Mississippi Valley Division,
Regional Planning and Environment Division South

Memphis Metropolitan Stormwater – North DeSoto County Feasibility Study, DeSoto County Mississippi

Appendix E – PRELIMINARY Draft 404(b)(1) Analysis

May 2021

ContentsSection 1.....1
Introduction1
1.1 Project Description.....1
1.1.1 Locally Preferred Plan.....1
1.1.2 National Ecosystem Restoration Plan.....3
Section 2 5
Review of Compliance.....5
2.1 Review of Compliance.....5
Section 3 6
Technical Evaluation Factors.....6
3.1 TEchnical Evaluation Factors.....6
Section 4 7
Evaluation of Dredged or Fill Material.....7
4.1 Evaluation of Dredged or Fill Material.....7
Section 5 8
Hazardous, Toxic, and Radioactive Waste.....8
Section 6 9
Disposal Site Delineation.....9
6.1 Disposal Site Delineation ((§230.11(f)).....9
Section 7 10
Actions to Minimize Adverse Effects.....10
7.1 Actions to Minimize Adverse Effects.....10
Section 8 11
Factual Determination.....11
8.1 Factual Determination (§230.11).....11
Section 9 12
Evaluation Responsibility.....12
Section 10 13
Findings 13

LIST OF TABLES

Table E:1-1. National Ecosystem Restoration Plan.....3
Table E:2-1. Review of Compliance (§230.10 (a)-(d)).....5
Table E:3-1. Technical Evaluation Factors (Subparts C-F).....6

Table E:4-1. Evaluation of Dredged or Fill Material (Subpart G).....7
Table E:6-1. Disposal Site Delineation.....9
Table E: 7-1. Disposal Site Delineation.....10
Table E:8-1. Factual Determination.....11
Table E:10-1. Findings.....13

Section 1
Introduction

The following short form 404(b)(1) evaluation follows the format designed by the Office of the Chief of Engineers, (OCE). As a measure to avoid unnecessary paperwork and to streamline regulation procedures while fulfilling the spirit and intent of environmental statutes, Memphis District is using this format for all proposed project elements requiring 404 evaluation but involving no significant adverse impacts to water quality.

1.1 PROJECT DESCRIPTION

The Tentatively Selected Plan (TSP) combines the Locally Preferred Plan (LPP) for flood risk management and the National Ecosystem Restoration (NER) plan. The LPP includes the construction of a channel enlargement along Horn Lake Creek, 3 detention basins, and non-structural measures such as residential elevations and flood-proofing. Non-structureal measures would have no impact on water quality and are not discussed further in this document. For further information regarding the non-structural measures, see the Memphis Metro Stormwater - North DeSoto County Draft Feasibility Report with Integrated Environmental Impact Statement. The following is a description of the features proposed in the TSP.

The NER Plan is to stabilize channels and connect/improve riparian habitat, which would minimize channel degradation and erosion and support aquatic ecosystem form and function along main stem channels and tributaries in the DeSoto County watersheds. This plan consists of eleven streams that would have a system of grade control structures (GCS) placed in each of the creeks (See Table below). The plan also included a riparian reforestation feature of 25% of the reforestable lands within 100 meters of each stream. .

1.1.1 Locally Preferred Plan

A channel enlargement along Horn Lake Creek (HLC) would be constructed downstream of Goodman Road in Horn Lake, Mississippi. The channel bottom would be enlarged from stream mile 18.6 to mile 19.41 (0.8-mile) from the current approximated width of 15-25 feet to 40 feet. The creek banks would be constructed for stability at a slope of approximately 3-foot horizontal to 1-foot vertical (3H:1V). The HLC channel enlargement would require tree clearing of approximately 10 acres along one bank of HLC for access, bank stabilization, and excavation. The enlargement and slope flattening would require approximately 95,000 cubic yards of excavation, all of which would be disposed off-site. Approximately 22,750 tons of riprap would be placed to prevent scour damage. The riprap would be placed in a 3-foot deep layer on the channel bottom and 5 feet up both streambanks. The riprap would be placed over approximately 6,000 tons of filter material. The upper banks would be protected with 18,780 square yards of turf reinforcing mat. The 0.04 Annual Exceedance Probability (AEP) Nonstructural aggregation feature would reduce stages during the 0.01 AEP event for

158 structures with an average reduction of 0.75 foot. During the 0.04 AEP event this feature would reduce stages for 125 structures with an average reduction of 1 foot.

The Lateral D Detention Basin would be constructed in-line with Lateral D, a tributary to HLC. The detention basin would encompass approximately 22 acres of bottomland hardwoods (BLH) that would requiring clearing. The bottom area of the detention basin would be approximately 16 acres. The area would be excavated to a depth of approximately 10 feet with 3H:1V side slopes. Approximately 350,000 cubic yards (cy) would be excavated to create the maximum storage of 177-acre-ft detention basin. A 500-linear foot outlet embankment would be constructed to include a 48-inch reinforced concrete pipe (RCP) outlet with a 100-linear foot overflow spillway armored with approximately 2,000 tons of riprap over approximately 500 tons of filter material on the downstream side. The spillway would operate at elevation 300.0 NAVD 88 (the 0.50 annual chance exceedance (ACE) event, or 2-year flood). The current design assumes replanting approximately 10 percent, or 2.2 acres with native vegetation of the area that would be cleared.

The Rocky Creek in-line detention basin would total approximately 9 acres and would require approximately 7.5 acres of tree clearing and excavation to a depth of approximately 10 feet. The pool bottom area would encompass approximately 6 acres. The detention basin would have a single pool elevation of approximately 302.0 NAVD 88. Slopes would be constructed at approximately 3H:1V for stability. A downstream embankment would be constructed and extend approximately 500 linear feet. The embankment would include a 48-inch RCP outlet and 100- linear foot overflow spillway armored with approximately 6,000 tons of riprap placed over approximately 1,500 tons of filter material on the downstream side. The maximum storage of 72 acre-feet requires approximately 115,000 cy of excavation, which would be disposed of off-site within an upland disposal area, no impacts are anticipated. The current design assumes replanting with native vegetation of approximately 10 percent, or 0.9 acre, of the area that would be cleared.

The Cow Pen Creek detention basin would total approximately 20 acres in two pools (a 12-acre upstream pool and an 8-acre downstream pool) and would require approximately 8.5 acres of tree clearing (upstream pool only) and excavation to a depth of approximately 10 feet. The upper pool would have a bottom elevation of 262.0 NAVD 88 with a bottom area of 10 acres, and slopes would be constructed at 3H:1V back to the existing grade. A 500-linear foot embankment would be constructed on the downstream end of the detention basin and would include a 48-inch RCP outlet and 100-linear foot overflow spillway armored with approximately 2,000 tons of riprap over approximately 500 tons of filter material on the downstream side. The spillway would operate at elevation 272.0, approximately at the 0.50 ACE event. The maximum storage of 108 acre-feet requires approximately 175,000 cubic yards of excavation, which would be disposed of off-site within an upland disposal area, no impacts are anticipated. The current design assumes replanting with native vegetation of approximately 10 percent, or 1.2 acres, of the area that would be cleared.

The downstream Cow Pen detention basin would be offline and encompass approximately 8 acres. The basin would have a bottom elevation of 258.0 NAVD 88with a bottom area of approximately 6 acres. Slopes would be constructed up to the existing grade at 3H:1V. A

500-linear foot embankment would be constructed on the downstream end of the detention basin and would include a 48-inch RCP outlet and 100-linear foot overflow spillway armored with approximately 2,000 tons of riprap over approximately 680 tons of filter material. An inlet sill would require an additional 800 tons of riprap. The 100-foot wide spillway would operate at elevation 268.0, approximately at the 0.50 ACE event. The maximum storage of 68 acre-feet would require approximately 115,000 cubic yards of excavation, which would be disposed of off-site. The current design assumes replanting with native vegetation of approximately 10 percent, or 1.2 acres, of the area that would be cleared.

1.1.2 National Ecosystem Restoration Plan

This plan consists of 11 streams that would have a system of grade control structures (GCS) placed in each of the creeks. The plan also includes a riparian reforestation feature of 25 percent of the reforestable lands within 100 meters of each stream (Table E:1-1. National Ecosystem Restoration Plan). The ecosystem restoration goal is to stabilize channels and connect/improve riparian habitat, which would minimize channel degradation and erosion and support aquatic ecosystem form and function along main stem channels and tributaries in the DeSoto County watersheds. Currently, the erosion, head-cutting and stream bed degradation leads to bank failures, sedimentation, and prevents stable habitat from forming. Riparian and potentially reforestable acreages were determined using National Land Cover Data mapping within 328 feet of each stream. Categories assumed to be reforestable include cultivated crops, barren land, hay/pasture, herbaceous, and shrub/scrub. This plan consists of eleven streams that would have a system of grade control structures (GCS) placed in each of the creeks (See Table below). The plan also included a riparian reforestation feature of 25% of the reforestable lands within 100 meters of each stream. Grade control structures were identified as systems of structures paired with various stabilization techniques such as stone toes, channel training structures, and pool and riffle components.

Table E:1-1. National Ecosystem Restoration Plan

Stream	Alt. ID	# GCS	Riparian Reforestation (acres)	# Average Annual Habitat Units
Camp	CP-5	7	98	98
Cane	CN-5	9	66	54
Hurricane	HN-5	5	160	140
Lick	LC-5	2	36	24
Nonconnah	NO-5	6	107	65
Mussacuna	MC-5	2	57	40
Horn Lake	HL-5	14	64	101

Nolehoe	NL-5	11	32	54
Johnson	JC-5	11	122	113
Red Banks	RB-5	5	48	46
Short Fork	SF-5	9	106	84

Section 2
Review of Compliance

2.1 REVIEW OF COMPLIANCE

Table E:2-1. Review of Compliance (§230.10 (a)-(d))

A review of this project indicates that:	Preliminary[1]	Final[2]
a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose (if no, see section 2 and information gathered for environmental assessment alternative);	YES	
b. The activity does not appear to: (1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the Clean Water Act; (2) jeopardize the existence of Federally listed endangered or threatened species or their habitat; and (3) violate requirements of any Federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies);	YES	
c. The activity will not cause or contribute to significant degradation of waters of the United States including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, esthetic, and economic values (if no, see section 2);	YES	
d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see section 5).	YES	

Section 3
Technical Evaluation Factors

3.1 TECHNICAL EVALUATION FACTORS

Table E:3-1. Technical Evaluation Factors (Subparts C-F)

	N/A	Not Significant	Significant *
Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)			
(1)Substrate impacts.		Y	
(2)Suspended particulates/turbidity impacts.		Y	
(3)Water column impacts.		Y	
(4)Alteration of current patterns and water circulation.		Y	
(5)Alteration of normal water fluctuations/ hydroperiod.		Y	
(6)Alteration of salinity gradients.	Y		
Biological Characteristics of the Aquatic Ecosystem (Subpart D)			
(1)Effect on threatened/endangered species and their habitat.		Y	
(2)Effect on the aquatic food web.		Y	
(3)Effect on other wildlife (mammals, birds, reptiles, and amphibians).		Y	
Special Aquatic Sites (Subpart E)			
(1)Sanctuaries and refuges.	Y		
(2)Wetlands.		Y	
(3)Mud flats.	Y		
(4)Vegetated shallows.	Y		
(5)Coral reefs.	Y		
(6)Riffle and pool complexes.	Y		
Human Use Characteristics (Subpart F)			
(1)Effects on municipal and private water supplies.	Y		
(2)Recreational and commercial fisheries impacts.	Y		
(3)Effects on water-related recreation.	Y		
(4)Esthetic impacts.		Y	
(5)Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves.	Y		

*No significant effects are anticipated

Section 4
Evaluation of Dredged or Fill Material

4.1 EVALUATION OF DREDGED OR FILL MATERIAL

Table E:4-1. Evaluation of Dredged or Fill Material (Subpart G)

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material.	
(1) Physical characteristics	Y
(2) Hydrography in relation to known or anticipated sources of contaminants	Y
(3) Results from previous testing of the material or similar material in the vicinity of the project	Y
(4) Known, significant sources of persistent pesticides from land runoff or percolation	Y
(5) Spill records for petroleum products or designated (Section 311 of CWA) hazardous substances	Y
(6) Other public records of significant introduction of contaminants from industries, municipalities, or other sources	Y
(7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities	Y
(8) Other sources (specify)	NA
b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or the material meets the testing exclusion criteria.	Y

Section 5
Hazardous, Toxic, and Radioactive Waste

The USACE is obligated under Engineer Regulation (ER) 1165-2-132 to assume responsibility for the reasonable identification and evaluation of all Hazardous, Toxic, and Radioactive Waste (HTRW) contamination within the vicinity of proposed actions. ER 1165-2-132 identifies that HTRW policy is to avoid the use of project funds for HTRW removal and remediation activities. The NFS would be responsible for planning and accomplishing any HTRW response measures and would not receive credit for the costs incurred.

An abridged HTRW Phase 1 Environmental Site Assessment (ESA) was conducted for the draft Integrated Feasibility Report and Environmental Impact Statement (draft IFR-EIS). This ESA was conducted to facilitate early identification and consideration of HTRW issues. The study area was surveyed via aerial photography and environmental database searches.

Several potential Recognized Environmental Conditions (REC) were identified in the ESA. When the final IFR-EIS is completed, Record of Decision (ROD) is signed, and funding allocated, then a final full Phase I ESA would be executed on the project feature prior to construction. It is anticipated that any HTRW sites would be avoided through design changes, if necessary.

Section 6
Disposal Site Delineation

6.1 DISPOSAL SITE DELINEATION ((§230.11(F))

The disposal sites have not been fully identified at this stage of the study. All excavated material would be placed into an upland, no adverse effects to wetlands or other waters of the United States are anticipated. Table 6-1 lists the factors considered in the disposal site delineation.

Table E:6-1. Disposal Site Delineation

a. The following factors, as appropriate, have been considered in evaluating the disposal site.	
(1) Depth of water at disposal site	Yes
(2) Current velocity, direction, and variability at disposal site	Yes
(3) Degree of turbulence	Yes
(4) Water column stratification	NA
(5) Discharge vessel speed and direction	NA
(6) Rate of discharge	NA
(7) Dredged material characteristics (constituents, amount, and type of material, settling velocities)	NA
(8) Number of discharges per unit of time	NA
(9) Other factors affecting rates and patterns of mixing (specify)	NA
b. An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are acceptable.	Yes

Section 7
Actions to Minimize Adverse Effects

7.1 ACTIONS TO MINIMIZE ADVERSE EFFECTS

The disposal sites have not been fully identified at this stage of the study. All excavated material would be placed into an upland, no adverse effects to wetlands or other waters of the United States are anticipated.

Actions taken: Surveys would be conducted as locations are finalized and prior to the placement of material to ensure minimization and avoidance of fish and wildlife populations. All discharged material would consist of riprap stone and filter material through an approved source. Best management practices to control erosion and reduce turbidity would be followed. Appropriate technology/machinery would be used at each discharge site. As locations are finalized/prior to the placement of material a survey of human use would be conducted to ensure minimization and avoidance of impacts to human use. Other actions may be taken, as necessary, once locations are finalized.

Table E: 7-1. Disposal Site Delineation

All appropriate and practicable steps have been taken, through application of the recommendations of §230.70-230.77 to ensure minimal adverse effects of the proposed discharge.	YES

Section 8
Factual Determination

8.1 FACTUAL DETERMINATION (§230.11)

Table E:8-1. Factual Determination

A review of appropriate information as identified in Sections 2-7 above indicates that there is minimal potential for short- or long-term environmental effects of the proposed discharge as related to:	Preliminary	Final
Physical substrate at the disposal site.	YES	
Water circulation, fluctuation and salinity.	YES	
Suspended particulates/turbidity.	YES	
Contaminant availability.	YES	
Aquatic ecosystem structure and function.	YES	
Disposal site.	YES	
Cumulative impact on the aquatic ecosystem.	YES	
Secondary impacts on the aquatic ecosystem.	YES	

A negative, significant, or unknown response indicates that the project may not be in compliance with the Section 404(b)(1) Guidelines.

[1]Negative responses to three or more of the compliance criteria at this stage indicates that the proposed projects may not be evaluated using this "short form procedure." Care should be used in assessing pertinent portions of the technical information of items 2a-d, before completing the final review of compliance.

[2]Negative responses to one of the compliance criteria at this stage indicates that the proposed project does not comply with the guidelines. If the economics of navigation and anchorage of Section 404(b)(2) are to be evaluated in the decision-making process, the "short form" evaluation process is inappropriate.

[3]If the dredged or fill material cannot be excluded from individual testing, the "short form" evaluation process is inappropriate.

Section 9
Evaluation Responsibility

a. Water Quality input provided by: Jared Everitt

   Position: Plan Formulator and Biologist

   Date: 15 April 2021

b. This evaluation was reviewed by: Andrea Carpenter

   Position: Environmental Manager

   Date: 15 April 2021

Section 10
Findings

Table E:10-1. Findings

Findings	Preliminary	Final
The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines	YES	
There is a less damaging practicable alternative	NO	
The proposed discharge will result in significant degradation of the aquatic ecosystem	NO	
The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem	NO	

Date:_____

_____

Zachary L. Miller
COLONEL, EN
Commanding