank treatment would be constructed. Temporary impacts of placing the proposed project in the Waters of the U.S. would be minimized by following BMPs. Coordination with the West Virginia Division of Environmental Protection (WVDEP) Division of Surface Water on April 4, 2012 was conducted to discuss details of the current proposal and potential applicability of a Nationwide Permit. Upon review, the WVDEP concluded that the current project meets certification for Nationwide Permit 13, Bank Stabilization. Correspondence with the WVDEP is attached in Appendix B. A National Pollutant Discharge Elimination System (NPDES) permit is required for construction storm water.

f. Hazardous, Toxic, or Radioactive Waste (HTRW)

A Phase 1 HTRW assessment was conducted within the proposed project area. The discharge for the sewer treatment plant is piped to the Pocatalico River in the immediate vicinity of the plant. The sewage treatment plant includes a holding tank for sludge. Sludge is periodically removed from the sewage treatment plant and hauled offsite. No landfarming of sludge takes place on the school property. A bus maintenance garage and underground tanks for diesel fuel are located on school property in the vicinity of the football field, which is downstream from the school and outside of the project area. A black PVC pipe along the bank, downstream from the sanitary sewer system outfall, is associated with roof drains from the building to the river. The Phase I assessment found no HTRW concerns associated with implementation of the proposed project or the No Action Alternative.

However, based on the investigative findings and the planned activities for this project, the following recommendations are as follows:

- Construction workers need to be made aware that the sanitary treatment plant outfall is upstream of the project area. The construction contractor needs to have a safety and health plan in place that addresses the area of the outfall and potential risk to workers from any potential exceedances to the water quality NPDES permit that may have occurred over time.
- If the design plans undergo further changes to include additional areas, the additional areas would also require a Limited Phase I investigation prior to implementation.

g. Air Quality

The United States Environmental Protection Agency (USEPA) is required to set air quality standards for pollutants considered harmful to public health and welfare. The Primary National

Ambient Air Quality Standards (NAAQS) set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and prevention of damage to animals, crops, vegetation, and buildings. These standards have been established for the following six pollutants, called criteria pollutants, as listed under Section 108 of the Clean Air Act (CAA):

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen dioxide (NO2)
- Ozone (O3)
- Particulate matter, classified by size as follows;
  - An aerodynamic size less than or equal to 10 micrometers (PM 10);
  - An aerodynamic size less than or equal to 2.5 micrometers (PM 2.5) 1997 Standard;
  - An aerodynamic size less than or equal to 2.5 micrometers (PM 2.5) 2006 Standard.
- Sulfur dioxide

Roane County is in attainment of all criteria air pollutants according to the West Virginia Environmental Protection Agency (WVEPA) Division of Air Pollution Control. In general, construction activities described by the Preferred Alternative would have the potential to cause localized and temporary nuisance air quality impacts, including particulate emissions. Emission sources include diesel exhaust and fuel odors associated with operation of heavy equipment, engine emissions associated with construction and construction activities. Walton Elementary/Middle School is located immediately adjacent to the project site and may realize a temporary increase of air emissions associated with the construction of the proposed project. However, all construction would be performed in compliance with applicable WV EPA Division of Air Pollution Control requirements, the construction period is expected to be relatively brief, and impacts would not exceed de minimis levels of direct emissions of a criteria pollutant.

Under the No Action alternative, further erosion of the riverbank and endangerment of the school foundation would eventually require repairs or relocation, leading to similar temporary elevations in emissions from construction equipment.

h. <u>Wetlands</u>

A review of the National Wetlands Inventory (NWI) maps revealed no wetlands in the project area. However, field surveys identified a small emergent wetland adjacent to northwestern corner of the spoil disposal area B. The emergent wetland was associated with a road culvert. The wetland was delineated and flagged and the will be avoided when hauling in disposal material to spoil disposal area B. The District will integrate avoidance measures into construction plans to eliminate activities in proximity to the wetland. Therefore, the proposed alternative and no action alternative would have no effect on wetlands.

i. Noise Level

Noise in the construction area would be generated by equipment operation, material handling, and equipment loading and unloading. Noise levels would be a function of the types and numbers of pieces of equipment in use, the way the equipment is operated, and the specific environment in which equipment is used. The levels would be variable through the workday and through the project duration. A composite noise level estimate could not be generated with accuracy, because specific equipment to be used and the schedule for use are not known. However, a relative estimate for the Preferred Alternative was made. Table 1 shows common equipment sound levels at 50-foot.

Table 1
Common Equipment Sound Levels

Equipment	Decibel Level	Distance in Feet
Augered earth drill	80	50
Backhoe	83-86	50
Cement mixer	63-71	50
Chain saw cutting trees	75-81	50
Compressor	67	50
Garbage Truck	71-83	50
Jackhammer	82	50
Paving breaker	82	50
Wood Chipper	89	50
Bulldozer	80	50
Grader	85	50
Truck	91	50
Generator	78	50
Rock drill	98	50

Source: The DEC Policy System (2001), excerpt and derived from Cowan, 1994

Ambient noise in the area is representative of public facilities and residential areas. Immediately adjacent to the project area is the school and sewage treatment plant whose activities contribute significantly to ambient noise in the project area. Nearby receptors which lie landward of the school and treatment plant includes residences. There would be a temporary increase in noise levels associated with increased traffic and machinery use during project construction. Equipment to be used during project construction, including, but not limited to a large crane, excavator, bulldozer and dump truck would contribute to ambient noise in the area. Noise levels may range from 80 to 91 dBA at a 50-foot distance. Referring to Table 2, the sound level was calculated for all of the equipment operating simultaneously. As a result, the total sound pressure of the combined noise sources is 88 dBA at a 50-foot distance.

Table 2
Approximate Addition of Sound Levels

Differences Between Two Sound Levels	Add to the Higher of the Two Sound Levels
1 dB or less	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0 dB

Source: USEPA, Protective Noise Levels, 1978

Due to close proximity of construction activity to Walton Elementary/Middle School, distances of the construction work limits will be closer than 50-feet in several locations but especially near the playground area. Therefore, noise levels could exceed 88 dBA in portions of the project area. Actions that will be taken to reduce effects of noise are BMPs and the utilization of noise barriers by the contractor. The concrete walls of the school building will help reduce noise impacts to the students and staff of Walton Elementary/Middle School. The District has contacted the school and adjacent school playground will not be utilized during construction to minimize exposure to elevated noise levels associated with construction. Therefore, no significant effects associated with construction related noise would occur with the preferred alternative.

Under the No Action alternative, further erosion of the riverbank and endangerment of the school foundation would eventually require repairs or relocation, leading to similar temporary elevations in noise from construction equipment.

j. Floodplain Management

The project area is located adjacent to the Pocatalico River which experiences occasional periods of flooding. The project lands and spoil areas A and B are located within the Special Flood Hazard Area and therefore fall under the purview of Executive Order 11988. Floodplain information for the project location is located in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) 54087C0250D dated March 2, 2012. The project area and spoil areas A and B are located in Zone A which is defined by FEMA as an area subject to inundation by the 1% annual chance flood, but since detailed hydraulic analysis have not been performed, no Base Flood Elevations (BFEs) or flood depths have been determined in this area.

To assess if the Preferred Alternative would result in increased flood heights in the regulatory floodplain within the vicinity of the project area, a limited hydrologic analysis was performed to determine potential impact to the 1% annual chance flood elevation. To assess the spoil disposal areas A and B, since the placement of fill is considered development, a 100-year inundation boundary was developed using WV Statewide Addressing and Mapping Board (SAMB) three-meter resolution Digital Elevation Model (DEM). See Appendix A for layout of 100 year flood boundary in relation to the project. To further mitigate any impact to the 100-year floodplain, at least a five-foot offset from the inundation boundary would be established for the placement of fill in spoil disposal area B. A limited hydraulic analysis was performed on effects of the spoil that would be placed in the floodplain in spoil disposal area A. The limited hydraulic analysis

determined that the fill associated with spoil disposal area A would impact the 1% annual chance flood elevation by a maximum increase of 0.2 feet in a localized region near the treatment area. The District determined that this impact is negligible when considering the project scope. The nature of this District project does not result in incompatible use of the regulatory floodplain and although fill will be placed in the floodplain, steps to minimize impacts to the floodplain have been taken. Therefore the District has determined that the Preferred Alternative would not adversely affect the floodplain.

Under the No Action Alternative, further erosion of the riverbank and endangerment of the school foundation would eventually require repairs that could potentially have an adverse effect to the regulatory floodplain.

k. Transportation and Traffic

The project area is located along the Pocatalico River and can be accessed from County Route 34, also known as River Road, and through land owned by Roane County Schools. Stone will be transported by dump trucks to the project location. Traffic will be affected by the project during the delivery of construction equipment and stone hauling along County Route 34. County Route 34 is a two-lane rural roadway. The project will result in occasional temporary disruptions in the flow of traffic as heavy equipment and stone is moved in areas where construction is to take place. It is not anticipated that any delivery will cause a traffic stoppage. However, the project will utilize flagging and signage as necessary to minimize impacts to traffic. The project is adjacent to the public school which already sees an influx of traffic from buses and residents to and from the site. Equipment and stone will be staged at a location on the site. Impacts anticipated to occur from the Preferred Alternative would be minimal and temporary.

Under the No Action alternative, further erosion of the riverbank and endangerment of the school foundation would eventually require repairs or relocation, leading to similar temporary elevations in traffic and associated effects from construction equipment.

l. Environmental Justice

Under Executive Order 12898 "Federal Action to Address Environmental Justice in Minority Populations and Low Income Populations," Federal agencies are directed to identify, address, and avoid disproportionately high and adverse human health or environmental effects on minority and low income populations. According to the U.S. Census Bureau, Roane County has been experiencing a population decrease. It is estimated that the city has lost approximately 3.4% of its year 2000 population of 15,446. Approximately 98.4% of the population is white. The median family household income is $27,428 compared with $38,380 for the state of West Virginia. Individuals residing in the city below the poverty level is 27.6% compared to 17.4% statewide.

The Preferred Alternative does not result in disproportionate adverse effects to any segment of the population because the public school serves all residences near Walton, West Virginia. T he proposed project would result in a benefit to the general public on equal terms. Therefore, the

proposed project would have no effect on minority and low-income populations and is in compliance with Executive Order 12898.

Under the No Action Alternative, failing of the school foundation would result in significant human health effects resulting from potential safety issues to the public.

m. Health and Safety

Currently, reaches of erosion and failure are within 20-feet of the school foundation. Soil failures are causing settlement of the sidewalk adjoining the building and have resulted in endangerment to the building foundation, presenting a safety hazard to staff and students of Walton Elementary/Middle School. The Preferred Alternative has been designed to stabilize the bank of the Pocatalico River adjacent to the school at the area of flood flow-related erosion and related bank retreat, upslope instability, and endangerment to the school building.

The Preferred Alternative will increase protection to the school building foundation before slope failures resulting from river bank erosion extend beneath the school building foundation and to maintain Walton Elementary/Middle School's structural integrity and its capacity to serve the public.

Under the No Action alternative, further erosion of the riverbank and endangerment of the school foundation is expected and may result in potential safety issues for the employees and students at the school. This would eventually warrant repairs or relocation, leading to similar temporary elevations in emissions from construction equipment.

n. Cumulative Effects

The District must consider the cumulative effects of the proposed project on the environment as stipulated in the National Environmental Policy Act (NEPA). Cumulative effects are "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions". Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR Part 1508.7 Council on Environmental Quality [CEQ] Regulations).

The cumulative effects analysis is based on the potential effects of the proposed project when added to similar impacts from other projects in the region. An inherent part of the cumulative effects analysis is the uncertainty surrounding actions that have not yet been fully developed. The CEQ regulations provide for the inclusion of uncertainties in the analysis and states that "when an agency is evaluating reasonably foreseeable significant adverse effects on the human environment. ...and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking" (40 CFR 1502.22).

Direct and indirect effects resulting from the implementation of the Preferred Alternative have been outlined in this report. Project life of height of bank treatment projects are considered to be 50 years, as the school was constructed in the 1960's, 75 years was considered an appropriate

temporal boundary for this analysis. The watershed of the Pocatalico River is considered an appropriate geographic boundary for this project. As discussed in prior sections, existing ecological resources are limited and no individually significant impact to any resource would result from the action alternative. Furthermore, with respect to the most likely future-without project scenario (or the no-action) taking action would result in minor beneficial effects to several resources including water quality, terrestrial and health and safety. Therefore, there are no adverse effects from the Preferred Alternative which would contribute cumulatively to past, present and reasonably foreseeable actions.

As discussed, the No Action future condition could result in further endangerment and eventual compromise of the schools foundation. As discussed previously it is likely that expedient and cost-effective action would be taken by the local jurisdiction to address the most critical stream reach. These actions would likely result in continued adverse effects to riparian habitat, water quality and human safety.

SECTION VI. HYDRAULIC ANALYSIS

Given the size of the contributing drainage area (29.5 mi^2), a rainfall-runoff approach was determined less accurate than the use of stream flow statistics. Given the lack of data and level of detail needed to meet the objectives of the project, a regression method was determined appropriate for developing flood discharges. The methods outlined in the USGS publication 'WRI-00-4080 *Estimating Magnitude and Frequency of Peak Discharge for Rural, Unregulated, Streams in West Virginia'* were used in developing the flood discharges included for the subsequent hydraulic analysis. Table 3 summarizes the flood discharges used in this analysis.

Table 3 Flood Discharges based on WRI-00-4080

Return Interval (years)	Discharge (cfs)	Standard Error (Percent)	Equivalent Years
2	1360	39	1.6
5	2090	37	2.7
10	2630	36	3.8
25	3350	37	5.3
50	3930	38	6.2
100	4510	40	6.9
200	5130	42	7.4
500	5970	45	7.9

The HEC-RAS steady-flow hydraulic model was chosen for hydraulic analysis due to its ability to perform backwater computations. A geometry file was developed using the GIS enabled HEC-GeoRAS software. Hydraulic cross sections, stream centerline, flow paths, culvert embankment, and bank stations were laid out using a combination of USGS three-meter resolution digital terrain model (DEM), 2009 NAIP aerial photography, and field topographic survey performed as part of this study effort. The District HEC-GeoRAS software was then used to extract this data into HEC-RAS. Once the geometry data was imported into HEC-RAS, the

channel modification tool was used to cut a channel approximately three- to five-feet in depth and approximately 28-feet wide into the sections that did not have bathymetry obtained during the survey effort. The dimension and slope of this channel modification was based on the field survey, site visit, and overall reach slope.

Manning's "n" values for channels were estimated using guidance from the USGS Publication '*Roughness Characteristics of Natural Channels'* and best professional judgment from field visits. A value was determined to be 0.035 for the channel. Over bank roughness values were estimated using guidance outlined in the FHWA publication '*Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Floodplains'* based on aerial photography and the site visit, and ranged between 0.07 – 0.11. Figure 4 depicts the layout and general plan view of the study reach. The 1% annual chance flood boundary is depicted by the solid blue line.

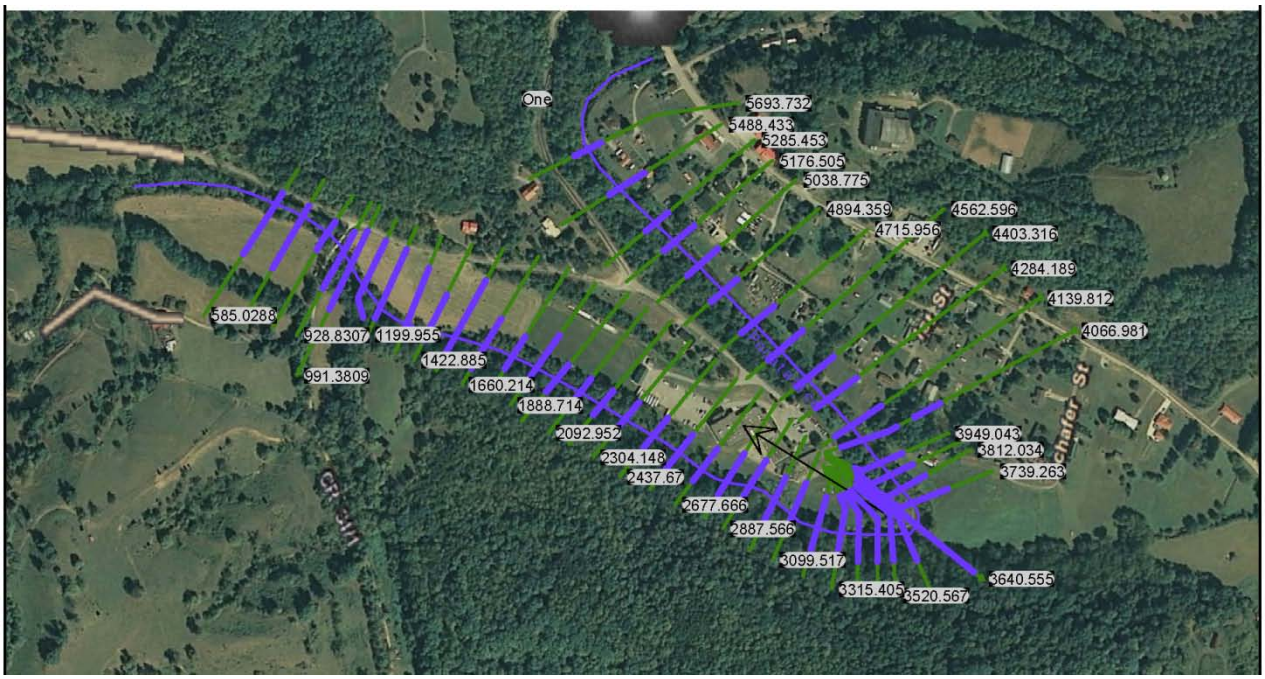


Figure 4- *RAS Plan View*

Based on a steady-flow mixed flow regime analysis, water surface profiles for the aforementioned recurrence interval discharges were calculated. No high water marks or historic discharge data were available for calibration and it is recommended that this data be incorporated if it becomes available.

The hydraulic properties of the cross-section in the project section were determined for later use in stone sizing. Figure 5 depicts the velocity distributions in a cross-section within the project area. The maximum channel velocity in the project area resulting from a 100-year flood discharge was 7.1 feet/second and occurred at the channel thalweg. As proposed at the time of the analysis, the stone slope protection was not intended to extend to the thalweg, although this hydraulic condition was evaluated to include potential construction modifications to design based on site conditions.

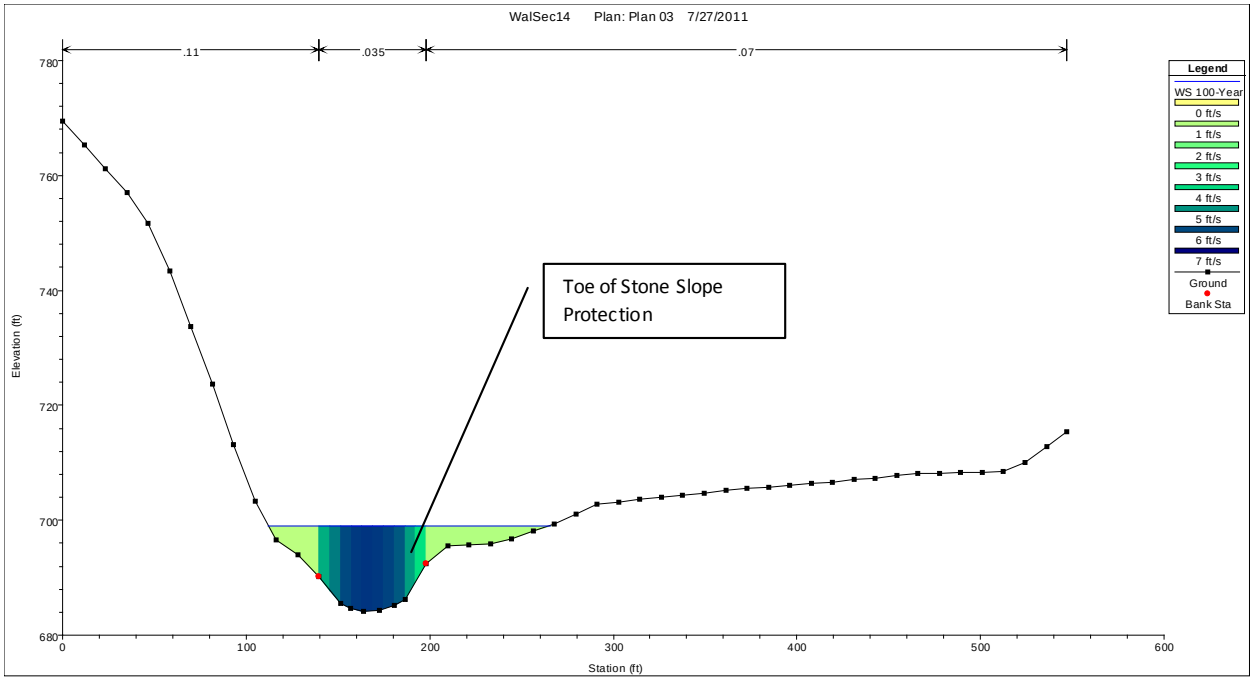


Figure 5- *Typical Cross-Section Velocity Distribution*

Stone requirements for stream bank protection in the project area are based on the criteria and procedures outlined in EM 1110-2-1601 Hydraulic Design of Flood Control Channels. As mentioned above, the maximum average channel subsection velocity for the 100-year discharge was computed to be 7.1 feet per second at the protected area. The maximum channel depth of the 100-year discharge at this location was calculated to be approximately 15-feet, and approximately 12-feet at the location of the treatment, although velocity-depth relationships from thalweg to the top of bank were considered to ensure the worst case for stone sizing. Maximum average channel boundary shear stress was calculated to be 0.75 lb/ft^3 near the protected area.

Values for the aforementioned variables were estimated using the procedures outlined in EM 1110-2-1601 and *User's Manual for CHANLPRO, PC Program for Channel Protection Design*. A factor of safety of 1.5 was used to account for localized velocities that may occur from the eddies observed during the site visit and that may have a larger magnitude at flood flows.

A minimum D_{30} stone size of 0.4-feet was calculated given this procedure. The recommended gradation limits for the stone size distribution are provided in Table 4 but a gradation using a larger D_{30} value may be used if more practicable. This gradation represents the values outlined in EM 1110-2-1601 for a unit stone weight of 165-lb/ft^2.

Table 4 Stone Gradation for Walton Elementary/Middle School Section 14 Project

PERCENT LIGHTER BY	MAXIMUM STONE	MINIMUM STONE

WEIGHT	DIAMETER (IN.)	DIAMETER (IN.)
D_{100}	12	9
D_{90}	N/A	8 ½
D_{50}	8	7
D_{30}	N/A	6
D_{15}	6 ½	4 ½

SECTION VII. ECONOMIC COSTS FOR SELECTED ALTERNATIVE

A cost estimate for the Preferred Alternative was completed based on October 2011 prices and conditions (Table 5). Total non-fully funded cost to construct this project is estimated to be $795,000. The fully funded cost is estimated to be approximately $816,000.

Table 5 Economic Costs for Project Alternatives for Walton Elementary/Middle School Section 14 Project

ESTIMATED ECONOMIC COSTS FOR PROJECT ALTERNATIVES FY 2012 Price Level	
Preferred Alternative	
Non-Fully Funded Project Cost	$795,000
Estimated Annual Project Cost (4% for 50 years)	$37,007
Annual Operations and Maintenance	$5,000
Total Annual Economic Cost	$42,007
Relocation Alternative	
Estimated Project Cost	$13,500,000
Estimated Annual Project Cost (4% for 50 years)	$628,428
Annual Operations and Maintenance	$0
Total Annual Economic Cost	$628,428

SECTION VIII. ECONOMIC JUSTIFICATION FOR SELECTED ALTERNATIVE

The benefits for the project are the lesser of:

1. The least cost relocation alternative; or
2. The value of the infrastructure benefits forgone if no corrective action is taken.

The benefit-cost ratio (BCR) of the protection alternative is based on the comparison of the annual cost of the Relocation Alternative with the annual cost of the Preferred Alternative.

$$BCR = \frac{\text{Annual Economic Cost of Relocation Alternative}}{\text{Annual Economic Cost of Preferred Alternative}}$$

$$BCR = \underline{\$628,428}$$

$42,007

BCR = 14.96

SECTION IX. REAL ESTATE REQUIREMENTS

The land required for the project is approximately 1.31 acres of streambank protection easement and 0.09 acre of temporary work area easement for staging across land owned in fee by the Board of Education of the County of Roane. According to WV Code Annotated Sec 18-5-6 "The county board shall have title to any land or school site which has been in the undisputed possession of the county board….and to which title cannot be shown by any other claimant. Such land shall be held and used for school purposes…" There is no evidence that the Project land is owned by the Federal government nor been provided for another Federal project. Non-standard estates are not proposed for this project. There are no existing Federal projects within the proposed project's area. The proposed project is not subject to navigational servitude. The real estate necessary for the project is already owned by the Non- Federal Sponsor. The Non-Federal Sponsor shall not receive credit for the value of any lands, easements, and rights-of ways (LER) because it is already owned by the Non-Federal Sponsor and is the owner of the facility being protected.

SECTION X. PUBLIC INVOLVEMENT AND COORDINATION

1. Required Coordination

Coordination with some Federal and state resource agencies was conducted in conjunction with the preparation of the Draft EA and PDA, Section 14 Emergency Streambank Protection, Draft Environmental Assessment, and Walton, West Virginia. All correspondence letters can be found in Appendix B. WVSHPO and WVDEP Division of Surface Water have been asked to review the project for potential negative resource impacts. The District will coordinate with the USFWS and West Virginia Division of Natural Resources (WVDNR) to address any concerns or recommendations regarding impact to resources during the 30-day public review period.

2. Public Involvement

The Draft EA and PDA will be available to the local community, state and Federal governmental agencies, the general public, and other interested agencies and groups for a 30-day review/comment period as required by NEPA.

A Notice of Availability (NOA) will be prepared and published in the Charleston Gazette regarding this document. All comments received during the 30-day review period will be considered in the Final EA and PDA.

SECTION XI. CONCLUSIONS

No significant adverse impacts have been identified with implementation and construction of a height of bank stone slope protection with stone blanket at this location. Short-term impacts associated with construction of the height of bank stone slope protection with stone blanket would be localized and minor. Long-term beneficial effects on the environment would be realized by project implementation through the prevention of foundation failure at the school.

SECTION XII. REFERENCES

Cowan, James P., Handbook of Environmental Acoustics, Van Nostrand Reinhold, 1994.

Environmental Protection Agency (EPA), 2009: Pocatalico River TMDL

Rohli, Robert, and Vega, Anthony, 2008: *Climatology*, Jones and Bartlett, ISBN 0-7637-3828-X

Sama, Jeffrey., Assessing and Mitigating Noise Impacts, New York State Department of Environmental Conservation, 2011.

USACE Engineering and Design - Hydraulic Design of Flood Control Channels, 1994, EM 1110-2-1601

USACE Safety and Health Requirements Manual, 2008, No. 385-1-1

U.S. Census Bureau, 2005-2009 American Community Survey

U.S Department of Transportation Federal Highway Administration, *Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Floodplains*, 1984.

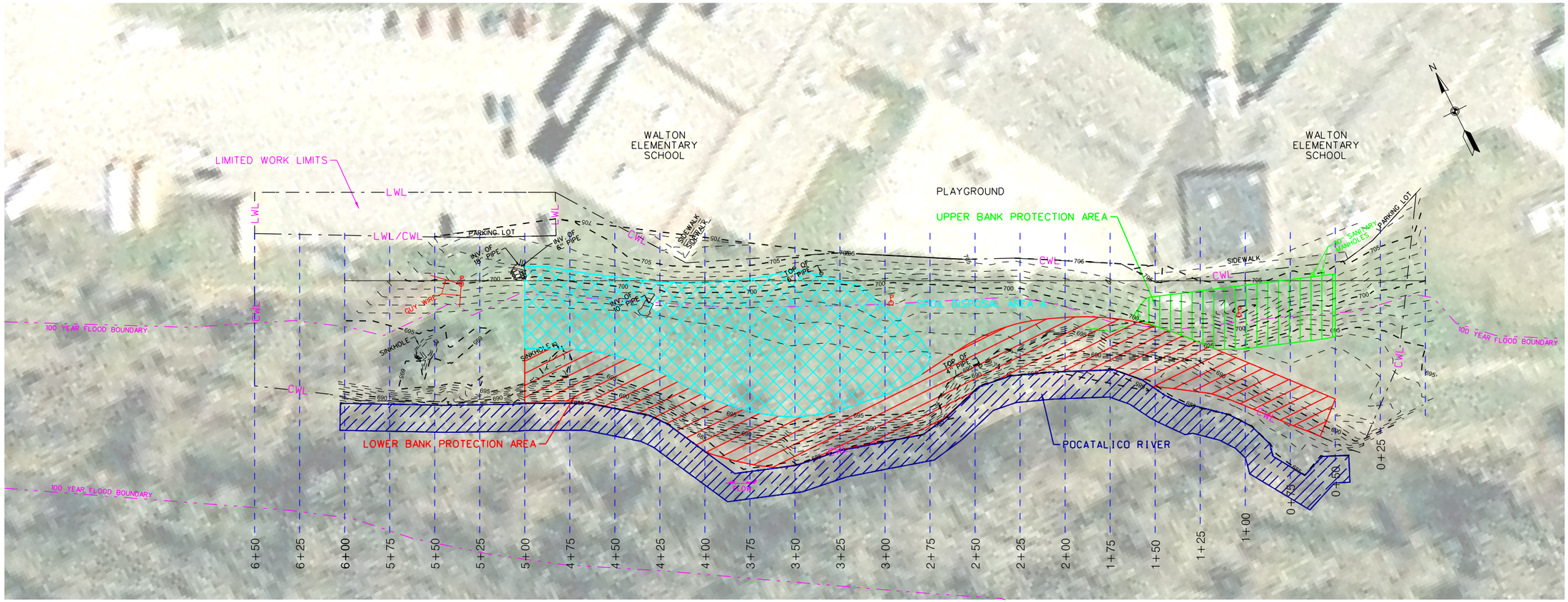
United States Environmental Protection Agency, Protective Noise Levels, Condensed Version of EPA Levels document, EPA 550/9-79-100, November 1978, Office of Noise Abatement & Control, Washington, D.C.

U.S. Geological Survey, WRI-00-4080 *Estimating Magnitude and Frequency of Peak Discharge for Rural, Unregulated, Streams in West Virginia,* 2000.

Wetlands Mapper (2011, May 11). *National Wetlands Inventory*.

Appendix A

Exhibits



PLAN VIEW

0 30' 60'

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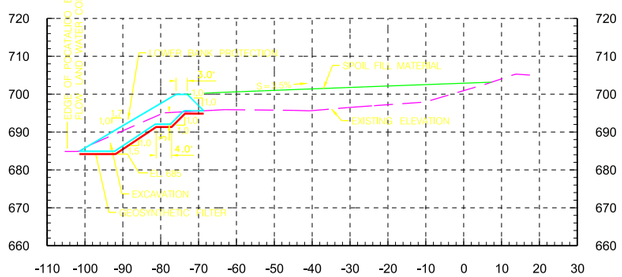

STATION 2+75 TO 5+00
TYPICAL SECTION

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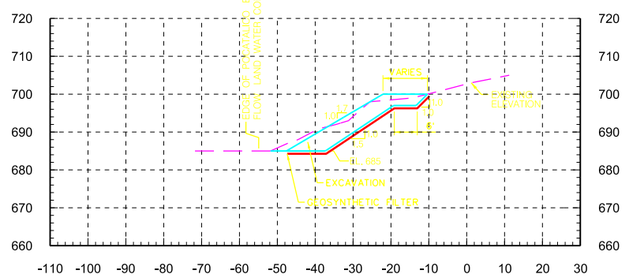

STATION 1+75 TO 2+75
TYPICAL SECTION

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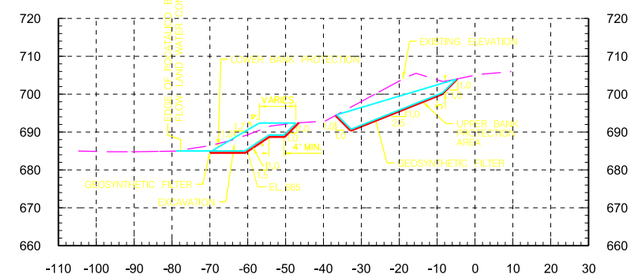
SCALE:1"=20'



STATION 0+50 TO 1+75
TYPICAL SECTION

0 10' 20' 40'

SCALE:1"=20'

US Army Corps of Engineers
Huntington District

MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.

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C:\Program Files (x86)\Common Files\InterPlot\PLOT\mile\color.ctb

U.S. ARMY CORPS OF ENGINEERS
HUNTINGTON DISTRICT
HUNTINGTON, WEST VIRGINIA

DESIGNED BY: A.B.N.
DWN BY: J.V.J.
CKD BY:
SUBMITTED BY:
SOLICITATION NO.:
CONTRACT NO.:
FILE NUMBER:
DATE:
PLOT SCALE: 1:1
PLOT DATE: 5/23/2012
SIZE: ANSI D
FILE NAME: CS401C01.dgn

POCATALICO RIVER
ROANE COUNTY, WV
WALTON ELEMENTARY SEC 14

SITE PLAN
CONSTRUCTION WORK LIMITS
TYPICAL SECTIONS

SHEET IDENTIFICATION
CS401
SHEET 1 OF 1

H1ECXKKF
IP_PWP:dms39491/CS401C01.dgn
23-MAY-2012 10:39

Walton Section 14 Emergency Streambank Protection Project

Project Site and Additional Spoil Disposal Area B

Photos of Project Area

Photos of Project Area

Appendix B

Agency Correspondence

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

June 16, 2011

Planning, Programs and Project Management Division
Planning Branch, Environmental Analysis Section

Lora Lamarre
Senior Archaeologist
West Virginia Division of Culture and History
The Cultural Center, Capitol Complex
1900 Kanawha Boulevard, East
Charleston, West Virginia 25305-0300

RE: Proposed Stream Bank Protection Project, Walton Elementary and Middle School, Walton, Roane County, West Virginia.

Dear Ms. Lamarre:

In order to aid the District, meet its obligations under Section 106 of the National Historic Preservation Act of 1966 (as amended) and its implementing language (36 CFR 800), the Huntington District of the U.S. Army Corps of Engineers (District) conducted a Phase I archeological survey at the location Proposed Stream Bank Protection Project, Walton Elementary and Middle School, Walton, Roane County, West Virginia (Project) as described below (Figure 1).

In accordance with 36 CFR 800.4(d)(1), it is the District's determination that no historic properties will be affected by the Project, as none are present. The District requests that the West Virginia State Historic Preservation Office (WVSHPO) concur with this determination.

These activities will take place exclusively on land owned by Roane County Schools and will include sloping the river bank and the placement of stone on the river bank behind Walton Elementary and Middle School. The school was constructed in the late 1960's and has been added to over the decades. This modern school shall shield any other potential above-ground historic properties in the vicinity from impacts resulting from the proposed Project. Therefore, as defined by 36 CFR 800.4(a)(1) and 36 CFR 800.16(d), the District defines the Area of Potential Effect (APE) from the Project as the location of ground-disturbing activities or the construction work limits (CWL).

The CWL is located is located along the right descending bank of the Pocatalico River in the back of the Walton Elementary and Middle School. At this location, approximately 198 linear meters (650 linear ft) of riverbank is active failure endangering the foundation of the school building due to flood related bank failures. To address this issue, the District is proposing to excavate the failing bank to a stable geometry (~1.7H:1V) and then treating the bank with a combination of height of bank stone slope protection and a rip rap blanket at the toe of the new bank.

A search of WVSHPO files conducted on 17 June 2011 failed to discover any previously identified cultural resources within the Project APE. A mound site (46Ro4) is reported to have been located near the center of the first U-shaped bend of the Pocatalico River (Figure 1). No evidence of this landscape feature was noted in the CWL and its charted location corresponds to the current location of the Walton Elementary and Middle School (Figure 2). A review of early twentieth century topographic mapping also failed to identify any development within the APE.

The location of this project along an alluvial landform (Moshannan Silt Loams) subject occasional flooding and a reported nearby mound indicated a potential for archeological sites to survive at or below the surface that could qualify as historic properties to survive within the APE. Therefore, the APE was subject to an archeological reconnaissance by the District Archeologist, Aaron Smith. Shovel tests measuring approximately 50-x-50 cm (19.6-x-19.6 in) were systematically shovel probed at 10-15 m (32.8-49.2 ft) intervals to test for intact archeology. Shovel test probes were excavated to depths approximating 50 cm (19.6.5 in) below the current surface. In addition, five hand-excavated bucket auger tests were completed to depths of 3 m (9.8 ft) and failing banks were trowel cleaned and inspected for evidence of archeological material. All excavated fill was screened through 0.6 cm (0.25 in) thick hardwire screen.

Exposed profiles encountered approximately 30 cm (12 in) of coarse grained deposits (recent alluvium) overlying silty-clay deposits with weak to moderately developed structure that fine downward to approximately 2 m (6.5 ft). Below that, a massive unstructured deposit made up of coarse-grain sands was encountered. Sporadic inclusions, including degrading sandstone and charcoal flecking, were encountered. However, no evidence of archeological materials or anthropogenic deposits was encountered.

CONCLUDING STATEMENTS

Based upon this study and in accordance with 36 CFR 800.4(d)(1), the District has determined that no historic properties will be affected from the Project, as none are present. Please submit any comments to my attention within 30 days of receipt of this letter. In accordance with 36 CFR 800.4(d)(1)(i) if WVSHPO does not object within this time frame, the District's responsibilities under Section 106 will be considered fulfilled. If questions arise when reviewing the enclosed document, please do not hesitate to contact Aaron Smith of my staff directly by voice at 304-399-5720 or by email at Aaron.Smith@usace.army.mil.

Sincerely,

Jonathan J. Aya-ay
Chief, Environmental Analysis Section

ATTACHMENT 1

Project Photographs

Photograph 1. Proposed disposal area facing east towards the football field and school.

Photograph 2. Proposed disposal area facing west towards County Route 34/1 and the double arch bridge.

Photograph 3. 1910 double arch bridge on County Route 34/1.

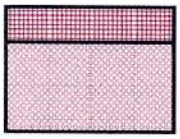
Photograph 4. Modern Residence located north of the project area.

Photo 5. Modern residence located north of the project area

ATTACHMENT 2

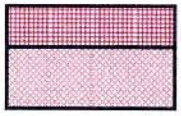
Shovel Tests

Shovel Test #1



0-14cm - 7.5YR 4/4 Br Silt Clay Loam
14-65cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #2

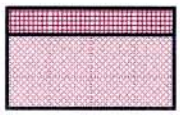


0-18cm - 7.5YR 4/4 Br Silt Clay Loam
18-50cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #3

0-13cm - 7.5YR 4/4 Br Silt Clay Loam
13-56cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #4



0-19cm - 7.5YR 4/4 Br Silt Clay Loam
19-60cm - 7.5YR 4/6 Str Br Silt Clay

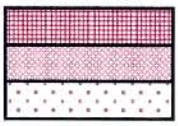
Shovel Test #5

0-13cm - 7.5YR 4/4 Br Silt Clay Loam
13-53cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #6

0-14cm - 7.5YR 4/4 Br Silt Clay Loam
14-45cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #7

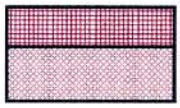


0-15cm - 7.5YR 4/4 Br Silt Clay Loam

15-31cm - 7.5YR 4/6 Str Br Silt Clay

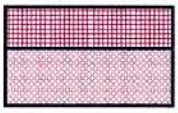
31-46cm - 7.5YR 5/4 Br Silt Clay

Shovel Test #8



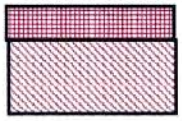
0-17cm - 7.5YR 4/4 Br Silt Clay Loam
17-44cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #9



0-18cm - 7.5YR 4/4 Br Silt Clay Loam
18-47cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #10



0-16cm - 7.5YR 4/4 Br Silt Clay Loam

16-42cm - 7.5YR 5/4 Br & 7.5YR 5/8 Str Br Silt Clay mottled w/ 7.5YR 4/6 Str Br Silt Clay

Shovel Test #13

0-10cm - 7.5YR 4/4 Br Silt Clay Loam
10-48cm - 7.5YR 4/6 Str Br Silt Clay

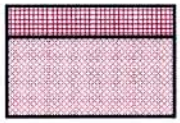
Shovel Test #14

0-14cm - 7.5YR 4/4 Br Silt Clay Loam
14-49cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #15

0-12cm - 7.5YR 4/4 Br Silt Clay Loam
12-46cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #16



0-11cm - 7.5YR 4/4 Br Silt Clay Loam
11-55cm - 7.5YR 4/6 Str Br Silt Clay

WEST VIRGINIA
Division of Culture and History

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300
Randall Reid-Smith, Commissioner
Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562
EEO/AA Employer

July 20, 2011

Mr. Jonathan J. Aya-ay, Chief
Environmental Analysis Section
U.S. Department of the Army
Corps of Engineers
802 Eighth Street
Huntington, WV 25701

RE: Stream Bank Protection Project; Walton Elementary and Middle School
FR#: 11-845-RO

Dear Mr. Aya-ay:

We have reviewed the above referenced project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to the submitted information, the US Army Corps of Engineers (COE) is proposing to stabilize a 198 meter section of stream bank along the Pocatalico River behind the Walton Elementary and Middle School, Roane County, WV. It is our understanding that the COE proposes to excavate the failing bank and place a combination of riprap and stone on the newly excavated bank. It is also our understanding that COE personnel conducted an archaeological survey within the proposed project area that documented recent alluvium overlying soils with a weak to moderately developed structure. No cultural materials were identified. As a result, it is our opinion that there are no cultural resources within the proposed project's Area of Potential Effect that are eligible for or listed in the National Register of Historic Places. No further consultation is necessary.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Lora A Lamarre-DeMott, Senior Archaeologist, at (304) 558-0240.*

Sincerely,

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/LAL

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

April 18, 2012

Planning, Programs and Project Management Division
Planning Branch, Environmental Analysis Section

Susan Pierce, Director
WV Division of Culture and History
The Culture Center
Capitol Complex
1900 Kanawha Boulevard East
Charleston WV 25305-0300

RE: Proposed Stream Bank Protection Project, Walton Elementary and Middle School, Walton, Roane County, West Virginia

Dear Ms Pierce:

In order to aid the District meet its obligations under Section 106 of the National Historic Preservation Act of 1966 (as amended) and its implementing language (36 CFR 800), the Huntington District of the U.S. Army Corps of Engineers (District) conducted a supplemental Phase I archeological survey at the location of the proposed disposal area for the Stream Bank Protection Project, Walton Elementary and Middle School, Walton, Roane County, West Virginia. Prior project coordination with your office resulted in a concurrence letter dated July 20, 2011 that no historic properties will be affected by the proposed undertaking (FR# 11-845-RO).

In accordance with 36 CFR 800.4(d)(1), it is the District's determination that no historic properties will be affected by the additions to the proposed undertaking. The District requests that the West Virginia State Historic Preservation Office (WVSHPO) concur with this determination.

The proposed undertaking will take place on land owned by Roane County Schools. The area is surrounded by Roane County Route 34 and modern residential development to the north, a football field to the east, the Pocatalico River and undeveloped hillside to the south, and County Route 34/1 to the west.

Disposal will include approximately 2,000 cubic yards of spoil material associated with the proposed stream bank protection project. The spoil material will be confined to approximately a 225 foot (68.6 meter) by 130 foot (39.7 meter) portion of a fallow field, raising the level of the existing field by approximately 1.7 feet (0.5 meter). The disposal area will also include a 200 foot (61 meter) access road. As defined by 36 CFR 800.4(a)(1) and 36 CFR 800.16(d), the District defines the Area of Potential Effect (APE) as the footprint of ground-disturbing activities, or construction work limits (CWL), and the surrounding viewshed.

A search of WVSHPO files conducted on 17 June 2011 failed to discover any previously identified cultural resources within the APE. A mound site (46Ro4) is reported to have been located near the center of the first U-shaped bend of the Pocatalico River (Figure 1). No evidence of this landscape feature was noted in the CWL and its charted location corresponds to the current location of the Walton Elementary and Middle School. A review of early twentieth century topographic mapping also failed to identify any development within the APE.

The CWL is located along a toeslope and a low terrace of the Pocatalico River. It is characterized as a Hackers Silt Loam. The Hackers series consists of very deep, well drained soils formed in alluvial material washed from reddish soils on uplands. Hackers soils are on high flood plains and along the major streams in the survey area. These soils are subject to rare flooding with slopes ranging from 0 to 3 percent.

Due to the proximity to site 46Ro4, as well as the potential for archeological sites to survive at or below the surface that could qualify as historic properties, the APE was subject to an archeological reconnaissance by archeologist, Susan Stafford. Shovel tests measuring approximately 50-x-50cm were systematically excavated within the high potential areas of CWL

at 15 meter intervals. Shovel tests were excavated to a maximum depth of 65cm below the current ground surface. All excavated fill was screened through 0.25 in (0.6 cm) thick hardware mesh (Figure 2). Shovel tests 11 and 12 were not excavated. Both were located in a low probability area with sloping terrain and evidence of surface disturbance associated with the adjacent football field and County Route 34. Shovel test 17 was as also not excavated due to standing water from a spring and culvert located on the southern edge of County Route 34. Additional tests were also not excavated within the proposed access road. The footprint of the access road either follows the footprint of an existing farm road off of County Route 34 or additional standing water was encountered.

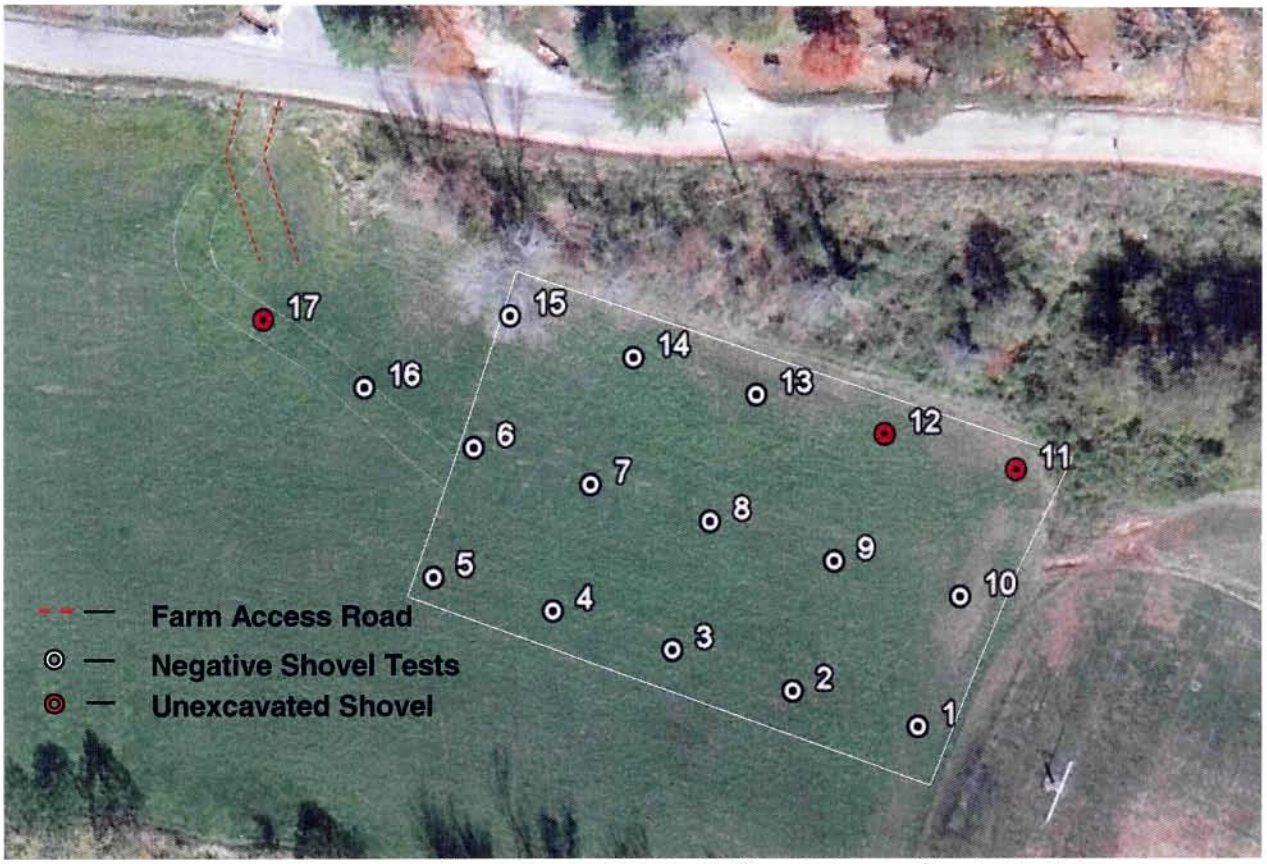


Figure 2. CWL Location and Access Road with Shovel Tests on Google Earth Image

Exposed profiles were largely consistent throughout the CWL (Attachment 2). A shallow 7.5YR 4/4 brown silt clay loam A horizon extended between 10 to 19cm below ground surface. The B Horizon was not clearly defined but rather a subtle shift to a 7.5YR 4/6 strong brown silt clay which was excavated to a total depth of 42 to 55cm below ground surface. Shovel test 7 was the only test to exhibit a third soil horizon. This horizon was represented by a 7.5YR 5/4 brown silt clay encountered at 31cm below ground surface. Cultural materials were not encountered in any of the tests.

The viewshed consists primarily of modern development. Exceptions include the school, which was constructed in the late 1960's, and has had several additions over the decades, and a bridge located on Roane County Route 35/1, approximately 610 feet (186 meters) west of the

proposed disposal area. This bridge is a 1910, single lane, double arch concrete bridge. The bridge is visible from the project area but will not encounter adverse effects as the disposal material will only elevate a 225 foot by 131 foot portion of the low terrace by approximately 1.7 feet. The disposal material will be reseeded and the area will continue to function in its current agricultural capacity, only at a slightly higher elevation.

CONCLUDING STATEMENTS

Based upon this study, and in accordance with 36 CFR 800.4(d)(1), the District has determined that no historic properties will be affected by the proposed undertaking. Please submit any comments to my attention within 30 days of receipt of this letter. In accordance with 36 CFR 800.4(d)(1)(i) if WVSHPO does not object within this time frame, the District's responsibilities under Section 106 will be considered fulfilled. If questions arise when reviewing the enclosed document, please do not hesitate to contact Susan Stafford of my staff at 304-399-5729 or by email at Susan.B.Stafford@usace.army.mil.

Sincerely,

Jonathan J. Aya-ay
Chief, Environmental Analysis Section

ATTACHMENT 1

Project Photographs

Photograph 1. Proposed disposal area facing east towards the football field and school.

Photograph 2. Proposed disposal area facing west towards County Route 34/1 and the double arch bridge.

Photograph 3. 1910 double arch bridge on County Route 34/1.

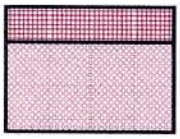
Photograph 4. Modern Residence located north of the project area.

Photo 5. Modern residence located north of the project area

ATTACHMENT 2

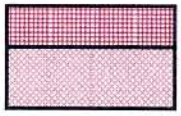
Shovel Tests

Shovel Test #1



0-14cm - 7.5YR 4/4 Br Silt Clay Loam
14-65cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #2

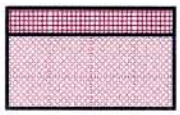


0-18cm - 7.5YR 4/4 Br Silt Clay Loam
18-50cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #3

0-13cm - 7.5YR 4/4 Br Silt Clay Loam
13-56cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #4



0-19cm - 7.5YR 4/4 Br Silt Clay Loam
19-60cm - 7.5YR 4/6 Str Br Silt Clay

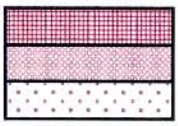
Shovel Test #5

0-13cm - 7.5YR 4/4 Br Silt Clay Loam
13-53cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #6

0-14cm - 7.5YR 4/4 Br Silt Clay Loam
14-45cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #7

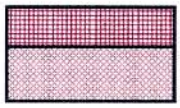


0-15cm - 7.5YR 4/4 Br Silt Clay Loam

15-31cm - 7.5YR 4/6 Str Br Silt Clay

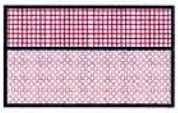
31-46cm - 7.5YR 5/4 Br Silt Clay

Shovel Test #8



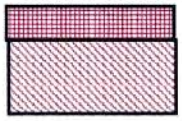
0-17cm - 7.5YR 4/4 Br Silt Clay Loam
17-44cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #9



0-18cm - 7.5YR 4/4 Br Silt Clay Loam
18-47cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #10



0-16cm - 7.5YR 4/4 Br Silt Clay Loam

16-42cm - 7.5YR 5/4 Br & 7.5YR 5/8 Str Br Silt Clay mottled w/ 7.5YR 4/6 Str Br Silt Clay

Shovel Test #13

0-10cm - 7.5YR 4/4 Br Silt Clay Loam
10-48cm - 7.5YR 4/6 Str Br Silt Clay

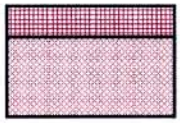
Shovel Test #14

0-14cm - 7.5YR 4/4 Br Silt Clay Loam
14-49cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #15

0-12cm - 7.5YR 4/4 Br Silt Clay Loam
12-46cm - 7.5YR 4/6 Str Br Silt Clay

Shovel Test #16



0-11cm - 7.5YR 4/4 Br Silt Clay Loam
11-55cm - 7.5YR 4/6 Str Br Silt Clay

WEST VIRGINIA
Division of Culture and History

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300
Randall Reid-Smith, Commissioner
Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562
EEO/AA Employer

May 17, 2011

Mr. Jonathan J. Aya-ay
Chief, Environmental Analysis Section
US Department of the Army
Huntington District, Corps of Engineers
502 Eighth Street
Huntington, WV 25701-2070

RE: Proposed Stream Bank Protection Project, Walton Elementary and Middle School
FR#: 11-845-RO-1

Dear Mr. Aya-ay:

We have reviewed the above referenced project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to the submitted information, the Huntington District of the US Army Corps of Engineers (USACE) conducted supplemental Phase I archaeological survey at the location of the proposed disposal area for the proposed stream bank protection project, Walton Elementary and Middle School, Roane County, WV. It is our understanding that disposal will include approximately 2,000 cubic yards of spoil material that will be confined to approximately a 225 x 130 foot portion of a fallow field, raising the level of the existing field by approximately 1.7 feet. The disposal area will also include a 200 foot access road.

Archaeological Resources:
It is our understanding that shovel probes were systematically excavated within the proposed waste area and access road. Although natural soils were encountered, no cultural materials were recovered. As a result, it is our opinion that there are no cultural resources within the proposed project area that are eligible for or listed in the National Register of Historic Places. No further consultation is necessary.

Architectural Resources
After review of the submitted information, including photographs, it is our opinion that there are no architectural resources eligible for or included in the National Register of Historic Places that will be impacted by this project. No further consultation regarding architectural resources is necessary.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Lora A Lamarre-DeMott, Senior Archaeologist, or Shirley Stewart Burns, Structural Historian, at (304) 558-0240.*

Sincerely,

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/LAL/SSB

From:	McKinley, Natalie LRH
To:	Ostrow, Ashley L LRH
Subject:	FW: Walton Elementary Section 14 Streambank Stabilization Project (UNCLASSIFIED)
Date:	Monday, March 12, 2012 10:31:45 AM
Attachments:	WALTON SEC. 14 PLAN AND PROFILE.pdf

Classification: UNCLASSIFIED
Caveats: NONE

Natalie J. McKinley
Regional Economist
Huntington District
304-399-5842

-----Original Message-----
From: McKinley, Natalie LRH
Sent: August 22, 2011 1:11 PM
To: 'LYLE.B.BENNETT@WV.GOV'
Cc: Ayaay, Jonathan J LRH
Subject: Walton Elementary Section 14 Streambank Stabilization Project (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Lyle,
I am contacting you regarding a proposed Section 14 streambank stabilization project located on the Pocatalico River adjacent to Walton Elementary/Middle School near Walton, WV in Roane County. The following is a description of the project followed by some additional information. I have attached a project map depicting the proposed project and providing typical cross section drawings of the protection. I'll let you take a look at this information and give you a call in a couple of days to discuss 401 permitting needs as it relates to this project.

Project Description:
Height of Bank Stone Slope Protection.
Flood related processes which have caused failure, erosion and top of bank retreat and piping failures would be addressed by construction of stone slope protection on the lower bank and a reach of the upper bank. The proposed treatment would be the least costly alternative to provide required extents of building foundation protection. The proposed treatment would consist of constructing stone slope protection on the lower bank using COE 18" stone placed on geotextile filter fabric within in place soils excavated to stable geometries. The treatment would extend from the land water contact to the top of the lower bank along the 650 foot length of project. Stone slope protection would be constructed within the upper bank upstream portion of the project reach which is adjacent to the school building. The upper bank protection would extend along terrace features at the upstream end of the project and would transition downstream to the lower stone slope protection. The stone protection would be placed to a slope of 1.7H: 1V. Up and downriver transitions would be required to address flood flow outflanking of the treatments. A component of the stone slope protection would require construction of a 5 ft high stone berm along the reach downstream of the upper slope protection to retain excavated soils placed during construction.

Treatment to address bank failures and erosion affecting the school, as described in the previous paragraph, would require excavation of failed bank soils; the clearing and grubbing of vegetation; removal of trees, drift, rubble, and debris; and the excavation and placement of failed soils onsite. COE 18" stone will be placed as slope protection and as a berm for retaining excavated soils. Construction would be accomplished by the Indefinite Delivery Indefinite Quantity Contract (IDIQ) utilizing land based equipment.

Additional Information:
Material to be used: Corps of Engineers 18” Limestone with a gradation of 100% passing 18” sieve, 94% passing 16”, 45% passing 12”, and 1% passing 6”. No fines.

Estimated Cubic Yards per Linear Ft Below OHWL: 1.0

Estimated Cubic Yards Total Placed Below OHWL: 650

Natalie J. McKinley
Regional Economist
Huntington District
304-399-5842

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Ostrow, Ashley L LRH

From: Bennett, Lyle B [Lyle.B.Bennett@wv.gov]
Sent: Tuesday, April 10, 2012 4:57 PM
To: Ostrow, Ashley L LRH
Subject: RE: Walton Elementary/Middle School Section 14 Streambank Stabilization Project - Nationwide Permit Assistance

Ashley,

WVDEP approves of the work on the subject project to be done under NWP 13. Should you have any questions contact me at your convenience.

Lyle B. Bennett, Manager
401 Certification Program
WVDEP-Division of Water and Waste Management
601 57th Street, SE
Charleston, WV 25304
Phone: 304-926-0499 ext. 1613
email: Lyle.B.Bennett@wv.gov

-----Original Message-----
From: Ostrow, Ashley L LRH [mailto:Ashley.L.Ostrow@usace.army.mil]
Sent: Wednesday, April 04, 2012 2:29 PM
To: Bennett, Lyle B
Subject: Walton Elementary/Middle School Section 14 Streambank Stabilization Project - Nationwide Permit Assistance

Lyle,

I am contacting you regarding a proposed Section 14 Streambank stabilization project located on the Pocatalico River adjacent to Walton Elementary/Middle School near Walton, WV in Roane County. The following is a description of the project followed by some additional information.
I have attached a project map depicting the proposed project and providing typical cross section drawings of the protection. We believe that this project falls under and meets the conditions of Nationwide Permit 13, We are seeking concurrence with WVDEP Division of Water and Waste Management for our Nationwide Permit 13 determination. If you could please review this information and if this is acceptable by your office, would you please send us an email of concurrence. Thank you for your assistance and please let me know if you have any questions.

Project Description:

Height of Bank Stone Slope Protection with Stone Blanket

Processes which have caused failure, erosion and top of bank retreat and piping failures would be addressed by construction of height of bank stone slope protection and a stone blanket. The proposed treatment would be the least costly alternative that would provide required extents of school building protection. The proposed treatment would consist of constructing height of bank stone slope protection using COE 18" top size stone placed together with base on in place soils excavated to stable geometries and geotextile filter fabric extending from the land water contact to the top of bank. The upstream 100 feet of

the project will consist of height of lower bank stone slope protection with a stone blanket along the upper bank slope where it will then transition to a full height of bank treatment within a 120 feet reach of the most critical bank erosion related building foundation endangered reach of the project. The treatment would then transition to a height of lower terrace stone slope protection inclusive of a spoil placement area which extends approximately 240 feet to and including the downstream transition. The stone slope protection would be placed to stable geometries and the stone blanket would be approximately 3 feet thick.
Up and downriver transitions would be required to address potential flood flow outflanking of these treatments. Total length of this bank and slope erosion related stabilization treatment would be approximately
460 feet.

The proposed treatment of bank, failures, and erosion affecting the school, as described in the previous paragraph, would require excavation of failed bank soils, the clearing and grubbing of vegetation, removal of trees, drift, rubble, and debris; the excavation and placement of failed soils in lower terrace areas or within an approved disposal area.
A geosynthetic filter and COE 18" top size stone would then be placed to stable geometries.
Construction would be accomplished by an Indefinite Delivery Indefinite Quantity Contract (IDIQ) using land based equipment.

Additional Information:

Estimated Cubic Yards per Linear Ft Below OHWL: .43

Thanks,
Ashley Ostrow, CFM
US Army Corps of Engineers
Huntington District
(304)399-5947

Appendix C

Notice of Availability

NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT
SECTION 14 EMERGENCY STREAMBANK PROTECTION PROJECT
WALTON ELEMENTARY/MIDDLE SCHOOL
ROANE COUNTY, WEST VIRGINIA

The U.S. Army Corps of Engineers, Huntington District, by this Notice of Availability (NOA), advises the public that the combined Draft Planning Design Analysis (PDA) and Environmental Assessment (EA) for the Walton Elementary/Middle School Emergency Streambank Protection project is complete and available for public review. The project is located in the City of Walton in Roane County, West Virginia. A Finding of No Significant Impact (FONSI) is anticipated for the proposed project. A copy of the draft FONSI is included with the Draft PDA/EA for public review.

In compliance with the National Environmental Policy Act (NEPA) and 40 CFR 1501.4, the Draft PDA/EA and draft FONSI will be available to the public in the affected area for thirty (30) days for review and comment. Final determination regarding the need for additional NEPA documentation will be made after the public review period, which begins on or about 28-May-2012. Copies of the documents may be viewed at the following location:

Walton Public Library
2 Cunningham Lane
Walton, WV 25286
(304) 577-6071

The documents may also be viewed at the following website:
http://www.lrh.usace.army.mil/projects/review/. Copies of the Draft PDA/EA and draft FONSI may be obtained by contacting the Huntington District Office of the Corps of Engineers at (304) 399-5276. Comments pertaining to the documents may be submitted on the website named above, by e-mail to: LRHPublicComments@usace.army.mil; or by letter to:

Mr. Jonathan J. Aya-ay, Chief
Environmental Analysis Section, Planning Branch
Huntington District Corps of Engineers
502 Eighth Street
Huntington, West Virginia 25701-2070

Appendix D

Mailing List

Draft Planning Design Analysis and Environmental Assessment
Section 14 Streambank Protection Project
Walton Elementary/Middle School
Roane County, West Virginia
Mailing List

Federal Agencies and Officials

Honorable Joe Manchin
United States Senate
300 Virginia Street, East Suite 2630
Charleston, West Virginia 25301

Honorable John D. Rockefeller IV
United States Senate
405 Capitol Street, Suite 508
Charleston, West Virginia 25301

Honorable Shelley Moore Capito
Representative In Congress
District 2
4815 MacCorkle Ave., SE
Charleston, West Virginia 25304

U.S. Environmental Protection Agency
Region III
1060 Ragland Road
Wheeling, West Virginia 26003

Mr. Robert N. Pate
USDA Natural Resources Conservation Service
1550 Earl Core Road, Suite 200
Morgantown, WV 26505

Ms. Deborah Carter, Field Supervisor
United States Fish and Wildlife Service
West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

State Agencies and Officials

Honorable Earl Ray Tomblin
Governor of West Virginia
1900 Kanawha Boulevard, East
Charleston, West Virginia 25305

Ms. Susan Pierce
State Historic Preservation Office
400 South Ruffner Road
Charleston, West Virginia 25314

Ms. Barbara Sargent
West Virginia Division of Natural Resources
P.O. Box 67
Elkins, West Virginia 26241

Mr. Lyle Bennett
West Virginia Department of Environmental Protection
Division of Water and Waste Management
601 57th Street
Charleston, West Virginia 25304

County Agencies and Officials

Ms. Melissa Gilbert
Roane County Floodplain Manager
205 E. Main St.
Spencer, West Virginia 25276

Mr. Jerry Garner
Director of Transportation Facility and Safety
Roane County Schools
813 Capitol Street
Spencer, West Virginia 25276

Walton Public Library
2 Cunningham Lane
Walton, WV 25286

Appendix E

Hazardous, Toxic, and Radioactive Wastes Assessment

CELRH-EC-CE (1110)

16 August 2011
Wolfe/5327
gw

MEMORANDUM FOR CELRH-PM-PP-P (Attn: David Frantz)

SUBJECT: Limited Phase I Hazardous, Toxic, and Radioactive Waste (HTRW) Investigation Report, Walton Elementary School Section 14 Streambank Restoration Project, August 2011.

1. Based on the assessment of current and historical information pertinent to the Walton Elementary School Section 14 Streambank Protection Project, no further HTRW investigation of this project area is necessary at this time.

2. The Limited Phase I HTRW Investigation Report, prepared by EC-CE and dated August 2011, has been placed on ProjectWise under the Walton Elementary School Section 14 Pre-Construction HTRW folder and on the J drive in the Temp folder under the Walton Elem Sect 14 subfolder.

3. The Recommendations as documented in the above referenced report are as follows:

- Construction workers need to be made aware that the sanitary treatment plant outfall is upstream of the project area. The construction contractor needs to have a safety and health plan in place that addresses the area of the outfall and potential risk to workers from any potential exceedances to the water quality NPDES (National Pollutant Discharge Elimination System) permit that may have occurred over time.
- No sampling of surface water or soil is recommended at this time. No further HTRW concerns were noted.
- If the design plans undergo further changes to include any additional areas, the additional areas would also require a Limited Phase I investigation prior to implementation.

4. If there are any questions concerning the information referenced above, please contact Ms. Janet Wolfe at x5327.

for John J. Jaeger, Ph.D., P.E.
Chief, Engineering and Construction Division

Enclosure
CF: EC-CE (file)

Appendix F

Cost Estimate

Walton Elementary School Walton, West Virginia
Section 14 Project

Study Report
Engineering Technical Appendix

TAB VII – Baseline Cost Estimate

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1 Project Scope

The purpose of this project is to protect critical infrastructure at the Walton Elementary School in Walton, West Virginia from slope failure along the banks of the. The scope of construction includes placing stone slope protection, extending existing drainage culverts, and relocating power lines to accommodate construction. Stone is estimated to be delivered and placed by land based crews (truck delivered material, hydraulic excavator, dozer, etc). Clearing and grubbing of brush, light trees, and other miscellaneous debris is also anticipated. For more information see the main body.

2 Cost Methodology

2.1 General

The feasibility cost estimate for the preferred plan has been prepared to an equivalent price level of 1 October 2011 using MCACES 2nd Generation MII Version 4.1. The preparation of the cost estimate is in accordance with guidelines and policies included in: "ER 1110-1-1300 - Cost Engineering Policy and General Requirements, (26 March 1993)"; "ER 1110-2-1302 - Civil Works Cost Engineering, (15 Sept 2008)"; "EI 01D010, Construction Cost Estimates (1 Sept 1997)"; "EM 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, Region II, (July 2007)"; and "EM 1110-2-1304, Civil Works Construction Cost Index System (CWCCIS), (30 September 2010)"; "ETL 1110-2-573, Construction Cost Estimating Guide for Civil Works, (30 Sept 2008)." The estimate was completed using the latest guidance from OCE concerning implementation of the Civil Works Breakdown Structure (CWBS) and Chart of Accounts. MII estimate software was used to apply unique crews to detailed work items and obtaining material and supply quotes from prospective vendors/contractors where possible for significant cost items.

2.2 Direct Costs

Direct costs are based on anticipated equipment, labor and materials necessary to construct this project. Direct costs have been calculated independent of the contractor assigned to perform the tasks. Following formulation of the direct cost, a determination is made as to whether the work would be performed by the prime contractor or a subcontractor.

2.2.1 Quantities

The estimate is based on detailed quantity take-offs prepared from the drawings as used as the basis of the estimate and augmented by spot checks performed by re-taking-off the original drawings.

2.2.2 IDIQ Rates for Labor and Equipment

The estimate assumes project will be implemented as a work order with one of Huntington District's current IDIQ contracts. These IDIQ labor and equipment rates are pre-negotiated to include all appropriate contractor markups (PTI, WCI, overhead, and profit).

2.2.3 *Vendor Quotes*

Vendor quotes have been acquired and documented for the key material prices associated with significant features of work. The key material item in this estimate is 15" top size stone riprap.

2.2.4 *Crews*

Project specific crews have been developed for use in estimating the direct costs for items not estimated using job quotes or historical cost information. Crew members consist of selected components of labor classifications and equipment pieces assembled to perform specific tasks. Productivity has been assigned to each crew reflective of the expected output per unit of measure for the specific activities listed in the cost estimate. Foremen have also been considered in the crews.

2.2.1 *Work Schedules/Overtime*

The estimate assumes a 5 day/week 10 hr/day work schedule to optimize production of mobilized equipment. Work is planned to be coordinated with the school's summer break period to avoid traffic and safety issues associated with working during school operation.

2.2.2 *Productivty*

A crew show-up time and general productivity loss factor has been applied in the MII estimate on labor hours assuming a loss of 20 minutes per 10 hour shift (9.8 HRS / 10 hrs = 98% productive) .

2.2.3 *Sales Tax*

Sales tax for the state of West Virginia is 6.0% and applied to bare material costs in the MII estimate.

2.3 **Indirect Costs**

2.3.1 *IDIQ Prime Contractor*

The construction contract is planned to be let as a task order with one of Huntington District's current IDIQ contractors. IDIQ labor and equipment rates are fully burdened with all appropriate indirect markups. A general markup of 11% is applied to remaining material and sub-quotes.

2.3.2 *Bond*

Bond added as 1% as a contractor markup for the prime contractor applied as a running percentage to prime's own work.

2.3.3 *Subcontractors – No subcontractors assumed for this project.*

2.4 **Project Feature Accounts**

The Walton Elementary School Section 14 Project baseline cost estimate was prepared and organized according to the Civil Works Breakdown Structure (CWBS). As such, the estimate includes the following feature accounts:

2.4.1 (02) Relocations

This feature account includes the cost for relocating necessary utilities to accommodate the main construction features of the project. Key items of work include relocating approximately 3 each power poles and lines to accommodate the placement of the stone slope protection and associated equipment access.

2.4.2 (16) Bank Stabilization

This feature account includes the cost for the construction contract. Key items of work include: environmental protection, light clearing and grubbing of brush and small trees along the river bank, land-based placement of stone riprap at the waterline of the bench just below the toe of the embankment. Other items in the project are including extending drain pipes and culverts with head walls, and repair man holes.

2.4.3 (30) Planning, Engineering, and Design

The work covered under this account includes project management, project planning, preliminary design, final design, preparation of plans, preparation of specifications, and engineering during construction, advertisement, opening of bids, and contract award. The cost for this account is estimated as 7.5% of the construction contract value.

2.4.4 (31) Supervision and Administration

The work covered under this account includes contract supervision, contract administration, construction administration, technical management activities, and District office supervision and administration costs. The cost for this account is estimated as 7.5% of the construction contract value

2.5 Risk-Based Contingency Development

An Abbreviated Cost and Schedule Risk Analysis (CSRA) were performed on this project to identify the 80% confidence level project cost and schedule duration. The results of the analysis for construction are 15.8% and 9.4% for E&D and S&A.

2.6 ESTIMATED COST

The PDT developed a project implementation schedule for project that supports the development of the fully funded cost estimates. The baseline cost estimate at PL 1 Oct 2012 is $802,000

2.7 FULLY FUNDED COST ESTIMATE

The fully funded cost estimate including inflation to the mid-point of construction is $916,000. The fully funded table distributes the base level cost estimate across the appropriate years according to the schedule. Each feature account is inflated to the mid-point of expenditure activity using CWCCIS factors. These inflated feature account totals are summed to yield a total fully funded project cost.

3 PROJECT IMPLEMENTATION SCHEDULE

The total project schedule was developed from the current project implementation schedule developed by the PDT and managed by the Project Manager and expanding the construction schedule based on the significant construction activities and durations from the MII cost estimate. The construction schedule calendars include major holidays and non-work weather days.

Activity ID	Activity Name	Original Duration	Remaining Duration	Physical % Complete	Start	Finish
333081 WALTON ELEMENTARY, WV SEC 14		**478.0d**	**227.0d**		**01-Apr-11 A**	**26-Feb-13**
333081.28000 CAP Feasibility - Planning & Design Analysis (PDA)		**346.0d**	**96.0d**		**01-Apr-11 A**	**15-Aug-12**
333081.28000.28A00 Prog & Proj Mgmt		**170.0d**	**95.0d**		**01-Apr-11 A**	**14-Aug-12**
PPM0020	(OWI) Feas - Conduct Program and Project Management	170.0d	95.0d	**25%**	01-Apr-11 A	14-Aug-12
333081.28000.28F00 PDA Plan Formulation/Environmental Studies		**259.0d**	**46.0d**		**23-May-11 A**	**5-Jun-12**
PD10050	401 WQC Permit Process	44.0d	44.0d	0%	**2-Apr-12**	1-Jun-12
PD10060	401 State Water Quality Certification	0.0d	0.0d	0%		4-Jun-12
PDF0090	(OWI) EA	142.0d	46.0d	**30%**	23-May-11 A	5-Jun-12
333081.28000.28C00 PDA Engineering		**61.0d**	**67.0d**		**23-May-11 A**	**5-Jul-12**
ENG0090	(OWI) Feas - PDA Engineering	61.0d	67.0d	**85%**	23-May-11 A	5-Jul-12
333081.28000.28D00 PDA Socio/Economics		**39.0d**	**6.0d**		**23-May-11 A**	**9-Apr-12**
SE1010	Socio/Economics BC Ratio	39.0d	6.0d	**90%**	23-May-11 A	**9-Apr-12**
333081.28000.28L00 PDA Report		**302.0d**	**96.0d**		**03-Jun-11 A**	**15-Aug-12**
PDA1010	Draft PDA & EA Complete	0.0d	0.0d	0%		**13-Apr-12**
PDA1000	Draft PDA & EA	61.0d	4.0d	**90%**	03-Jun-11 A	**13-Apr-12**
PDA1020	Conduct District Quality Control (DQC) of Draft PDA	5.0d	0.0d	**0%**	03-Jun-11 A	**16-Apr-12**
PDA1030	Resolve/Incorp DQC Comments from PDA Review	5.0d	5.0d	0%	**16-Apr-12**	**20-Apr-12**
PDA1040	Complete DQC Certification Sheet from PDA Review	5.0d	5.0d	0%	**23-Apr-12**	**27-Apr-12**
PDA1060	Conduct External Cost Review of Draft PDA	5.0d	5.0d	0%	**30-Apr-12**	4-May-12
PDA1050	Conduct ATR of Draft PDA	5.0d	5.0d	0%	**30-Apr-12**	4-May-12
PDA1070	Resolve/Incorp ATR Comments from PDA Review	5.0d	5.0d	0%	7-May-12	11-May-12
PDA1080	Resolve/Incorp Cost Review Comments	5.0d	5.0d	0%	7-May-12	11-May-12
PDA1090	BCOE Type Review	5.0d	5.0d	0%	14-May-12	18-May-12
PDA1100	PDA/EA Public Review	22.0d	22.0d	0%	21-May-12	20-Jun-12
PDA1110	Incorp Comments from PDA Public Review	5.0d	5.0d	0%	21-Jun-12	27-Jun-12
PDA1120	Finalize PDA	5.0d	5.0d	0%	28-Jun-12	5-Jul-12
PDA1130	Sign FONSI	1.0d	1.0d	0%	6-Jul-12	6-Jul-12
PDA1140	Final PDA & EA Complete	0.0d	0.0d	0%		6-Jul-12
PDA1150	Prepare Submittal Package to MSC	5.0d	5.0d	0%	9-Jul-12	13-Jul-12
PDA1160	Submit Final PDA/EA to MSC	0.0d	0.0d	0%		13-Jul-12
PDA1170	MSC Technical Review	22.0d	22.0d	0%	16-Jul-12	14-Aug-12
PDA1180HQM	MSC PDA/EA Approval	0.0d	0.0d	0%		14-Aug-12
PDA1190	(OWI) Feasilbility PDA & EA	157.0d	96.0d	**80%**	03-Jun-11 A	15-Aug-12
333081.22V00 CAP Feas Project Partnership Agreement (PPA)		**45.0d**	**45.0d**		**27-Jun-12**	**29-Aug-12**
PPA1000	Start PPA Development	0.0d	0.0d	0%	28-Jun-12	
PPA1010	Draft PPA	10.0d	10.0d	0%	28-Jun-12	12-Jul-12
eng	Sponsor's Self Financial Certification	22.0d	22.0d	0%	13-Jul-12	13-Aug-12
PPA1020	Sponsor Prep LOI / Resolution or Ordinance	22.0d	22.0d	0%	13-Jul-12	13-Aug-12
PPA1040	Certification of Legal Review	5.0d	5.0d	0%	14-Aug-12	20-Aug-12
PPA1050	District Negotiation of PPA	5.0d	5.0d	0%	21-Aug-12	27-Aug-12
PPA1060HQM	District Executes PPA	0.0d	0.0d	0%		28-Aug-12
PPA1070	(OWI) PPA Development	45.0d	45.0d	0%	27-Jun-12	29-Aug-12

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Activity ID	Activity Name	Original Duration	Remaining Duration	Physical % Complete	Start	Finish
333081.30D00	**Construction E&D (D&I)**	**171.0d**	**171.0d**		**20-Jun-12**	**26-Feb-13**
333081.30D00.30E00	**CE&D Prog & Proj Mgmt**	**171.0d**	**171.0d**		**20-Jun-12**	**26-Feb-13**
CED1000	Initial Work Allowance	5.0d	5.0d	0%	21-Jun-12	27-Jun-12
CED1010	Receive Fed D&I Funds	5.0d	5.0d	0%	29-Aug-12	5-Sep-12
CED1020	Receive Sponsor Funds	10.0d	10.0d	0%	29-Aug-12	12-Sep-12
CED1030	(OWI) Conduct Prog & Proj Mgmt (D&I)	171.0d	171.0d	0%	20-Jun-12	26-Feb-13
333081.30D00.01000	**Real Estate**	**82.0d**	**82.0d**		**29-Aug-12**	**27-Dec-12**
333081.30D00.01000.01A00	**RE Project Planning**	**22.0d**	**22.0d**		**29-Aug-12**	**28-Sep-12**
RPP1010	RE Certification (D&I)	22.0d	22.0d	0%	29-Aug-12	28-Sep-12
RPP1050	Sponsor Obtains RE Easements & Rights of Entry	22.0d	22.0d	0%	29-Aug-12	28-Sep-12
333081.30D00.01000.01T00	**RE LERRD Crediting**	**60.0d**	**60.0d**		**28-Sep-12**	**27-Dec-12**
CRD1710	Certify Real Estate LERRD Credits	0.0d	0.0d	0%		28-Sep-12
CRD1680	LERRD Admin Costs	60.0d	60.0d	0%	1-Oct-12	27-Dec-12
CRD1700	All Other LERRD Credit	60.0d	60.0d	0%	1-Oct-12	27-Dec-12
333081.30D00.30DS0	**Construction - Contract A**	**68.0d**	**68.0d**		**29-Aug-12**	**6-Dec-12**
CON520	Contract Adv/RFP Issued	0.0d	0.0d	0%		12-Sep-12
CON500M	Contract RTA	0.0d	0.0d	0%		12-Sep-12
CON505	Contract Nego/Awd Docs	10.0d	10.0d	0%	29-Aug-12	12-Sep-12
CON590HQM	Contract Award	0.0d	0.0d	0%		28-Sep-12
CON610	Issue NTP	0.0d	0.0d	0%		28-Sep-12
CON630	Construction Contract	44.0d	44.0d	0%	1-Oct-12	4-Dec-12
CON640	Construction Completion	0.0d	0.0d	0%		4-Dec-12
CON660	Physical Completion	0.0d	0.0d	0%		6-Dec-12
END6380	Final Inspection	2.0d	2.0d	0%	5-Dec-12	6-Dec-12
333081.30D00.30DV0	**E&D During Construction**	**68.0d**	**68.0d**		**1-Oct-12**	**9-Jan-13**
END6330	E&D During Construction	68.0d	68.0d	0%	1-Oct-12	9-Jan-13
333081.30D00.31000	**Supervision & Admin (S&A)**	**68.0d**	**68.0d**		**1-Oct-12**	**9-Jan-13**
333081.30D00.31000.31C00	**District Office S&A**	**68.0d**	**68.0d**		**1-Oct-12**	**9-Jan-13**
SNA1001	District Office S&A	68.0d	68.0d	0%	1-Oct-12	9-Jan-13
333081.30D00.30F00	**Project Closeout**	**54.0d**	**54.0d**		**7-Dec-12**	**26-Feb-13**
END6410HQM	Project Physically Complete	0.0d	0.0d	0%		13-Dec-12
END6370	Physical Closeout	5.0d	5.0d	0%	7-Dec-12	13-Dec-12
END6510	After Action Report	10.0d	10.0d	0%	14-Dec-12	28-Dec-12
END6500	OMRR&R Manual	22.0d	22.0d	0%	14-Dec-12	16-Jan-13
END6650	Notice of Project Compl/Assumption of OMRR&R	5.0d	5.0d	0%	17-Jan-13	24-Jan-13
END6490	Balance Cost Sharing	5.0d	5.0d	0%	17-Jan-13	24-Jan-13
END6650HQM	Notice of Project Compl/Assumption of OMRR&R	0.0d	0.0d	0%		24-Jan-13
END6450	Final Accounting / Fiscal Closeout	22.0d	22.0d	0%	25-Jan-13	26-Feb-13
END6480	Project Fiscally Complete	0.0d	0.0d	0%		26-Feb-13

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4 RISK ANALYSIS DEVELOPMENT

4.1 Cost and Schedule Risk Analyis Development

A Cost and Schedule Risk Analysis (CSRA) was performed on this project to more accurately identify risk and potential impacts to the project. This analysis required participation by entire PDT to identify the 80% confidence level project cost and contingencies.

4.2 Risk Results

The results of the cost and schedule risk analysis are shown below. Key risks contributing to the overall project contingency are presented below.

Abbreviated Risk Analysis

Project (less than $40M): **Walton Elementary**
Project Development Stage: **Feasibility (Recommended Plan)**

Total Construction Contract Cost = $ 602,414

	WBS	Potential Risk Areas	Contract Cost		New Method % Contingency	New Method $ Contingency	New Method Total
1	02 RELOCATIONS	Power Pole Relocation	$ 12,000		8.91%	$ 1,069	$ 13,069.42
2	16 BANK STABILIZATION	Land Equipment Mobilization/Demobiliz	$ 5,950		8.91%	$ 530	$ 6,480.46
3		Site Survey	$ 6,676		8.91%	$ 595	$ 7,270.63
4		Environmental Protection	$ 1,144		8.91%	$ 102	$ 1,245.43
5		Clearing	$ 3,393		8.91%	$ 302	$ 3,695.40
6		Stone / Aggregate	$ 427,074		18.94%	$ 80,877	$ 507,950.87
7		Drainage Feature Extensions	$ 9,304		8.91%	$ 829	$ 10,132.84
8		Sidewalk Repair	$ 1,912		7.09%	$ 136	$ 2,047.55
9		Geo-Fabric (Non-woven #180)	$ 24,346		7.09%	$ 1,726	$ 26,072.57
10		Cut and Fill	$ 40,701		9.46%	$ 3,851	$ 44,552.76
11		Traffic Control	$ 37,440		7.09%	$ 2,655	$ 40,094.75
12		Remaining Construction Items	$ 32,474	5.7%	7.09%	$ 2,303	$ 34,777.27
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	$ 45,181		9.37%	$ 4,235	$ 49,416.07
14	31 CONSTRUCTION MANAGEMENT	Construction Management	$ 45,181		9.37%	$ 4,235	$ 49,416.07

Totals					
Total Construction Estimate	$ 602,414	15.77%	$ 94,976	$ 697,390
Total Planning, Engineering & Design	$ 45,181	9.37%	$ 4,235	$ 49,416
Total Construction Management	$ 45,181	9.37%	$ 4,235	$ 49,416
Total	$ 692,776		$ 103,446	$ 796,222

4.3 Risk register

Walton Elementary
Feasibility (Recommended Plan)
Abbreviated Risk Analysis

Meeting Date: 40742

Risk Level

	Negligible	Marginal	Significant	Critical	Crisis
Very Likely	2	3	4	5	5
Possible to Likely	1	2	3	4	5
Unlikely	0	1	2	3	4
Very Unlikely	0	0	1	2	3

Risk Element	Potential Risk Areas	Concerns Pull Down Tab (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level
Project Scope Growth							
						Max Potential Cost Growth	0.75
PS-1	Power Pole Relocation	• Potential for scope growth, added features and quantities?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Marginal	0
PS-2	Land Equipment Mobilization/Demobilization	• Potential for scope growth, added features and quantities?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Marginal	0
PS-3	Site Survey	• Potential for scope growth, added features and quantities?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Marginal	0
PS-4	Environmental Protection	• Water care and diversion fully understood, planned?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Marginal	0
PS-5	Clearing	• Potential for scope growth, added features and quantities?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
PS-6	Stone / Aggregate	• Potential for scope growth, added features and quantities?	• Potential for scope growth, added features and quantities?	The longer the project is delayed the worse the erosion will get, and will get increases the quantities needed to midigate the damage.	Possible to LIKELY	Negligible	1
PS-7	Drainage Feature Extensions	• Water care and diversion fully understood, planned?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
PS-8	Sidewalk Repair	• Potential for scope growth, added features and quantities?	No concerns.	Anticipate no impact to the cost of the project.	Unlikely	Negligible	0
PS-9	Geo-Fabric (Non-woven #180)	• Potential for scope growth, added features and quantities?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
PS-10	Cut and Fill	• Potential for scope growth, added features and quantities?	• Potential for scope growth, added features and quantities?	The longer the project is delayed the worse the erosion will get, and will get increases the quantities needed to midigate the damage.	Possible to LIKELY	Negligible	1
PS-11	Traffic Control	• Potential for scope growth, added features and quantities?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
PS-12	Remaining Construction Items	• Potential for scope growth, added features and quantities?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
PS-13	Planning, Engineering, & Design	• Potential for scope growth, added features and quantities?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
PS-14	Construction Management	• Potential for scope growth, added features and quantities?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0

Acquisition Strategy

						Max Potential Cost Growth	0.3
AS-1	Power Pole Relocation	• Requirement for subcontracting?	No concerns.	Anticipate no impact to the cost of the project.	Unlikely	Negligible	0
AS-2	Land Equipment Mobilization/Demobilization	• Contracting plan firmly established?	No concerns.	Anticipate no impact to the cost of the project.	Unlikely	Negligible	0
AS-3	Site Survey	• Contracting plan firmly established?	No concerns.	Anticipate no impact to the cost of the project.	very Unlikely	Marginal	0
AS-4	Environmental Protection	• Contracting plan firmly established?	No concerns.	Anticipate no impact to the cost of the project.	Unlikely	Negligible	0
AS-5	Clearing	• Contracting plan firmly established?	No concerns.	Anticipate no impact to the cost of the project.	very Unlikely	Marginal	0
AS-6	Stone / Aggregate	• Accelerated schedule or harsh weather schedule?	• Accelerated schedule or harsh weather schedule?	School will be in session during the time of construction.	Unlikely	Marginal	1
AS-7	Drainage Feature Extensions	• Contracting plan firmly established?	No concerns.	Anticipate no impact to the cost of the project.	very Unlikely	Marginal	0
AS-8	Sidewalk Repair	• Contracting plan firmly established?	No concerns.	Anticipate no impact to the cost of the project.	Unlikely	Negligible	0
AS-9	Geo-Fabric (Non-woven #180)	• Contracting plan firmly established?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
AS-10	Cut and Fill	• Contracting plan firmly established?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
AS-11	Traffic Control	• Contracting plan firmly established?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
AS-12	Remaining Construction Items	• Contracting plan firmly established?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
AS-13	Planning, Engineering, & Design	• Contracting plan firmly established?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
AS-14	Construction Management	• Contracting plan firmly established?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0

Construction Elements

						Max Potential Cost Growth	0.25
CE-1	Power Pole Relocation	• Special equipment or subcontractors needed?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CE-2	Land Equipment Mobilization/Demobilization	• High risk or complex construction elements, site access, in-water?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CE-3	Site Survey	• Accelerated schedule or harsh weather schedule?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CE-4	Environmental Protection	• Accelerated schedule or harsh weather schedule?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CE-5	Clearing	• Accelerated schedule or harsh weather schedule?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CE-6	Stone / Aggregate	• High risk or complex construction elements, site access, in-water?	• High risk or complex construction elements, site access, in-water?	School will be in session during the time of construction.	Unlikely	Marginal	1
CE-7	Drainage Feature Extensions	• Accelerated schedule or harsh weather schedule?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CE-8	Sidewalk Repair	• Accelerated schedule or harsh weather schedule?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CE-9	Geo-Fabric (Non-woven #180)	• Accelerated schedule or harsh weather schedule?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CE-10	Cut and Fill	• Accelerated schedule or harsh weather schedule?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CE-11	Traffic Control	• Accelerated schedule or harsh weather schedule?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CE-12	Remaining Construction Items	• Accelerated schedule or harsh weather schedule?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CE-13	Planning, Engineering, & Design	• Accelerated schedule or harsh weather schedule?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CE-14	Construction Management	• Accelerated schedule or harsh weather schedule?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0

Quantities for Current Scope

						Max Potential Cost Growth	0.2
Q-1	Power Pole Relocation	• Sufficient investigations to develop quantities?	• Level of confidence based on design and assumptions?	The longer the project is delayed the worse the erosion will get, and will get increase the quantities needed to midigate the damage.	Unlikely	Marginal	1
Q-2	Land Equipment Mobilization/Demobilization	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	The longer the project is delayed the worse the erosion will get, and will get increase the quantities needed to midigate the damage.	Unlikely	Marginal	1
Q-3	Site Survey	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	The longer the project is delayed the worse the erosion will get, and will get increase the quantities needed to midigate the damage.	Unlikely	Marginal	1
Q-4	Environmental Protection	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	The longer the project is delayed the worse the erosion will get, and will get increase the quantities needed to midigate the damage.	Unlikely	Marginal	1
Q-5	Clearing	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	The longer the project is delayed the worse the erosion will get, and will get increase the quantities needed to midigate the damage.	Unlikely	Marginal	1
Q-6	Stone / Aggregate	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	The longer the project is delayed the worse the erosion will get, and will get increase the quantities needed to midigate the damage.	Possible to LIKELY	Marginal	2
Q-7	Drainage Feature Extensions	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	The longer the project is delayed the worse the erosion will get, and will get increase the quantities needed to midigate the damage.	Unlikely	Marginal	1
Q-8	Sidewalk Repair	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	The longer the project is delayed the worse the erosion will get, and will get increase the quantities needed to midigate the damage.	Unlikely	Negligible	0
Q-9	Geo-Fabric (Non-woven #180)	• Possibility for increased quantities due to loss, waste, or subsidence?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
Q-10	Cut and Fill	• Possibility for increased quantities due to loss, waste, or subsidence?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
Q-11		• Level of confidence based on design and assumptions?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
Q-12	Remaining Construction Items	• Level of confidence based on design and assumptions?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
Q-13	Planning, Engineering, & Design	• Level of confidence based on design and assumptions?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
Q-14	Construction Management	• Level of confidence based on design and assumptions?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0

Specialty Fabrication or Equipment

						Max Potential Cost Growth	0.75
FE-1	Power Pole Relocation	• Unusual parts, material or equipment manufactured or installed?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-2	Land Equipment Mobilization/Demobilization	• Ability to reasonably transport?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-3	Site Survey	• Confidence in contractor's ability to install?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-4	Environmental Protection	• Confidence in contractor's ability to install?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-5	Clearing	• Risk of specialty equipment functioning first time? Test?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-6	Stone / Aggregate	• Confidence in suppliers' ability?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-7	Drainage Feature Extensions	• Confidence in contractor's ability to install?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-8	Sidewalk Repair	• Confidence in contractor's ability to install?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-9	Geo-Fabric (Non-woven #180)	• Confidence in contractor's ability to install?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-10	Cut and Fill	• Confidence in contractor's ability to install?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-11	Traffic Control	• Unusual parts, material or equipment manufactured or installed?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-12	Remaining Construction Items	• Unusual parts, material or equipment manufactured or installed?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-13	Planning, Engineering, & Design	• Unusual parts, material or equipment manufactured or installed?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
FE-14	Construction Management	• Unusual parts, material or equipment manufactured or installed?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0

Cost Estimate Assumptions

						Max Potential Cost Growth	0.35
CT-1	Power Pole Relocation	• Reliability and number of key quotes?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-2	Land Equipment Mobilization/Demobilization	• Site accessibility, transport delays, congestion?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-3	Site Survey	• Assumptions regarding crew, productivity, overtime?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-4	Environmental Protection	• Assumptions regarding crew, productivity, overtime?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-5	Clearing	• Assumptions regarding crew, productivity, overtime?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-6	Stone / Aggregate	• Assumptions regarding crew, productivity, overtime?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-7	Drainage Feature Extensions	• Assumptions regarding crew, productivity, overtime?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-8	Sidewalk Repair	• Assumptions regarding crew, productivity, overtime?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-9	Geo-Fabric (Non-woven #180)	• Assumptions regarding crew, productivity, overtime?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-10	Cut and Fill	• Assumptions regarding crew, productivity, overtime?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-11	Traffic Control	• Reliability and number of key quotes?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-12	Remaining Construction Items	• Assumptions regarding crew, productivity, overtime?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-13	Planning, Engineering, & Design	• Reliability and number of key quotes?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0
CT-14	Construction Management	• Reliability and number of key quotes?	No concerns.	Anticipate no impact to the cost of the project.	Very Unlikely	Negligible	0

External Project Risks

							Max Potential Cost Growth	0.4
EX-1	Power Pole Relocation	• Political influences, lack of support, obstacles?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Unlikely	Marginal	1
EX-2	Land Equipment Mobilization/Demobilization	• Unanticipated inflations in fuel, key materials?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Unlikely	Marginal	1
EX-3	Site Survey	• Potential for severe adverse weather?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Unlikely	Marginal	1
EX-4	Environmental Protection	• Political influences, lack of support, obstacles?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Unlikely	Marginal	1
EX-5	Clearing	• Political influences, lack of support, obstacles?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Unlikely	Marginal	1
EX-6	Stone / Aggregate	• Political influences, lack of support, obstacles?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Possible to LIKELY	Marginal	2
EX-7	Drainage Feature Extensions	• Political influences, lack of support, obstacles?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Unlikely	Marginal	1
EX-8	Sidewalk Repair	• Political influences, lack of support, obstacles?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Unlikely	Marginal	1
EX-9	Geo-Fabric (Non-woven #180)	• Unanticipated inflations in fuel, key materials?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Possible to LIKELY	Negligible	1
EX-10	Cut and Fill	• Unanticipated inflations in fuel, key materials?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Possible to LIKELY	Negligible	1
EX-11	Traffic Control	• Potential for severe adverse weather?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Possible to LIKELY	Negligible	1
EX-12	Remaining Construction Items	• Unanticipated inflations in fuel, key materials?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Unlikely	Marginal	1
EX-13	Planning, Engineering, & Design	• Potential for severe adverse weather?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Possible to LIKELY	Marginal	2
EX-14	Construction Management	• Potential for severe adverse weather?	• Political influences, lack of support, obstacles?	Political influences on funding have the potential for significant impact. Current assumptions are that funding is available within the next fiscal year. However, current political climate against Congressional Ads may hinder this funding. Adverse weather that could impact construction would be high water events and	Possible to LIKELY	Marginal	2

Walton Elementary
Feasibility (Recommended Plan)
Abbreviated Risk Analysis

Typical Risk Elements	Potential Risk Areas: Power Pole Relocation	Land Equipment Mobilization/Dem ization	Site Survey	Environmental Protection	Clearing	Stone / Aggregate	Drainage Feature Extensions	Sidewalk Repair	Geo-Fabric (Non-woven #180)	Traffic Control	#REF!	Remaining Construction Ite	Planning, Engineering, & Design	Construction Management
Project Scope Growth	-	-	-	-	-	1	-	-	-	1	-	-	-	-
Acquisition Strategy	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Construction Elements	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Quantities for Current Scope	1	1	1	1	1	2	1	-	-	-	-	-	-	-
Specialty Fabrication or Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cost Estimate Assumptions	-	-	-	-	-	-	-	-	-	-	-	-	-	-
External Project Risks	1	1	1	1	1	2	1	1	1	1	1	1	2	2

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: **Walton Elementary School**
LOCATION: Walton WV

DISTRICT: LRH Huntington
POC: CHIEF, COST ENGINEERING, Micheal Ferguson
PREPARED: 4/24/2012

This Estimate reflects the scope and schedule in report;

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Doller Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
						Program Year (Budget EC): 2013 Effective Price Level Date: 1 OCT 12								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	**TOTAL ($K)**	Spent Thru: 19-Aug-11 ($K)		COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*K*	*L*	*M*	*N*	*O*
02	RELOCATIONS	$12	$2	16%	$14	0.8%	$12	$2	$14			$12	$2	$14
16	BANK STABILIZATION	$590	$93	16%	$683	0.9%	$595	$94	$689			$606	$96	$702
	CONSTRUCTION ESTIMATE TOTALS:	$602	$95		$697	0.9%	$607	$96	$703			$619	$98	$716
01	LANDS AND DAMAGES		-			-								
22	FEASIBILITY STUDY (CAP studies)									$100				
30	PLANNING, ENGINEERING & DESIGN	$45	$4	9%	$49	0.3%	$45	$4	$49			$46	$4	$50
31	CONSTRUCTION MANAGEMENT	$45	$4	9%	$49	0.3%	$45	$4	$49			$46	$4	$50
	PROJECT COST TOTALS:	$692	$103	15%	$795		$698	$104	**$802**	$100		$710	$106	$916

ESTIMATED FEDERAL COST:	65%	**$526**
ESTIMATED NON-FEDERAL COST:	35%	**$289**
FEDERAL FEASIBILITY CAP COSTS:	100%	**$100**
ESTIMATED TOTAL PROJECT COST:		**$916**

O&M OUTSIDE OF TOTAL PROJECT COST:

Mandatory by Regulation	CHIEF, COST ENGINEERING, Micheal Ferguson
Mandatory by Regulation	PROJECT MANAGER, David Frantz
Mandatory by Regulation	CHIEF, REAL ESTATE,
	CHIEF, PLANNING,xxx
	CHIEF, ENGINEERING,John Jeager
	CHIEF, OPERATIONS, xxx
	CHIEF, CONSTRUCTION, Wren Wilson
	CHIEF, CONTRACTING,Sandy King
	CHIEF, PM-PB, xxxx
	CHIEF, DPM, xxx

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Walton Elementary School
LOCATION: Walton WV
This Estimate reflects the scope and schedule in report;

DISTRICT: LRH Huntington
POC: CHIEF, COST ENGINEERING, Micheal Ferguson
PREPARED: 4/24/2012

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Doller Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 19-Aug-11 Effective Price Level: 19-Aug-11				Program Year (Budget EC): 2013 Effective Price Level Date: 1 OCT 12								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	RISK BASED CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	PHASE 1 or CONTRACT 1													
02	RELOCATIONS	$12	$2	16%	$14	0.8%	$12	$2	$14	2013Q1	1.9%	$12	$2	$14
16	BANK STABILIZATION	$590	$93	16%	$683	0.9%	$595	$94	$689	2013Q1	1.9%	$606	$96	$702
	CONSTRUCTION ESTIMATE TOTALS:	$602	$95	16%	**$697**		$607	$96	$703			$619	$98	$716
01	LANDS AND DAMAGES			25%										
30	PLANNING, ENGINEERING & DESIGN													
2.0%	Project Management	$12	$1	9%	$13	0.3%	$12	$1	$13	2012Q3	0.6%	$12	$1	$13
	Planning & Environmental Compliance			9%										
3.5%	Engineering & Design	$21	$2	9%	$23	0.3%	$21	$2	$23	2012Q3	0.6%	$21	$2	$23
	Engineering Tech Review ITR & VE			9%										
	Contracting & Reprographics			9%										
2.0%	Engineering During Construction	$12	$1	9%	$13	0.3%	$12	$1	$13	2013Q1	1.4%	$12	$1	$13
	Planning During Construction			9%										
	Project Operations			9%										
31	CONSTRUCTION MANAGEMENT													
7.5%	Construction Management	$45	$4	9%	$49	0.3%	$45	$4	$49	2013Q1	1.4%	$46	$4	$50
	Project Operation:			9%										
	Project Management			9%										
	CONTRACT COST TOTALS:	$692	$103		**$795**		$698	$104	$802			$710	$106	**$816**

Appendix G

Hydrology and Hydraulic Analysis

Introduction

A hydrologic and hydraulic analysis of the project is being performed to assist in the development of an minimum stone size and identify any long term channel instabilities that may threaten the success of the proposed stream bank erosion protection project.

The study reach included in this analysis is a reach of the Pocatalico River in South Central Roane County, West Virginia. The study reach is located in the Appalachian Plateau Physiographic Province. The study reach starts approximately 52 miles upstream of the confluence of the Pocatalico River with the Kanawha River at the town of Poca. The contributing Drainage area at the bottom of the study reach is 29.5 square miles as delineated using USGS 7.5 minute quadrangle maps and verified using the USGS EDNA ArcHydro Flow Accumulation Grid.

Previous Studies

There is an effective FEMA Flood Insurance Study for the Pocatalico River below the project in Jackson and Kanawha Counties, but are no known studies available near the project reach.

Site Conditions

A site visit was conducted on 07/13/2011 to assess the particular details pertaining to this hydrologic and hydraulic analysis and to identify the areas of the reach where additional topographic and bathymetric data was needed. The site visit was performed during relatively low flow and dense vegetative cover.

Observation of the upstream reach determined that there was a large pool feature approximately 800-feet upstream of the bank failure that is located within a very sharp channel bend. Immediately downstream of this bend, the tributary of McKown Creek enters the Pocatalico River along the left descending bank at an approximately perpendicular angle. There is a gravel delta at the confluence that consists primarily of gravel size material. There appears to be a relatively stable riffle downstream of the confluence. It is worth noting that there is a relic channel/channel braid that runs parallel to the riffle; which is separated by an island/knoll approximately 6-feet high. Debris was racked in trees located at the crest of the island which would suggest that this island was inundated by recent flooding.

This section transitions into a section that has a large amount of gravel on the right descending bank. The left bank near this reach is near vertical and appears to be comprised of cohesive material. It is worth noting that a large block failure (approximately 2-3 feet) located in the river adjacent to the left bank. The right bank in this area appears to be relatively stable.

The project section is immediately downstream of this section, and is characterized by near a near vertical right bank (approximately 6-10 feet tall) and an apparently stable left bank that has riparian area consisting of trees, shrubs, and herbaceous vegetation. There is also a terrace feature along the left bank that does not appear to be connected to the floodplain during frequent flooding events. The right bank is actively failing and appears to have several geotechnical piping features. It is expected that during flood conditions failed material is removed and additional bank material is plucked, then additional geotechnical failures result from the rapid

recession that is characteristic of small relatively high gradient streams in southern Appalachia. This results is a cycle of stream bank erosion and downstream transport. At base flow conditions, there was the presence of a significant horizontal eddie that may acerbate the bank instability at higher flows.

The reach downstream of the project is seemingly stable with a more gentle slope than the project section. This section has riparian zone on either bank that is comprised of trees, shrubs, and herbaceous vegetation. The section also lacks sinuosity and does not display any features that would suggest horizontal or vertical channel stability issues. The reach did have several fallen trees and stumps in the channel. These trees and stumps were transported from somewhat remote unstable banks and launched from the left descending bank. The left descending bank includes erosionally truncated terraces and bedrock outcrops. Based on the stability of the downstream reach, a more detailed fluvial geomorphic assessment was not performed. The condition of the downstream reach did not suggest that there was vertical instability migrating upstream in the form of a head cut.

Photos and field notes of the site visit are included in Addendum A of this Appendix.

Hydrologic Modeling

Given the size of the contributing drainage area (29.5 mi^2), a rainfall-runoff approach was determined less accurate than the use of stream flow statistics. Given the lack of data and level of detail needed to meet the objectives of the project; a regression method was determined appropriate for developing flood discharges. The methods outlined in the USGS publication WRI-00-4080 *Estimating Magnitude and Frequency of Peak Discharge for Rural, Unregulated, Streams in West Virginia* were used in developing the flood discharges included for the subsequent hydraulic analysis. Table 1 summarizes the flood discharges used in this analysis.

Regression equation details are in Addendum B of this Appendix.

Table 1 Flood Discharges based on WRI-00-4080

Return Interval (years)	Discharge (cfs)	Standard Error (Percent)	Equivalent Years
2	1360	39	1.6
5	2090	37	2.7
10	2630	36	3.8
25	3350	37	5.3
50	3930	38	6.2
100	4510	40	6.9
200	5130	42	7.4
500	5970	45	7.9

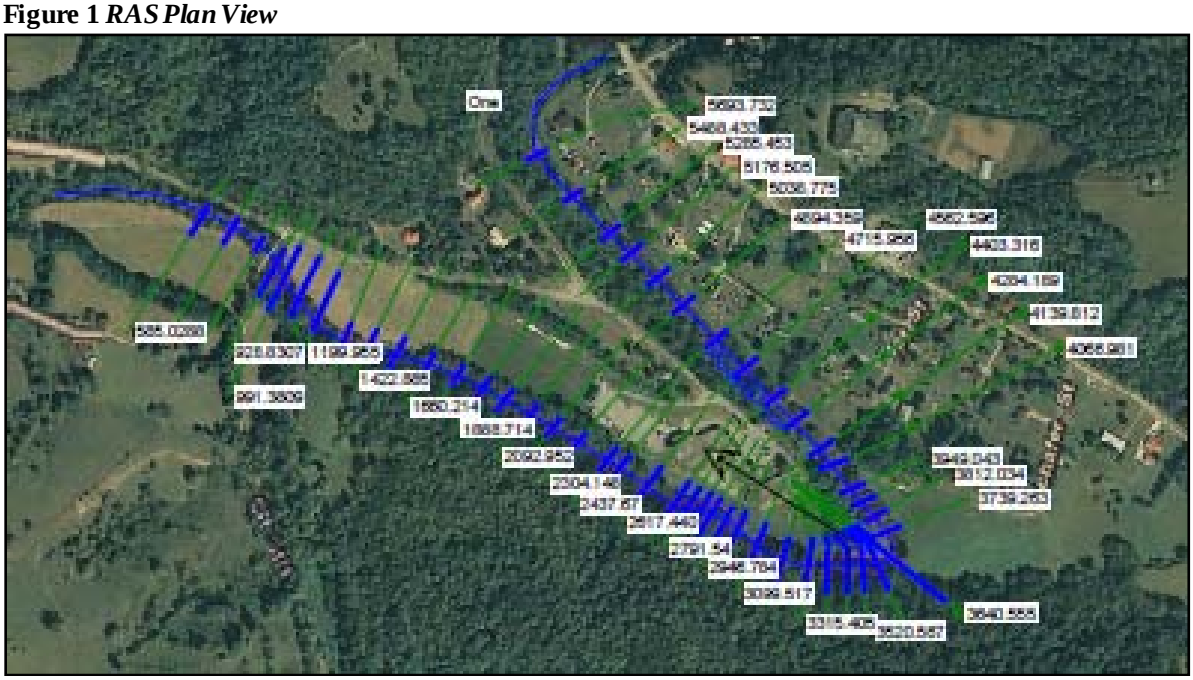
Hydraulic Analysis

One Dimension Numerical Modeling

The HEC-RAS steady-flow hydraulic model was chosen for hydraulic analysis due to it's ability to perform backwater computations. A geometry file was developed using the GIS enabled HEC-GeoRAS software. Hydraulic cross sections, stream centerline, flow paths, culvert embankment, and bank stations were laid out using a combination of USGS 3-meter resolution digital terrain model (DEM), 2009 NAIP aerial photography, and field topographic survey performed as part of this study effort. The USACE HEC-GeoRAS software was then used to extract this data into HEC-RAS. Once the geometry data was imported into HEC-RAS , the channel modification tool was used to cut a channel approximately 3- to 5-feet in depth and approximately 28-feet wide into the sections that did not have bathymetry obtained during the survey effort. The dimension and slope of this channel modification was based on the field survey, site visit, and overall reach slope.

Manning's "n" values for channels were estimated using guidance from the USGS Publication *Roughness Characteristics of Natural Channels* and best professional judgment from field visits; a value was determined to be 0.035 for the channel. Over bank roughness values were estimated using guidance outlined in the FHWA publication *Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Floodplains* based on aerial photography, the site visit, and and ranged between 0.07 – 0.11. Figure 1 depicts the cross section layout and general plan view of the study reach.

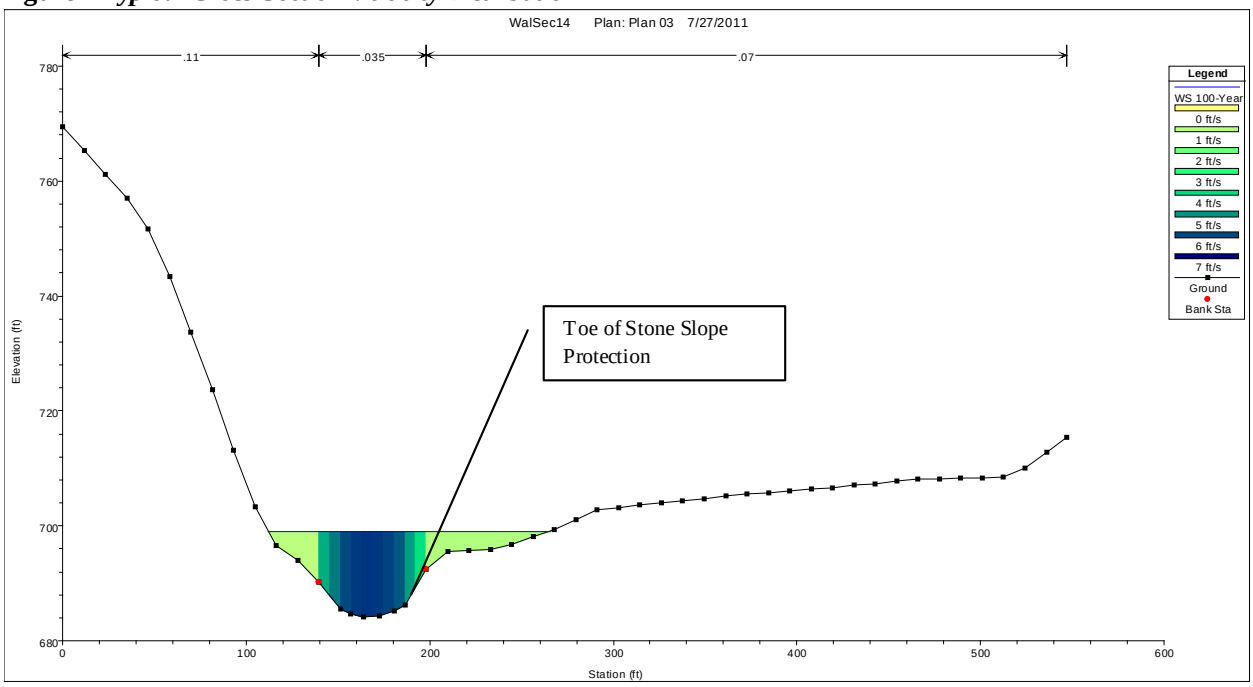
Figure 1 ***RAS Plan View***



Based on a steady-flow mixed flow regime analysis, water surface profiles for the aforementioned recurrence interval discharges were calculated. No high water marks or historic discharge data were available for calibration and it is recommended that this data be incorporated if it becomes available.

The hydraulic properties of the cross-section in the project section were determined for later use in stone sizing. Figure 2 depicts the velocity distributions in a cross-section within the project area. The maximum channel velocity in the project area resulting from a 100-year flood discharge was 7.1 feet/second and occurred at the channel thalweg. As proposed at the time of this analysis, the stone slope protection was not intended to extend to the thalweg; although this hydraulic condition was evaluated to include potential construction modifications to design based on site conditions.

Figure 2 ***Typical Cross-Section Velocity Distribution***



Details of the Hydraulic Analysis are included in Addendum C of this Appendix.

Selection of Stone Slope Protection

Stone requirements for stream bank protection in the project area are based on the criteria and procedures outlined in EM 1110-2-1601 Hydraulic Design of Flood Control Channels. As mentioned above, the maximum average channel subsection velocity for the 100-year discharge was computed to be 7.1 feet per second at the protected area. The maximum channel depth of the 100-year discharge at this location was calculated to be approximately 15-feet, and approximately 12-feet at the location of the treatment; although velocity-depth relationships were considered from thalweg to the top of bank to ensure the worst case for stone sizing was considered. Maximum average channel boundary shear stress was calculated to be 0.75 lb/ft^2 in the near the protected area.

The D_{30} Stone Size (i.e. RipRap size of which 30 percent is finer) was calculated using Equation 1, which is prescribed in EM 1110-2-1601 to determine the critical stone size for incipient motion.

Equation 1 Representative Stone Size in Straight or Curved Channels

$$D_{30} = S_f * C_s * C_v * C_t * d * [(\gamma_w / (\gamma_s - \gamma_w))^{0.5} (V / K_1 * g * d)]^{2.5}$$

Where,

S_f = *Safety Factor, min 1.1*
C_s = *Stability Coefficient for incipient failure, 0.3 for angular Rock*
C_v = *Vertical velocity distribution coefficient, 1.283 – 0.2*log(R/W), where R=Radius of Bend and W=Width of water surface*
C_t = *Thickness Coefficient, assume 1.0*
d = *Local depth of flow*
γ_w = *Unit weight of water*
γ_s = *Unit weight of Stone*
V = *Local velocity, calculated using average section velocity*
K_1 = *Side Slope correction factor*
g = *gravitational constant*

Values for the aforementioned variables were estimated using the procedures outlined in EM 1110-2-1601 and *User's Manual for CHANLPRO, PC Program for Channel Protection Design*. A factor of safety of 1.5 was used to account for localized velocities that may occur resulting from the eddies observed during the site visit, that may have a larger magnitude at flood flows.

A minimum D_{30} stone size of 0.4-feet was calculated given this procedure. The recommended gradation limits for the stone size distribution are provided in Table 1; but a gradation using a larger D_{30} value may be used if more practicable. This gradation represents the values outlined in EM 1110-2-1601 for a unit stone weight of 165-lb/ft^2.

Table 2 Stone Gradation for Walton Elementary Section 14 Project

PERCENT LIGHTER BY WEIGHT	MAXIMUM STONE DIAMETER (IN.)	MINIMUM STONE DIAMETER (IN.)
D_{100}	12	9
D_{90}	N/A	8 ½
D_{50}	8	7
D_{30}	N/A	**6**
D_{15}	6 ½	4 ½

Appendix H

Letter of Intent

ROANE COUNTY SCHOOLS

P.O. Box 609
Spencer, WV 25276
304-927-6400

April 20, 2011

District Engineer
U.S. Army Corps of Engineers, Huntington District
502 Eighth Street
Huntington, WV 25701-2070

Dear Sir:

In accordance with the provisions of Section 14 of the Flood Control Act of 1946, the Board of Education of the County of Roane, Spencer, WV, requests Corps of Engineers assistance in addressing a stream bank erosion problem at Walton Elementary/Middle School along the Pocatalico River.

We are aware of the following cost sharing requirements associated with projects undertaken under this authority and are able to meet these obligations within 12 months.

a. Feasibility Phase is federally funded up to $100,000. Costs in excess of $100,000 are shared on a 50/50 basis with the local sponsor. The sponsor's 50% share of any costs over $100,000 may be provided by in-kind services.

b. Sponsor's Share of Construction consists of provision of land, easements, rights-of-way, relocations and disposal areas, plus a cash contribution of at least 5% of the total project cost. If this amount is less than 35% of the total project cost, the sponsor will provide any additional cash contribution required to equal 35%. The Federal limit is $1,500,000.

c. The sponsor is responsible for removal of all hazardous, toxic, and radioactive wastes prior to any construction and for the operation and maintenance of the project after it is completed.

We are aware that this letter serves as an expression of intent and is not a contractual obligation and that either party may discontinue the study process at any stage prior to construction.

Respectfully,

Stephen F. Goffreda

Stephen F. Goffreda
Superintendent of Schools