

Binghamton-Johnson City
Joint Sewage Treatment Plant
Comprehensive Flood Risk Reduction Project

Appendix F
EO 11988/11990 Eight-Step
Decision Making Process

**EO 11988 & EO 11990 Eight-Step Decision Making Process
Summary Binghamton/Johnson City Joint Sewage Treatment
Plant, Owego, NY
Construction Project
FEMA-4031-DR-NY PW 02504**

Executive Order 11988 (Floodplain Management) and Executive Order 11990 (Protection of Wetlands) require Federal agencies “to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of the floodplains/wetlands and to avoid direct or indirect support of floodplains/wetland development wherever there is a practicable alternative.” FEMA’s implementing regulations are contained in 44 CFR Part 9, which includes an Eight-Step Decision Making Process for compliance with this part.

This Eight-Step Decision Making Process is applied to the proposed Binghamton/Johnson City Joint Sewage Treatment (Plant) Plant Floodwall Construction Project. The Village of Vestal, Broome County, New York experienced storm damages and flooding from Tropical Storm Lee that occurred September 7, 2011 to September 11, 2011. The storm incident period was declared a major declaration by President Barack H. Obama on September 13, 2011 (amended September 23, 2011). The project is described in FEMA-4031-DR-NY PW 02504 (hereon, the Project). The Grantee for the proposed project is the New York State Department of Homeland Security and Emergency Services and the Subgrantee is the Binghamton/Johnson City Joint Sewage Treatment Board.

The Subgrantee proposes to construct flood barrier walls around the Plant (which is sited in the 100-year floodplain) and implement dewatering measures within the flood barrier walls to allow the Plant to remain in limited operation during a flood disaster, and return to full operation more quickly after flood waters subside, thereby protecting the health and safety of the public. The majority of the floodwall design would utilize a reinforced concrete inverted T-type flood wall. Typical wall sections adjacent to the Susquehanna River and Fuller Hollow Creek would include sheet piling and stone fill (rip rap). A partial depth steel sheet piling cut-off wall would be installed behind the base foundation heel, which faces the river, to help control groundwater seepage rates and to provide scour protection. Some areas of the site would be integrally protected by existing reinforced concrete structures modified as required to withstand the hydraulic forces sustained during a flood event, as part of a separate, non-FEMA funded project. Refer to project design plans in the Environmental Assessment associated with this project *Appendix C*.

The steps in this decision making process are steps 1, 2, 3, 4, 5, 6, 7, and 8 per 44 CFR Part 9.5(d), as follows:

Step 1 Determine if the proposed action is located in, affects or is affected by the Floodplain or Wetland.

The Binghamton-Johnson City Joint Treatment Plant (4480 Vestal Road; GPS: 42.09635, -75.96215) is located in Zone AE within the 100-year floodplain, also referred to as the

Special Flood Hazard Area (SFHA), as noted on the National Flood Insurance Program's Flood Insurance Rate Map (FIRM), Community Panel Number 36007C0352F, Preliminary, February 5, 2010. The Base Flood Elevation (BFE) at the facility site is 839.9 feet, (NAVD 1988). The elevation of the 500-year floodplain is 842.9 feet, (NAVD 1988). These elevations are as depicted at the facilities highest point along the Susquehanna River profile included in the FEMA Preliminary Flood Insurance Study for the Broome County, New York (All Jurisdictions) dated February 5, 2010. Refer to Preliminary FIRM in *Appendix A of the Environmental Assessment (EA)*. A small portion of the proposed action floodwall alignment (riprap and steel sheet-piling cut off wall) would be within estimated floodways of the Susquehanna River and Fuller Hollow Creek.

The Plant sustained major flooding during the declared 2011 event and during a prior flooding event in 2006, declared as major disaster number 1650-DR-NY.

The 2011 event is the flood of record, as discussed in the U.S. Geological Survey (USGS)/Department of Interior, *Floods of 2011 in New York State, Scientific Investigation Report 2014-5058*. The Peak Surface Water Discharge (Sep 8-9, 2011) at Vestal was 833.98' (NAVD 1988) and less than the 200-Year Level Event, but as shown in the photo in *Appendix H* of the EA, the facility infrastructure was submerged with floodwater during Tropical Storm Lee. The 500-Year Annual Exceeded Probability was discussed as 834.9 (NAVD 88) in the USGS report.

The site is located adjacent to riverine wetlands of the Susquehanna River and Fuller Hollow Creek riparian corridor. A wetlands screening was conducted by Griffiths Engineering, LLC and their wetland professional, which revealed that the Palustrine, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded (PUBHh) wetland had been filled during previous construction of the facility. Screening results also indicated that no other wetlands depicted on the NYS Freshwater Wetlands Regulatory Maps applied to the project site. Riparian corridor vegetation at the site includes sycamore, box elder, and ash trees along with an assortment of vines and ground cover, including Japanese Knotweed, which is an invasive species.

Step 2 Early public notice (Preliminary Notice)

A cumulative public notice for the disaster was published in the *New York Press Service* newspapers on October 10, 2011. As indicated in the notice, "projects and activities may adversely affect historic property, floodplains or wetlands, or may result in continuing vulnerability to damage by flooding...however, certain measures to mitigate the effects of future flooding or other hazards may be included in the work". The notice also states that "mitigation measures will be incorporated on an action by action basis and this (the October 10, 2011 notice) may be the only public notice concerning these actions. In addition, a project specific notice integrated with the Notice of Availability of the National Environmental Policy Act (NEPA) Environmental Assessment will be published in the local newspapers, the *Binghamton Press & Sun-Bulletin*. The public notice will invite comments within 30 days of the publication date of the notice.

Step 3 Identify and evaluate alternatives to locating in the base floodplain and wetland.

44 CFR 9.9 (b) requires that FEMA “identify and evaluate practicable alternatives to carrying out a proposed action in floodplains or wetlands, including:

- 1) Alternative sites outside the floodplain or wetland;
- 2) Alternative actions which serve essentially the same purpose as the proposed action, but which have less potential to affect or be affected by the floodplain or wetlands; and
- 3) No action. The floodplain and wetland site itself must be a practicable location in light of the factors set out in this section.

Factors to consider in determining practicable alternatives include:

- 1) the natural environment (topography, habitat, hazards, etc.);
- 2) social concerns (aesthetics, historical and cultural values, land patterns, etc.);
- 3) economic aspects (cost of space, construction, services and relocation);
- 4) legal constraints (deeds, leases, etc.); and
- 5) engineering

The Alternatives analyzed in further detail in the EA included a No Action Alternative and Proposed Action Alternative. The EA also discussed Alternatives Considered and Dismissed in Section 4.3. A brief summary of the three categories of alternatives is the following:

- 1) No Action Alternative- facility would remain at risk to future flooding events. The facility would be repaired, but no hazard mitigation measures would be constructed. No federal funding would be applied for proposed hazard mitigation measures.
- 2) Proposed Action Alternative - To construct flood barrier walls around approximately three-fourths of the site perimeter of the Plant as floodproofing and implement dewatering measures within the flood barrier walls to allow the Plant to remain in limited operation during a flood disaster.
- 3) Alternatives Considered and Dismissed - Included relocation of the facility outside of the 500-year floodplain; building a floodwall that would encompass the entire Plant; floodproofing the individual structures at the Plant to make them watertight; relocating electrical equipment and installing submersible pump/equipment motors; and partial relocation of the facility infrastructure that is closest to the water’s edge to provide more of a buffer between the floodwall alignment and the river/creek.

The No Action Alternative would result in the strong likelihood that flooding would damage the Plant again during subsequent major storm events. This alternative would also subject the town and community to future risk of service disruptions and create potential adverse public health and safety impacts as occurred during Tropical Storm Lee. This alternative would not address the project’s purpose and need.

The Proposed Action Alternative to construct flood barrier walls around roughly three-fourths of the Plant and implement dewatering measures within the flood barrier walls would allow the Plant to remain in limited operation during a flood disaster, and return to full operation more quickly after flood waters subside, thereby protecting the health and safety of the public. The majority of the flood wall design would utilize a reinforced concrete inverted T-type flood wall. Typical wall sections include sheet piling and stone fill (rip rap). See EA sections and *Appendix C*. A partial depth steel sheet piling cut-off wall would be installed behind the base foundation heel, which faces the river, to help control groundwater seepage rates and to provide scour protection. Some areas of the site would be integrally protected by existing reinforced concrete structures modified as required to withstand the hydraulic forces sustained during a flood event, as part of a separate, non-FEMA funded project.

The floodwall would be designed in accordance with United States Army Corps of Engineers (USACE) EM 1110-2-2502 Retaining and Flood Walls and other applicable engineering and design guidelines from USACE. As shown on design plans in *Appendix C* of the EA, the Subgrantee would plan to construct the floodwall to a design elevation of 845' (NAVD 1988), providing for freeboard above the 500-Year floodplain elevation, is 842.9' (NAVD 1988) as depicted at the facilities highest point along the Susquehanna River profile included in the FEMA Preliminary Flood Insurance Study for the Broome County, New York (All Jurisdictions) dated February 5, 2010. This elevation would result in a barrier wall that would range between four (4) and twelve (12) feet above ground level. Existing grades are higher at the southeast corner of the site and a barrier wall will not be needed in these areas. No state or local floodplain management standards, such as the 10 States Standards, NYS ECL and Town of Vestal Zoning Code, are requiring a higher level of design elevation for flood risk reduction.

Please refer to Section 4.2 of the EA for additional information on the proposed project description.

The Alternatives Considered and Dismissed included: relocation of the facility outside of the 500-year floodplain; flood proofing the entire Plant perimeter and flood proofing the individual buildings. These alternatives were deemed not practicable due to cost factor and other considerations and were therefore dismissed from further analysis.

Additionally, it was determined that there were no practicable alternatives to the proposed floodwall alignment due to site space constraints and the prohibitive costs to partially relocate existing wastewater treatment infrastructure within or to off-property location.

Therefore, no practicable alternatives were identified to continued floodplain occupancy or the minor adverse impact to riparian corridor upland and wetland habitat involved with the Proposed Action Alternative.

Step 4 Identify impacts of the proposed action associated with occupancy or modification of the floodplain and wetland.

The Proposed Action Alternative would have beneficial floodplain management impacts for the facility. The proposed alternative would provide flood damage risk reduction at or above the

500-year flood elevation for the Plant through installation of the proposed floodwall and associated infrastructure for the flood damage risk reduction structural alternative. The facility would be more resilient with the structural protections and would have less risk of disruption of the public services it provides in the future. The proposed project would reduce the risk of release of wastewater into the surrounding environment during future flood events.

The proposed project would adversely impact riparian habitat in the floodplain due to permanent development of the undeveloped vegetated riverbank area (approximately 850 linear feet and approximately 0.1 acres) for floodwall construction and due to floodway encroachments along the Susquehanna River and Fuller Hollow Creek for floodwall construction. The construction may result in temporary minor impacts to aquatic habitats due to sedimentation during construction. Wildlife that may use the wetland and upland riparian habitat would also be temporarily displaced due to noise and disturbance during construction.

The proposed project would be designed to comply with the National Flood Insurance Program. Specifically, 44 CFR 60.3(d)(3) requires that a hydrologic and hydraulic analysis be performed in accordance with standard engineering practices to demonstrate that the proposed floodway encroachments would not result in any increase in flood levels within the community during the occurrence of a base flood discharge. A hydraulic and hydrologic study was completed by Woidt Engineering dated January 24, 2014 (*Appendix C*), to assess the hydraulic effects of the flood damage risk reduction system on the water surface elevations and velocities of the Susquehanna River. The Preliminary New Digital Flood Insurance Rate Maps (DFIRMS) were available for the project area and the HEC-RAS computer model used to create the DFIRMS was obtained to create the Duplicative Effective Model. The HEC-RAS model was augmented following published FEMA protocol to create the Corrected Effective Model using geometric data obtained throughout the project area. The proposed conditions model was then developed using the proposed floodwall geometry. The findings of the study show that the proposed condition's water surface elevations are the same or slightly lower than the existing conditions. There is a slight increase (maximum increase 0.06 ft./sec) in velocity due the displacement of flow area in the extreme limit of the 100 and 500-year floodplain of the Susquehanna River. Since there is "zero rise" in water surface elevations and only minimal increase in channel velocities, the proposed concrete T-Wall floodwall system would comply with all local, state and Federal floodplain ordinances and regulations.

Step 5 Design or modify the proposed action to minimize threats to life and property and preserve its natural and beneficial floodplain and wetland values.

In order to minimize the risk of future floodplain damage to the existing facility and to comply with EO 11988 and the NFIP, FEMA must minimize potential harm to lives and the investment at risk from the base flood. The Proposed Action Alternative would provide flood damage risk reduction to above the 500-year level of protection through construction of the floodwall above the 500-Year floodplain elevation and through construction of associated stormwater and closure/flap gate structures. The floodwall would be designed to avoid any increases in water surface elevations or hazardous increases in channel velocities along the study reach of the Susquehanna River.

As mentioned in 5.1.2 of the EA, the Subgrantee would be responsible to a Stormwater Pollution Prevention Plan (SWPPP) and would be expected to install silt fences and turbidity barriers for erosion control and to minimize potential sedimentation into adjacent watercourses during construction. Stormwater management features would be designed and implemented for the Proposed Action alternative to manage for the increased impervious cover.

Riprap and steel sheet piling cut off walls would be incorporated into the design for floodwall alignment areas closest to the river and for an area along Fuller Hollow Creek as scour risk reduction for the floodwall, as shown on the site plans. Flap gates would be installed on outfalls to minimize risk of backflow. The stormwater pump stations would have the capacity to pump stormwater surface runoff from the 500-year level rainfall event, nominal seepage through the floodwall barrier, inadvertent overtopping of the floodwalls from waves, and non-bypassed influent inflows that exceed the plant capacity.

The Plant would prepare an operations and maintenance plan for the facility to detail how closure gates, pumps, other floodplain management control devices were operated and to identify the plan in the event that the floodwall were overtopped. Other reasonably foreseeable future projects on the Fuller Hollow Creek and/or at the confluence with the Susquehanna River, as proposed by the Subgrantee or others would potentially minimize risk of future flood impacts and/or help address water quality concerns for the facility's operations in the future.

Step 6 Re-evaluate the proposed action.

After evaluating alternatives including impacts and minimization opportunities, as set forth by factors described in 44 CFR Part 9.9(c) and documented in Step 3 of this Eight-Step Review, FEMA determined that the Proposed Action Alternative was a practicable alternative. No practicable alternatives to avoid continued floodplain occupancy were identified. The No Action Alternative would not meet the project purpose and need. The public benefits of the project outweigh the risk of investment into the floodplain-located facility. Future flood damage risk would be reduced to the extent practicable with the floodwall designed to above the 500-year floodplain elevation.

FEMA determined it was not practicable to modify the floodwall alignment to avoid adverse impacts to riparian habitat along the Susquehanna River and a small portion of stream habitat in Fuller Hollow Creek. It was determined that it was not practicable to avoid some fill of estimated floodway areas. The loss of a small acreage of riparian habitat would be outweighed by the overall public benefits of the proposed project, including long-term benefits for the floodplain environment due to minimization of risk of wastewater releases into the watercourses and surrounding area during flood events. Modeling of the proposed floodwall project demonstrated that the project would be in conformance with NFIP 44 CFR 60.3(d)(3) regulation concerning floodway encroachments because it showed 0.00% rise associated with the project.

Step 7 Final Public Notice

FEMA's determination is documented in this summary. This Eight-Step Review as part of the project's Environmental Assessment (EA) will be made available for public review and

comment with a project specific public notice. The Final Public Notice will be integrated with the anticipated Finding of No Significant Impact statement for the EA.

Step 8 Implement the action.

The project will be constructed in accordance with the proposed scope of work and applicable floodplain development requirements as described in the project worksheet and per conditions of the federal grant. The Subgrantee is responsible for review of the final building plans and will need to ensure compliance with all applicable Federal, state, and local codes and standards. The Subgrantee will need to obtain all required building and site development permits, as a condition of the Federal grant, to protect the environment, and to minimize risk and harm to life and property. To restore the facility to its pre-disaster functionality, the facility must be sited, elevated or floodproofed to at/above the 500-Year Floodplain utilizing the Best Available Data for 500-year floodplain determination (*Flood Insurance Rate Map Community-Panel Number 36007C0352F, Preliminary, dated February 5, 2010*) in accordance with the NFIP and 44 CFR Part 9. The Subgrantee will submit copies of obtained permits and certification from the local floodplain administrator in accordance with 44 CFR 65.10 to NYSDHSES/FEMA at/before final project closeout documentation submission.