Rahway River Basin, New Jersey
Flood Risk Management Feasibility Study

APPENDIX A3
Section 404 (b)(1) Evaluation

Rahway River Flood Risk Management Feasibility Study, Union and Essex Counties, New Jersey

Section 404 (b)(1) Evaluation

I. Introduction

This 404(b)(1) summarizes the evaluation of effects the proposed action will have on water resources pursuant to the Clean Water Act Section 404(b)(1) guidelines. The proposed action involves the replacement and outlet modification of the Orange Reservoir, and channel modifications in the Township of Cranford. For a full description of the project, existing conditions and environmental impacts, refer to the draft Feasibility Report/Environmental Impact Statement (draft Feasibility Report/EIS). As indicated in the draft Feasibility Report/EIS, although a complete dam replacement may not be required, for the purposes of the environmental impacts, a full dam replacement including the complete drawdown of the Orange Reservoir is assessed in this 404(b)(1) Evaluation.

II. PROJECT DESCRIPTION

a. Location: West Orange, Essex County, and the Township of Cranford, Union County, New Jersey.

b. General Description: Replacement of Orange Reservoir dam and modification of outlets and modification of 8,390 linear feet of the Rahway River in the Township of Cranford. Replacement of the Orange Reservoir will require a complete drawdown during construction. A channel will be excavated within the reservoir to maintain flow of the Rahway River during construction.

c. Authority and Purpose: The study was authorized in a resolution of the Committee on Transportation and Infrastructure of the U.S. House of Representatives. The Rahway River Basin resolution was dated 24 March 1998. The purpose of the project is to provide flood risk management to communities within the Rahway River watershed.

d. General Description of Fill Material:

1) Characteristics of Material: Material to be used for the Orange Reservoir dam replacement and outlet modification include embankment fill, stone/riprap and concrete. Material used for the construction of the channel modifications include rock/riprap, soil and steel sheet piling.

2) Quantity of Material: Approximately 108,950 cy of fill, 1,895 cy of concrete and 9,471 cy of rock/riprap will be used to replace the dam. Approximately 3,970 cy of riprap/rock and 100 linear feet of steel sheetpile for the channel modifications in the Township of Cranford. Approximately 21,000 cy of soil will be excavated to create the channel modifications.

3) Source of Material: The rock will be obtained from a local quarry. Embankment fill for the dam replacement will be obtained from an appropriate source

e. Description of the Proposed Discharge Sites

1) Location: The discharge site is located at the Orange Reservoir within the South Mountain Reservation in the City of West Orange, Essex County, and the segment of the Rahway River that flows through the Township of Cranford, Union Counties, New Jersey.

2) Size: The Orange Reservoir is approximately 700 acre feet and is 0.69 miles long and 0.50 miles wide. The dam is approximately 668 feet long. The length of the Rahway River

to undergo channel modifications in the Township of Cranford is approximately 8,390 linear feet.

3) Type of Site: The Orange Reservoir is a manmade reservoir used for recreational purposes located within the South Mountain Reservation in West Orange. The Rahway River is a freshwater system located within an urbanized setting comprised of predominantly residential structures in the Township of Cranford.

4) Types of Habitat: The Orange Reservoir is categorized as lacustrine with unconsolidated bottom. Habitat type within the vicinity of the Orange Reservoir includes upland deciduous forest and palustrine broad leaved deciduous forest. The aquatic habitat for both the Orange Reservoir and the Rahway River consists of non-tidal freshwater classified as FW2-NT by the NJDEP.

5) Time and Duration of Disposal: Construction of the Orange Reservoir dam replacement will take approximately 1.5 years. The pre-construction drawdown will occur in the September/October timeframe to minimize impacts to fish. Construction of the channel modifications in the Township of Cranford will take approximately six months. All in-water activities are restricted between 1 May and June 30 to comply with the NJDEP fish spawning window.

f. Description of Disposal Method: Land based construction equipment will be used to construct the project. The project will also be sequenced to minimize in water work to the extent possible.

III. FACTUAL DETERMINATION

a. Physical Substrate Determinations

1) Substrate Evaluation, Sediment Type and Slope: Sediment analyses have not been conducted for the Orange Reservoir. However, it is assumed that the sediments are comprised of finer silts, clays and/or sand material. The slope of the reservoir bottom is generally flat. The substrate of the Rahway River within the channel improvement footprint is composed of cobble/ gravel overlain with finer sediments such as silt and clay. The general slope of the channel cut will be approximately 2.35 ft./mile with a maximum deepening of about 1.9 ft. near the terminus of the channel improvement.

2) Dredged/Fill Material Movement: The excavation and placement of fill in the form of soil and riprap/stone will result in the impact of 8,390 linear feet of open water. Soil used to construct the channel will be stabilized with erosion control matting and vegetation.

3) Physical Effects on Stream Bottom: Excavation and fill activities associated with the channel modifications in the Township of Cranford could initially change the river substrate depending on the type of substrate exposed during construction.

4) Other Effects: N/A

5) Actions Taken to Minimize Impacts: Measures to be implemented to minimize adverse impacts to substrate include: a) implementation of erosion and sediment control best management practices; and b) restore the existing substrate within the channel modifications.

b. Water Circulation, Fluctuation and Salinity Determinations

1) Water, Consider Effects on:

(a) Salinity: No effect

(b) Water Chemistry: There may be minor changes to water chemistry as a result of suspended sediment during construction. Long term changes to water chemistry is not expected.
(c) Clarity: Water clarity may be slightly to moderately impacted during drawdown of the Orange Reservoir and through the construction of the channel modifications in the Township of Cranford. No long-term effect is anticipated.
(d) Color: Minor impacts associated with turbidity may affect water color during construction. Erosion and sediment control best management practices including the installation of cofferdams to construct the channel modifications will be implemented during construction to minimize turbidity.
(e) Odor: The sediment on the bottom of the Orange Reservoir may emit a foul odor as it dries out subsequent of the drawdown to complete the dam replacement. This is expected to be temporary and will be minimized through seeding the reservoir floor.
(f) Taste: The Rahway River is used as water supply for the City of Rahway. However, the water is withdrawn for treatment approximately three miles downstream of the Cranford portion of the project area and is treated prior to distribution to consumers. Therefore, the proposed action is not expected to have an adverse impact on taste.
(g) Dissolved Gas Levels: Dissolved oxygen levels may be reduced to some degree during construction, but this will be a temporary effect. The installation of erosion and sediment controls and stabilization of soil through grass seed, shrubs and tress will reduce sedimentation and pollutant runoff which can have detrimental impacts to dissolved oxygen levels.
(h) Nutrients: Nutrient load to the Rahway River may increase during construction as a result of resuspension of sediments during the pre-construction drawdown of the Orange Reservoir and the construction of channel modifications in the Township of Cranford. Erosion and sediment control best management practices will be implemented during construction to minimize the suspension of nutrient laden sediment during construction. The bottom and side slopes of the Orange Reservoir will be seeded with grass to prevent the suspension of sediment during storm events.
(i) Eutrophication: Eutrophication may occur within the channel constructed in the Orange Reservoir to maintain flow of the river through the reservoir during construction due to exposure to sun and nutrient laden sediments within the reservoir. Measures that will be implemented to minimize potential eutrophication include seeding the bottom of the reservoir
(j) Others as Appropriate: No other adverse impacts are anticipated from the project.

2) Current Patterns and Circulation:

(a) Current Patterns and Flow: There will be no significant adverse impacts to river current patterns or flow from implementation of the proposed action. Flow of the Rahway River will be maintained through the Orange Reservoir during dam replacement construction. Discharge rates from the reservoir during pre-construction drawdown will be at the same rate as existing conditions. Regarding the channel modifications in the Township of Cranford, baseflow conditions are anticipated to be similar to the pre-project conditions.
(b) Velocity: The installation of larger outlet pipes in the Orange Reservoir dam will increase discharge rates during pre-storm drawdown as compared to the existing velocities. However, this change is not considered significant. The channel modifications in the Township of Cranford will not substantially change velocities compared to existing conditions.
(c) Stratification: The project will not impact stratification.
(d) Hydrologic Regime: The proposed action will not change normal daily or seasonal water level fluctuations. However, the Orange Reservoir will be drawndown prior to storm

events to minimize flood risk. This is a temporary change since the reservoir will refill after the storm event. Refill times range from 30 hours for a 25-yr storm event versus 2 weeks should the storm not occur.

3) Normal Water Level Fluctuations: The project will not have any permanent adverse impacts on normal water level fluctuations. Subsequent of project completion, the Orange Reservoir will be partially drawndown from elevation 330 ft to elevation 315 ft prior to storm events. Depending on the storm event, the reservoir will refill within 30 hrs (for 25-yr storm event) to 2 weeks (if storm event does not occur).

4) Salinity Gradients: Not applicable

5) Actions Taken to Minimize Impacts: Measures to be implemented to minimize adverse impacts include: a) drawing down the Orange Reservoir at a slow rate and b) designing the channel modifications in the Township of Cranford to maintain the same velocities as existing conditions.

c. Suspended Particulate/Turbidity Determinations.

1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Sites: Minor increases in particle suspension and turbidity during the Orange Reservoir drawdown and construction of channel modifications in the Township of Cranford are expected to occur.

2) Effects on Chemical/Physical Properties of the Water Column:

(a) Light Penetration: Minor adverse impacts may occur within the project area during construction of the channel modifications due to turbid conditions.

(b) Dissolved Oxygen: Dissolved oxygen levels may be reduced during construction, particularly within the channel that will be constructed in the Orange Reservoir to maintain flow of the river through the reservoir during dam replacement. In order to minimize this potential, the grass that will be planted on the bottom of the reservoir will be allowed to grow to provide some shade.

(c) Toxic Metals and Organics: There is a slight potential that construction activities may disturb sediments contaminated with organics. Erosion and sediment controls such as silt fence and cofferdams to construct the channel modifications in the Township of Cranford will be implemented during construction to minimize the risk.

(d) Pathogens: There is a potential that the sediments within the Orange Reservoir could contain pathogens such as e. coli that could be transported during the drawdown and then through exposure of the sediments once the reservoir is drawndown. This potential will be minimized by performing the drawdown slowly to minimize sediment resuspension and through stabilization of the reservoir bottom with grass seed. In addition, exposure of the sediments to sunlight typically kills any waterborne pathogens.

(e) Aesthetics: The aesthetics of the Orange Reservoir will be adversely impacted during construction activities given that it will be completely drawndown. In addition, minor adverse impacts to aesthetics will occur during the drawdown prior to storm events. However, the reservoir will return to normal conditions within 30 hours to 2 weeks depending on the storm event. Aesthetics of the footprint of the channel modifications in the Township of Cranford will be impacted during construction and after construction. Actions that will be taken to minimize impacts of the channel modification include replacing material excavated for the channel and using rock from local sources to match existing rock material in the channel. Herbaceous vegetation will be planted along the

riverbanks and trees and shrubs will be planted along the top of bank. Aesthetics will gradually improve as the vegetation that has been planted as part of the project matures.

(f) Others as Appropriate: Not applicable

3) Effects on Biota:

(a) Primary Production, Photosynthesis: Removal of mature trees reduces amount of organic material into the river that aquatic species use for food/cover/spawning.

(b) Suspension/ Filter Feeders: No permanent adverse impact is expected. Erosion and sediment control best management practices will be implemented during construction to reduce sedimentation to the Rahway River that could temporarily impact suspension/filter feeders.

(c) Sight Feeders: There may be temporary adverse impacts to sight feeders during the drawdown of the reservoir to complete the dam replacement and the construction of the channel modifications in theTownship of Cranford. These impacts will be minimized by performing the preconstruction drawdown slowly and through implementation of erosion and sediment control practices during construction.

4) Actions Taken to Minimize Impacts: Measures to be implemented to minimize adverse impacts include: a) implementation of erosion and sediment control best management practices; b) seeding the bottom and side slopes of the Orange Reservoir during the dam replacement; c) installation of cofferdams to construct the channel modifications in Township of Cranford; d) incorporating in-stream mitigation measures within the channel improvement; and e) replanting the river banks and top of bank with native vegetation.

d. Contaminant Determinations: There are no issues with contaminant issues within the study area. All fill material will be clean and will not pose a risk.

e. Aquatic Ecosystem and Organism Determinations.

1) Effects on Plankton: An increase in sedimentation/nutrients during construction may increase some plankton species such as algae. Erosion and sediment control best management practices will be implemented to reduce this potential. The channel modifications proposed in the Township of Cranford will be designed in a manner to maintain velocities in order to prevent algal blooms.

2) Effects on Benthos: Project construction will result in the removal of benthic species during channel creation. However, this impact is expected to be temporary as recruitment of benthic species from upstream areas is expected to occur subsequent of construction. The project will be designed in a manner to provide similar or better habitat than existing conditions in order to provide long term benefits to benthic species.

3) Effects on Nekton: Mobile aquatic life will move from area during construction.

4) Effects on Aquatic Food Web: The project will have temporary adverse impacts on the food web as a result of turbidity, draining of the reservoir during construction and channel modifications. Permanent significant adverse impacts are not expected from implementation of the project.

5) Effects on Special Aquatic Sites:

(a) Sanctuaries and Refuges: Not applicable

(b) Wetlands - Based on cursory field investigations, approximately 0.13 acres of forested wetlands will be permanently impacted through tree removal as part of compliance with the Corps policy of maintaining a 50 ft vegetation free zone from the toe of the dam. The

specific mitigation type will be evaluated during the Preconstruction Engineering and Design Phase and will consist of either: a) wetland enhancement; b) wetland creation/restoration; or c) purchasing a wetland mitigation credit from a New Jersey Department of Environmental Protection approved wetland mitigation bank.

(c) Mudflats: Not applicable

(d) Vegetated Shallows: Not applicable

(e) Coral Reefs: Not applicable

(f) Riffle and Pool Complexes: Any existing pool and riffle complexes within the footprint of the channel modifications in theTownship of Cranford will be removed during construction. However, pool and riffle complexes will be incorporated into the design of the improved channel and should also re-establish through natural morphological process once construction is completed.

6) Threatened and Endangered Species: The proposed action may remove potential summer roosting habitat for the federally and state endangered Indiana bat and federally threatened northern long-eared bat. A tree clearing restriction from 1 April through 30 September will be implemented during construction to protect these species. Multiple endangered, threatened, and special concern bird species have been documented in the project area. A shrub and tree clearing restriction from 15 March through 31 July will be implemented to comply with the Migratory Bird Treaty Act will protect these species. In addition, native vegetation will be replanted on-site of the channel modifications as well as off-site to compensate for the removal of vegetation associated with the dam replacement and channel modifications.

7) Other Wildlife: The project will mainly have temporary adverse impacts to wildlife. Minor adverse temporal impacts to wildlife will occur as a result of the removal of mature vegetation that is used for nesting, shelter and foraging. These impacts will be minimized through replanting of vegetation and the use of larger tree stock as opposed to saplings in the replanting efforts.

8) Actions to Minimize Impacts: Measures to be implemented to minimize adverse impacts include: a) implementation of erosion and sediment control best management practices; b) seeding the bottom and side slopes of the Orange Reservoir during the dam replacement; c) installation of cofferdams to construct the channel modifications in the Township of Cranford; c) adhering to woody vegetation clearing windows from 15 March through 30 September to protect federal endangered and threatened bat species as well as migratory bird species; d) incorporating in-stream mitigation measures within the channel improvement; and e)replanting the river banks and top of bank with native vegetation.

f. Proposed Disposal Site Determinations

1) Mixing Zone: Not applicable

2) Determination of Compliance with Applicable Water Quality Standards: All fill used to construct the project will be comprised of clean material that meets water quality standards.

3) Potential Effects on Human Use Characteristic:

(a) Municipal and Private Water Supply: The Rahway River is used as a water supply for the City of Rahway. The location of the treatment plant is located approximately three

miles downstream of the proposed channel modifications in the Township of Cranford. Since the water is treated prior to distribution, no adverse impacts are expected.

(b) Recreational and Commercial Fisheries: Although not specifically stocked, the Orange Reservoir is used for fishing and has held annual fishing derbies since 2014. Fishing activities within the Orange Reservoir during construction and during any pre-storm drawdown will be adversely impacted. The impacts associated with the construction drawdown will be semi-permanent given that the reservoir will be drawndown for 1.5 yrs. The pre-storm drawdown will be temporary as the reservoir is expected to refill between 30 hours to 2 weeks depending on the storm event.

The Rahway River within the footprint of the channel improvement in the Township of Cranford is used as a recreational fishery and is stocked with trout by the New Jersey Division of Fish and Wildlife. One of the locations where the NJDFW stocks is located within the footprint of the channel modifications in Tthe ownship of Cranford. It is expected that the New Jersey Division of Fish and Wildlife will suspend stocking in this location until construction is completed. The channel modifications may have moderate temporal impacts on recreational fishing until the river system recovers.

(c) Water Related Recreation: The Orange Reservoir supports water dependent activities such as paddle boating and fishing. These activities will be suspended during the drawdown to complete the dam replacement as well as during pre-storm drawdown. Water dependent activities supported by the Rahway River in the Township of Cranford include kayaking, canoeing and fishing. These activities will be suspended during construction of the channel modifications but can resume once construction is completed.

(d) Aesthetics: The aesthetics of the Orange Reservoir will be adversely impacted during construction due to the drawdown of the reservoir. The bottom and side slopes of the reservoir will be seeded to minimize adverse aesthetic impacts. Significant adverse impacts to aesthetics of the reservoir during pre-storm drawdown are not expected.

The river within the channel improvement footprint in the Township of Cranford may have an initial “engineered” appearance; however, as the vegetation matures and the river substrate returns through its natural aggradation/degradation processes, the aesthetics will improve and develop a more natural look.

(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves:

The Orange Reservoir is part of the South Mountain Reservation, an Essex County owned park. During construction, use of the Orange Reservoir by park patrons will be limited. There will be no adverse impacts to the use of the larger South Mountain Reservation.

There are seven parks adjacent to the portion of the Rahway River in the Township of Cranford that are located within the channel improvement project area. There may be temporary park closures during construction due to the actual construction of the project and the possibility of using the parks as staging areas. Permanent adverse impacts to park use as a result of implementation of the proposed action is not expected.

g. Determination of Cumulative Effects on the Aquatic Ecosystem: The proposed action will have negligible cumulative impacts on the aquatic ecosystem. Mitigation measures proposed in the above sections will minimize cumulative impacts.

h. Determination of Secondary Effects on the Aquatic Ecosystem: No secondary effects on the aquatic ecosystem are expected from this project.

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

a. No significant adaptation of the Section 404(b)(1) guidelines was made relative to this evaluation.

b. The objective of flood risk management necessitates the replacement of the Orange Reservoir and the modification of 8,390 ft of the Rahway River.

c. The proposed activity will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

d. The proposed disposal operations will not harm any endangered species or their critical habitats under the Endangered Species Act of 1973.

e. The proposed discharge of fill material will not result in significant adverse effects on human health and welfare, including municipal and private waters supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be significantly affected.

f. Appropriate steps to minimize potential adverse impacts of the discharge of fill material include the implementation of an erosion and sediment control plan and judicious engineering practices.