



## **Draft Environmental Assessment**

*Kalamazoo River Erosion Hazard Mitigation (Allegan, Allegan County, Michigan)*

*January 10, 2017*

*Prepared by*

Katie Kolokithas

Architectural Historian

ASTI Environmental

10448 Citation Drive, Suite 100

Brighton, Michigan, 48116

*Prepared for*

FEMA Region V, Disaster DR-4195-MI, Project ID 4195.13

536 South Clark Street, Sixth Floor

Chicago, IL 60605



**FEMA**

## List of Acronyms, Chemical Formulas, and Abbreviations

AHPA—Archaeological and Historic Preservation Act of 1974	NOI—Notice of Intent
AIRFA—American Indian Religious Freedom Act	NO <sub>2</sub> —Nitrogen Dioxide
AIRS—Aerometric Information Retrieval System	NPDES—National Pollutant Discharge Elimination System
APA—Authorized Public Agencies	NRCS—Natural Resources Conservation Service
APE—Area of Potential Effect	NREPA—Michigan Natural Resources and Environmental Protection Act
CAA—Clean Air Act	NRHP—National Register of Historic Places
CEA—County Enforcing Agency	NWI—National Wetlands Inventory
CEQ—Council on Environmental Quality	O <sub>3</sub> —Ozone
C.F.R.—Code of Federal Regulations	OHWM—Ordinary High Water Mark
CO—Carbon Monoxide	OSHA—Occupational Safety and Health Administration
EA—Environmental Assessment	Pb—Lead
EIS—Environmental Impact Statement	PCBs—Polychlorinated Biphenyls
EO—Executive Order	P.L. —Public Law
EPA—Environmental Protection Agency	PM <sub>10</sub> —Particulate matter
ESA—Endangered Species Act	RCRA—Resource Conservation and Recovery Act
FEMA—Federal Emergency Management Agency	ROW—Right-Of-Way
FIRM—Flood Insurance Rate Map	SESC—Soil Erosion and Sedimentation Control
FONSI—Finding of No Significant Impact	SHPO—State Historic Preservation Office
FPPA—Farmland Protection Policy Act	SO <sub>2</sub> —Sulfur Dioxide
HMGP—Hazard Mitigation Grant Program	SVOC—Semi volatile organic compounds
Ldn—Day-Night Average Sound Level	THPO—Tribal Historic Preservation Office
MDA— Michigan Department of Agriculture	TSCA—Toxic Substances Control Act
MDEQ— Michigan Department of Environmental Quality	USACE—United States Army Corps of Engineers
MDNR—Michigan Department of Natural Resources	U.S.C.—United States Code
MNFI—Michigan Natural Features Inventory	USFWS—United States Department of the Interior Fish and Wildlife Service
NAAQS—National Ambient Air Quality Standards	VOCs—Volatile organic compounds
NEPA—National Environmental Policy Act	
NHIS—Natural Heritage Information System	
NHPA—National Historic Preservation Act	

## Table of Contents

SECTION ONE: BACKGROUND .....	1
1.1 Project Authority .....	1
1.2 Project Location.....	1
1.3 Purpose and Need.....	1
1.4 Existing Facility (If Applicable).....	2
SECTION TWO: ALTERNATIVE ANALYSIS .....	3
2.1 Alternative 1 – No Action .....	3
2.2 Action Alternative 2 – Kalamazoo River Hazard Mitigation Project (Proposed Alternative) .....	3
2.3 Alternatives Considered and Eliminated From Further Consideration.....	4
SECTION THREE: AFFECTED ENVIRONMENT AND CONSEQUENCES .....	5
Preliminary Screening of Assessment Categories.....	5
3.1 Physical Environment .....	5
3.1.1 Geology, Seismicity and Soils .....	5
3.1.2 Water Resources and Water Quality.....	8
3.1.3 Floodplain Management (Executive Order 11988) .....	11
3.1.4 Air Quality.....	12
3.2 Biological Environment .....	13
3.2.1 Terrestrial and Aquatic Environment.....	13
3.2.2 Wetlands (Executive Order 11990) .....	15
3.2.3 Threatened and Endangered Species.....	17
3.2.4 Migratory Birds.....	19
3.3 Hazardous Materials .....	20
3.4 Socioeconomics.....	21
3.4.1 Zoning and Land Use .....	21
3.4.2 Visual Resources.....	21
3.4.3 Noise.....	22
3.4.4 Public Services and Utilities.....	22
3.4.5 Traffic and Circulation .....	23
3.4.6 Environmental Justice (Executive Order 12898) .....	24
3.4.7 Safety and Security.....	24
3.5 Historic and Cultural Resources .....	25
3.5.1 Historic Structures.....	26
3.5.2 Archaeological Resources.....	27
3.5.3. Tribal Coordination and Religious Sites.....	27
3.6 Comparison of Alternatives.....	28
SECTION FOUR: CUMULATIVE IMPACTS .....	31

SECTION FIVE: PUBLIC PARTICIPATION .....	32
SECTION SIX: MITIGATION MEASURES AND PERMITS .....	32
SECTION SEVEN: CONSULTATIONS AND REFERENCES .....	33
SECTION EIGHT: LIST OF PREPARERS.....	35
APPENDICES .....	35

## SECTION ONE: BACKGROUND

---

### 1.1 Project Authority

The City of Allegan (City) applied to the Federal Emergency Management Agency (FEMA) for \$4,204,712 of grant assistance (total project cost: \$5,606,283) under the Hazard Mitigation Grant Program (HMGP), application number 4195.13. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. § 5170c. The HMGP assists communities to implement hazard mitigation measures following a Presidential major disaster declaration. This application is for projects related to Federal disaster declaration DR-4195-MI, flooding that occurred after a period of severe storms between August 11, 2014 and August 13, 2014. The disaster was declared on September 25, 2014 and included individual assistance and public assistance available to those in Wayne, Macomb and Oakland Counties. The declaration also made HMGP assistance available statewide to fund hazard mitigation measures.

In accordance with the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. § 4332; the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [C.F.R.] Parts 1500 through 1508), and FEMA Management Directive and Instruction for NEPA compliance (FEMA Directive 108-1, *Environmental Planning and Historic Preservation Responsibilities and Program Requirements* (Aug. 22, 2016); and FEMA Instruction No. 108-1-1, *Instruction on Implementation of the Environmental Planning and Historic Preservation Responsibilities and Program Requirements* (Aug. 22, 2016), FEMA must fully understand and consider the environmental consequences of actions proposed for federal funding. The purpose of this Environmental Assessment (EA) is to meet FEMA's responsibilities under NEPA and to determine whether to prepare a Finding of No Significant Impact (FONSI) or a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the proposed project.

### 1.2 Project Location

The proposed project is located in the City of Allegan, Allegan County, Michigan, on the shoreline of a bend in the Kalamazoo River, adjacent to and below the North American headquarters of Perrigo, at 515 Eastern Avenue, Allegan, Michigan. The approximate latitude and longitude for the project area is 42°31'40.36" N 85°50'18.33"W. A Site Location Map and an aerial photograph of the proposed project area are included in Appendix A. The City of Allegan is a city of approximately 5,000 residents in Allegan County in southwest Michigan. Allegan is located approximately 30 miles northwest of Kalamazoo and 40 miles south-southwest of Grand Rapids.

### 1.3 Purpose and Need

The objectives of FEMA's Hazard Mitigation Grant Program is to provide assistance to communities in implementing hazard mitigation measures to reduce or eliminate long term risk to people and property from natural hazards.

In accordance with federal laws and FEMA's Environmental Management Directive (FD 108-1), the EA process for a proposed federal action must include an evaluation of alternatives and a discussion of the potential environmental impacts. This EA was prepared in accordance with FEMA's regulations as required under NEPA. As part of this NEPA review, the requirements of other environmental laws and executive orders are addressed.

The City of Allegan has experienced river-induced erosion at the proposed project location and at another site a short distance downstream. At this second site, the Michigan Department of Transportation had to move two structures (homes) and stabilize approximately 250 linear feet of shoreline and eroding bluff above a meander of the Kalamazoo River, in order to maintain the integrity of the state highway, M-222.

The focus of the action alternatives presented in this Environmental Assessment is to consider project alternatives which would stabilize an eroding riverbank and protect an economically important building at the top of the bluff. Comparison of topographic survey data (1995 and 2013) indicates that the top of the bluff has eroded at rates of 0.55 to 0.89 feet per year, and that the toe of the streambank has eroded at rates of 1.1 to 2 feet per year. The toe of the slope has migrated 36 feet, and the top of the bluff as much as 16 feet, toward the building over the last 18 years. New gullies have appeared, exhibiting rapid slumping and soil loss; the affected building, office space for approximately 450 people, is now only 44 feet from the top of the bluff and a sidewalk linking the parking lot and a patio behind the building is now only 6 feet from the eroding bluff edge.

Purposes for the project include (1) protecting the above-referenced commercial building and associated infrastructure at risk of loss due to river-related erosion, (2) reducing soil erosion and sedimentation in the Kalamazoo River, and (3) improving river water quality.

#### **1.4 Existing Facility (If Applicable)**

The project area is adjacent to the North American headquarters of Perrigo, the largest employer and taxpayer in the City of Allegan and one of the largest employers in southwest Michigan. Perrigo's building is at risk due to structural instability and collapse associated with streambank erosion on the Kalamazoo River bluff adjacent to and below the building. Perrigo is a global healthcare supplier that develops, manufactures, and distributes over-the-counter and prescription pharmaceuticals. The affected building is also the hub for fiber-optic connections to other Perrigo facilities elsewhere in the City of Allegan.

The City of Allegan proposes to stabilize the 70-foot tall slope below Perrigo's North American corporate headquarters. The slope is part of the east bank of the Kalamazoo River, upstream of M-222 and downstream of the City of Allegan. The toe of the slope has been cut away by erosive flows of the Kalamazoo River and is undermining the upper parts of the slope. The slope in its present state is close to a 1:1 angle. There is concern by Perrigo that further erosive forces from the river will continue to undermine the upper parts of the slope and affect the foundation of the building at the top of the slope. It was determined that at this advanced stage of erosion,

less intensive alternatives (such as planting vegetation) would be insufficient to curtail the continued destabilization of the slope.

## **SECTION TWO: ALTERNATIVE ANALYSIS**

---

The applicant is required to provide alternatives to the proposed project, and describe the environmental impacts of each alternative as provided below.

### **2.1 Alternative 1 – No Action**

The No Action alternative would not reduce or slow erosion of the bluff on which Perrigo's building sits; no construction activities would take place to stabilize existing slope.

### **2.2 Action Alternative 2 – Kalamazoo River Hazard Mitigation Project (Proposed Alternative)**

The proposed mitigation activity includes stabilizing the riverbank by installing stone and a steel sheet pile base at the toe of the slope with an additional soldier pile wall along the upper slope, beneath the Perrigo building. This will both retain the upper slope and stabilize the toe of the slope against further river erosion while supporting the added soil. The proposed activity will also include backfilling to create a stable (2.5:1) grade, covering the soil with soil erosion blankets and planting the slope with deep rooted, native vegetation. An existing access road, which was built by the Michigan Department of Transportation for stabilization along the next bend in the river, is across the river from the site and a portion of this will be used for construction access and staging.

The stabilization of the riverbank will include the following elements. Project plans are provided in Appendix A.

1. Mobilize from the west utilizing a portion of the existing MDOT gravel road access. Construct 1,460 feet of new temporary 20-foot wide gravel access road (541 cu. yds.) west to the rivers' edge ending with a 125 foot radius turn-around for haul trucks.
2. Install 3,000 linear feet of silt fencing to control access and runoff from temporary gravel road.
3. Construct 7,000 cubic yards of existing river-bottom sediment and 2,900 cubic yards of existing wetland and floodplain soils to create an embayment and temporary docking facilities for barges on the shoreline opposite the project area.
4. Place approximately 167 of the 2,900 cubic yards of excavated soil to create a barge platform for off-loading rock. The remainder will be used as sand backfill on the opposite shore.
5. Install 60 linear feet of temporary sheet pile along the existing, west shoreline.
6. Mobilize and install permanent sheet pile from barges in river along 410 feet of the east embankment with a maximum streamward impact of 42 feet.
7. Install approximately 90 linear feet of turbidity curtain as required by permit agencies for proposed excavation.

8. Excavate the river bottom from barges beginning along installed sheet pile wall and working west to shore using long reach backhoe.
9. After excavation is completed, add 3,660 cubic yards of oversized rock (24-36 inches) to face of 410 linear feet sheet pile on a 1.5H to 1V slope (20 feet of impact to the river beyond sheet pile).
10. During above excavation and rock reinforcement activities begin constructing 8,000 square feet of top-of-slope retaining wall by creating access to both sides of proposed retaining wall.
11. Drills holes for, and install, H-piles for retaining wall from upper access.
12. Drill tie backs for retaining wall from lower access.
13. Frame up around H Piles and pour concrete retaining wall.
14. Secure tiebacks and backfill upper part of retaining wall.
15. Add 2,080 cubic yards sand fill from above and below to develop 2.5H:1V final slope from bottom of exposed retaining wall to top of sheet pile.
16. Seed, and install 7,850 square yards of erosion control blankets to bare slope.
17. Install 370 shrubs and trees.
18. Install 3,333 square yards of soil erosion blankets and seed to repair lower temporary access road in flood plain and 600 square yards of seed and sod to repair temporary access at top of slope.
19. Repair landscaping work around Perrigo building.
20. Conduct as-built survey and generate report documenting all facets of construction.

Construction methods, materials, and equipment will be consistent with normal construction methods. Typical construction equipment such as bulldozers, skid loaders, long reach backhoes, barges, and haul trucks will be used to complete the project. The majority of the work for this project will involve construction of the retaining wall and alteration of the slope. This project also involves the installation of soil erosion blankets and deep rooted, native vegetation to further stabilize the riverbank. It is anticipated that construction will begin and be completed in 2017.

### **2.3 Alternatives Considered and Eliminated From Further Consideration**

The following alternatives were evaluated as part of the project design and permitting but eliminated from further consideration.

#### **Relocating the Staging Area**

The option of relocating the staging area to the east side of the river, building the slope stabilization treatment from the bluff-top, and limiting all impacts to the east side of the river was evaluated but ultimately rejected. It was determined that the side slopes on the eastern bluff were too steep for safe construction equipment access. Additionally, this alternative would require tree removal; further destabilizing the slope in areas of current stability. Construction of the entire treatment from one location was infeasible due to the limited reach of available equipment.

### **Using Barges as Staging Area**

Construction staging from barges anchored in the river was evaluated but deemed infeasible due to the inaccessibility of the project area from the upstream end and the high velocities of the river at that location.

### **Alternate Siting of, or Use of Existing, Access Road**

Relocating the proposed temporary access road north of the proposed location was also considered. The tree densities in the two areas were compared during the wetland delineation and it was determined that the proposed path impacted fewer trees. Further, the northern alternative was found to have a greater impact on the wetland and floodplain. Access by barge from downstream, at the end of the existing access road, was also explored but this was found to be cost prohibitive.

### **Permanent Impact on Wetland and Floodplain**

Creating a permanent access road would provide access to the forested floodplain for future recreational use. However, this alternative was rejected due to the impact of a permanent roadway on the wetland and floodplain. The temporary impact was the preferred alternative in discussions with the MDEQ. Creation of a temporary access road, and subsequent restoration, kept permanent wetland impacts below 0.33 acre, thereby avoiding the need for wetland mitigation. The proposed excavation of the west bank will result in the creation of shallow water shelves that will be colonized by wetland vegetation.

## **SECTION THREE: AFFECTED ENVIRONMENT AND CONSEQUENCES**

---

### **Preliminary Screening of Assessment Categories**

A preliminary screening resulted in the Coastal Zone Management and Coastal Barrier Resources assessment categories being eliminated. The Coastal Zone Management category is not applicable as the project area is not located near the two Coastal Zone Management Areas in Allegan County, Michigan. The Coastal Barrier Resources category is not applicable as the project area is not located near a Coastal Barrier Resources System unit.

## **3.1 Physical Environment**

### **3.1.1 Geology, Seismicity and Soils**

The project area includes a large bluff along the outer, eroding bend of the Kalamazoo River. Soils in this portion of the project area are primarily Oakville, 18-45% slopes (10E). Further, the USDA Soil Survey of Allegan County, Michigan identifies the proposed project area as containing Oakville fine sand, 18-45% slopes (10E); with smaller areas of Aquents, sandy and loamy (34); and Pipestone sand, 0-4% slopes (26A) on the east side of the river (soil map, Appendix A). The forested floodplain on the west side of the river is identified as Cohoctah silt loam (29). Of the soils within the project area, the Allegan Soil Survey identifies only Cohoctah silt loam as a soil that is considered prime farmland. Due to its slope and droughtiness, this soil is highly erosive.

The underlying bedrock in the area beneath the glacial deposits is composed of the Michigan Formation, Marshall Sandstone, and Coldwater Shale. The Michigan Formation is composed of discontinuous siltstone, sandstone lenses, shale, carbonate and evaporate. The Marshall Sandstone underlies the Michigan Formation which in turn is underlain by the Coldwater Shale. The Coldwater Shale ranges in thickness between 700 and 860 feet while the Marshall Sandstone is at its thickest point at 171 feet.

There is very low seismic risk for the project area; therefore, Executive Order (EO) 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction does not apply.

The Farmland Protection Policy Act (FPPA) (P.L. 97-98, Sec. 1539-1549; 7 U.S.C. § 4201, et seq.), which states that federal agencies must “minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses,” was considered in this EA. The proposed project area contains no lands in agricultural production. Specifically, Cohoctah silt loam is considered prime farmland only when not in “urban or built-up areas” and “where drained and either protected from flooding or not frequently flooded during the growing season.” The floodplain area west of the river is forested and is wholly within, and owned by, the City of Allegan. It is neither drained nor protected from flooding; in fact, it is within the 100 year floodplain of the Kalamazoo River and is frequently flooded during the growing season. With the exception of a small rise near the river, the entire project site west of the river is wetland. The presence of a wetland plant community, by definition, demonstrates the presence of saturation, inundation, and/or flooding during the growing season. Observations of scoured surface soils and drift deposits of plants and woody debris provide further evidence of frequent flooding.

***Alternative 1 – No Action:***

The No Action Alternative would result in continued erosion of the bluff below the Perrigo office building. Active cracks and gullies in the eastern riverbank, continued tree loss, and further development of these features since the 1995 topographic survey was conducted indicate that continued instability of the river bluff will likely cause additional areas of the slope, currently stable, to potentially become unstable and erode. The river bottom adjacent to the bluff contains heavy deposits of silt, sand, and clay from the ongoing erosion. These soil deposits are not limited to the inner side of the riverbend, where rivers normally deposit sediments, but instead extend across much of the river’s width. Continued erosion of the bluff is likely to further degrade the river substrate and put developed infrastructure at risk.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative will impact the soil and geology in the area in order to stabilize the eroding streambank. The Proposed Alternative includes installing 1,460 linear feet of gravel (541 cubic yards) to construct a temporary access road, extending from the existing MDOT access road to the river’s western edge, on the opposite shore from the eroding bank. On the west side of the river, approximately 60 feet of shoreline will be excavated and temporary sheet pile will

be added to construct a temporary docking facility for barges. Approximately, 7,000 cubic yards of material will be excavated from the existing river bottom (below the OHWM) to shift the watercourse to the west. Approximately, 2,900 cubic yards of additional material will be excavated from 0.28 acre of existing wetland and floodplain to expand the river on the west bank. The proposed project will not convert prime or unique farmland.

Of the 2,900 cubic yards, approximately 167 cubic yards of material will be used to construct a barge platform for off-loading rock. On the opposite side of the river, where the streambank stabilization is to be constructed, 410 linear feet of permanent sheet pile will be installed at an elevation of 622 feet and driven down to an elevation of 592 feet. A total of 3,660 cubic yards of stone will be placed on the river side of this sheet pile, extending 42 feet into the river from the measured water elevation of 616.5 and 60 feet from the OHWM. Large rocks will be added to the face of the sheet pile at a 1.5H to 1V slope with 20 feet of impact to the river beyond the sheet pile. Additional fill will be added from above to create a 2.5H:1V slope from the bottom of the exposed retaining wall to the top of the sheet pile.

Mitigation of the various impacts will include removing the 60 linear feet of sheet pile installed on the west bank for barge docking, removal of all temporary fill within the staging area, and removal of the gravel temporary access road.

The following required mitigation measures have been written into the MDEQ Floodplain/Inland Lakes & Streams/Wetland permit (Appendix C) and agreed to by the applicant:

- All dredged or excavated materials shall be disposed of in an upland site [outside of floodplains, unless exempt under Part 31, Water Resources Protection provisions of the Michigan Natural Resources and Environmental Protection Act (NREPA), Public Act 451 of 1994, Mich. Comp. Laws §§ 324.3101 – 324.3134 (2016), and wetlands, and stabilized].
- Authority granted by the MDEQ permit does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the County Enforcing Agency (CEA).
- No fill, excess soil, or other material shall be placed in any wetland or surface water area not specifically authorized by the MDEQ permit, its plans, or specifications.
- All raw areas in uplands resulting from the permitted construction activity shall be effectively stabilized with sod and/or seed and mulch (or other technology specified by this permit or the project plans) in a sufficient quantity and manner to prevent erosion and any potential siltation to surface waters or wetlands. Temporary stabilization measures shall be installed before or upon commencement of the permitted activity, and shall be maintained until permanent measures are in place. Permanent measures shall be in place within five (5) days of achieving final grade.
- All raw earth within 100 feet of a lake or stream, or wetland that is not brought to final stabilization by the end of the active growing season shall be temporarily stabilized with mulch blankets by October 10<sup>th</sup>.

- All rip rap shall be properly sized based on wave action and velocity, and shall consist of natural field stone or rock (free of paint, soil or other fines, asphalt, soluble chemicals, or organic materials). Broken concrete is not allowed.
- Temporary soil erosion and sedimentation control measures shall be installed before or upon commencement of the earth change and shall be maintained daily. Temporary soil erosion and sedimentation control measures shall be maintained until permanent soil erosion and sedimentation control measures are in place and the area is stabilized. Permanent soil erosion and sedimentation control measures for all slopes, channels, ditches, or any disturbed area shall be installed within five (5) calendar days after final grading or the final earth change has been completed.

### **3.1.2 Water Resources and Water Quality**

The project is proposed along the east and west banks of the Kalamazoo River within the City of Allegan, Allegan County, Michigan. The Kalamazoo River is approximately 130 miles long and its watershed drains eight counties including all or portions of Allegan, Barry, Eaton, Van Buren, Kalamazoo, Calhoun, Jackson, Hillsdale, Kent, and Ottawa. The river eventually drains in to Lake Michigan. The Kalamazoo River and its tributaries are spread across approximately 2,020 square miles in southwest Michigan. The main river is 175 miles long. According to the MDNR's 2005 River Assessment for the Kalamazoo River, the hydrology is strongly influenced by glacial deposits. Most of the surficial geology consists of outwash sand and gravel. The glacial deposits provide permeable soils that allow for groundwater inflow into the river which contributes to the flow of the river. The normal water surface elevation of the Kalamazoo River was measured at 616.5 feet above sea level (local benchmark) and the Ordinary High Water Mark (OHWM) was determined to be 619 feet. The base of the Perrigo building is approximately 690 - 691 feet.

The Kalamazoo River in the general area of the proposed project (HUC subwatershed 04050003000022) exhibits both legacy PCBs and excessive nutrient loading. Concentrations of dioxin (including 2,3,7,8-TCDD), mercury in the water column, and PCBs in the water column and in fish tissues all exceed state water quality standards. The proposed project site lies within the Kalamazoo River Area of Concern and is also within the Kalamazoo Total Maximum Daily Load (TMDL) reach for exceeding Michigan water quality standards for Total Phosphorus. However, areas most affected by excess nutrients and legacy PCBs are within impounded sections of the river upstream and downstream of the free-flowing reach within the proposed project area.

Sampling conducted by ASTI on October 14, 2014 (Appendix G), indicated that the macroinvertebrate assemblage was "acceptable" to "good," as scored using the Michigan Department of Environmental Quality's Procedure 51 Protocol. No water quality or sediment sampling was conducted for the proposed project, but sediment sampling and analysis was conducted for a similar shoreline stabilization project implemented by the Michigan Department of Transportation, on the same oxbow of the Kalamazoo River, approximately ¼-mile downstream. In that instance, sediment collected at four locations for soil cores from the surface to depths of 26, 36, and 66 inches were analyzed for VOCs, SVOCs, PCBs, arsenic, barium,

cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc and compared to a variety of drinking water, human health/contact, surface and groundwater standards. Only one sample was found to exceed any of the standards; a single sample from boring B104 was found to exceed the Groundwater Surface Water Interface Protection Criterion for selenium (Appendix G).

Storm water runoff within the project area flows to the Kalamazoo River directly via storm outlets at the top of the eroded slope and routed through the municipal storm sewer system. According to the MDEQ, the City obtains its drinking water from Lake Michigan. There are no sole source aquifers in the State of Michigan. The closest is the St. Joseph Aquifer system which is located in Indiana just south of the Michigan-Indiana state line which is located over 50 miles south of the project area.

***Alternative 1 – No Action:***

The principal adverse impact to water quality and fisheries habitat of the No Action Alternative would be the continued erosion of the streambank and deposition of sediment at the base of the bluff. Continued sedimentation will result in further burial of river substrate and fisheries habitat and in excess sediment oxygen demand. Continued soil erosion, and transport of nutrients adsorbed to soil particles, will also exacerbate phosphorus loading to the Kalamazoo River and the phosphorus TMDL for Lake Allegan downstream. No impacts to, or withdrawals of, groundwater are anticipated to result from either alternative.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative will reduce the ongoing erosion and sediment deposition, and the related nutrient loading to Lake Allegan downstream. Stopping the erosion of the bluff and excavating deposited sediments within the river channel will positively impact aquatic resources and help restore fisheries habitat. The proposed project includes removing 7,000 cubic yards of sediment that has been deposited into the river from the eroding streambank. In addition to improving substrate habitat, sediment removal will also reduce sediment oxygen demand and sediment-adsorbed phosphorus in the river, further improving water quality. Short- and long-term impacts from construction-related sediment mobilization and deposition will be contained by sheet pile and turbidity curtains. No impacts to, or withdrawals of, groundwater are anticipated to result from either alternative.

In Michigan, construction activities that disturb one or more acres of land and discharge storm water to streams, rivers, lakes, and/or wetlands are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Michigan Department of Environmental Quality, Water Resources Division (WRD). State Water Quality Certification under the Clean Water Act (33 U.S.C. § 1251, et seq.) Section 401 is included as part of the joint permit review and authorization. A copy of the permit is provided in Appendix C.

The WRD has adopted a process called "Permit-by Rule" (Rule 2190, promulgated under Part 31, NREPA) for issuing the necessary storm water coverage. Permit-by Rule streamlines the permitting process and is dependent upon the applicant first obtaining a Soil Erosion & Sedimentation Control (SESC) permit under Part 91. In Allegan County the Part 91 permitting agency is the County Health Department.

For projects disturbing one to five acres, as the proposed activity does, NPDES storm water permit coverage is automatic upon the applicant obtaining a Part 91 permit or undertaking the project as an Authorized Public Agency (APA). Although the coverage is automatic, the permittee must comply with the requirements of Permit by Rule. For the proposed project, the contractor will be responsible for obtaining the SESC (and thereby NPDES) permit following approval of their bid and prior to construction.

The Proposed Alternative will affect river hydraulics. Construction of the streambank erosion treatment includes substantial fill below the OHWM and within the 100-year floodplain. Compensatory mitigation measures include removal of deposited sediment from the river channel itself and additional excavation of portions of the floodplain opposite the eroding bluff. This will in effect, move the thalweg of the river to the west, away from the toe of the eroding bluff to reduce the erosive stress on the outer bank.

All disturbed areas in the wetland floodplain will be restored with native wetland vegetation. Turbidity curtains will be installed during construction of the barge platform to minimize sedimentation in the river.

In addition to those permit restrictions described in Section 3.1.1, the following required mitigation measures have been written into the MDEQ Floodplain/Inland Lakes & Streams/Wetland permit and agreed to by the applicant:

- The permittee, in exercising the authority granted by the MDEQ permit, shall not cause unlawful pollution as defined by Part 31 of the NREPA.
- Prior to commencing installation of the shore protection structure, the entire waterward perimeter of the project site shall be isolated with a turbidity curtain to prevent movement of suspended sediments. The turbidity curtain shall be installed to extend from the bed of the waterbody to a point above the water's surface. The turbidity curtain shall be maintained for the duration of the project and shall be left in place after completion until all disturbed sediments have settled.
- All slurry resulting from any dewatering operation shall be discharged through a filter bag or pumped to a sump located away from the wetlands and surface waters and allowed to filter through natural upland vegetation, gravel filters, or other engineered devices for a sufficient distance and/or period of time necessary to remove sediment or suspended particles.

### **3.1.3 Floodplain Management (Executive Order 11988)**

Executive Order (EO) 11988 requires federal agencies to take action to minimize occupancy and modification of the floodplain. Specifically, EO 11988 prohibits federal agencies from funding construction in the 100-year floodplain unless there are no practicable alternatives. FEMA's regulations for complying with EO 11988 are promulgated in 44 C.F.R. Part 9.

The design flood or 1.0% annual chance (100-year) floodplain elevation at this location on the Kalamazoo River is 622.1 feet NGVD29. The proposed project is within the 100-year floodplain of the Kalamazoo River as indicated in the FIRM (Flood Insurance Rate Map), panel # 260003 0001 B for the City of Allegan, Allegan County, Michigan (Appendix A). A summary of the Eight-Step Decision-Making Process to ensure funding consistent with EO 11988 is attached in Appendix B and is summarized below.

#### ***Alternative 1 – No Action:***

The No Action Alternative would not require modification to the existing floodplain. The No Action Alternative would, however, result in continued erosion of the river bluff and subsequent continued, non-human-induced fill within the river channel due to deposition of sediment. According to the hydraulic report provided by ATC, the river exhibits "significant changes in channel size and location along the actively failing bank." Mid-channel bars represent obstruction to flow in the project area. The No Action Alternative would lead to continued dynamic changes to the floodplain from sedimentation of the river channel.

#### ***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative includes significant changes to the Kalamazoo River floodplain. These include:

- 3,660 cubic yards of permanent stone fill and 2,080 cubic yards of sand backfill within the 100-year floodplain
- an additional 540 cubic yards of temporary gravel fill for construction access
- 7,000 cubic yards of material excavated from the river bottom to shift the watercourse to the west
- approximately, 2,900 cubic yards of additional material excavated from 0.28 acre of wetland and floodplain to expand the river on the west bank, and
- of these 2,900 cubic yards, approximately 167 will be used to construct a temporary platform for unloading stone from the barges.

Hydraulic modeling for the project (Appendix G) indicates that the proposed project will create a 0.49-foot rise in water surface elevations at the middle of the river bend during a 100-year storm event, but would lower water surface elevations at model cross-sections both above and below the cross-section where the model occurs. Modeled water surface elevations upstream of the project are 1.64 feet lower than the modeled existing conditions. Modelers determined that the

higher 100-year flood elevation only affects adjacent floodplain wetlands and does not create a harmful interference. No structures are expected to be impacted by the change in water surface. MDEQ found this acceptable and issued the joint Part 31 (Floodplain)/ 301 (inland lakes & streams)/ 303 (wetlands)/permit on October 27, 2016.

Due to both the location and nature of the proposed project (streambank stabilization) portions of the project, at least, must be conducted within the 100-year floodplain. The steepness (1:1 slopes) , the height (60-80 feet) of the bluff on the east side of the river, and the proximity of the Perrigo building to the cliff edge limit construction access and prohibit alternatives that would entail less fill within the floodplain.

Mitigation measures to limit the impact to the floodplain or changes in flood elevations include, removal of temporary floodplain fill used for constructing construction access and staging areas, restoration of original floodplain ground surface elevations in the access and staging areas, and compensatory cut in excess of floodplain fill within both the river channel and the adjacent floodplain.

In addition to those permit restrictions described in previous sections, the following required mitigation measures have been written into the MDEQ Floodplain/Inland Lakes & Streams/Wetland permit and agreed to by the applicant:

- The compensating cut (excavations) for floodplain fill, as authorized by the MDEQ permit, shall be completed prior to, or concurrently with, the placement of fill.
- The proposed fill and construction are located within a 100-year floodplain included in the community's Flood Insurance Rate Map and/or flood elevation study. The permittee must apply to FEMA for a Letter of Map revision based on fill (LOMR-F) if engineered earthen fill is placed within the mapped 100-year floodplain. As part of the National Flood Insurance Program requirements the community must ensure that the requirements found in Section 65.5(a) of the FEMA's 44 C.F.R. Part 65 are followed.
- Any temporary dam (coffer dam) constructed as part of this project shall have the dam crest placed at such an elevation that the dam will not cause upstream flooding in the event of high flow conditions. In no case shall the crest be set more than two feet above the Ordinary High Water Mark.

### **3.1.4 Air Quality**

The Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. 42 U.S.C. § 7401 et seq. The Clean Air Act established two types of national air quality standards. Primary standards 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, damage to animals, crops, vegetation and buildings. Current criteria pollutants are: Carbon Monoxide (CO),

Nitrogen Dioxide (NO<sub>2</sub>), Ozone (O<sub>3</sub>), Lead (Pb), Particulate Matter (PM<sub>10</sub>), and Sulfur Dioxide (SO<sub>2</sub>).

According to the EPA's NAAQS Attainment Map for Michigan the entire state is located in the attainment area for O<sub>3</sub>, CO, NO<sub>2</sub>, PM<sub>10</sub>, and Annual and 24-hour Fine Particulate Matter (PM<sub>2.5</sub>). The project area is not in the non-attainment areas for sulfur dioxide and lead which are present in small areas in the state.

***Alternative 1 – No Action:***

If no action is taken, there will be no construction activities that would occur. Therefore, no impacts to air quality are anticipated.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative may result in temporary impact to air quality due to the construction equipment utilized for the project. Impacts may result from the operation of diesel and gasoline engines associated with excavation, installation of the sheet pile and other equipment during the construction phase. Also, during the construction phase, exposed soil could temporarily increase airborne particulate matter into the project area. The proposed project will not create any long-term air quality issues. No adverse impacts to air quality are anticipated and no air permit is required. Open construction areas will be minimized and watered as needed to minimize particulates.

## **3.2 Biological Environment**

### **3.2.1 Terrestrial and Aquatic Environment**

The project area includes portions of the east and west riverbanks along a bend of the Kalamazoo River in the City of Allegan. The east riverbank is a 60 to 80-foot tall bluff rising from the river's edge and exhibits significant on-going erosion. Eroded portions of the slope are bare soil. Non-eroded sections of the slope consist of upland hardwood forest. River scour has undermined the toe of the slope, which has in turn resulted in slumping and failure of the bluff above the toe.

The west river bank, where the proposed construction access and staging area are located is forested wetland floodplain, dominated by silver maple, red maple, green ash, box elder, spicebush, moneywort, and reed canary grass. The southwest corner of the floodplain also contains a vernal pool and potential amphibian habitat.

Cardno, Inc. conducted a site investigation for potential threatened, endangered, or special concern species and their habitats. The results of that investigation are described further in Section 3.2.3. Bird species observed on the site, that are not listed as rare or special concern species, included bank swallows nesting in the eroding bluff face and belted kingfishers along the river.

Sampling conducted by ASTI on October 14, 2014, upstream of the project site, indicated that the macroinvertebrate assemblage in the river was “acceptable” to “good,” as scored using the MDEQ’s Procedure 51 Protocol, and included both an abundance and diversity of mayfly and caddisfly species indicative of high dissolved oxygen content.

***Alternative 1 – No Action:***

The No Action Alternative of not stabilizing the riverbank has the potential to adversely impact the surrounding terrestrial and aquatic environments. Continued erosion of the bluff will likely cause additional loss of trees on the slope, which in turn will destabilize additional sections of the bluff.

Although the addition of trees to the river provides the benefit of large woody debris for fish and invertebrate habitat, this benefit is outweighed by the negative impact on additional sediment in the river. The reach of river at the base of the bluff within the project area exhibits deep deposits of clay, silt, and sand from the eroded bluff. The river channel at the project site, exhibits significantly slower velocities and more homogenous substrate habitat due to sediment deposition. Although the project site section of the river contains a number of downed logs/trees, sediment has covered the hard substrates required by most macroinvertebrates and fish.

Continued erosion of the bluff also could threaten the existing bank swallow nests. Bank swallows typically burrow 20 to 40 inches into vertical banks. Mass failure of soil planes due to erosion has the potential to destroy nests.

The No Action Alternative would not adversely impact terrestrial habitats on the western riverbank.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative will temporarily impact terrestrial environments within the project limits and permanently impact the aquatic environment of the Kalamazoo River. Some trees and other vegetation will need to be removed to construct the temporary construction access road and other vegetation will be removed to excavate a portion of the floodplain to divert the river to the west and to provide compensatory floodplain cut. The floodplain forest is fairly open beneath the canopy and trees are widely spaced. It is estimated that approximately 50 trees will need to be removed to build the temporary access road (based upon an estimated 20-foot o.c. spacing and review of aerial photos). The proposed streambank stabilization will eliminate existing bank swallow nest sites. Proper timing of the bank stabilization will allow construction to proceed without negatively impacting young or nesting birds. Stopping the erosion of the bluff and excavating deposited sediments within the river channel will positively impact aquatic resources and help restore fish habitat.

The following procedures were recommended by the design firm and/or incorporated into the proposed construction methods to minimize and mitigate impacts to wildlife and habitat in the area.

1. Access to the area of investigation will be limited to the existing access road to the west and to a single lane of access to the riverbank for equipment.
2. The upland pocket adjacent to the river will be used as a partial staging area for equipment and materials.
3. Placement of the access road was selected to avoid impacts to the vernal pool.
4. Alternative access routes were evaluated to minimize tree removal and wetland impact. It is suggested that review of the proposed route should be conducted prior to tree removal to avoid 'take' of any active bird nests.
5. Work on the eroded bank should not occur from April through September 1st to facilitate the fledging of nesting birds in the bluff.
6. Turbidity curtains and other erosion control fencing will be used to surround areas of road construction and in-stream activities to contain soil erosion and prevent sedimentation in the wetlands or river.
7. The stabilized streambank and the restored access road area will be seeded and planted with native plant species.
8. Soil in the seeded areas will be protected with soil erosion control blankets following construction.

In addition to those permit restrictions described in previous sections, the following required mitigation measures have been written into the MDEQ Floodplain/Inland Lakes & Streams/Wetland permit and agreed to by the applicant:

- For projects with potential impacts to fish spawning or migration, no work shall occur within fish spawning or migration timelines (i.e., windows) unless otherwise approved in writing by the Michigan Department of Natural Resources Fisheries Division.
- No work or dredging within the water authorized by the MDEQ permit is allowed from May 1 to June 30 due to critical spawning times for smallmouth bass and other warm water fish species.

### **3.2.2 Wetlands (Executive Order 11990)**

Executive Order (EO) 11990, Protection of Wetlands, requires federal agencies to take action to minimize the loss of wetlands. The NEPA compliance process requires federal agencies to consider direct and indirect impacts to wetlands, which may result from federally funded actions. In Michigan, the MDEQ has been granted authority over the federal program for wetland permitting under Section 404 of the Clean Water Act, 33 U.S.C. § 1334.

A wetland delineation was conducted and one wetland was found within the project area. Maps of possible wetland areas in the vicinity of the proposed project are provided in Appendix A and

the wetland delineation report is included in Appendix G. The majority of the project site on the west river bank is wetland; determined to be such based upon evidence of wetland hydrology (evidence of frequent flooding and saturated soils), hydric soils (Cohoctah silt loam), and a wetland plant community (including silver maple, red maple, green ash, sycamore, eastern cottonwood, moneywort and reed canary grass). The MDEQ issued a permit for the proposed wetland impacts on October 27, 2016. A copy of the permit is provided in Appendix C.

***Alternative 1 – No Action:***

The east side of the river contains no wetland within the project area. The No Action Alternative is not anticipated to adversely impact wetland resources.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

Construction of the access road and staging area for the Proposed Alternative will temporarily impact 0.67 acre of wetland. Floodplain excavation will permanently impact 0.21 acre of wetland. Permanent wetland impacts have been kept less than 0.33 acre; as such, no compensatory wetland mitigation will be required. Temporarily impacted areas will be restored with native seed and plantings. Compliance with EO 11990 has been met.

The access road configuration and location were determined based upon the wetland delineation results and site investigation. The selected route removes fewer trees and avoids impacts to a vernal pool in the southwest portion of the site. Use of a small upland area near the river for construction staging reduces the wetland impact.

Because the wetland is larger than five acres in size, and because it is contiguous with the Kalamazoo River, it is regulated by the State of Michigan. Any dredge or fill activities within the wetland requires a permit from the Michigan Department of Environmental Quality. A wetland delineation report and wetland permit application were submitted to the MDEQ and, following review, the MDEQ issued Wetland Permit #WRP004490 v1.0 on October 27, 2016. This permit remains in effect until October 27, 2021. A copy of the permit and associated permit restrictions are provided in Appendix C.

In addition to those permit restrictions described in previous sections, the following required mitigation measures have been written into the MDEQ Floodplain/Inland Lakes & Streams/Wetland permit and agreed to by the applicant:

- Construction must be undertaken and completed during the dry period of the wetland or when frozen. If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.
- Prior to the start of construction, all adjacent non-work wetland areas shall be protected by properly trenched sedimentation barrier to prevent sediment from entering the wetland. Orange construction fencing shall be installed as needed to prohibit construction personnel and equipment from entering or performing work in these areas.

### 3.2.3 Threatened and Endangered Species

In accordance with Section 7 of the Endangered Species Act (ESA) of 1973, 16 U.S.C. § 1536, the project area was evaluated for the potential occurrences of federally listed threatened and endangered species. The ESA requires any federal agency that funds, authorizes or carries out an action to ensure that their action is not likely to jeopardize the continued existence of any endangered or threatened species (including plant species) or result in the destruction or adverse modification of designated critical habitats.

A Threatened and Endangered Habitat Assessment was conducted for the project area and is included in Appendix G. Prior to the site investigation, Cardno, Inc. reviewed the Michigan Natural Features Inventory (MNFI) database for any threatened, endangered, or special concern species occurrences within the area of the proposed project. MNFI records indicated that the following state-listed species have been recorded within one mile of the project site.

Common Name	Scientific Name	Category	State Status	Federal Status
Blanchard's cricket frog	<i>Acris crepitans blanchardii</i>	Amphibian	Threatened	---
Marbled salamander	<i>Ambystoma opacum</i>	Amphibian	Endangered	---
Cerulean warbler	<i>Dendroica cerulea</i>	Bird	Threatened	---
Tinted spurge	<i>Euphorbia commutata</i>	Plant	Threatened	---
Prothonotary warbler	<i>Protonotaria citrea</i>	Bird	Special concern	---
Eastern box turtle	<i>Terrapene carolina carolina</i>	Reptile	Special concern	---

FEMA has determined that species of special concern are not afforded legal protection under Part 365, Endangered Species Protection provisions of the NREPA, Public Act 451, of 1994.

Cardno also found that, although there are no records of state-listed mussels within one mile of the project area, three species of special concern mussels and one threatened mussel species are recorded within five miles of the project site.

No threatened, endangered, or special concern species, or their preferred habitats, were observed during Cardno's site assessment. Cardno determined that the forest did not exhibit suitable nesting habitat for the listed bird species and the project area lacked downed trees used as cover by the marbled salamander. The lack of marsh habitat indicated that the Blanchard's cricket frog is not likely to occur in the project area. A vernal pool was identified on the site that could serve as seasonal breeding habitat for a variety of both frog and salamander species; the proposed project area was specifically selected to avoid possible impacts to this vernal pool.

The following federally listed threatened and endangered species are known to occur in Allegan County: Indiana bat (*Myotis sodalists*) – endangered; Northern long-eared bat (*Myotis septentrionalis*) – threatened; Rufa red knot (*Calidris canutus rufa*) – threatened; Eastern masassauga (*Sistrurus catenatus catenatus*) – threatened; Karner blue butterfly (*Lycaeides melissa samuelis*); and Pitcher's thistle (*Cirsium pitcher*) - endangered.

Cardno's threatened and endangered species habitat assessment report did not include a review for federally-listed species or for the bald eagle, which is a state-listed special concern species and protected under the Migratory Bird Treaty Act, 16 U.S.C. §§ 703 – 712, and the Bald and Golden Eagle Protection Act, 16 U.S.C. §§ 668 – 668d. Of the federally-protected species known to occur in Allegan County, the Indiana bat and the northern long-eared bat, and to a lesser extent, the eastern massasauga rattlesnake, have the potential to be found on the site.

To determine if habitat exists for the listed bat or rattlesnake species, Cardno conducted a follow-up site inspection to assess the availability of trees with sloughing or peeling bark or cavities that could house maternity colonies or provide roosting sites for the Indiana or northern long-eared bats. ASTI also assessed potential bat and rattlesnake habitat on September 6, 2016, while on-site prior to archaeological investigations.

There are no known northern long-eared bat hibernacula or roost trees in Allegan County. However, both firms determined that there are trees on-site that exhibit peeling or sloughing bark (dead elms and ash trees and some live shagbark hickories) that have the potential to provide habitat for the federally listed bat species.

ASTI determined that the project area lacks the sunning/basking habitat, open wetlands, and the interface between upland and wetland habitats preferred by the eastern massasauga rattlesnake. It is ASTI's opinion that the eastern massasauga rattlesnake is not likely to be found on the site or impacted by the proposed project. The other species (Rufa red knot, Pitcher's thistle, and Karner blue butterfly) are also not likely to be found on the project site due to the lack of appropriate habitat for these species. MNFI records indicate that the bald eagle (*Haliaeetus leucocephalus*), although known to occur in Allegan County, is only recorded in Sections 13 and 14 of Valley Township, more than three miles west of the proposed project site.

***Alternative 1 – No Action:***

The No Action Alternative will not impact state- or federally-listed threatened or endangered, or state special concern, plant or animal species. No threatened, endangered, or special concern mussel species are known within the project area. However, continued erosion of the riverbank will continue to discharge sediment loads to the Kalamazoo River. Mussel habitat elsewhere could be negatively affected by these sediments as they are mobilized and washed downstream.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative will require some tree removal. Some of the affected trees may exhibit the sloughing or peeling bark, or cavities with the potential to provide roosting habitat for either the Indiana or northern long-eared bat.

As such, FEMA consulted with the USFWS and, in a letter dated August 24, 2016 (Appendix C), the USFWS confirmed that, if tree clearing is conducted between the dates of October 1 and March 31, when bats are not present on the landscape, the project will avoid direct take of

Indiana or Northern long-eared bats and that any effects to bats returning in the spring would be insignificant.

The threatened and endangered species survey report was provided to the MDEQ as supplementary information for their permit review. No permit conditions were required to further address threatened or endangered species concerns. The following procedures were recommended by the design firm and/or incorporated into the proposed construction methods to minimize and mitigate impacts to wildlife and habitat in the area.

1. Access to the area of investigation will be limited to the existing access road to the west and to a single lane of access to the riverbank for equipment.
2. Placement of the access road was selected to avoid impacts to the vernal pool.
3. Tree removal should be limited to the period October 1 through March 31 to avoid possible impacts to listed bat species.

### **3.2.4 Migratory Birds**

As noted in Section 3.2.1 above, two species of birds protected under the Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. §§ 703 – 712), i.e. bank swallows and belted kingfishers, were found on the project site. The presence of migratory bird species was included in the applicant's Threatened and Endangered Species Habitat Assessment Report provided in Appendix G.

#### ***Alternative 1 – No Action:***

The No Action Alternative will not directly impact migratory birds; however, the continued erosion of the bluff could result in the loss of nesting sites in the cliff face. If portions of the slope fail during the nesting season, young unfledged birds could be killed.

#### ***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative, by its nature, will cover and reshape the vertical bluff face where bank swallows now nest. FEMA and ASTI consulted with the USFWS regarding the proposed work; USFWS correspondence is provided in Appendix C.

To avoid impacts to nesting pairs and young, both bank swallows and kingfishers that may use bank swallow nesting holes, possible nesting areas should be covered before the birds arrive for the beginning of nesting season or construction impacting these areas should be scheduled to take place outside the nesting season. Work on the eroded bank should not occur from April 15 through July 15 for kingfishers and May 15th through August 15th for bank swallows to facilitate the fledging of nesting birds in the bluff. If construction on the bank cannot be avoided during nesting season, then further consultation with the United States Fish and Wildlife Service should be completed to obtain an incidental take permit to authorize unavoidable impacts (email correspondence from Katie Koch – Migratory Birds Biologist - USFWS dated 12/22/2016 – Appendix C).

### **3.3 Hazardous Materials**

No hazardous materials were observed in the project area. Perrigo's North American headquarters is listed as an AIRS, RCRA-generator, and TSCA site for its manufacturing of pharmaceutical products. The EPA NEPAassist website has no facility reports for the TSCA listing. The AIRS listing indicates that the facility is in compliance. The RCRA-generator listing indicates that the facility is a large quantity generator with no violations. One other site was identified in the immediate project area, JH Packaging at 502 Eastern Avenue, Allegan, Michigan. This site was a commercial printer and appears to be in compliance with all state requirements. This facility is nearly 1,000 feet from the main project area and based on this distance and the compliance status, this site is not likely to impact the project area. The Rockwell International Corporation, a Superfund site, is located at 1 Glass Street in Allegan and is approximately one mile distant and likely contributed to the general contamination of the Kalamazoo River.

The Kalamazoo River is a federally-designated Superfund site from the mouth of the river at Lake Michigan, upstream to the Morrow Lake Dam upstream of Kalamazoo. This stretch of river includes the proposed project site and the City of Allegan. There is reason to expect sediments contaminated with PCBs within the impoundments created by the City of Allegan Dam and the Lake Allegan Dam upstream and downstream of the proposed project site, respectively. However, sediment analysis (Appendix G) conducted within the same river meander for the M-222 shoreline stabilization project downstream of the Perrigo site found no PCB congeners above the laboratory reporting limit in any of the samples collected. It is believed that transport of river sediments within these actively eroding areas has removed any finer depositional sediment that may contain hazardous or toxic materials.

#### ***Alternative 1 – No Action:***

If the No Action Alternative were undertaken at the site there would be no hazardous materials impacts anticipated. The Perrigo building, endangered by the ongoing erosion, would be abandoned or demolished prior to an actual riverbank collapse.

#### ***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative does not involve the addition of any hazardous operations or chemicals, nor will it present the risk of hazardous materials-related impacts to the environment. Construction equipment used for the project will have small quantities of gasoline and fuel but no releases are anticipated from these machines as they will be kept in good working order. Based upon sampling conducted along the same bend in the river, a short distance downstream, subsurface hazardous materials are not anticipated to be present. Excavation activities could potentially expose or otherwise affect subsurface hazardous wastes or materials; any hazardous materials discovered, generated, or used during implementation of the proposed project shall be disposed of and handled by the project applicant in accordance with applicable local, state, and federal regulations.

### **3.4 Socioeconomics**

#### **3.4.1 Zoning and Land Use**

The project area is along the Kalamazoo River near 505 Eastern Avenue, Allegan, Michigan. The project area is located within the city limits of the City of Allegan and is associated with the North American headquarters of Perrigo. Land within the project area on the western shore is zoned R-2 (single-family residential, medium density) although current City plans for this floodplain area include use for passive recreation. The eastern streambank, proposed for stabilization, is zoned as M-1 Manufacturing District. A map showing the project location and surrounding land use is included in Appendix A.

##### ***Alternative 1 – No Action:***

The No Action Alternative would impact local zoning by removing the eroding bank from its zoned use. Continued erosion will ultimately impact Perrigo's building, causing the company to move their headquarters. The City anticipates that if Perrigo has to relocate, they will do so outside of the City limits; eliminating local jobs and impacting the tax base of the City of Allegan. Perrigo relocating may also affect employees and the economy of the greater southwest Michigan area. Perrigo is one of the largest employers in the region and losing this important job creator would be detrimental to the community.

##### ***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative will allow the site of the Perrigo building to remain in use as zoned (manufacturing). Review of the City's zoning map and aerial photos indicate that land within the City boundaries zoned for manufacturing is largely already developed and in use. Only one area zoned M-1 is currently undeveloped and it does not appear to be of sufficient size to accommodate a building and associated parking of the same size as the existing Perrigo building. Additionally, the existing Perrigo building is within a campus setting with other Perrigo facilities, proximal to one another and connected by fiber optic cables and shared computer systems. The above-referenced undeveloped M-1 zoned property is across town. Restoration actions taken following construction will return the west-shore floodplain wetlands owned by the City of Allegan to their native state.

#### **3.4.2 Visual Resources**

The visual resources in the project area include the Kalamazoo River and surrounding riverbanks, forest, and wetlands. There are no residential dwellings in the project area but the Perrigo building overlooks the river and surrounding area. Views of the area are largely limited to those working in the Perrigo building, canoeists using this section of the Kalamazoo River, and individuals that may be hiking in the floodplain forest west of the river. The eroding bluff on the river is a departure from the forest cover elsewhere along the river. Existing visual impacts include the eroding slope, and sedimentation and fallen trees within the river.

***Alternative 1 – No Action:***

The No Action Alternative would allow continued slope erosion. It is anticipated that the length of eroding shoreline will increase, that additional areas will lose existing tree cover, and additional trees and sediment will be deposited in the river channel, as additional areas of slope become unstable. This will result in a larger section of bare streambank and additional logs and debris in the river, further impacting the visual resource for paddlers on the river.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative will result in both temporary and permanent changes to the visual resources for those using the Kalamazoo River. Construction equipment, sheet pile on the west bank, excavation, tree removal, and other activities will temporarily impact visual resources during construction. Permanent visual impacts include visible sheet pile and large rocks on the eastern bank. As noted, there are no residential homes or recreation paths currently in the project area. The potential benefits to water quality, safety, the Perrigo structure, and the local economy outweigh the impact to the visual resources for any future development in the project area and by individuals using the Kalamazoo River for water recreation.

The temporary access road and the stabilized bluff will both be reseeded and planted with native plant species, restoring the existing visual impact of the erosion and the temporary impacts caused by construction. The use of native plantings will soften the visual impact of the proposed project as compared to the M-222 streambank stabilization downstream, where rock only was employed.

**3.4.3 Noise**

The project area is not near any noise-sensitive land uses and the only sound receptor in the area would be Perrigo’s office building.

***Alternative 1 – No Action:***

The No Action Alternative will not change ambient noise levels in the project area.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative will cause short-term, temporary changes in the ambient noise levels in the area associated with the construction activities. Construction machinery used will include trucks hauling materials to the site, and long-reach excavator for dredge and fill activities, and a pile-driver for installing sheet piling. The population most affected by construction noise will be workers at the Perrigo building. To minimize noise impacts, construction activities will be limited to regular business hours. There are no sensitive receptors in the project area.

**3.4.4 Public Services and Utilities**

The project area is serviced by the City of Allegan Police and Fire Departments and is within the Allegan School District. Areas adjacent to the proposed construction on the east side of the river have storm water outfalls and the Perrigo building is serviced by the City of Allegan sanitary

sewer system. There are no public utilities or services on the west bank of the river. Perrigo has private fiber optic cables in the eastern river bank that are at risk if continued erosion is allowed to take place. These would need to be rerouted or replaced if Perrigo moves to a new location.

***Alternative 1 – No Action:***

The No Action Alternative could potentially impact sanitary and storm sewer infrastructure at the top of the bluff if erosion is left unchecked. If erosion continues until the Perrigo building foundation is affected, then the Perrigo private fiber optics/computer connection would be adversely impacted. These cables are located beneath the building on the eastern river bank, linking this building with other Perrigo facilities to the east, and would be prohibitively expensive to relocate.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative will not impact public services or utilities. No utilities will need to be installed as part of the proposed project. The Perrigo fiber optics cable will be protected by the proposed alternative to stabilize the river bank and will not be impacted by the proposed construction.

**3.4.5 Traffic and Circulation**

The project area has very few roadways that are used for daily transit. A temporary, gravel access road was built by MDOT in the center of the western riverbank to conduct the M-222 streambank stabilization project downstream. The access road is gated and receives no traffic at this time. This road will be utilized as a starting point for the proposed new access road.

Eastern Avenue is a two-lane street located east of the Perrigo building on the eastern bank and services Perrigo buildings and adjacent residential areas. Little construction work will be conducted from the Perrigo site and the eastern upper bank. There is no public transportation near the project area. Water traffic on the Kalamazoo River, in the form of recreational users, is extremely light and will be interrupted during construction activities.

***Alternative 1 – No Action:***

If the proposed project is not undertaken (No Action alternative) there will be no impact on the roadway traffic in the project area.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The proposed project may temporarily impact traffic within the City of Allegan as materials and equipment are mobilized to the site. No other traffic utilizes the MDOT access road. There will be no road closures or detours associated with the project. No traffic mitigation measures are required. The project will have no long-term or short-term impacts to roadway traffic in the area.

### **3.4.6 Environmental Justice (Executive Order 12898)**

On February 11, 1994, President Clinton signed Executive Order (EO) 12898, entitled, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” The EO directs federal agencies, “to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States . . . .”

Allegan County had a population of 111,408 in the 2010 Census compared to 9,922,576 in the entire State of Michigan. In Allegan County, nearly 90% of those individuals living in the area identify as white, 1.5% identifies as black, and nearly 7% identify themselves as Hispanic. These are compared to the entire state which has about 75% identifying as white, 14% as black, and 4% as Hispanic. The US Census bureau indicates that only 3% of individuals county-wide were born in another country while 6% in the entire state indicate they were foreign born.

#### ***Alternative 1 – No Action:***

In compliance with FEMA’s policy implementing EO 12898, Environmental Justice, the socioeconomic condition and potential effects related to the No Action Alternative have been reviewed. If the proposed project does not occur, there will be no anticipated impact on minority or low-income populations in the area. The general working population of Perrigo will be temporarily or potentially permanently impacted if Perrigo is forced to relocate their operations.

#### ***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The proposed project will have no anticipated impact on minority or low-income populations in the area.

### **3.4.7 Safety and Security**

The proposed project area has no known safety and security issues except for the potential continued erosion of the river bank. Site safety for construction equipment will be ensured by the contractors performing the work. The project area is in uninhabited areas along the Kalamazoo River and adjacent to an office park with little chance for safety risks for children and therefore, EO 13045 is not applicable.

#### ***Alternative 1 – No Action:***

The No Action alternative would potentially have an impact on safety of the individuals in the area if the river bank is allowed to continue to erode. There are no schools, residences, or play areas in the project area; therefore, child safety is not anticipated to be an issue.

#### ***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative would reduce or eliminate ongoing erosion of the riverbank which in turn would reduce sedimentation of the Kalamazoo River and protect the Perrigo building on the

bluff above the river. This would reduce the impact to the safety and security of the employees utilizing the Perrigo building and also those using the Kalamazoo River for recreation.

During the construction of the riverbank stabilization measures, standard construction-related safety risks would exist for those working on the project. To minimize the risks to safety and human health, all construction activities will be performed using qualified personnel trained in the proper use of the appropriate equipment including all appropriate safety precautions. Additionally, all activities will be conducted in a safe manner in accordance with the standards specified in OSHA and MIOSHA regulations.

### **3.5 Historic and Cultural Resources**

In addition to review under NEPA, consideration of effects to historic properties is mandated under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, as amended, and implemented by 36 C.F.R. Part 800. These requirements include identification of significant historic properties that may be affected by the Proposed Alternative. Historic properties are defined as buildings, structures, objects, sites or districts included or eligible for listing in the National Register of Historic Places (NRHP), 36 C.F.R. § 60.4. Section 110 of the NHPA which provides guidelines regarding the identification and protection of historic properties and the avoidance of unnecessary damage to them, will also be taken into consideration. In addition to NHPA, the federal regulations implementing NEPA require consideration of the context and intensity or severity of impacts on historic and cultural resources. 40 C.F.R. § 1508.27. FEMA also has obligations according to the American Indian Religious Freedom Act of 1978, 42 U.S.C. § 1996, which provides for the protection and preservation of American Indian Sites, possessions, and ceremonial and traditional rites. FEMA will consider the Archaeological Resources Protection Act of 1979, 16 U.S.C. §§ 470aa – 470 mm, which provides for the protection of archaeological resources on public lands and Indian lands. Finally, FEMA is required to consider the Native American Graves Protection and Repatriation Act, 25 U.S.C. §§ 3001 – 3013, in cases where Native American Cultural Items are found.

As defined by 36 C.F.R. Part 800.16(d), the Area of Potential Effect (APE), “is the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if such properties exist.”

In addition to identifying historic properties that may exist in the proposed APE, FEMA must also determine, in consultation with the appropriate State Historic Preservation Officer (SHPO)/Tribal Historic Preservation Officer (THPO), what effect, if any, the action will have on historic properties. If the project is determined to have an adverse effect on these properties, FEMA must consult with SHPO/THPO on ways to avoid, mitigate, or minimize the adverse effect.

The Michigan State Police Emergency Management Division initiated the Section 106 consultation process with the State Historic Preservation Office in order to assess the potential

impacts of the proposed project on the site. A response from SHPO was received dated May 27, 2016 requesting an archaeological survey of the area (Appendix C).

The City of Allegan, the grantee, contracted the services of Arbre Croche Cultural Resources (ACCR) to conduct a Phase I archaeological survey of the west floodplain and east riverbank of the project area (attached in appendix G). The investigation included shovel testing at 15-meter intervals on the east high eroding riverbank and on the west floodplain. Geomorphological investigation was undertaken via deep coring on the west floodplain. This deep coring was used to determine the presence or absence of stable buried land surfaces that may have allowed for and contained evidence of human occupation. A total of 1.77 acres was investigated by shovel testing and deep coring. The results of the deep coring found evidence of extensive erosion and no buried surfaces, paleosols, or A-horizons in the floodplain area. Review of historic imagery of the site indicates that the current land surface has developed since 1947. There is low potential for buried land surfaces based on the results of the deep coring, and no significant cultural materials were observed or recovered. No additional archaeological investigation was recommended. On October 5, 2016, this archaeological survey report was submitted to SHPO for review with FEMA's finding of no historic properties affected. SHPO responded on November 14, 2016 indicating that they concurred with the FEMA determination that no historic properties are affected within the area of potential effect. The SHPO correspondence is included in Appendix C.

***Alternative 1 – No Action:***

No impacts to historic or cultural resources are anticipated for the No Action alternative.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

The Proposed Alternative will not impact any historic properties or cultural resources. The historical review and a Phase I archaeological survey identified no historic properties or cultural resources. If ground-disturbing activities occur during implementation, the applicant will monitor excavation activity. If any artifacts or human remains are found during the excavation process, all work is to cease and the applicant will notify the Recipient who will notify FEMA and the SHPO/THPO.

**3.5.1 Historic Structures**

See 3.5 above. No historic structures have been identified in the APE. The City of Allegan has a Multiple Resource Area (MRA) for the National Register of Historic Places. The nearest listed property is the Sarah Lowe Stedman House, located approximately 2,100 feet from the project area. The project area is not within the viewshed of the Stedman House. The Perrigo facility is a large L-shaped building, constructed in 1992 with an addition in 1994. Properties that have achieved significance within the past 50 years are generally not considered eligible for the National Register of Historic Places.

***Alternative 1 – No Action:***

There are no historic structures in the APE therefore the No Action Alternative would have no effect on any historic structures.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

There are no historic structures in the APE therefore this alternative would have no effect on historic structures.

**3.5.2 Archaeological Resources**

During the Section 106 consultation process, it was determined that the project area has the potential for the presence of archaeological sites based on the riparian setting and records available at the SHPO. A Phase I Archaeological Survey was conducted at the project area to determine whether any archaeological sites could be identified. The methodology for testing included shovel testing and deep coring. The results of the survey found low potential for buried land surfaces on which archaeological sites could occur and no significant cultural materials. No further archaeological sampling was recommended based on the results of the Phase I Archaeological Survey included in Appendix G. FEMA determined that no historic properties were located in the APE, and SHPO concurred with this determination in a letter dated November 14, 2016 (Appendix C).

***Alternative 1 – No Action:***

Based on the results of the Phase I Archaeological Survey, with the No Action Alternative, no impacts to archaeological resources are anticipated.

***Alternative 2 – Kalamazoo River Hazard Mitigation Project:***

Based on the results of the Phase I Archaeological Survey, with the Proposed Alternative no impacts to archaeological resources are anticipated. If any human or archaeological remains are encountered during the project then work will stop immediately and FEMA and SHPO will be notified.

**3.5.3. Tribal Coordination and Religious Sites**

On November 6, 2000, President Clinton signed Executive Order (EO) 13175, entitled, “Consultation and Coordination with Indian Tribal Governments.” The EO directs federal agencies, “to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes . . . .”

Requests for evaluation of the presence or absence of known archaeological and Indian Religious sites within the proposed project areas were submitted to all of the federally recognized tribal nations with known interest in Allegan County on July 29, 2016, in accordance with NEPA, NHPA and AIRFA. Letters were sent to the following recipients:

1. Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana, Box Elder, MT
2. Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians of Michigan, Shelbyville, MI
3. Citizen Potawatomi Nation, Shawnee, OK
4. Hannahville Indian Community, Wilson, MI
5. Pokagon Band of Potawatomi Indians, Dowagiac, MI
6. Forest County Potawatomi Community of Wisconsin, Crandon, WI
7. Ottawa Tribe of Oklahoma, Miami, OK
8. Prairie Band Potawatomi Nation, Mayetta, KS

The letter details the project location and proposed activity and requested comment from the tribal governments within 30 days of July 29, 2016; no responses were received by FEMA. Documentation is provided in Appendix D.

**Alternative 1 – No Action:**

Based on the results of the Phase I Archaeological Survey, no impacts to archaeological resources from the No Action Alternative are anticipated.

**Alternative 2 – Kalamazoo River Hazard Mitigation Project:**

Based on the results of the Phase I Archaeological Survey, no impacts to archaeological resources are anticipated. No mitigation measures are recommended in terms of archaeological sites. If any human or archaeological remains are encountered during the project then work will stop immediately and FEMA and SHPO will be notified.

**3.6 Comparison of Alternatives**

**Table 1. Summary of Environmental Impacts**

Affected Environment	No Action Impacts	Proposed Alternative Impacts	Mitigation
<b>Soils and Geology</b>	<ul style="list-style-type: none"> <li>• Continued streambank erosion and sedimentation of the Kalamazoo River</li> </ul>	<ul style="list-style-type: none"> <li>• Temporary gravel roadway created</li> <li>• Excavation of sediment along 60 feet of shoreline</li> <li>• Sheet pile and large rocks will stabilize the riverbank</li> </ul>	<ul style="list-style-type: none"> <li>• The gravel access road is temporary and will be removed following project completion.</li> <li>• Sheet pile on west side of river will be removed at completion of construction.</li> <li>• Existing sediment removed from river bottom</li> </ul>
<b>Water Resources and Water Quality</b>	<ul style="list-style-type: none"> <li>• Continued streambank erosion and sedimentation of the Kalamazoo River – adverse impacts to fish</li> </ul>	<ul style="list-style-type: none"> <li>• No adverse impacts to water quality – project will improve water quality &amp; fish habitat.</li> <li>• Minor change in hydraulics, but no harmful interference</li> </ul>	<ul style="list-style-type: none"> <li>• Sedimentation fencing and turbidity curtains installed to prevent mobilization of suspended sediments.</li> </ul>

Affected Environment	No Action Impacts	Proposed Alternative Impacts	Mitigation
	habitat and water quality		
<b>Floodplain Management</b>	<ul style="list-style-type: none"> <li>No direct impacts to floodplain, but continued erosion could cause changes in flood dynamics.</li> </ul>	<ul style="list-style-type: none"> <li>Fill below the 100-year flood elevation.</li> <li>Creation of a temporary access road in floodplain</li> </ul>	<ul style="list-style-type: none"> <li>Floodplain fill offset by compensatory floodplain cut.</li> </ul>
<b>Air Quality</b>	<ul style="list-style-type: none"> <li>No impact to air quality</li> </ul>	<ul style="list-style-type: none"> <li>Construction equipment exhaust may cause local, temporary, short-term impacts Potential for exposed soil and dust during construction</li> </ul>	<ul style="list-style-type: none"> <li>Open construction areas will be minimized and watered as needed to minimize particulates.</li> </ul>
<b>Terrestrial and Aquatic Environment</b>	<ul style="list-style-type: none"> <li>Continued erosion will cause continued sedimentation of the river, damaging in-stream habitat and causing further tree loss on bluff.</li> <li>Potential for riverbank collapse which would destroy bird habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Excavation of sediment from riverbed</li> <li>Tree removal</li> <li>Placement of sheet pile, rock and other stabilization methods</li> </ul>	<ul style="list-style-type: none"> <li>Limit access on the west bank to the staging area and single roadway</li> <li>Avoid the vernal pools identified in the wetland assessment</li> <li>Re-vegetate the riverbank and the restore temporary access road and staging area with native seed and native plantings</li> <li>No work or dredging within the water authorized by the MDEQ permit is allowed from May 1 to June 30 due to critical spawning times for smallmouth bass and other warm water fish species.</li> </ul>
<b>Wetlands</b>	<ul style="list-style-type: none"> <li>No impacts to wetlands</li> </ul>	<ul style="list-style-type: none"> <li>Temporary impacts from access road within regulated wetland</li> <li>Permanent impact to wetland from excavation of west riverbank</li> </ul>	<ul style="list-style-type: none"> <li>Permanent wetland impacts were kept below 0.33 acres</li> <li>Temporary wetland impact area restored following construction</li> <li>Prevent sedimentation or other impacts to adjacent wetland areas</li> <li>Limit access on the west bank to the staging area and single roadway</li> <li>Avoid the vernal pools identified in the wetland assessment</li> <li>Feasible &amp; prudent alternatives test met in MDEQ wetland permit review</li> </ul>
<b>Threatened and Endangered Species</b>	<ul style="list-style-type: none"> <li>No impact to listed threatened or endangered species</li> </ul>	<ul style="list-style-type: none"> <li>Tree removal may impact potential roosting habitat for federally-listed bats, but no known</li> </ul>	<ul style="list-style-type: none"> <li>Avoid vernal pool/potential amphibian habitat</li> <li>Remove possible habitat trees between the dates of October 1 and</li> </ul>

Affected Environment	No Action Impacts	Proposed Alternative Impacts	Mitigation
	<ul style="list-style-type: none"> <li>Ongoing erosion has potential to degrade downstream mussel habitat, but no known mussel occurrence within project area</li> </ul>	<ul style="list-style-type: none"> <li>occurrence of bats on-site</li> <li>Removal of fine sediments in river may create opportunities for mussel re-colonization</li> </ul>	<ul style="list-style-type: none"> <li>March 31, outside of the bat roosting timeframe</li> </ul>
<b>Migratory Birds</b>	<ul style="list-style-type: none"> <li>Bank swallows and kingfisher birds and nest may be impacted by ongoing erosion.</li> </ul>	<ul style="list-style-type: none"> <li>Birds and active nests may be impacted if construction is conducted during the nesting season.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct construction before nesting season, cover possible nesting sites prior to nesting season, or avoid construction activity along the streambank April 15 to August 15.</li> </ul>
<b>Hazardous Materials</b>	<ul style="list-style-type: none"> <li>No impact to the site by hazardous materials</li> </ul>	<ul style="list-style-type: none"> <li>No impact to the site by hazardous materials</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
<b>Zoning and Land Use</b>	<ul style="list-style-type: none"> <li>Continued erosion will ultimately impact the Perrigo building, likely causing one of the largest employers in the region to move their headquarters</li> </ul>	<ul style="list-style-type: none"> <li>No impact on zoning and land use</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
<b>Visual Resources</b>	<ul style="list-style-type: none"> <li>Continued riverbank erosion and loss of trees, sedimentation and trees in river</li> </ul>	<ul style="list-style-type: none"> <li>Construction equipment</li> <li>Sheet pile and rock on stabilized bank</li> </ul>	<ul style="list-style-type: none"> <li>The benefits to the natural environment outweigh the visual impact of the proposed stabilization project.</li> <li>Riverbank and floodplain restoration with native plantings will, in-time, restore impacts to visual resources</li> </ul>
<b>Noise</b>	<ul style="list-style-type: none"> <li>No impact on ambient noise in the project area</li> </ul>	<ul style="list-style-type: none"> <li>Short-term, temporary increase in noise associated with construction</li> </ul>	<ul style="list-style-type: none"> <li>None, there are no noise sensitive areas in the project area</li> </ul>
<b>Public Service and Utilities</b>	<ul style="list-style-type: none"> <li>Potential impacts to private and public resources if slope continues to erode</li> </ul>	<ul style="list-style-type: none"> <li>Protection of private and public resources by stabilization of slope</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
<b>Traffic and Circulation</b>	<ul style="list-style-type: none"> <li>No impact on traffic</li> </ul>	<ul style="list-style-type: none"> <li>No impact on roadway traffic</li> </ul>	<ul style="list-style-type: none"> <li>No mitigation measures are required.</li> </ul>

Affected Environment	No Action Impacts	Proposed Alternative Impacts	Mitigation
		<ul style="list-style-type: none"> <li>Minor interruption of Kalamazoo River recreational traffic during construction</li> </ul>	<ul style="list-style-type: none"> <li>Efforts will be made to allow recreational river traffic through the project area when safety allows</li> </ul>
<b>Environmental Justice</b>	<ul style="list-style-type: none"> <li>No impacts to minority or low-income populations</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on minority or low-income populations in the area</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
<b>Safety and Security</b>	<ul style="list-style-type: none"> <li>Potential safety concerns for those working near the eastern riverbank as it continues to erode</li> </ul>	<ul style="list-style-type: none"> <li>Standard, construction-related safety risks during construction</li> </ul>	<ul style="list-style-type: none"> <li>Use of qualified workers</li> <li>Appropriate equipment</li> <li>Appropriate safety measures</li> <li>All work done in compliance with OSHA regulations</li> </ul>
<b>Historic and Cultural Resources</b>	<ul style="list-style-type: none"> <li>No impact to historic or cultural resources</li> </ul>	<ul style="list-style-type: none"> <li>No impact to historic or cultural resources</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
<b>Historic Structures</b>	<ul style="list-style-type: none"> <li>No impact on historic structures</li> </ul>	<ul style="list-style-type: none"> <li>No impact on historic structures</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
<b>Archaeological Resources</b>	<ul style="list-style-type: none"> <li>No impact on archaeological resources</li> </ul>	<ul style="list-style-type: none"> <li>No impact on archaeological resources based on the Phase I archaeological survey conducted</li> </ul>	<ul style="list-style-type: none"> <li>If during the ground disturbing activities any artifacts or human remains are found the applicant will notify FEMA and the SHPO/THPO.</li> </ul>
<b>Tribal and Religious Sites</b>	<ul style="list-style-type: none"> <li>No anticipated impacts to archaeological resources</li> </ul>	<ul style="list-style-type: none"> <li>No anticipated impacts to archaeological resources</li> </ul>	<ul style="list-style-type: none"> <li>If during the ground disturbing activities any artifacts or human remains are found the applicant will notify FEMA and the SHPO/THPO.</li> </ul>

## SECTION FOUR: CUMULATIVE IMPACTS

Cumulative Impacts are effects on the environment that result from the Proposed Alternative when added to past, present, and future actions. Cumulative impacts may result from individually minor activities, which when added together result in greater impacts over a period of time.

In addition to the proposed Kalamazoo River Hazard Mitigation Project, the Michigan Department of Transportation conducted another riverbank stabilization project, on the same bend of the river approximately ¼-mile downstream to protect a section of state highway M-222 in Allegan. Completion of these two projects on the same meander of the river should not result in cumulative loss of floodplain, as both projects required compensatory floodplain cut. Deposition of sediment, from portions of the streambank above the 100-year flood elevation, within the river channel has the potential to reduce flood storage. These streambank

stabilization projects will help eliminate the source of the deposition and therefore maintain floodway and floodplain capacity.

Any future riverbank hazard mitigation projects, if necessary, will be required to comply with local, state, and federal rules and regulations. By complying with these regulations cumulative impacts will be avoided. Each project will also likely require detailed review of wetland impacts, hydrologic and hydraulics analysis to ensure there are no unintended consequences to the Kalamazoo River Watershed.

## **SECTION FIVE: PUBLIC PARTICIPATION**

---

Preliminary public notice of the City of Allegan's Hazard Mitigation Grant Program application, in conjunction with the Michigan State Police and the Federal Emergency Management Agency, was published in the Allegan County News (newspaper) on September 15, 2016 (Appendix E). Interested parties and citizens were invited to provide input to FEMA regarding the project during a 30-day public comment period. Additionally, streamside inventories and streambank stabilization projects protecting area roads and buildings were included by the City as recommended actions in Allegan County's Hazard Mitigation Plan. A draft of that plan was provided online and at local municipal offices, and a meeting for public review and comment was held on April 14, 2014. The public meeting was announced via the project website, and was publicized the two Thursdays prior with public notices printed in the Allegan County News.

A 30-day public review period will be held for this document. A public notice regarding the public comment period and the availability of the document will be published in the Allegan County News. The draft EA will be available at a location to be determined. The draft EA will also be published on the FEMA website.

At the end of the public comment period, a summary of the comments will be prepared and incorporated into this assessment.

## **SECTION SIX: MITIGATION MEASURES AND PERMITS**

---

- The applicant is responsible for obtaining and complying with all required local, State and Federal permits and approvals.
- The applicant will monitor ground disturbance during the construction phase. Should human skeletal remains, or historic or archaeological materials be discovered during construction, all ground-disturbing activities on the project site shall cease and the applicant shall notify the coroner's office (in the case of human remains), FEMA, and the State Historic Preservation Office.
- If deviations from the proposed scope of work result in substantial design changes, the need for additional ground disturbance, additional removal of vegetation, or any other unanticipated changes to the physical environment, the Recipient must contact FEMA so that the revised project scope can be evaluated for compliance with NEPA and other applicable environmental laws.

The following permits and mitigation measures are required for the implementation of the proposed Kalamazoo River Hazard Mitigation Project:

1. Michigan Department of Environmental Quality Part 31 (floodplain)/301 (Inland Lakes & Streams)/303 (wetlands) permit. This permit was issued on October 27, 2016. Mitigation measures or conditions must be followed.
2. Although MDEQ permit conditions include requirements for soil erosion and sedimentation control, an Allegan County Soil Erosion and Sedimentation Control (Part 91) permit will be required. Because the area of impact is less than five acres, the local Part 91 permit is also an NPDES permit by rule. No additional NPDES permit application is required.
3. To avoid impacts to nesting pairs and young birds and/or federally protected bat species, construction impacting possible habitat trees or cliff faces should be scheduled to take place outside the nesting season. For protection of bat habitat and avoidance of direct take of bats, tree removal will be conducted between October 1 and March 31. Activities along the cliff face should be conducted outside of the period between April 15 through August 15, or nesting areas should be covered prior to the beginning of nesting, to facilitate the fledging of nesting birds in the bluff.
4. If the removal of trees or work along the streambank cannot be avoided during bat or bird nesting/roosting seasons then consultation with the United States Fish and Wildlife Service should be undertaken to obtain an incidental take permit to authorize unavoidable impacts.
5. Temporarily impacted slopes and wetland areas will be restored with native species seed, shrubs, and trees.
6. No work or dredging within the water authorized by the MDEQ permit is allowed from May 1 to June 30 due to critical spawning times for smallmouth bass and other warm water fish species.

## **SECTION SEVEN: CONSULTATIONS AND REFERENCES**

---

The following agencies were consulted during the preparation of this EA:

### **Federal, State, City, and Local Agencies consulted:**

City of Allegan  
Federal Emergency Management Agency (FEMA)  
Michigan Department of Environmental Quality (MDEQ)  
Michigan Department of Natural Resources (MDNR)  
Michigan State Historic Preservation Office (SHPO)  
United States Fish and Wildlife Service (USFWS)

### **Tribal Agencies consulted:**

Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana, Box Elder, MT  
Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians of Michigan, Shelbyville, MI  
Citizen Potawatomi Nation, Shawnee, OK

Hannahville Indian Community, Wilson, MI  
Pokagon Band of Potawatomi Indians, Dowagiac, MI  
Forest County Potawatomi Community of Wisconsin, Crandon, WI  
Ottawa Tribe of Oklahoma, Miami, OK  
Prairie Band Potawatomi Nation, Mayetta, KS

## References

Arbre Croche Cultural Resources. 2016. *Archaeological Phase I and Geomorphological Investigation for the City of Allegan River Erosion Hazard Mitigation for the Stabilization of the Kalamazoo River Bank*, September 26, 2016.

ASTI Environmental. 2014. *Ecological Data Collection, Fisheries Habitat or Dam Management Grant Applications*. Report for the City of Allegan. October 27, 2014.

ATC Associates Inc., 2016. *Engineering Hydraulic Report, Kalamazoo Riverbank Stabilization*, August 1, 2016.

Cardno: *Regulated Wetland Delineation Report*, May 21, 2015.

Cardno: *Threatened and Endangered Species Habitat Assessment Report*, May 13, 2015.

Michigan Department of Environmental Quality Air Quality Website,  
[http://www.michigan.gov/documents/deq/deq-aqd-aqe-mi\\_attainment\\_status\\_map\\_407842\\_7.pdf](http://www.michigan.gov/documents/deq/deq-aqd-aqe-mi_attainment_status_map_407842_7.pdf), accessed October 18, 2016.

State Historic Preservation Office Response Letter, May 27, 2016.

State Historic Preservation Office Response Letter, November 14, 2016.

U.S. Census Bureau, <https://www.census.gov/quickfacts/table/PST045215/00>, accessed October 18, 2016.

USDA NCRS Soils Website, <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>, accessed October 18, 2016.

U.S. Geological Survey. 2007. Summary of Hydrogeologic conditions by County for the State of Michigan, United States Geologic Survey Open-File Report 2007-1236.  
<https://pubs.usgs.gov/of/2007/1236/pdf/OFR2007-1236.pdf>

## **SECTION EIGHT: LIST OF PREPARERS**

---

Katie Kolokithas, Architectural Historian, ASTI Environmental

Paul Rentschler, Aquatic/Wetland Ecologist, Arborist, ASTI Environmental

Carey Kratz, Environmental Professional, ASTI Environmental

Nicholas Mueller, Regional Environmental Officer, FEMA Region V

Jessica Follman, Environmental Protection Specialist, FEMA Region V

## **APPENDICES**

---

Click a link to view the Appendix stored on the City of Allegan web site.

[Appendix A Maps and Figures](#)

[Appendix B Floodplain Management Eight-Step Documentation](#)

[Appendix C Agency Correspondence](#)

[Appendix D Tribal Nation Consultation](#)

[Appendix E Public Notice](#)

[Appendix F Public Comments](#)

[Appendix G Technical Reports](#)