

Item 5

Proposed Project Antidegradation Analysis

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1. Project Description

1.1 The proposed project is authorized under Section 103 of the 1962 Rivers and Harbors Act (P.L. 87-874). This legislation provides the U.S. Army Corps of Engineers (USACE) authority to construct small shore and beach restoration and protection projects not specifically authorized by Congress. An investigation to determine the applicability of Section 103 was initiated in response to a letter dated December 1, 1994 from the Lake County Board of County Commissioners.

1.2 The affected area encompasses a 600-foot section along the Lake Erie shoreline fronting the Lake County Raw Water Pump Station (Item 6, Figures 1-1, 1-3 and 1-4). The pump station is situated atop a 50-foot high bluff that rises above a 10- to 60-foot wide sand and gravel beach. Frequent Lake Erie storms have eroded the bluff and caused major bluff failure and the loss of several nearby residences, roads, and utilities. Currently, the pump station is located within 80 feet of the bluff. The Ohio Department of Natural Resources' (ODNR) 1997 Coastal Erosion Area map for the project area estimates an average shoreline recession rate of 1.7 feet per year. A maximum recession rate of 12.3 feet per year has been measured at this section of shoreline.

1.3 *Preferred Design (Alternative 2 – Revetment with Bluff Access)*. This alternative would involve the construction of a stone rubblemound revetment along the base of the eroding bluff (Item 6, Figures 4-3 and 4-4). The proposed protection would extend to an elevation of 15 feet above LWD¹.

1.4 A 15-foot wide gravel construction/maintenance access road would be cut at a 10 percent grade from the top of the bluff and incorporated into the revetment. Geotextile filter fabric would be placed along the revetment alignment to prevent the washing out of the finer bluff material through the structure and into the lake. Over the fabric, a two-foot thick cover of underlayer stone (approximately 3,500 cy) would then be placed, followed by a 4.5-foot layer of armor stone (approximately 7,000 cy). The toe of the revetment would be keyed into shale bedrock to a minimum depth of two feet. Approximately 1,350 cy of shale bedrock would be excavated along the toe of the revetment and hauled to an off-site placement area. Figure 4 presents a typical cross section of the revetment.

1.5 The intended purpose of the proposed revetment to prevent further bluff erosion would consequently decrease the supply of sand to the littoral system. It is estimated that 18,000 cy of sand would be excavated along the bluff and/or protected from further erosion along the bluff, and thereby eliminating it from the littoral system for the life of the project. This loss would be compensated by the placement of an equal volume of sand fill in the nearshore zone during project construction.

¹ Low water datum (LWD) for Lake Erie is 569.2 feet above mean sea level at Rimouski, Quebec, Canada (IGLD 1985).

1.6 Above the revetment, the upper portion of the bluff would be graded to a 1V:1.5H slope. To protect the slope, an erosion control blanket would be laid over the groomed slope, then covered with topsoil and seeded. Additional plantings of trees and/or shrubs and any future landscaping conducted subsequent to project construction would be the responsibility of the non-Federal project sponsor (i.e., Lake County). These plantings could be selected to benefit local wildlife, but would also need to be consistent with future maintenance requirements for the project. The Corps of Engineers would coordinate with Lake County and Ohio Department of Natural Resources-Division of Wildlife to review the species composition and general layout of any planting plan.

1.7 Future maintenance of the revetment would also entail accessing the structure via the existing road along the top of the bluff. It is assumed that project maintenance would occur at 10-year intervals and entail repairing the road access in addition to other structural repairs to the revetment.

1.8 *Minimal Degradation Alternative (Alternative 1 – Revetment with Beach Access)*. This alternative would also protect the existing pump station by constructing a 600-foot long stone rubblemound revetment along the shoreline fronting the facility (Item 6, Figures 4-1 and 4-2). The revetment would be constructed of geotextile fabric, underlayer stone (approximately 2,000 cy) and armor stone (approximately 5,400 cy), and require the excavation and off-site placement of approximately 980 cy of broken shale.

1.9 Due to the high bluff at this location, access to the shoreline is challenging. Construction access would use existing roads with access to the beach at a point approximately 1,200 feet east of the pump station where the bluff is at a low enough elevation to allow beach access. Material and equipment would then be hauled along the beach to the construction site.

1.10 It is estimated that approximately 18,000 cubic yards (cy) of sand would be excavated and/or protected from future erosion along the bluff and thereby eliminated from the littoral system for the life of the project. This loss would be compensated by the placement of an equal volume of sand in the nearshore zone during project construction.

1.11 Above the revetment, the upper portion of the bluff would be graded to a 1V:1.5H slope. To protect the slope, an erosion control blanket would be laid over the groomed slope, then covered with topsoil and seeded. Additional plantings of trees and/or shrubs and any future landscaping conducted subsequent to project construction would be the responsibility of the non-Federal project sponsor (i.e., Lake County). These plantings could be selected to benefit local wildlife, but would also need to be consistent with future maintenance requirements for the project. The Corps of Engineers would coordinate with Lake County and Ohio Department of Natural Resources-Division of Wildlife to review the species composition and general layout of any planting plan.

1.12 Future maintenance of the revetment would also entail accessing the structure via the existing roads along the top of the bluff and beach. It is assumed that project maintenance would occur at 10-year intervals and entail repairing the road access and restoring the beach access in addition to structural repairs to the revetment.

1.13 *Non-Degradation Alternative (No Action)*. The Lake County Raw Water Pump Station is a water-dependent facility that draws potable water directly from Lake Erie. Therefore, the No Action Alternative, or “no build” plan, has been designated as the Non-Degradation Alternative. Under this plan, the Corps of Engineers would not participate in any construction measures at the project location.

2. Avoidance

2.1 The only reasonable means of protecting the structural integrity of the Lake County Raw Water Pump Station and avoiding impacts to water resources would be to relocate the facility to account for the currently projected bluff recession rate (1.8 feet per year). The well chambers and pumps would need to be relocated landward and its intake pipes would also need to be extended from the lake to the new location. Although adjacent vacant land is available, the estimated cost for relocating the station would be approximately \$9,916,000. The coastal dynamics of the nearshore zone and height of the eroding bluff make it technically infeasible to identify any other alternative to structural shoreline protection at the Lake County Raw Water Pump Station. During the preliminary screening of potential shore protection measures, the creation of a sand beach (with recurring beach nourishment) and biotechnical erosion control were also considered. Beach creation/restoration was determined to be not feasible due to exceedingly high annual maintenance costs for sand replenishment. Grading and establishing native vegetation along the bluff would not be technically feasible due to the unprotected nature of the shoreline and its harsh wave climate.

2.2 If the project is not built, structural damage to the pump station would eventually occur. It is reasonable to assume that Lake County would begin planning for relocating the facility before catastrophic failure is imminent, however there is a risk that a significant disruption to the public water supply is possible if this damage occurs before a new facility is operational.

3. Minimization

3.1 Stone sizes and the design slope for the proposed revetment have been selected to provide the required erosion protection and remain stable under anticipated wave conditions. The horizontal dimension of the revetment is designed to be the minimum necessary to provide a stable structure. The placement of a geotextile filter fabric beneath the revetment would prevent the washing out of finer bluff material through the structure and into the lake. The revetment is intended to reduce bluff erosion and consequently reduce the supply of sand to the littoral system. It is estimated that 18,000 cy of sand would be excavated along the bluff and/or protected from future erosion along the bluff and thereby eliminated from the littoral system for the life of the project. This loss would be compensated by the placement of an equal volume in the nearshore zone during project construction.

3.2 Above the proposed revetment, the bluff face would be covered with an erosion control blanket, and then seeded with appropriate grass species to provide vegetative cover to prevent further erosion into the lake. Additional plantings of trees and/or shrubs and any future

landscaping conducted subsequent to project construction would be the responsibility of the non-Federal project sponsor. These plantings could be selected to benefit local wildlife, but would also need to be consistent with future maintenance requirements for the project. The Corps of Engineers would coordinate with Lake County and Ohio Department of Natural Resources-Division of Wildlife to review the species composition and general layout of any planting plan.

3.3 To the maximum extent practicable, in-water construction would be avoided between April 15 and June 30 in order to minimize the potential disruption of fish spawning activities. The eventual construction contractor would be required to develop and implement an Environmental Protection Plan identifying appropriate measures to avoid, minimize and respond to accidental spills of petroleum, oil and lubricants. During construction, the contractor would be required to minimize turbidity and accidental releases to Lake Erie, and all construction activities would be monitored by a Corps of Engineers representative.

4. Magnitude of the Proposed Lowering of Water Quality

4.1 No streams or wetlands would be affected by the proposed project.

4.2 Existing fishery habitat in the vicinity of the pump station consists of nearshore shallow water habitat with a shale and sand substrate. Generally the Central Basin of Lake Erie supports a variety of fish species, including both sport and forage species. There is a smallmouth bass fishery located several miles offshore but very little fishing activity nearshore. No vegetated shallows have been observed at the project site and to date no spawning habitat has been identified.

4.3 The eventual construction contractor would be required to develop and implement an Environmental Protection Plan identifying appropriate measures to avoid, minimize and respond to accidental spills of petroleum, oil or lubricants. Only naturally occurring, chemically inert sand and stone would be used in the construction of both the Preferred and Minimal Degradation Alternatives. Excavation and stone placement along the shoreline would unavoidably create short-term elevated turbidity levels within the nearshore zone. These elevated turbidity levels would subside shortly after the completion of project construction.

4.4 The physical placement of fill would adversely affect bottom-dwelling organisms at the site by direct burial of immobile forms or forcing mobile forms to migrate. The submerged portions of the proposed stone protection would increase local benthic habitat diversity and may increase the diversity of local benthic communities. Temporary increases in turbidity and suspended solids generated during project construction may cause negligible decreases in primary production and photosynthesis. Some aquatic macrophytes (aquatic plants) may also be directly covered as a result of construction activities. The placement of fill along the shoreline may smother bottom-dwelling organisms within the project area. Temporary turbidity increases may also interfere with their feeding. These short-term turbidity increases in local turbidity levels may induce free-swimming fish species to avoid the project area, however these species would return the site shortly after completion of the project. Only minor, short-term adverse impacts

would be expected to affect plankton due to limited, temporary increases in turbidity and suspended solid levels during project construction. The placement of fill material would cover and/or destroy immobile bottom-dwelling organisms. However, submerged portions of the proposed revetment would increase local benthic habitat diversity and provide improved feeding and shelter habitat. Only minor, temporary effects on the aquatic food web are expected at the project site, primarily due to the mortality of benthic organisms as discussed above. Other minor effects would reflect the mortalities of plankton and nekton from physical impacts. Rapid recolonization of the proposed project site is anticipated shortly after construction activities are completed.

4.5 No substantial effects would occur to the economic value of Lake Erie for recreation, tourism or other commercial activities. The major benefit of the proposed project is the protection of the Lake County Water Pump Station from shoreline erosion and the uninterrupted use of the public water supply. Increased turbidity in the project area may be temporarily aesthetically displeasing. However, the turbidity plume generated during project construction should dissipate before affecting widespread areas. In addition, ambient turbidity levels during construction may be sufficiently high so that any temporary increase in turbidity at the project site may not represent an excessive change. In the long term, the shoreline protection project would help reduce loadings of suspended solids into the lake by reducing bluff erosion thereby contributing to a reduction in nearshore turbidity levels. The presence of the protection would unavoidably present an artificial, man-made appearance; however, the persistent erosion scars along the shoreline would be eliminated.

5. Technical Feasibility and Cost Effectiveness

5.1 *Preferred Design (Alternative 2 – Revetment with Bluff Access)*. Not only is the Preferred Design alternative technically feasible and cost effective, but it would also have fewer technical challenges for future operation and maintenance of the project for the non-Federal sponsor (i.e., Lake County). The incorporation of the bluff access into the design of the proposed revetment would be less disruptive to the landscape and avoid costs for maintenance of the beach and road. In addition, the non-Federal project sponsor prefers to use their own lands to construct the project. Total project costs for this alternative would be \$3,628,700 and average annual operation and maintenance costs are estimated to be \$28,300 per year.

5.2 *Minimal Degradation Alternative (Alternative 1 – Revetment with Beach Access)*. This alternative is technically feasible and cost effective, however it would necessitate the preparation and repair of an approximately 1,200-foot long access road for construction and maintenance vehicles. Total project costs for this alternative would be \$2,597,700 and average annual operation and maintenance costs are estimated to be \$26,900 per year.

5.3 *Non-Degradation Alternative (No Action)*. The benefits associated with this project are facility damages avoided, that is, pump station relocation costs. The economic analysis for the project assumes that the relocation costs would occur in two phases. Phase 1 (Project Year 9 or 2023) replacement costs were estimated at \$6,939,100 and Phase 2 (Project Year 10 or 2024) would be \$2,976,900.

6. Economic Considerations

6.1 Construction of both the Preferred and Minimal Degradation Alternatives would result in a minor, short-term increase in employment opportunities, particularly the construction sector. It is estimated that approximately 10 construction jobs would be created during the six-month construction period. Major employers in Lake County include Lake Hospital System, Inc. (service), Lubrizol Corp. (chemicals), STERIS Corp. (manufacturing), Wal-Mart Stores, Inc. (retail), and ABB Automation Inc. (manufacturing) (Lake County Ohio Port and Economic Development Authority, <http://lcport.org/workforce>). Table 1 presents general economic characteristics for Lake County and Painesville Township.

Subject	Lake County	Painesville Township
Percent Unemployment (%)	7.2	10.2
Poverty Rate (All people) (%)	9.5	11.7
Mean Household Income (\$)	69336	63952
Major Employment Sectors (Industry) (%):		
• Educational Services, health care and social assistance	21.9	16.6
• Manufacturing	19.9	23.2
• Retail Trade	10.0	11.2
• Professional, scientific, and management, and administrative and waste management services	9.2	7.0
• Finance and insurance, and real estate and rental and leasing	8.5	10.5
• Arts, entertainment, and recreation and accommodation and food services	8.4	7.6
• Construction	5.2	4.0

Source: U.S. Census Bureau, 2011-2013 3-Year American Community Survey

6.2 Implementation of the Non-Degradation Alternative would likely result in a short-term indirect increase in local employment generated by the eventual need to construct a new pump station. The relocation of the pump station would also necessitate a substantial expenditure of county tax revenues to fund its construction.

7. Cumulative Impact

7.1 The cumulative effects associated with both the Preferred and Minimal Degradation Alternatives would include those resulting from future project maintenance and operation of the pump station. These may include noise, dust, erosion/sedimentation, and the removal of vegetation that could adversely affect the structural stability of the shoreline structure(s) or interfere with their periodic inspection. Normal grounds maintenance in the vicinity of the pump station would tend to sustain a turf/field habitat and prevent a succession to a natural climax habitat type. By protecting the pump station site from shoreline erosion, future expansion of the station may be made possible if needed. Water from the pump station is pumped to the Bacon Road Water Treatment Plant which has a 9 million-gallon per day (MGD) capacity. In 2008, the facility produced an average of 3 MGD. Given the current capacity of the plant, future expansion is not to be expected. However, this expansion could be required to accommodate

growth and greater demand for potable water within the service area or as an inducement for additional future growth and development. Expansion of the facility could result in short-term adverse construction-related impacts such as noise, dust, air emissions, erosion and sedimentation, etc. By expanding the “footprint” of the structure, a certain amount of upland vegetation (primarily turf) would be lost. An increase in water treatment plant production could also facilitate the development of residential and commercial sites throughout the service area which may result in the loss of additional undeveloped areas.

7.2 The Non-Degradation Alternative would result in no cumulative impacts to Lake Erie.

8. Indirect Impacts

8.1 The Preferred and Minimal Degradation Alternatives are not expected to create a barrier to the movement of aquatic organisms; cause changes to drainage patterns; impact groundwater; or cause measurable changes to project area vegetation and/or surfacing. The nearshore slope would be reduced from a near vertical eroding bluff to a stone structure with a designed 1V:1.5H slope. The cross sectional dimension and area would also be increased by the placement of the stone construction units. Indirect impacts of the project are expected to be negligible.

8.2 The Non-Degradation Alternative would result in no indirect impacts to Lake Erie.

9. Construction Storm Water Management Plans

9.1 Prior to commencing construction activities or delivery of materials to the project site, the contractor would submit an Erosion and Sediment Control Plan for review and approval by the Corps of Engineers. The purpose of the plan would be to present a comprehensive overview of known or potential erosion and sediment issues which the contractor must address during construction. The plan would identify the type and location of the erosion and sediment controls to be provided. It would also include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, and Federal, State and local laws and regulations.

9.2 Erosion and sediment control measures selected and maintained by the construction contractor would be required to insure that water quality standards are not violated as a result of construction activities. The area of bare soil exposed at any one time by construction operations would be kept to a minimum. Temporary and permanent erosion and sedimentation control best management practices (BMPs) to be installed would include, but not limited to, vegetation cover, slope stabilization, silt fences, sediment traps, diversion channels, and sedimentation basins. The placement of a geotextile filter fabric across the profile of the revetment would prevent the washing out of finer bluff material through the structure and into the lake. Above the proposed revetment, the bluff face would be covered with an erosion control blanket, and then seeded with appropriate grass species to provide vegetative cover to prevent further erosion into the lake.

9.3 A storm water management plan would not be applicable for the Non-Degradation Alternative, but may be required for any future construction activities that would disturb one or more acres of land.

10. Post-Construction Storm Water Management Plans

10.1 The operation and maintenance of the project would be the responsibility of the non-Federal sponsor (i.e., Lake County). For both the Preferred and Minimal Degradation Alternatives, it is assumed that structure and access road maintenance and repairs would occur at 10-year intervals. Storm water management measures during these maintenance activities would be the responsibility of Lake County.

10.2 A post-construction storm water management plan would not be applicable for the Non-Degradation Alternative.

Item 6

Proposed Project Mapping

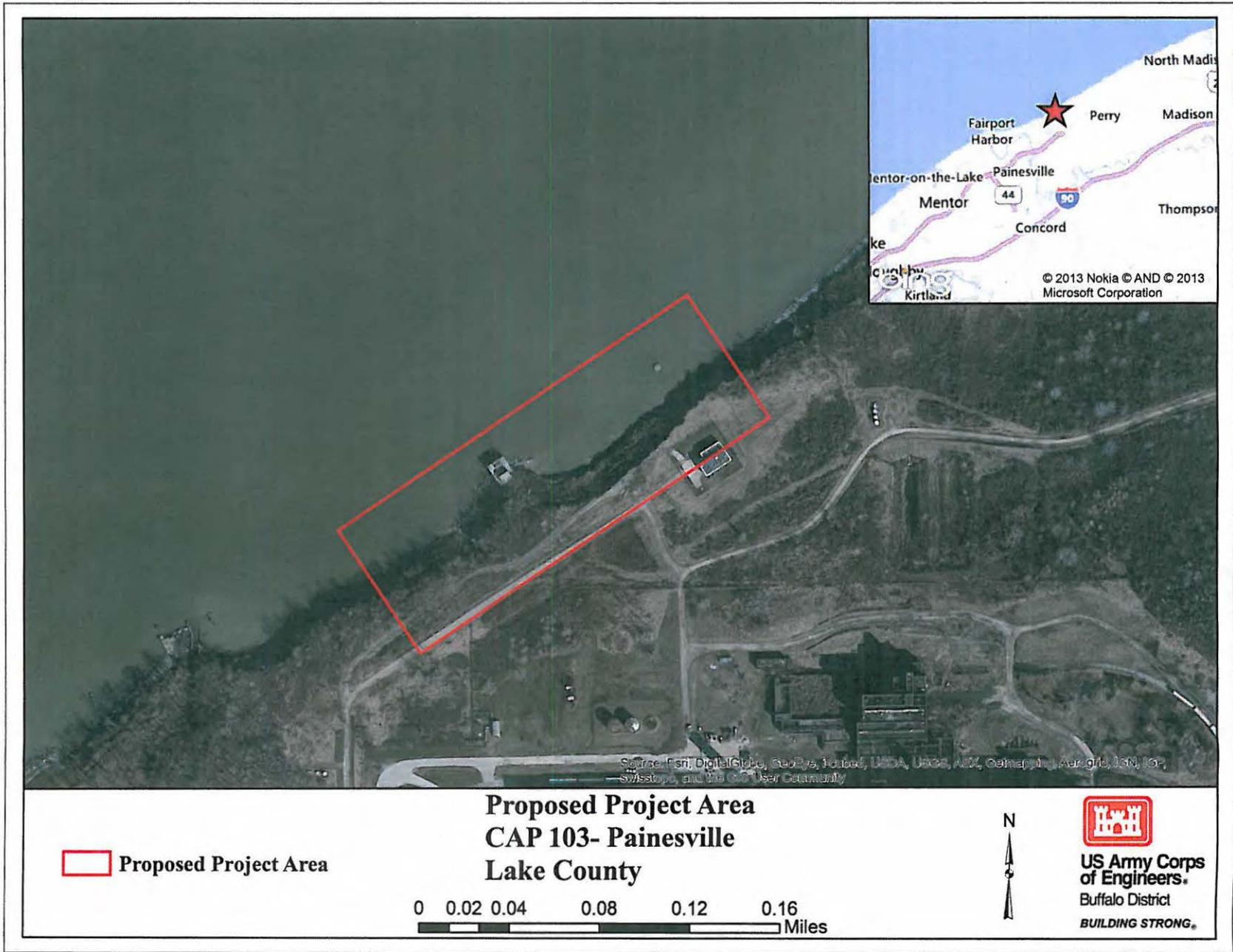


Figure 1-1: Location and Vicinity of the Lake County Raw Water Pump Station in Painesville, Ohio.

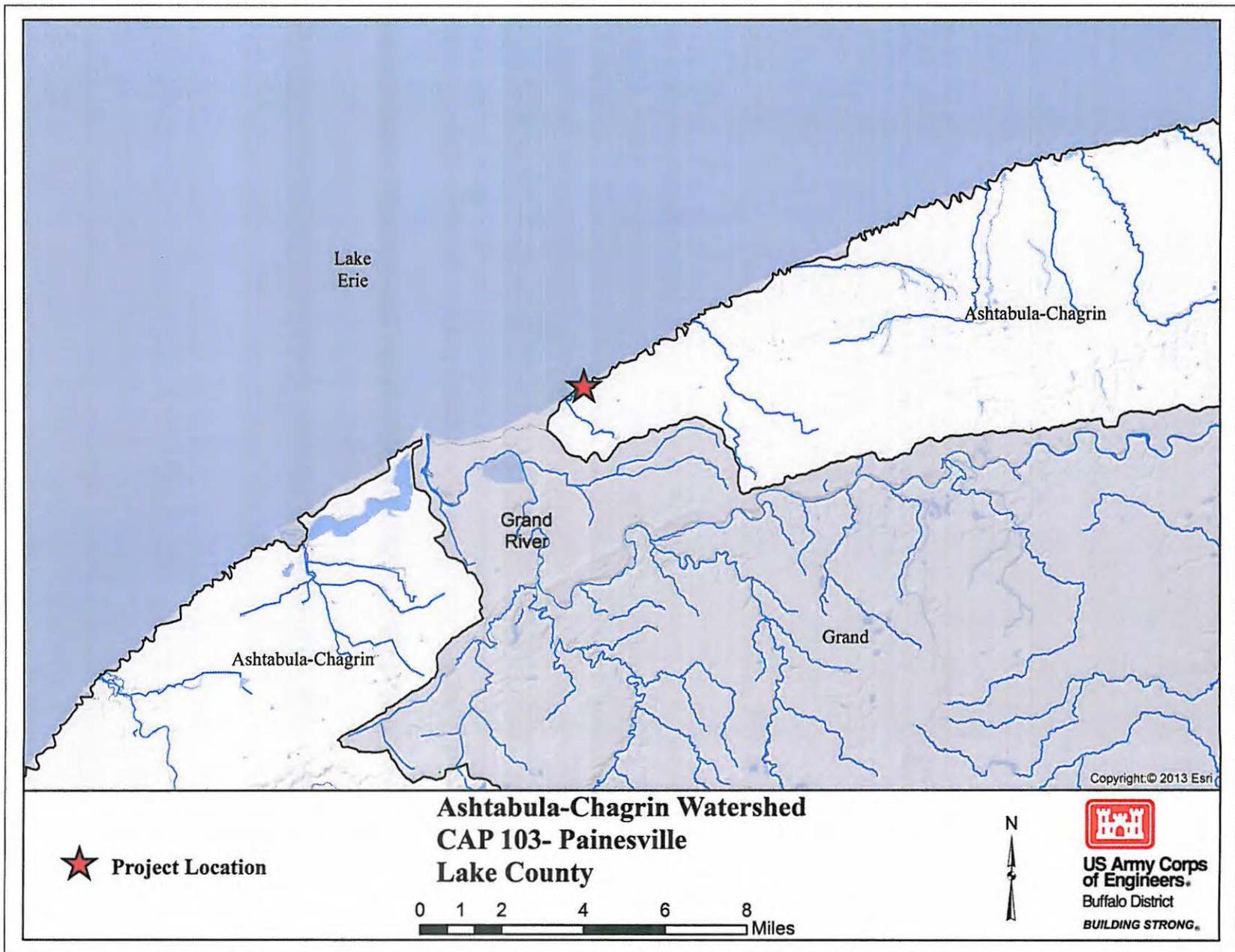


Figure 1-3: Watershed and Associated Minor Tributaries.



Figure 1-4: View of the Lake County Raw Water Pump Station in Painesville, Ohio.

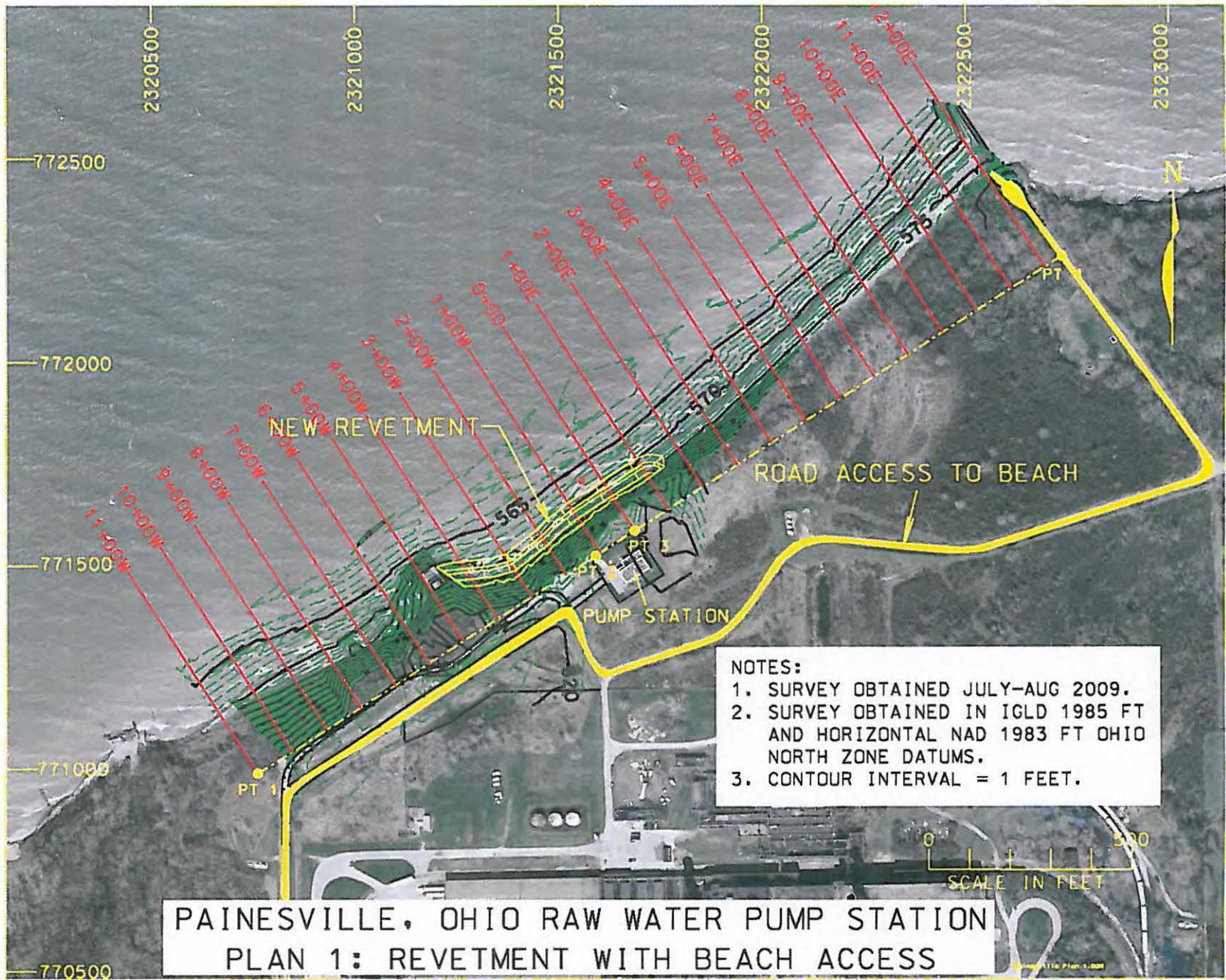
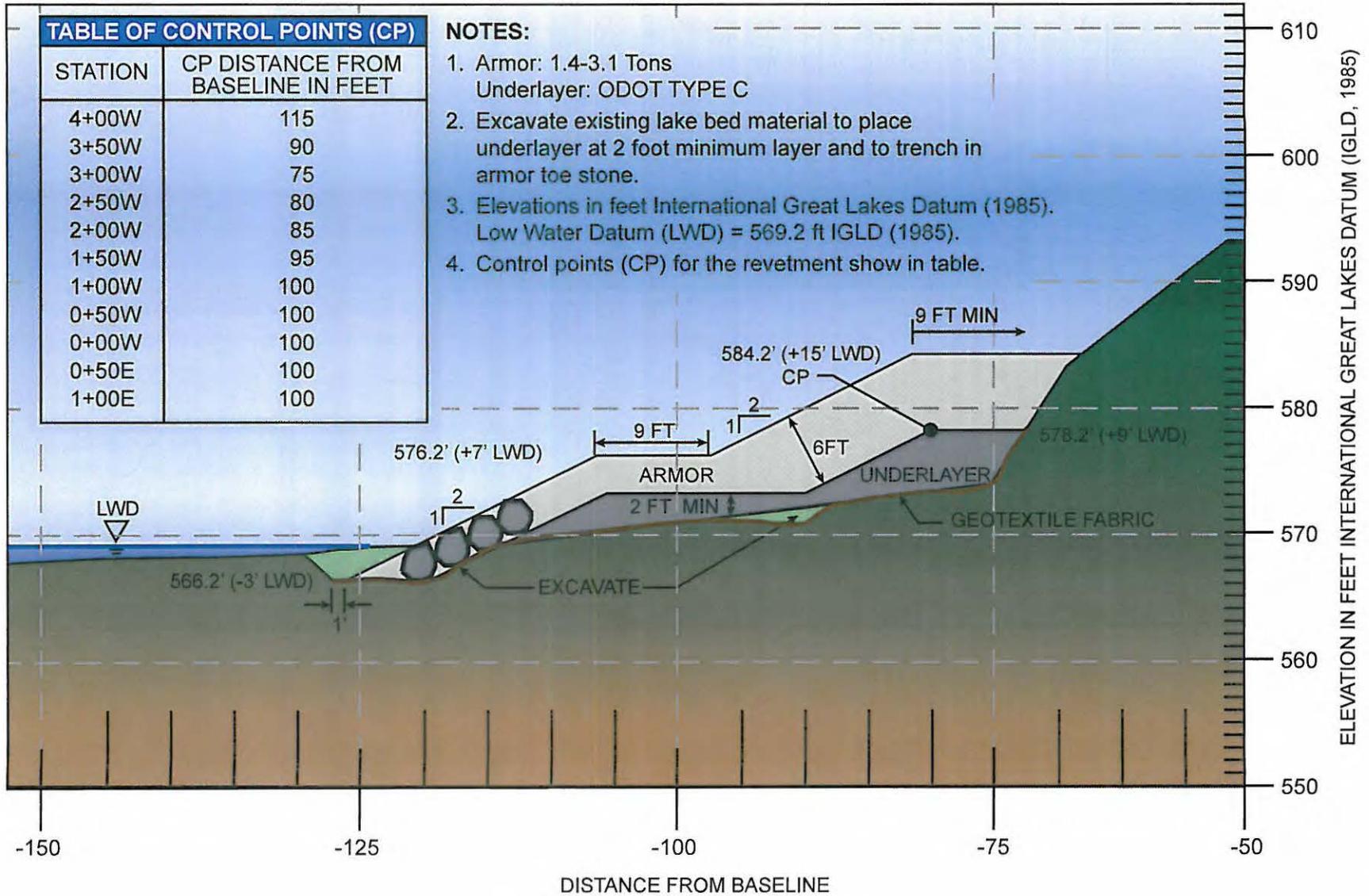


Figure 4-1: Alternative 1 - Plan View of Revetment with Beach Access.



TYPICAL SECTION PLAN 1

Figure 4-2: Alternative 1 - Typical Cross Section of Stone Revetment.



Figure 4-3: Alternative 2 - Plan View of Revetment with Bluff Access.

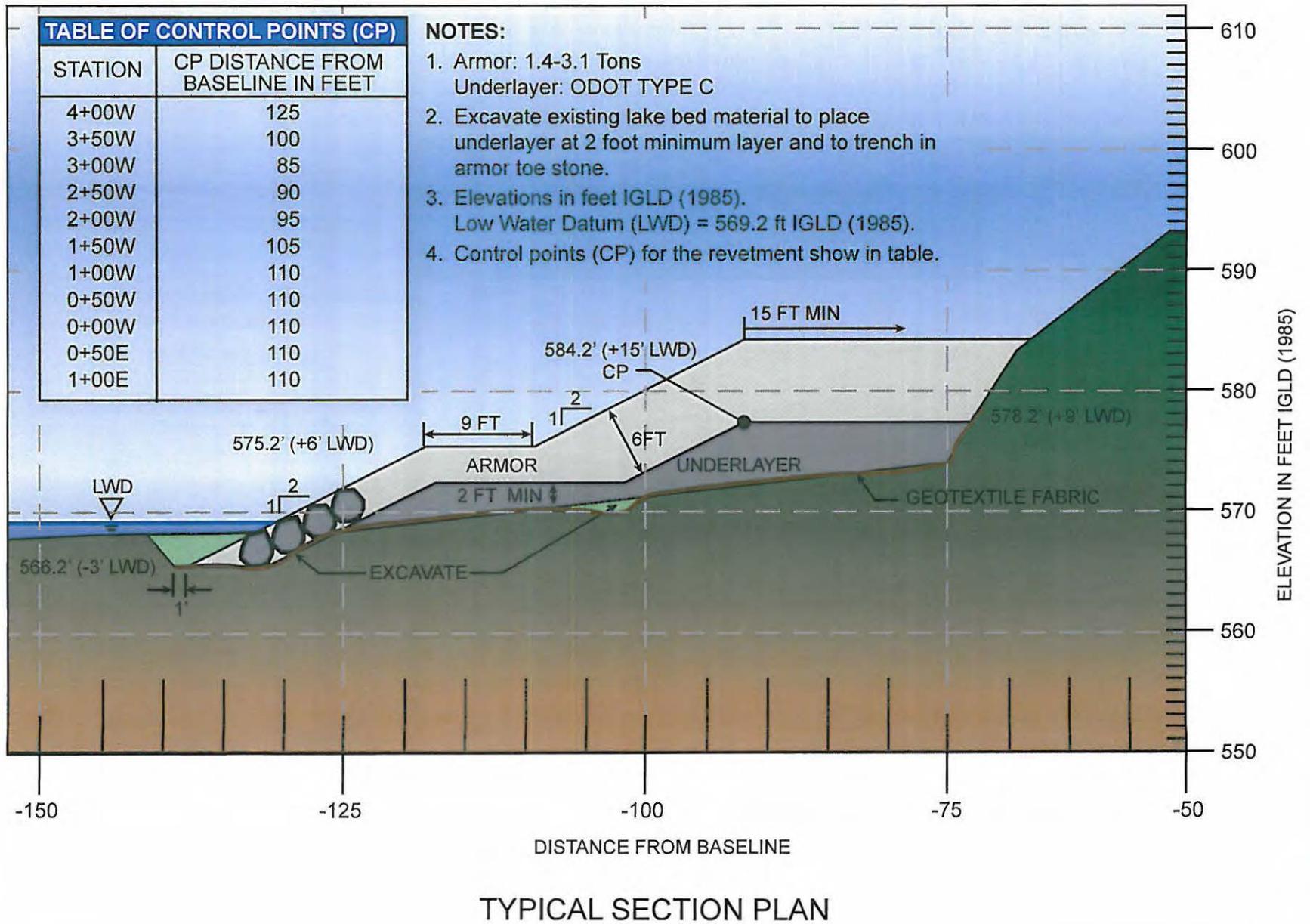


Figure 4-4: Alternative 2 - Typical Cross Section of Stone Revetment.

Item 7

Proposed Mitigation Plan

[Compensatory Mitigation is not required for this project]



State of Ohio Environmental Protection Agency

STREET ADDRESS:

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ENTERED DIRECTOR'S JOURNAL

October 24, 2001

CORRECTED COPY ISSUED NOVEMBER 6, 2001

U.S. Army Corps of Engineers, Buffalo District
Attn: John Landahl
1776 Niagara Street
Buffalo, New York 14207-3199

of the
Ohio Environmental Protection Agency.
Zonad Clements 11-6-01
Date

Re: Lake County / City of Painesville / Painesville Township
Grant of Section 401 Certification
Project to construct a rubblemound revetment along the base of an eroding bluff along the Lake Erie shoreline. The protection would extend for a distance of approximately 550 feet to a crest elevation of 15 feet above low water datum

Public Notice No. (B)2001-103

Ladies and Gentlemen:

The Director of Ohio Environmental Protection Agency hereby authorizes the above referenced project under one or both of the following authorities.

Section 401 Water Quality Certification

Pursuant to Section 401 of the Federal Water Pollution Control Act, Public Law 95-217, the Director of Ohio Environmental Protection Agency hereby certifies that the above-referenced project will comply with the applicable provisions of Sections 301, 302, 303, 306, and 307 of the Federal Water Pollution Control Act.

Ohio Isolated Wetland Permit

Pursuant to Ohio Revised Code Chapter 6111 and Ohio Administrative Code Chapter 3745-1, and other applicable provisions of state law, the Director of Ohio Environmental Protection Agency hereby concludes that the above-referenced project will comply with the applicable provisions of Sections 6111.03 and 6111.04 of the Ohio Revised Code.

This authorization is specifically limited to a 401 certification and or Ohio Isolated Wetlands permit with respect to water pollution and does not relieve the applicant of further certifications or Permits as may be necessary under the law. I have determined that a lowering of water quality in Lake Erie as authorized by this certification/Ohio Isolated Wetlands Permit is necessary. I have made this determination based upon the consideration of all public comments, and including the technical, social, and economic considerations concerning this application and its impact on waters of the state.

Bob Taft, Governor
Maureen O'Connor, Lieutenant Governor
Christopher Jones, Director

U.S. Army Corps of Engineers, Buffalo District
October 24, 2001
Page 2

This certification is issued subject to the following conditions:

Care must be taken to avoid impacts to the 0.4 acre Category 1 wetland to the west of the Lake County Pumping Station. No wetland impacts were requested nor authorized.

Steps shall be taken during construction to minimize bank erosion.

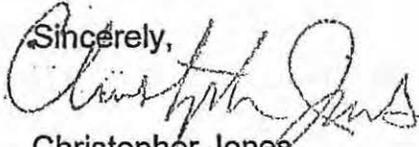
Steps shall be taken upon completion of this project, to ensure bank stability. This may include, but is not limited to, the placement of riprap or bank seeding, turf reinforcing matrix and erosion control blanket.

Materials used for bank protection shall be erosion resistant and free from toxic or other contaminants. Broken asphalt is specifically excluded from use as bank protection.

The fill shall be limited to that amount necessary to provide shoreline protection.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code by any person who was a party to this proceeding. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. It must be filed with the Environmental Review Appeals Commission within thirty (30) days after the notice of the Director's action. A copy of the appeal must be served on the Director of the Ohio Environmental Protection Agency and the Environmental Enforcement Section of the Office of the Attorney General within three (3) days of the filing with the Commission. An appeal may be filed with the Environmental Review Appeals Commission, 236 East Town Street, Room 300, Columbus, Ohio 43266-0557.

Sincerely,



Christopher Jones
Director

cc: Bill Butler, U.S. Army Corps of Engineers, Buffalo District
Dave Schulenberg, U.S. EPA, Region 5
Megan Sullivan, U.S. Fish & Wildlife Service
Don Polvony, ODNR, Division of Real Estate & Land Management
L. Fay, DSW, CO
Marc Smith, EAS
D. Stroud, DSW, NEDO
401 file

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