Trinity River Authority of Texas
Elm Fork Relief Interceptor Segment EF-2

DRAFT

Environmental Assessment

Prepared for the U.S. Army Corps of Engineers
Project Number 199800058

December 2011

Prepared by
Black & Veatch Corporation
Dallas, Texas
Registration No. F-258

Table of Contents

1.0 General Information 1-1
1.1 Introduction 1-1
1.2 Project Location 1-1
1.3 Purpose and Need 1-1
1.4 Scope 1-3

2.0 Alternatives Considered 2-1
2.1 Alternative 1 2-1
2.2 Alternative 2 2-2
2.3 Alternative 3 2-3
2.4 Alternative 4 – Preferred Alternative 2-4
2.5 No Action Alternative 2-6

3.0 Affected Environment 3-1
3.1 Geological Elements 3-1
3.2 Hydrological Elements 3-2
3.2.1 Surface Water 3-2
3.2.2 Groundwater 3-2
3.3 Floodplains and Waters of the U.S. Including Wetlands 3-2
3.3.1 Floodplains 3-2
3.3.2 Waters of the U.S. Including Wetlands 3-2
3.4 Biological Elements 3-3
3.4.1 Vegetation 3-4
3.4.2 Wildlife 3-6
3.4.3 Threatened and Endangered Species 3-6
3.5 Parks and Natural Areas 3-7
3.6 Land Use/Planning 3-7
3.7 Hazardous Materials 3-7
3.8 Social and Economic Conditions 3-8
3.9 Cultural Resources 3-8
3.10 Air Quality 3-9

4.0 Environmental Consequences 4-1
4.1 Geological Elements 4-1
4.1.1 Alternative 4 – Preferred Alternative 4-1
4.1.2 No Action Alternative 4-1

4.2 Hydrological Elements 4-2
4.2.1 Surface Water 4-2
4.2.1.1 Alternative 4 – Preferred Alternative 4-2
4.2.1.2 No Action Alternative 4-3
4.2.2 Groundwater 4-3
4.2.2.1 Alternative 4 – Preferred Alternative 4-3
4.2.2.2 No Action Alternative 4-4
4.3 Floodplains and Waters of the U.S. Including Wetlands 4-4
4.3.1 Floodplains 4-4
4.3.1.1 Alternative 4 – Preferred Alternative 4-4
4.3.1.2 No Action Alternative 4-4
4.3.2 Waters of the U.S. Including Wetlands 4-5
4.3.2.1 Alternative 4 – Preferred Alternative 4-5
4.3.2.2 No Action Alternative 4-5
4.4 Biological Elements 4-6
4.4.1 Vegetation 4-6
4.4.1.1 Alternative 4 – Preferred Alternative 4-6
4.4.1.2 No Action Alternative 4-6
4.4.2 Wildlife 4-6
4.4.2.1 Alternative 4 – Preferred Alternative 4-6
4.4.2.2 No Action Alternative 4-7
4.4.3 Threatened and Endangered Species 4-7
4.4.3.1 Alternative 4 – Preferred Alternative 4-7
4.4.3.2 No Action Alternative 4-7
4.5 Parks and Natural Areas 4-7
4.5.1 Alternative 4 – Preferred Alternative 4-7
4.5.2 No Action Alternative 4-8
4.6 Land Use/Planning 4-8
4.6.1 Alternative 4 – Preferred Alternative 4-8
4.6.2 No Action Alternative 4-8
4.7 Hazardous Materials 4-8
4.7.1 Alternative 4 – Preferred Alternative 4-8
4.7.2 No Action Alternative 4-9
4.8 Social and Economic Conditions 4-9
4.8.1 Alternative 4 – Preferred Alternative 4-9
4.8.2 No Action Alternative 4-9
4.9 Cultural Resources 4-9
4.9.1 Alternative 4 – Preferred Alternative 4-9
4.9.2 No Action Alternative 4-10

4.10 Air Quality 4-10
4.10.1 Alternative 4 – Preferred Alternative 4-10
4.10.2 No Action Alternative 4-10
4.11 Summary Appraisal of Environmental Losses vs. Gains 4-10

5.0 Cumulative Impacts 5-1
5.1 Geological Elements 5-2
5.2 Hydrological Elements 5-2
5.2.1 Surface Water 5-2
5.2.2 Groundwater 5-3
5.3 Floodplains and Waters of the U.S. Including Wetlands 5-3
5.3.1 Floodplains 5-3
5.3.2 Waters of the U.S. Including Wetlands 5-3
5.4 Biological Elements 5-4
5.4.1 Vegetation 5-4
5.4.2 Wildlife 5-4
5.4.3 Threatened and Endangered Species 5-4
5.5 Parks and Natural Areas 5-5
5.6 Land Use/Planning 5-5
5.7 Hazardous Materials 5-5
5.8 Social and Economic Conditions 5-5
5.9 Cultural Resources 5-5
5.10 Air Quality 5-6

6.0 Findings and Conclusions 6-1

7.0 Public Involvement 7-1
7.1 Public Review 7-1
7.2 Agency Review 7-1
7.2.1 U.S. Fish and Wildlife Service 7-1
7.2.2 Texas Parks and Wildlife Department 7-1

8.0 References 8-1

List of Tables

Table 3-1 – Plant Species Observed During the May 1998 Wetland Delineation 3-5
Table 3-2 – Threatened and Endangered Species for Dallas County, Texas 3-7

Table D-1 – Impacted Wetlands and Other Waters of the U.S. D-1
Table D-2 – Waters Upload Sheet..... D-2
Table D-3 – Hydrologic Function D-3
Table D-4 – Biogeochemical Function D-4
Table D-5 – Habitat and Food Web Support..... D-5

List of Figures

Figure A-1 Project Location A-1
Figure A-2 Location of COE Regulated Wetlands and Waters..... A-2
Figure A-3 Alternative 1, 60-inch Parallel A-3
Figure A-4 Alternative 2, 84-inch Replacement A-4
Figure A-5 Alternative 3, 108-inch Relief..... A-5
Figure A-6 Alternative 4, 72-inch and 108-inch Relief..... A-6

List of Appendices

Appendix A Figure A-1 Project Location
Figure A-2 Location of COE Regulated Wetlands and Waters
Figure A-3 Alternative 1, 60-inch Parallel
Figure A-4 Alternative 2, 84-inch Replacement
Figure A-5 Alternative 3, 108-inch Relief
Figure A-6 Alternative 4, 72-inch and 108-inch Relief

Appendix B USGS 7.5-minute Topographic Map
Irving, TX Quadrangle

Natural Resources Conservation Service Soils Data
Soil Map, Dallas County, TX
Prime and other Important Farmlands, Dallas County, TX

FEMA Flood Insurance Rate Map
Map Panel Number 48113C0310J

Appendix C Sheet M-1, 108” Interceptor Aerial Crossing
(Irving Flood Control P.S.#1 @ STA. 45+00)

Sheet M-2, 108” Interceptor Aerial Crossing
(South of SH-183 @ STA. 8+42)

Sheet M-3, 72” Line “E” Aerial Crossing
(Lake Carolyn) Station 39+00

Sheet TC-2, 72” Line “E” Spillway Crossing
Lake Sitatunga

November 5, 2010 Memorandum
108-inch Interceptor Trench Embedment Provisions

Appendix D Table D-1, Impacted Wetlands and Other Waters of the U.S.
Table D-2, Waters Upload Sheet
Table D-3, Hydrologic Function
Table D-4, Biogeochemical Function
Table D-5, Habitat and Food Web Support

Appendix E Wildlife Habitat Appraisal

Appendix F City of Irving Generalized Future Land Use Map
City of Irving New Development Locations Map from June 2008

Appendix G Letters of Comment
November 17, 1998 Facsimile from the Fish and Wildlife Service
February 19, 1999 letter to the U.S. Army Corps of Engineers
January 5, 2000 letter from the Texas Historical Commission
December 17, 2008 acknowledgement from the U.S. Fish & Wildlife Service
December 19, 2008 letter from the Texas Parks & Wildlife
June 22, 2009 letter to the Texas Parks & Wildlife
Notice of Availability
December 20, 2011 letter to Mr. Michael Jansky, U.S. EPA Region 6
December 20, 2011 letter to Mr. Tom Heger, Texas Parks and Wildlife Department
December 20, 2011 letter to Ms. Kathy Boydston, Texas Parks and Wildlife Department
December 20, 2011 letter to Mr. Thomas Cloud, Jr., U.S. Fish and Wildlife Service

December 20, 2011 letter to Mr. David W. Galindo, Texas Commission on Environmental Quality
December 20, 2011 letter to Mr. Stratford Williams, Wichita Executive Committee
December 20, 2011 letter to Mr. Ronal D. Twohatchet, Comanche Indian Tribe of Oklahoma
December 20, 2011 letter to Mr. Don Tofpi, Kiowa Indian Tribe of Oklahoma
December 20, 2011 letter to Mr. Mark Wolfe, Texas Historical Commission

1.0 General Information

1.1 Introduction

The Trinity River Authority of Texas (TRA) is proposing the addition of a sewer interceptor known as the Elm Fork Relief Interceptor Segment EF-2 (EF-2) to the existing sewer interceptor system. This interceptor will generally parallel existing interceptors. A portion of the proposed interceptor is within the Dallas Floodway adjacent to the Northwest Levee in Irving, Texas. Since installation of the interceptor will modify project lands, the U.S. Army Corps of Engineers (USACE) will review plans to verify that there are not any adverse impacts to the Federal Project in accordance with 33 USC Section 408. An Environmental Assessment (EA) was prepared to meet the requirements of the Texas Water Development Board (TWDB) for financing through the Clean Water State Revolving Fund. The TWDB EA did not address all of the needs of 33 USC 408. This draft environmental assessment was prepared to meet the requirements of 33 CFR Section 230, which requires a discussion of the environmental impacts on the Federal project resulting from the proposed interceptor pursuant to the National Environmental Policy Act (NEPA). This document also addresses compliance with Section 404 of the Clean Water Act requirements.

The proposed activity is submitted under permit number SWF-1998-00058, and is proposed to be permitted under Regional General Permit CESWF-09-RGP-12 for Modification and Alterations of Corps of Engineers Projects, including any applicable regional conditions.

1.2 Project Location

The majority of the proposed interceptor will be within the City of Irving. A portion also passes through the City of Dallas and through an unincorporated area of Dallas County. A map showing the project location and the pipeline alignment are included in Appendix A as Figures A-1 and A-2, respectively. The USGS Topographic Map, located in Appendix B, also shows the pipeline alignment.

1.3 Purpose and Need

As proposed, EF-2 would be a component of the Central Regional Wastewater System (CRWS), an interceptor system that transports flow to the Central Regional Wastewater Treatment Plant. The purpose of the interceptor is to provide supplemental capacity for the currently overloaded existing lines, and to provide capacity for future development to meet anticipated demand. The need for the relief interceptor was originally identified in the 1996 Infiltration/Inflow Assessment, (I/I Assessment) as prepared by Black & Veatch Corporation (B&V). Based on this report, B&V prepared a series of memoranda with

recommendations for interceptor alternatives. The population estimates were updated in the 2004 Phase IV Infiltration/Inflow Assessment prepared by B&V and indicate that the population in the service area will increase from year 2000 values by approximately 50 percent in 2040. Because the current interceptor system is already overloaded, a need exists for additional capacity to support the projected population growth.

Between 2006 and 2008, the existing interceptors experienced eight sanitary sewer overflows (SSOs) that were directly related to peak wet weather events. After 2008, the EF-6 and EF-1 interceptor sewers were placed into service, which helped reduce capacity concerns within the Elm Fork Interceptor System. However, the existing EF-2 segment still experiences overflows directly related to capacity of the existing interceptors during peak wet weather events and as the population continues to increase, the capacity will continue to diminish. These overflow events have adverse impacts on human health, the environment, and economic development. Exposure to untreated wastewater can expose humans, animals, and aquatic life to harmful contaminants. Bacteria and disease vectors are transported in untreated wastewater and exposure can cause illness. Though the majority of the alignment is in areas where there is minimal public exposure, a portion of the alignment is close to California Crossing Park and the Cistercian School. Furthermore, if an overflow enters the Trinity River; the wastewater can have a negative impact by reducing the dissolved oxygen available to aquatic organisms.

There are costs involved in the cleanup of an overflow, with TRA providing personnel and equipment to contain the overflow and clean the area. Spills over a certain minimal volume also require reporting and coordination with the Texas Commission on Environmental Quality (TCEQ). Major overflows could also require notification to the public, which may discourage future use or development in the area of the spill. Finally, without sufficient capacity, continual development in the service area can be hindered and existing sewer connections could experience problems with diminished sewer service.

The existing 45-inch and 90-inch interceptors currently transport flows in excess of 100 percent of capacity during peak wet weather events. Therefore, relief interceptors for the 45-inch and the 90-inch were identified in the I/I Assessment to transport projected year 2040 flows and relieve existing interceptors. By increasing the capacity within the EF-2 segment, the adverse effects of SSOs on the environment can be reduced, future economic development may be encouraged, and the public health can be safeguarded.

1.4 Scope

This EA discusses the potential environmental impacts associated with the construction aspects of the EF-2 interceptor. While positive benefits would accrue to the cities being served, the affected area being considered in this EA is primarily the linear alignment of the interceptor, further described in Section 2.0. Environmental impacts from the project are not anticipated to extend beyond the immediate alignment, with the exception of temporary, short-term effects, such as noise. The resources to be considered herein are those within the EF-2 alignment, which includes soils, aquatic habitats, wildlife, including endangered or threatened species and their habitats, vegetation, parks and open space or natural areas, socioeconomics and cultural resources, and air quality.

2.0 Alternatives Considered

The Elm Fork Relief Interceptor EF-2 is intended for relief of the existing 45-inch EF-2, constructed in 1958 and the existing 90-inch Elm Fork Relief Segment 1-B, which was constructed in 1983. The 45-inch interceptor is through an industrial area on the protected side of the levee and the 90-inch interceptor is in the flood plain. Both interceptors generally follow the Elm Fork from California Crossing to Proctor Road. The 45-inch and 90-inch interceptors are operated independently for metering of customer city flows. As part of the route alignment/existing facility review, B&V reviewed options for the alignment and operation/capacity of EF-2 to provide additional interceptor capacity for this portion of the Elm Fork Interceptor System. Four alternatives were identified for review, along with a "no action" alternative as further discussed in the following sections below. Because of the specific need for additional capacity on the EF-2 segment, other alternatives (e.g., interceptor alignments elsewhere or other system improvements) were not evaluated.

Alternative 1. 60-inch parallel relief interceptor for existing 45-inch interceptor
Alternative 2. 84-inch replacement interceptor for existing 45-inch interceptor
Alternative 3. 108-inch relief interceptor for existing 45-inch and 90-inch interceptors
Alternative 4. 72-inch and 108-inch relief interceptors for existing 45-inch and 90-inch interceptors
Alternative 5. No Action

Each option for the project area was evaluated, beginning south of California Crossing and ending at Proctor Road. Considerations for each alternative revolve around meeting the project purpose and need, reducing or eliminating environmental impacts, lowering construction costs, and minimizing disruptions of service. The original alternative review described below was performed based on transporting year 2020 flows; however, the final EF-2 design capacity will transport year 2040 flows.

2.1 Alternative 1
60-inch parallel relief interceptor for existing 45-inch interceptor

Alternative 1 would provide relief for the existing 45-inch interceptor with construction of a new 60-inch relief interceptor. The relief interceptor would operate in parallel with, and follow the existing 45-inch alignment. The relief interceptor would serve the urban areas of Dallas and Irving. The existing 45-inch interceptor and Lift Station No. 1 would both remain in service and require rehabilitation. The 90-inch interceptor would continue to operate independently from the 45-inch interceptor and require future relief

interceptors to transport the projected year 2020 flows. Refer to Figure A-3 in Appendix A for the alignment of Alternative 1.

The opinion of probable construction cost for Alternative 1 is $51,000,000.

Capacity information for Alternative 1 interceptor lines is provided below.

Existing 45-inch	21 mgd
Existing 90-inch	72 mgd
Parallel 60-inch	42 mgd
Future Parallel 84-inch	60 mgd
2040 Total Capacity	195 mgd
2040 Required Capacity	180 mgd

The following comparisons and concerns apply to Alternative 1.

- Levee crossings (Loop 12, Proctor Road)
- Highway tunnel crossings (Loop 12, Highway 183)
- Construction through industrial area
- Construction through Irving Stormwater Detention Basin
- Multiple relief interceptors
- Potentially greater environmental impacts than the preferred alternative

Note: Alternative 1 was determined to be impracticable based on the required levee and highway crossings, surface disturbance, higher construction cost, and greater environmental impacts than the preferred alternative.

2.2 Alternative 2
84-inch replacement interceptor for existing 45-inch interceptor

Alternative 2 would provide a new 84-inch replacement interceptor to replace the existing 45-inch interceptor. The replacement interceptor would have the same alignment as Alternative 1, following the existing 45-inch interceptor, and would serve the cities of Dallas and Irving. The existing 45-inch interceptor would be removed from service. Lift Station No. 1 would remain in service and require rehabilitation. The 90-inch interceptor would continue to operate independently from the new 84-inch replacement interceptor. Future relief interceptors would be required to transport the projected year 2020 flows. Refer to Figure A-4 in Appendix A for the alignment of Alternative 2.

The opinion of probable construction cost is $47,000,000.

Capacity information for the Alternative 2 interceptor lines is provided below.

Existing 45-inch	21 mgd
Existing 90-inch	72 mgd
Replacement 84-inch	60 mgd
Future Parallel 84-inch	60 mgd
2040 Total Capacity	192 mgd
2040 Required Capacity	180 mgd

The following comparisons and concerns apply to Alternative 2.

- Levee crossings (Loop 12, Proctor Road)
- Highway tunnel crossings (Loop 12, Highway 183)
- Construction through industrial area
- Construction through Irving Stormwater Detention Basin
- Multiple relief interceptors
- Potentially greater impacts than the preferred alternative

Note: Alternative 2 was determined to be impracticable based on the required levee and highway crossings, surface disturbance, higher construction cost, and greater environmental impacts than the preferred alternative.

2.3 Alternative 3
108-inch relief interceptor for existing 45-inch and 90-inch interceptors

Alternative 3 would provide a new 108-inch replacement interceptor to replace the existing 45-inch interceptor and relieve the existing 90-inch interceptor. The replacement interceptor would operate in parallel with and follow the existing 90-inch interceptor alignment. The replacement interceptor would serve the cities of Addison, Carrollton, Coppell, Dallas, Farmers Branch, and Irving. A portion of the existing 45-inch interceptor and Lift Station No. 1 would remain in service. Future relief interceptors for the 90-inch interceptor would not be required to transport year 2020 or 2040 flows. Refer to Figure A-5 in Appendix A for the alignment of Alternative 3.

The opinion of probable construction cost is $30,000,000.

Capacity information for the Alternative 3 interceptor lines is provided below.

Existing 45-inch	21 mgd
Existing 90-inch	72 mgd
Parallel 108-inch	118 mgd
2040 Total Capacity	190 mgd
2040 Required Capacity	180 mgd

The following comparisons and concerns apply to Alternative 3.

- Levee crossings for existing Points of Entry (POEs)
- Multiple in-line cumulative meters
- Unresolved hydraulic connection constraints
- Single relief interceptor

Note: Alternative 3 was determined to be impracticable based on the required levee crossings, multiple in-line cumulative meters, and unresolved hydraulic connection constraints. Multiple in-line cumulative meters would increase the difficulty of metering contracting party flows. In addition, the levee crossings would require more extensive environmental impacts than the preferred alternative.

2.4 Alternative 4 – Preferred Alternative

72-inch and 108-inch relief interceptors for existing 45-inch and 90-inch interceptors

Alternative 4 would provide a new 72-inch replacement interceptor to replace the existing 45-inch interceptor upstream of the existing Meter Station (MS) 8.0E location (at Tom Braniff Road). Downstream of the MS 8.0E location, a new 108-inch replacement interceptor would be provided to replace the existing 45-inch interceptor and relieve the existing 90-inch interceptor. A portion of the existing 45-inch interceptor would remain in service. Future relief interceptors for the 90-inch interceptor would not be required to transport year 2020 or 2040 flows, thereby providing the increased capacity to support future development in the area served.

The new 72-inch replacement interceptor (3,900 linear feet) would follow the existing 30-inch Dallas County Utility and Reclamation District (DCURD) reuse line alignment. The flows from three existing City of Irving sanitary sewers, upstream of the existing Irving siphon, would be transported to a new meter station on the 72-inch interceptor, at approximately the MS 8.0E location. The 72-inch replacement interceptor would serve the City of Irving.

The 108-inch replacement interceptor (15,300 linear feet) would operate in parallel with and follow the existing 90-inch alignment and would serve the cities of Addison, Carrollton, Coppell, Dallas, Farmers Branch, and Irving.

Additional work includes approximately 695 linear feet of collection line installation and one meter station. The collection lines have the following diameters, lengths and locations:

- 100 ft - California Crossing line upsize - 18-inch
- 120 ft - University Hills sewer relocation - 18-inch
- 425 ft - Irving Trunk extensions - 36-inch
- 50 ft - Crossover between 90-inch and 108-inch interceptors - 54-inch

A new smaller lift station and rehabilitation of approximately 8,000 to 12,000 feet of existing 45-inch interceptor would be required in the future to serve the adjacent industrial area. The future need for the lift station and rehabilitation of the existing 45-inch interceptor are not included in the Section 408 request nor or they being addressed by this EA. Refer to Figure A-6 in Appendix A for the alignment of Alternative 4.

The opinion of probable construction cost is $39,000,000.

Capacity information for the Alternative 4 interceptor lines is provided below.

Existing 45-inch	21 mgd
Existing 90-inch	72 mgd
Parallel 108-inch	118 mgd
2040 Total Capacity	190 mgd
2040 Required Capacity	180 mgd

The following comparisons and concerns apply to Alternative 4.

- No levee crossings
- Single relief interceptor

Note: The EF-7 relief interceptor designed by KBR will continue north from the junction box connection with EF-2 at Tom Braniff Road to the junction box connection with the previously constructed EF-6 at Northwest Highway. Although it has been reviewed and

permitted separately, EF-7 will be bid and constructed concurrently with EF-2. EF-7 has received two permits from the USACE. The first is for project number 2006-00529 for work permitted under Regional General Permit 2. This permit notification was transmitted on July 2, 2008. The second is for project number SWF-2006-0059 for work permitted under Nation Wide Permit 13. The permit notification was transmitted on December 30, 2009.

The cost of Alternative 4 is greater than Alternative 3, however Alternative 3 includes several undesirable items including levee crossings, more complicated in-line cumulative metering, and unresolved hydraulic connection constraints. Therefore, Alternative 4 is the preferred alternative because it is the least environmentally damaging practicable alternative and the other alternatives fail to adequately meet the project purpose and need, including the no action alternative. The discussion in Sections 3 and following are related to the preferred alternative only since it is the only practicable alternative.

2.5 No Action Alternative

Under this alternative, the existing interceptors would continue to be used. Because the existing interceptor sewers do not provide adequate capacity to serve projected population and employment growth within the service area, the adverse consequences of continued use would accumulate. Without the proposed action, future growth and economic development would be negatively impacted because of inadequate sewer service. The relief interceptor sewer is also necessary to provide additional capacity to reduce SSOs that occur during peak wet weather events, adversely affecting the aquatic environment in the Elm Fork. Without this project, the existing interceptor would continue to experience greater flows with increased development and the occurrence of SSOs could be expected to increase in frequency and magnitude, which could adversely affect public health as well as the environment.

3.0 Affected Environment

3.1 Geological Elements

The project is located in the Elm Fork floodplain, which consists of rolling hills, prairie, and valleys along the vicinity of the entire project site. The driving forces behind the present site topography were water and wind. The proposed 108-inch alignment of EF-2 is within the Quaternary-age fluviatile terrace and alluvial deposits within and along the floodplain for the Elm Fork and its tributaries. Part of the 72-inch interceptor alignment in areas of higher ground is within or near the Cretaceous-age Eagle Ford formation (Fugro Consultants, 2005).

Soils in the vicinity of the Trinity River area are characterized by deep, dark, plastic clay soils. The interceptor sewer alignment crosses through five different soil series as defined by the Natural Resources Conservation Service (NRCS) *Soil Survey of Dallas County, Texas* (Coffee et al., 1980). Soil survey data and information on prime and other important farmlands was provided by the NRCS web site (http://websoilsurvey.nrcs.usda.gov/app). Soil survey data for the project area is provided in Appendix B. The five soil series mapped by the NRCS are:

- 2 - Arrents, loamy, gently undulating
- 3 - Arrents, loamy, hilly
- 34 - Ferris Heiden complex, 5 to 12 percent slopes
- 55 - Ovan Clay, frequently flooded
- 73 - Trinity Clay, frequently flooded

In their native condition, five soils in the project area are classified by the NRCS as prime agricultural land:

- 36 - Frio silty clay, occasionally flooded
- 41 – Heiden clay, 1 to 3 percent slopes
- 43 – Houston Black clay, 0 to 1 percent slopes
- 60 – Silawa fine sandy loam, 1 to 3 percent slopes
- 72 - Trinity Clay, occasionally flooded.

The only agricultural areas present in the project vicinity are located west of Wildwood Drive.

3.2 Hydrological Elements

3.2.1 Surface Water. The proposed EF-2 alignment is located on the river side of the Dallas Floodway Northwest levee, beginning near Proctor Road and proceeding in a northerly direction to Storey Lane. The proposed EF-2 alignment continues in a northwesterly direction from Storey Lane and ends at a proposed junction box at Station 40+27 of the 72-inch Line, just north of Tom Braniff Road. The EF-2 alignment traverses three stormwater ditches using aerial crossings. The first is a currently unused Irving Flood Control District (IFCD) ditch located approximately 250 feet south of State Highway 183 (SH183). The second crossing is the outfall ditch from IFCD pump station No. 1. The third crossing is the drainage channel from Lake Carolyn (owned and operated by DCURD). The alignment for the 72-inch diameter interceptor also requires crossing the drainage channel from Lake Sitatunga (owned and operated by DCURD). The proposed crossing location is at an existing low-water concrete spillway constructed to create the lake. Details for the four crossings are included in Appendix C.

3.2.2 Groundwater. Groundwater was observed in many of the borings near the proposed pipe invert elevations. Relatively impervious clays were generally encountered both in the alluvial/terrace deposits and in the residual/weathered shale deposits, which can limit groundwater flow rates during non-flood conditions. (Fugro Consultants, 2005) There is an intermittent sand layer that extends under the levee and within the flood plain. Because of the higher permeability, the sand layer can allow the horizontal migration of groundwater through the area. The project is not located in an area identified for aquifer recharge.

3.3 Floodplains and Waters of the U.S. Including Wetlands

3.3.1 Floodplains. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), (included in Appendix B) EF-2 is located entirely within the 100-year flood zone and includes the Regulatory Zone. The Regulatory Zone is FEMA's 100-year regulatory floodplain of the Trinity River Corridor, minus areas of Specific Prior Development, and includes the area from Clear Fork, West Fork, Elm Fork, and the mainstem of the Trinity River[1].

3.3.2 Waters of the U.S. Including Wetlands. The U.S. Army Corps of Engineers is directed by Congress under Section 404 of the Clean Water Act (33 USC 1344) to regulate the discharge of dredged and fill material into all waters of the United States,

[1] http://www.nctcog.org/envir/SEEsafe/fpm/cdc/4th_edition/4th_Edition_Final.pdf

including wetlands. B&V conducted a wetland delineation of the project area in 1998. This delineation indicated that emergent wetlands and other waters of the U.S. were present along the alignment. An additional site investigation to review the site conditions was conducted by B&V on June 11 and 12, 2008. This additional survey confirmed the findings of the original wetlands delineation. A copy of the 1998 delineation was presented in the Preliminary Jurisdictional Determination (JD) submitted to the USACE and was subsequently verified in 1999. Reinstatement of the previously approved JD was requested on November 19, 2008. A map depicting Waters of the United States is in Appendix A, Figure A-2. Tables summarizing the impacted waters of the United States are located in Appendix D.

Twelve regulated areas were identified in the 1999 delineation and were reconfirmed during the 2008 site visit. One additional wetland site (12b) was identified during the 2008 site review. The regulated areas include crossings at outfalls, intermediate streams, and wetlands. The vegetation types present include floodplain grassland, floodplain forest, emergent wetland, and maintained lawn. The regulated areas are indicated in Figure A-2 in Appendix A.

3.4 Biological Elements

According to the Texas Parks and Wildlife web site, the project lies in the Blackland Prairie Ecological Region of Texas (http://www.tpwd.state.tx.us). The project vicinity has been altered from its native condition by the addition of the levee, utility improvements, and non-residential and industrial construction. A pedestrian survey was conducted on September 9, 2000 to evaluate the regulated sites along the proposed project alignment using the Wildlife Habitat Appraisal Procedure (WHAP). The results were summarized in a report dated November 2000, which is included in Appendix E. WHAP scores are based on seven habitat components evaluated for each of the regulated areas identified during the wetland delineations (see Section 3.3.2 above). These components are site potential, temporal development, uniqueness and relative abundance of the cover type in the region, vegetation species richness, vertical stratification, additional structural components, and condition of existing vegetation. Component scores for each evaluated area were used to determine an average habitat quality (HQ) score for each cover type present. The average HQ for each area evaluated was multiplied by the impacted acreage of each cover type to derive a value for lost habitat units (HU).

In general, the HQ scores are relatively low, indicating that the wildlife habitat along the proposed alignment provides poor quality wildlife habitat. The emergent wetlands evaluated lack structural components considered important to provide a diverse habitat

supporting a variety of wildlife species (e.g., brush or rock piles, fallen trees or snags, or dense vegetative cover). Floodplain grasslands in the project area are associated with the constructed levees and are dependent on flooding or seasonal intermittent sheet flows for surface water. This cover type is dominated by perennial grasses with a scattering of herbaceous plants, mostly disturbance-tolerant weedy species. The grasses are relatively short (less than 3 feet tall) and woody species tend to be sparsely distributed, reducing the available perching sites and the available mast crop. Floodplain forest in the project area is typically a narrow strip of vegetation on the Elm Fork banks or tributary banks. Two tree species, Cedar Elm (*Ulmus crassifolia*) and Black Willow (*Salix nigra*) dominate the forest strips. Most trees are 12 inches in diameter at breast height (DBH) or smaller, indicating second-generation growth or immature forest that lacks the habitat structure of mature forest. Vertical structure is two-tiered, with a canopy greater than 20 feet high and an understory of 3 to 12 feet in height. The ground layer is poorly developed because of a closed canopy, reducing vegetative cover below the understory. The trees do not produce a significant mast crop in most years, lowering their overall habitat value. Maintained lawn is the remaining cover type, occurring mainly in outfall channels and on the levees. Woody species and other structural habitat features are lacking in this cover type because of frequent mowing and the wildlife habitat value is very low.

The 2008 site update confirmed the original finding of the WHAP investigation. The project alignment is within utility easements and areas may be maintained by mowing and other vegetation removal, reducing the potential wildlife habitat value. There has been minimal change in the area since the studies were initiated and based upon required maintenance of the area the wildlife values are unlikely to change in the future. The average wildlife quality score for the emergent wetlands, floodplain grasslands, floodplain forests, and maintained lawn are 0.44, 0.43, 0.43, and 0.26, respectively.

3.4.1 Vegetation. The project alignment is dominated by floodplain grasslands, floodplain forests, and maintained lawn cover types, with emergent wetlands forming a fourth cover type present. The floodplain forest consists of narrow strips of vegetation on the banks of the Elm Fork and its tributaries. Cedar Elm and Black Willow dominate the woody vegetation, with less than six tree species total in the area. The vertical structure of the floodplain forest includes a closed canopy and vertical structure is limited in most locations to the canopy and a poorly developed understory without a significant ground layer. Emergent wetlands are characteristically devoid of vegetation except along the shorelines of the seasonally-filled shallow depressions where a few sedges or grasses are present. A few of the wetlands have dense vegetation dominated by sedges, grasses and some flowering plants (forbs), but this is the exception in the project area. Floodplain grasslands are dominated by a few species of grasses with a few scattered wildflowers

(forbs), mostly weedy species. Maintained lawn occurs in uplands adjacent to the outfall channels from Lake Carolyn and Lake Sitatunga. This area is dominated by grasses common to the Dallas/Fort Worth vicinity, which includes Bermuda Grass (*Cynodon dactylon*), Japanese Brome (*Bromus japonicus*), and Smooth Brome (*Bromus inermis*). Plant species observed during the 1998 wetland delineation are listed below. These species still are present, with very few additions since the delineation.

Table 3-1. Plant Species Observed During the May 1998 Wetland Delineation.

English Name	Latin Name
Giant Ragweed	*Ambrosia gigantea*
Oats	*Avena fatua*
Japanese Brome	*Bromus japonicus*
Buffalo Grass	*Buchloe dactyloides*
Purple Poppy Mallow	*Callirhoe involucrata*
Crowfoot Sedge	*Carex crus-corvi*
Black Hickory	*Carya texana*
Sugarberry	*Celtis laevigata*
Wavyleaf Thistle	*Cirsium undulatum*
Bermuda Grass	*Cynodon dactylon*
Green Flatsedge	*Cyperus pseudovegetus*
Illinois Bundle Flower	*Desmanthus illinoensis*
Flatstem Spikerush	*Eleocharis compressa*
Virginia Wild Rye	*Elymus virginicus*
Green Ash	*Fraxinus pennsylvanica*
Velvet-leaf Butterflyweed	*Gaura parviflora*
Squirrel-tail Grass	*Hordeum jubatum*
Annual Sumpweed	*Iva annua*
Wild Bergamot	*Monarda fistulosa*
Eastern Cottonwood	*Populus deltoides*
Mesquite	*Prosopis juliflora*
Yellow Prairie Coneflower	*Ratibida columnaris*
Oklahoma Blackberry	*Rubus oklahomus*
Clasping Coneflower	*Rudbeckia amplexicaulis*
Curly Dock	*Rumex crispus*
Black Willow	*Salix nigra*
Silverleaf Nightshade	*Solanum elaeagnifolium*
Western Horse-nettle	*Solanum dimidiatum*
Johnson Grass	*Sorghum halepense*
Sand Dropseed	*Sporobolus cyptandrus*
Texas Needlegrass	*Stipa leucotricha*
Cedar Elm	*Ulmus crassifolia*

Source: *Elm Fork Relief Interceptor Segment EF-2, Preliminary Jurisdictional Determination of Waters of the U.S.*, as prepared by Black and Veatch for the Trinity River Authority, August 1998, revised July 1999.

3.4.2 Wildlife. Wildlife in the project corridor is what would be expected in an urban area. Mammals potentially present would include Coyote (*Canis latrans*), Raccoon (*Procyon lotor*), Striped Skunk (*Mephitis mephitis*), Eastern Cottontail (*Sylvilagus floridanus*), Fox and Gray Squirrels (*Sciurus* spp.), and Opossum (*Didelphis virginiana*). Birds within the corridor may include year-round residents and migratory species including the Great Blue Heron (*Ardea herodias*), American Crow (*Corvus brachyrhynchos*), American Robin (*Turdus migratorius*), European Starling (*Sturnus vulgaris*), Northern Cardinal (*Cardinalis cardinalis*), Eastern Meadowlark (*Sturnella magna*), English or House Sparrow (*Passer domesticus)*, and Red-tailed Hawk (*Buteo jamaicensis*) among others. No rookeries, migratory nesting birds, or raptor nests were observed in the areas to be affected. Frogs, snakes, and turtles also may present along the corridor, but would not be adversely affected by the project activities.

3.4.3 Threatened and Endangered Species. The EF-2 alignment was thoroughly investigated by project biologists for the presence of any threatened or endangered species or suitable habitat for these species. No designated critical habitat has been identified within the project area by the US Fish and Wildlife Service. No threatened or endangered species were encountered during onsite surveys in 1998 or 2008. The Least Tern has been documented to utilize the Trinity River floodplain and adjacent areas during recent years. Most nesting has been observed on manmade structures that are similar to disturbed sand or gravel bars in river systems. Least Terns have also been observed feeding in impoundments on tributaries to the Trinity River within the Dallas Fort Worth area. Habitat considered suitable for protected species is otherwise not present in the project area, to support species other than during migration.

Because of past landscape modifications for flood and stormwater control, the project area lacks suitable habitat for any of the species considered. Former floodplain forest has largely been converted to an urban landscape where small woodlots or maintained lawns at the rear of commercial properties predominate.

Protected wildlife species with reported occurrences in Dallas County are listed in Table 3-2. No plants are listed for legal protection at the federal levels in Dallas County.

Table 3-2. Threatened and Endangered Species for Dallas County, Texas.

Taxon	English Name	Latin Name	Federal Status
Birds	Bald Eagle	*Haliaeetus leucocephalus*	DM
	Black-capped Vireo	*Vireo atricapilla*	E
	Golden-cheeked Warbler	*Dendroica chrysoparia*	E
	Least Tern	*Sterna antillarum*	E
	Piping Plover	*Charadrius melodus*	E, T
	Whooping Crane	*Grus americana*	E, EXPN

E = Endangered; T = Threatened; DM = Delisted Taxon, Recovered, Being Monitored First Five Years; EXPN = Experimental Population
(data source: http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ListSpecies.cfm)

3.5 Parks and Natural Areas

Since most of the EF-2 alignment is located in designated floodplain, residential development is not present and the stream corridors have been left as idle lands, open space, or greenways. Limited industrial development is present west of the EF-2 alignment between Highways 183 and 114. The northern part of the 72-inch portion of the EF-2 terminates adjacent to California Crossing Park near Riverside Drive in Irving. The Cistercian School property is immediately west of the 72-inch portion of EF-2.

California Crossing Park is used for a variety of activities, including recreational walking, jogging, rollerblading, biking, and as a river overlook. The alignment terminates immediately south of the California Crossing Park public use areas.

The Trinity River Greenbelt Park is located in the Elm Fork floodplain, but ends at the southern shoreline of the river, extending northward across the river and away from the project area. No other designated natural areas were identified along the project corridor.

3.6 Land Use/Planning

The entire EF-2 alignment lies within the 100-year floodplain. Based on a review of zoning and land use documents for the City of Irving, land use along EF-2 is designated as Retail, Mixed Use, Semi-public, Industrial, and Open Space/Parks. The alignment is mostly open, idle land, although a portion is used for utility corridors. Appendix F contains the City of Irving Generalized Future Land Use Map and the City of Irving New Development Locations Map from June 2008, illustrating the zoned land use areas.

3.7 Hazardous Materials

Throughout the initial routing and environmental assessment process, the project corridors have been thoroughly investigated by biologists and engineers for any indications of hazardous materials. This includes, but is not limited to, the presence of

odd appearing or unusually stunted vegetation, unusual odors, visual or olfactory evidence of petroleum products, buried tanks or other debris, and dump sites. The investigation revealed that petroleum-containing material (soil) is present on the site. This is due to an Explorer pipeline break in 1985 when more than 400 barrels of gasoline were spilled in the area between Lake Sitatunga and the Lake Carolyn discharge channel.

3.8 Social and Economic Conditions

The EF-2 wastewater service area includes the entire City of Irving and sections of the Cities of Addison, Carrollton, Coppell, Dallas, and Farmers Branch. Wastewater flow and population projections were developed in the 2004 Phase IV Infiltration/Inflow Assessment. These projections indicate that the total population within the EF-2 wastewater service area is projected to increase from about 256,821 in 2000 to about 386,424 by 2040, an increase of just over 50 percent. Because of this projected population increase and the existing capacity problems, current conditions do not support economic expansion, lowering the potential socioeconomic standards for the area served by the preferred alternative.

3.9 Cultural Resources

A Clean Water Act Section 404 permit is required, which mandates compliance with Section 106 of the National Historic Preservation Act (NHPA). A cultural resources investigation was conducted to determine the presence of historic properties, both archeological and above ground resources, within the Area of Potential Effect (APE) of the undertaking, and its potential to impact them.

The APE of the EF-2 alignment is confined to the project area. No above ground structures are present within the APE. When completed, no features of the project are visible above ground and do not have the potential to effect potential above ground resources within the viewshed. Therefore, potential cultural resource impacts are limited to archeology.

The results of the archeological investigation were outlined in a 2000 report (Geoarch Consultants, 2000).The investigation was conducted jointly for the EF-2 alignment between Proctor Road and Loop 12 and for the EF-1 alignment. The EF-1 alignment extends south of Proctor Road from the EF-1 Junction Box and has already been designed, constructed, and placed into service by the Authority. The investigation did not include the EF-2 alignment west of Loop 12 as this area had previously been surveyed in 1998. This decision was discussed with the USACE and is summarized in a letter dated to Ms. Mary Flores on February 19, 1999. This letter has been included in Appendix G.

A review of previous cultural resources investigations was conducted by Geoarch Consultants. At the time of the survey, only a few small archeological surveys had been completed in the EF-2 project area. The EF-2 alignment was surveyed through a series of exploratory trenches up to a depth of three meters. Fourteen trenches were excavated along the alignment. Archeological materials were not discovered during this investigation. While recommendations were made to monitor areas of the EF-1 alignment during construction, recommendations for monitoring of the EF-2 alignment during construction were not required since the chance of uncovering archaeological or historic materials was low.

Compliance with the NHPA requires consultation with the State Historic Preservation Office in defining the APE, historic properties present and assessment of impacts to historic properties. The Texas Historical Commission (THC) is the State Historic Preservation Office for Texas. Appendix G contains a January 5, 2000, letter from the THC for this project concurring with the recommendations of the Geoarch Consultants report.

Federally recognized tribes that may attach religious or cultural importance to the project area include the Comanche, Kiowa, and Wichita. These tribes are in the process of being contacted to ascertain if they place religious or cultural importance to the site and if so, enter consultation should the project adversely affect the qualities the tribes ascribe to the area.

3.10 Air Quality

The Environmental Protection Agency (EPA) is required to set National Ambient Air Quality Standards (NAAQS). The pollutants included, known as criteria pollutants, are carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur dioxide. TCEQ administers the federal program in Texas. Effective January 19, 2011, Dallas County is classified as “Serious Nonattainment” based on 1997 eight-hour ozone NAAQS of 0.08 ppm.

4.0 Environmental Consequences

This chapter will discuss the environmental consequences arising from the Preferred and the No Action Alternatives. The other alternatives initially considered are not discussed since they were found impracticable and do not adequately meet the project purpose or need and do not allow for less environmental impact than the preferred alternative.

4.1 Geological Elements

4.1.1 Alternative 4 – Preferred Alternative. EF-2 will be buried for its entire length, with the exception of three aerial crossings totaling approximately 190 feet. Trenching depth and average cover for EF-2 varies considerably based on location. The southern sections of EF-2 will be trenched to a depth of 11 to 18 feet, which would result in cover depths of 2 to 9 feet. Trenching and cover depths generally increase in the northern sections of the EF-2 alignment. Maximum trench depths may exceed 30 feet, which would result in maximum cover depths of up to 24 feet. Trenches will be dug using diesel-powered excavators and backhoes. Where the trenches are in the vicinity of the levee, the trench width will be minimized. Trenching will not interfere with or negatively impact the levee or other utilities. Select areas will also be installed by tunneling.

The impacts to geological resources, primarily mineral soils, from project activities are expected to be minor and temporary. Buried minerals or other geological resources would not be affected or made inaccessible by the pipeline construction. Best management practices (BMPs) would be used during construction to control stormwater runoff and minimize the potential for sedimentation in local waters. Final grading would restore the pre-construction contours and elevations to the extent practicable. Following grading, restoration of temporary impacts would include using native grasses to revegetate disturbed areas on the project site. The Contractor would be required to dispose of excess spoil in an approved off-site location with no drainage to waters of the United States.

No significant loss of prime farmland would occur because of the location of EF-2 in an urban area and the minimal amount of farmland along the pipe routes. None of the project area is zoned for agricultural use and no existing farmland would be converted to another use because of the project.

4.1.2 No Action Alternative. The No Action Alternative would not have any impact on geological elements.

4.2 Hydrological Elements

4.2.1 Surface Water

4.2.1.1 Alternative 4 – Preferred Alternative. Potential impacts to surface waters in the project area would be limited to those areas where EF-2 crosses drainage channels; none of the wetlands in the project area would be directly affected. The installation of the interceptor would not impact the hydraulics or the hydrology of the Elm Fork or any of the drainage channels. There are three aerial crossings in the alignment, as further described below.

The first crossing is the unused IFCD ditch located approximately 250 feet south of SH183. This crossing would result in a temporary impact of approximately 0.01 acre and a permanent loss of 0.01 acre. The ditch consists of a weedy plant community that is composed of a variety of disturbance-tolerant plant species and does not provide significant function. The second crossing is an outfall ditch from the IFCD pump station No. 1. This crossing would result in a temporary impact of 0.47 acre and a permanent loss of 0.20 acre. This ditch consists of a weedy plant community that is composed of a variety of disturbance-tolerant plant species and does not provide significant function. The third crossing is the drainage channel from Lake Carolyn. This crossing would result in a temporary impact of 0.08 acre and a permanent loss of 0.005 acre. The area adjacent to the outfall is maintained lawn and has a low function. All three crossings would be made with prestressed concrete embedded cylinder pipe (PCCP) in 16-foot lengths. Installation of the pipeline will occur during dry periods.

The alignment for the 72-inch diameter interceptor requires crossing the drainage channel from Lake Sitatunga. The proposed crossing location is at an existing low-water spillway constructed to create the lake. The pipeline would be installed in the spillway using open-cut methods. This crossing would have a temporary impact of 0.37 acre with no permanent losses because the spillway dimensions would not be increased. The area vegetation is maintained lawn and has a low function, primarily serving as ground cover.

Tables summarizing all impacted waters of the U.S., including their function, and a Waters Upload sheet, are included in Appendix D.

No activities would alter the current streambed alignment or configuration of the stream bank except at the Cistercian channel crossing. During construction, a temporary channel crossing will be required to allow access to the area. These activities would be covered by Nationwide Permit 14. The temporary channel crossing would result in a temporary

impact of 0.03 acre of waters of the United States and there would not be any discharge into special aquatic sites. Because of the loss of water is less than 1/10 acre and discharge is not in a special aquatic site, a pre-construction notification would not be required, although the Contractor will be required to follow the general conditions of the permit. BMPs would be used to minimize the potential for erosion during and after construction along the entire alignment. This would include returning all areas to pre-construction contours (e.g., graded embankments not to exceed 4:1 slopes) and using hay bales, silt screens, and other BMPs where appropriate. To limit potential streambed damage, in-stream construction would be completed only during low water or under dry conditions to limit potential damage to streambeds.

4.2.1.2 No Action Alternative. The No Action Alternative would not have any positive impacts on the surface waters. However, an increased potential for surface water degradation would continue to exist as the currently overloaded interceptor begins to fail, allowing untreated wastewater to enter surface waters. Furthermore, economic expansion would be stalled because of inadequate wastewater facilities.

4.2.2 Groundwater

4.2.2.1 Alternative 4 – Preferred Alternative. There would be no significant impacts to groundwater in the project vicinity from the recommended plan. In the areas with relatively impervious clays, it is anticipated that groundwater flow rates will be minimal during non-flood conditions. There are locations where groundwater could flow into the construction area, generally where the alignment is close to the adjacent drainage channels or the riverbank. The Contractor would implement appropriate dewatering plans to address these instances; any permits required for groundwater withdrawals and discharge would be obtained by the Contractor in accordance with federal, state or local requirements. These areas would be limited in size and occurrence. (Fugro Consultants, 2005)

Within the intermittent sand layer that extends under the levee and within the flood plain, higher permeability sand may allow the horizontal migration of groundwater or flood water. In order to prevent migration of water through the pipe embedment, which is typically granular fill, the embedment material will be modified for the 108-inch interceptor between Proctor Road and Loop 12. Depending on the pipe material selected by the Contractor, and the pipe will either be embedded in controlled low-strength material (CLSM) or completely encased in concrete. CLSM is a low strength concrete. This method was previously discussed with the USACE in November 2010. A memo discussing this method is included in Appendix C.

4.2.2.2 No Action Alternative. With the steps summarized above, the No Action Alternative would not have any impacts on the groundwater.

4.3 Floodplains and Waters of the U.S. Including Wetlands

4.3.1 Floodplains

4.3.1.1 Alternative 4 – Preferred Alternative. Although this project is located in the FEMA 100-year floodplain, it is not expected to alter or otherwise hinder the flow of floodwaters in the floodplain. No decrease in floodwater storage or floodways would occur from the project. During construction, BMPs will be used to minimize the potential for soil erosion and sedimentation. Any excess excavation materials would be removed to an approved disposal area outside the floodplain. Materials to be used as fill would be temporarily stored in upland locations or in the floodplain for short periods (less than 90 days) and protected against dispersion by water or wind. All fill used would be obtained from the project site with no importation from offsite anticipated. Local topography would be returned to pre-construction conditions, as much as practicable, to insure the project would not impact the flow of floodwaters.

The Contractor would be required to develop a Flood Emergency Plan to be implemented in the event of eminent flooding during construction.

Because the project site is within the Trinity River Development Corridor, a Corridor Development Certificate (CDC) is typically required. The certificate process is in place to minimize the flood risk along the Trinity River. Since the storage volume in the floodplain would not be affected and flood levels would be unchanged due to this project, a request for an exemption has been previously submitted to the City of Irving.

As no floodplain impacts are anticipated and no significant above ground structures would be constructed in the floodplains, mitigation is not anticipated to be necessary. Relevant floodplain requirements to prevent loss of floodplain function would be complied with during construction.

4.3.1.2 No Action Alternative. The No Action Alternative would not have any impacts on the floodplains.

4.3.2 Waters of the U.S. Including Wetlands.

4.3.2.1 Alternative 4 – Preferred Alternative. The proposed project would result in the discharge of approximately 1,700 cubic yards of dredged and fill material into approximately 0.77 acre of low quality wetlands and other waters of the U.S. The discharge would occur at six of the twelve distinct identified locations. Proposed adverse impacts would include 6.24 acres of temporary impact and 0.77 acre of permanent loss. Four of these twelve sites were discussed in Section 4.2.1.1 above. Tables summarizing all proposed impacts to waters of the U.S., including their function and the Waters Upload sheet, are included in Appendix D. To the extent possible, construction work would be conducted under dry conditions to limit the dispersion of disturbed soils. During construction, appropriate BMPs would be used to minimize erosion, sedimentation, or other problems often associated with stormwater runoff, including regularly scheduled inspection and repair of installed BMPs. Following construction, all temporary impacts to jurisdictional wetlands or other waters would be restored to pre-construction conditions to the maximum extent practicable. Through the project design process, the applicant has made all reasonable efforts to avoid and minimize impacts to waters of the U.S. The alignment has entirely avoided the Elm Fork, the lakes operated by DCURD, and the Northwest Levee.

Permanent losses would occur where new structures will be added or additional cover is required for the pipeline installation, resulting in a loss of waters of the U. S.

Because on-site wetland creation is deemed unlikely to succeed and a suitable mitigation site has been elusive, in compliance with USACE requirements the purchase of mitigation bank credits for unavoidable wetland impacts would be used to compensate for the permanent losses. The permittee shall debit the appropriate number and type of credits from any USACE, Fort Worth District approved mitigation bank(s) having a service area encompassing the project site. The debit(s) shall compensate off-site for unavoidable adverse project impacts that would not be compensated for by on-site mitigation and shall be calculated in accordance with the appropriate mitigation banking instrument (MBI). The permittee shall indentify the mitigation bank(s) selected for use, calculate credits required, and submit to the USACE for verification. Upon verification, complete the mitigation banks transaction(s), and provide documentation to the USACE that the transactions(s) occurred prior to any ground disturbing activities within waters of the U.S.

4.3.2.2 No Action Alternative. The No Action Alternative would not result in adverse impacts to waters of the U.S. However, an increased potential for surface water

degradation would continue to exist as the currently overloaded interceptor begins to fail, allowing untreated wastewater to enter surface waters, including wetlands.

4.4 Biological Elements

During the third quarter of 1998, the U.S. Fish and Wildlife Service (FWS) was consulted concerning the potential for project impacts to wildlife and habitat, especially protected species of plants and animals. In 2008, the FWS and the Texas Parks and Wildlife Department (TPWD) were provided copies of the EA prepared for the TWDB and requested to provide comments. The opinion letters from the agencies are included in Appendix G

4.4.1 Vegetation.

4.4.1.1 Alternative 4 – Preferred Alternative. The impacts to the existing vegetation would be minimal and limited to work areas. The EF-2 alignment was modified to the maximum extent practical to avoid forested areas and wetlands. By using existing utility alignments, the interceptor would be installed in areas previously cleared to accommodate utility installations was utilized, reducing the environmental impacts from this project. Potential impacts to existing vegetation conditions would be further minimized by implementing BMPs during construction, such as conducting grading under low water or dry conditions or excavation only in areas under active construction. On completion of construction, disturbed areas would be re-vegetated to the pre-construction conditions as much as possible. In most cases, this would be an approved grass cover using species native to the project area.

4.4.1.2 No Action Alternative. The No Action Alternative would not have any impact on vegetation.

4.4.2 Wildlife.

4.4.2.1 Alternative 4 – Preferred Alternative. No significant impact to wildlife or wildlife habitat from the project would occur. The wildlife present is typical of mixed urban and rural areas and does not represent a unique or rare wildlife assemblage. Based on the WHAP, the average wildlife quality score for the areas evaluated is relatively low: 0.44 for emergent wetlands, 0.43 for floodplain grasslands, 0.43 for floodplain forests, and 0.26 for maintained lawn. Wildlife would be expected to avoid the project area during construction due to the presence of workers and equipment, but should return once construction is completed and pre-construction conditions are restored. Because habitat conditions would be essentially unchanged relative to the current condition, long-term

avoidance of the project area by wildlife is not anticipated and a similar wildlife assemblage will be present before and after construction.

4.4.2.2 No Action Alternative. The No Action Alternative would not have any impact on wildlife.

4.4.3 Threatened and Endangered Species.

4.4.3.1 Alternative 4 – Preferred Alternative. Least Tern has been identified as a species observed with increased frequency throughout the Trinity River and tributaries. It is known to feed in ponded areas and to nest on disturbed sites such as sand bars or gravel bars and other areas that are similar in composition. Gravel roof tops have been shown to be attractive for Least Tern nesting activities. . Some infrequent use by transients for resting or for other short-term uses is possible for other species Based on information provided by officials at the U.S. Fish and Wildlife Service and Texas Parks and Wildlife Department, impacts to protected species in the project vicinity are considered highly unlikely (See Appendix G). The USACE has concluded that construction of the preferred alternative is not likely to adversely affect the Least Tern or any other species protected by the Endangered Species Act.

4.4.3.2 No Action Alternative. The No Action Alternative would not result in any changes in interactions of protected species with the environment.

4.5 Parks and Natural Areas

4.5.1 Alternative 4 – Preferred Alternative. The impact of the project on public parks would be negligible. Work would be conducted during daylight hours, so noise would be a slight addition to existing noise levels in the urbanized project site. Most of the pipeline has been routed through little-used areas, such as within the levee for the Elm Fork or along existing pipelines right-of-ways. The northern part of the 72-inch portion of EF-2 terminates adjacent to California Crossing Park. The project does not impinge on the Trinity River Greenbelt Park, although noise from construction could enter the park space or visual appeal in the project area would be diminished for a short period. The project would not significantly impact recreational use of these areas since the EF-2 alignment has been routed along existing electrical transmission and distribution line corridors or other pipelines away from high-volume public use. Where the Cistercian school racetrack is adjacent to the EF-2 alignment, tunneling would be used to limit the impact on the Cistercian School property and use of the track facilities. Where the

project comes close to high-use areas, construction barriers would be erected along the alignment with warning signage during construction.

4.5.2 No Action Alternative. The No Action Alternative would not have any impact on parks and natural areas. However, an increased potential for surface water degradation would continue to exist as the currently overloaded interceptor begins to fail, allowing untreated wastewater to enter surface waters. This could have an indirect impact on the aesthetics of the river adjacent to California Crossing Park.

4.6 Land Use/Planning

4.6.1 Alternative 4 – Preferred Alternative. No permanent or significant negative impacts would occur that would impact current or future land use/planning from project activities. During construction, there would be temporary disruptions to some roadways or traffic patterns. However, the pipeline routing is compatible with current land use in that it makes use of existing utilities corridors and unoccupied land to the fullest reasonable extent. Because of the pipeline location in a utility corridor, no portion of the pipeline routing would place future park, residential, or business development at risk.

All junction boxes, manholes, and structures associated with the interceptor sewers would be enclosed. Access openings for these structures would have bolted-down, watertight covers and frames. Venting of these structures would also be limited to the minimum amount necessary for adequate system operation. This would limit the escape of objectionable odors associated with raw sewage to the atmosphere. Providing sewer capacity as proposed would allow for economic growth and development within the service area of the project.

4.6.2 No Action Alternative. Under the No Action Alternative, current conditions would be unchanged and the sewer capacity for the area would remain overloaded and inadequate. This condition will hinder economic growth and development in the area as well as threatening the environment and public health. Frequent overflows due to overcapacity lines would also impact the area by posing health threats to the people, animals, and vegetation, making the area less desirable for growth.

4.7 Hazardous Materials

4.7.1 Alternative 4 – Preferred Alternative. No hazardous materials impacts would occur from the project. Soil contaminated by petroleum is present on the project site because of a past Explorer pipeline break. Precautions would be taken to properly

remove, handle, and dispose of contaminated material that is excavated in this part of this project area. Procedures for hazardous material handling would be included in the project Specifications. Precautions would also be made to prevent migration of any petroleum products because of this project. A spill prevention, countermeasure and control plan (SPCC Plan) would be developed and implemented to prevent possible spills of fuel from construction equipment. The installation of the pipeline and the mitigation of a portion of the contaminated soils would have an overall beneficial impact on the project area.

4.7.2 No Action Alternative. The No Action Alternative would not have any impact on hazardous materials. The existing petroleum spill would remain and potentially contaminate the groundwater. In addition, the spill could migrate to other areas, affecting a broad array of land uses, which may limit the economic development of the region.

4.8 Social and Economic Conditions

4.8.1 Alternative 4 – Preferred Alternative. The existing interceptor sewers do not provide adequate capacity to serve projected growth in the northwest Dallas and Irving areas. The proposed facilities would benefit the area economy by providing the sewer capacity needed to allow for expanded residential and commercial development in the service area. The project would eliminate the current overflows and the required cleanup associated with the overflow events. Additionally, there would be a temporary beneficial impact on the economy associated with project construction.

4.8.2 No Action Alternative. The No Action Alternative would have a negative impact by not providing adequate sewer capacity to accommodate existing conditions, much less expansion of economic growth and development in the area. Sewer overflows would continue to have negative impacts to the health and safety of people in the area.

4.9 Cultural Resources

4.9.1 Alternative 4 – Preferred Alternative. The APE is based on the width of the excavation along the length of the alignment. Though the width will vary, it would not exceed 100-feet. The overall length of the interceptor is approximately 19,000 feet. Where trench boxes would be utilized, the width of the trench would be greatly reduced. The maximum trench width would occur where junction boxes are installed. The trench widths would be limited where the trench could impact the levee, other utility right-of-ways, and surface features. The edge of the trench must be located at least 50 feet from the toe of the levee.

Based on the cultural survey results, impacts to above-ground historic properties would not occur since there are none within the APE. The APE has a low potential to contain archeological resources and therefore no historic properties are anticipated during construction. Should undiscovered archaeological or historic properties be encountered, all construction work in that location will be stopped until the THC is notified and National Register eligibility of the site is determined and impacts are assessed. .

4.9.2 No Action Alternative. The No Action Alternative would not have any impact on cultural resources.

4.10 Air Quality

4.10.1 Alternative 4 – Preferred Alternative. During construction activities, there would be temporary impacts on the air quality in the immediate project area. Construction equipment at the work site may include a variety of diesel engine machinery, such as bulldozers, front loaders, excavators, or cranes. The construction machinery would have exhaust emissions from the combustion of the diesel fuel and the soil disturbance would result in releases of dust and other particulates. Fugitive dust could be released into the air and suspended, affecting visibility and contributing to suspended particulate matter. However, these effects are considered temporary and short term and long-term degradation of air quality would not occur. Dust control and use of properly calibrated pollution controls on engines would further limit the effects. An initial analysis indicates that the amount of emissions from the project would not produce sufficient precursors to develop ozone to levels that would impair Texas ability to meet SIP and no further analysis is required.

4.10.2 No Action Alternative. The No Action Alternative would not have any impact on air quality.

4.11 Summary Appraisal of Environmental Losses vs. Gains

Land use in the project area is primarily floodway and open space, with a small amount of medium density industrial areas. The proposed sewer improvements would not have any adverse impacts on land values in the area and may result in neutral land value effects or increase them as sewer capacity were increased encouraging new regional development. No significant impacts to cultural resources, protected species, wildlife and habitat, or vegetation are anticipated. Existing right-of-ways and utility easements would be used for large portions of this project. Construction and operation of the proposed improvements would result in benefits to the health and economy of the area served by

the pipeline. Temporary inconveniences would include construction activities and related consequences, e.g. the generation of dust and potential for runoff from stormwater erosion. Most impacts would be addressed and minimized or eliminated by design, planning, or construction BMPs. Furthermore, the project would provide long-term benefits for both the environment and public from the improvements in wastewater handling.

5.0 Cumulative Impacts

This section addresses past, present, and reasonably foreseeable future actions within the project area.

Past actions in the area are numerous, including utility, road, commercial, and industrial development.

Major highways include Loop 12, State Highway 482 Spur, and State Highway 183. Numerous other roads that service the area have also been constructed including Northwest Highway, California Crossing, Rochelle, and Tom Braniff Drive. Plans are underway to expand State Highway 183 from State Highway 360 to Interstate Highway 35. The proposed modifications would include three lanes on the service road, four traffic lanes, and two managed High Occupancy Vehicle (HOV) lanes in both the east and westbound directions.

The previous Texas Stadium was located close to the project site, but this stadium was recently demolished. The former Texas Stadium site will be redeveloped, with plans to construct three residential facilities (lofts, condominiums, and a multifamily facility). Portions of the parking facility are adjacent to the project site. Timing of development is unknown, but is not anticipated during the time that EF-2 will be under construction.

The University of Dallas and Cistercian Preparatory School and Cistercian Abbey are located in the project vicinity. The 72-inch alignment will parallel the school track facility.

The levee protecting the Elm Fork in the vicinity of the project is another past project, along with the facilities owned by DCURD including Lake Carolyn, Lake Sitatunga, and the levee constructed around the lakes. California Crossing Park, owned and maintained by the City of Dallas and part of the City of Irving Campion Trails system, has a paved walking trail and maintained public areas. A variety of previous utilities were installed, including the 45-inch, 90-inch, and 102-inch interceptors owned by TRA, a 30-inch reuse water line, a 3-inch gas pipeline owned by Explorer Pipeline Company, two 4-inch petroleum lines owned by Exxon, a 48-inch water line, a 12-inch sanitary sewer, and a variety of overhead power and transmission lines. Recent interceptor construction for TRA includes EF-1, which extends south of EF-2 at Proctor Road and EF-6, which extends north of EF-7 at Northwest Highway. The interceptor system is expanded in segments based on the planning and funding needs of TRA.

Present activities include operation of the lake and flood control facilities, use and maintenance of utility lines, public use of the park, and use of the existing roads. Construction of the proposed EF-2 and EF-7 interceptor lines will commence in late 2011.

Future utility work would also be expected to address the needs of a metropolitan area including water, sewer, and power. Other work associated with the addition of collection sewers, meter stations, and lift stations for the existing TRA interceptors and Contracting Party collection system will be required in the future to continue to meet system demands. Planned activities by the TRA include lining the existing 45-inch interceptor. Levee remediation will also occur, including the addition of a slurry wall at the levee by the IFCD to help prevent migration of groundwater beneath the levee through the sand layer. Future development of the Campion Trails system is planned to commence after the construction of EF-2 is complete. Campion Trails is 22 miles of planned greenbelt within the City of Irving. Approximately five miles has been constructed, with additional trails added each year.

5.1 Geological Elements

There have been and will continue to be impacts on geological elements. Construction-related earth-moving activities for various past, present, or proposed future projects impact the surface geology of the area, primarily the surface soils. Underlying subsurface geology generally is not affected by most construction in the region. Cumulative impacts from the proposed work are therefore expected to be minimal. Effects for other past, present, or foreseeable future projects that include earthwork are expected to have similar impacts on soils to the proposed project, the addition of which would not significantly change the existing environmental conditions. Impacts to the soil are generally temporary in nature and can be minimized by the use of BMPs during construction to control stormwater runoff and prevent erosion. In nearly every instance where soil disturbance would occur, permit requirements are in effect that further limit the extent of any impacts (e.g., erosion and sedimentation controls required for projects that disturb more than one acre). Because most soil disturbance is a short-term temporary effect, the cumulative effect of all present or future projects in the region is anticipated to be non-significant.

5.2 Hydrological Elements

5.2.1 Surface Water. Given the location in an urban area, there have been and will continue to be impacts to surface waters. Past work, including the construction of the Northwest Levee, Lake Sitatunga, and Lake Carolyn, permanently changed the water

control structures. Cumulative impacts from the proposed project would be minimal during construction activities since existing flood controls, stormwater management, and other control mechanisms would not be altered. The temporary channel crossing at the Cistercian channel will be used only as long as needed and permanently removed when access is no longer required. Construction and stormwater BMPs will be implemented during all construction activities near surface waters, which will eliminate or minimize any conveyance of loosened soil into water bodies. Given the current level of existing surface water disturbance, the regulatory mechanisms in place to control various project construction activities, and the minimal effect of the project on past and present actions, the cumulative impacts are expected to be short term and temporary.

5.2.2 Groundwater. Although groundwater is present, the project vicinity is not identified as an aquifer recharge zone. An overall cumulative beneficial impact on groundwater from the proposed project is likely since a portion of the petroleum-contaminated soil from the Explorer pipeline will be removed during construction and SSO events would be reduced or eliminated. Use of CLSM or concrete encasement on the 108-inch interceptor will prevent increased migration of ground water. No past, present or proposed actions would have a similar effect on groundwater as this project. Therefore, the cumulative effect is a localized net benefit.

5.3 Floodplains and Waters of the U.S. Including Wetlands

5.3.1 Floodplains. The area around the Elm Fork is located within the 100-year floodplain, which includes the floodway. Other areas are also identified as protected from 100-year flood events by levees, but flooding could occur during larger flooding events. Past and present actions, principally the construction of the levees, have resulted in changes in the dimensions of the floodplain. However, this project would not produce a significant change in the floodplain storage or flows in the floodway. Impacts from project construction activities are temporary and short term. Disturbed areas will be returned to preconstruction contours, including revegetation where appropriate. Therefore, the cumulative floodplain impact from this project, in combination with past and present actions, is minimal and non-significant.

5.3.2 Waters of the U.S. Including Wetlands. Past activities have changed the native landscape around the Elm Fork, which likely has resulted in the loss of wetlands prior to wetland regulations. The proposed project will have a minor cumulative impact associated with the utility installation, primarily affecting waters other than wetlands (e.g., ponds and impoundments). Temporary wetland impacts will be restored to the preconstruction contours. Mitigation for unavoidable permanent losses will occur off site

in an established mitigation bank due to the inability to locate adequate onsite areas for mitigation. Overall, the project will impact wetlands, but the cumulative effect is small and temporary. Because the existing wetlands were previously disturbed by past and present actions and the project would not intensify the effects of the other actions, taken as a whole the impacts of the project are considered minimal. It is not known if future actions that may occur would affect the wetlands in the project area. However, these actions would be subject to the same wetland regulations as the project, which could be expected to reduce the cumulative effects of these future actions.

5.4 Biological Elements

5.4.1 Vegetation. Past activities have removed the native vegetation around the Elm Fork. Existing vegetation is planted or is volunteer species. Most vegetation is managed to control access to previous utility installations and related easements. The principal management technique used is mowing or trimming. The proposed project could have a positive cumulative impact on vegetation since disturbed locations will be re-vegetated with native species, thereby increasing native vegetation diversity in the project area. Regardless, the overall effect on vegetation would be minimal because the existing management scheme would remain in effect resulting in little change from current conditions.

5.4.2 Wildlife. Past activities may have impacted wildlife or wildlife habitats in the project area. The proposed project is not anticipated to have any permanent cumulative impacts on wildlife or wildlife habitat since the existing conditions would not be significantly altered. Most habitat impacts from construction activities would be temporary. Generally, wildlife will avoid the area during construction and should return once construction is completed. There may be a small benefit through the addition of native vegetation to the project area, but the overall cumulative effect is expected to be minimal, short term and temporary.

5.4.3 Threatened and Endangered Species. Threatened or endangered species are known to visit or temporarily seek food, rest, or feeding within the Upper Trinity River floodplain within Dallas County, the project as proposed would not adversely impact any protected species,. There would be no cumulative effects from past, present, or foreseeable future actions in combination with the project that would adversely affect these species.

5.5 Parks and Natural Areas

Impacts from construction activities on parks or natural areas will be minimal and temporary. Cumulative impacts related to project activities would not affect parks or natural areas since all activities will be confined to the work areas, which have been previously disturbed and do not include nearby parks. Much of the project area is open space that is managed for utility access. Therefore, any cumulative impacts would be non-significant and minor.

5.6 Land Use/Planning

There will be positive cumulative impacts from the proposed project for planning and land use. The proposed project will increase the sanitary sewer capacity and allow additional development in the area. The current interceptor capacity is inadequate and can impede future development, resulting in negative environmental and public health consequences. Thus, the cumulative impact of the project in combination with present or foreseeable future actions is positive.

5.7 Hazardous Materials

There will be a positive impact from the proposed project from a hazardous materials standpoint. Some of the petroleum-contaminated soil from an Explorer pipeline break will be removed from the site during construction activities. In addition, the project would be subject to current regulations mandating controls on hazardous materials handling and clean-up in the event of an accidental spill. Thus, the project area would be left in a better condition with respect to hazardous materials than a no action alternative. The net cumulative impact is positive.

5.8 Social and Economic Conditions

There will be a positive impact on social and economic conditions from the proposed project. The interceptor will provide supplemental capacity for the currently overloaded existing lines, and capacity for future development. New businesses and other developments can be proposed and constructed because of the increase in the interceptor capacity that may otherwise never reach the construction phase. There will be an additional temporary positive impact with the addition of jobs directly related to the construction of the interceptor. The net cumulative impact of the project, in combination with present or future actions, is positive and long term.

5.9 Cultural Resources

Cultural resources are not anticipated along the interceptor alignment, based on the results of a cultural resources survey and concurrence by the THC. The project viewshed would not be adversely affected, except during construction, which would be a short term

temporary effect. There will be no cumulative impacts on cultural resources from the proposed project.

5.10 Air Quality

There will be a minimal impact on air quality from construction activities. Exhaust emissions from construction equipment and increased particulates from soil disturbance are the primary effects on air quality from the project. Similar present or foreseeable future actions would have similar short term, temporary effects as the project. However, standard regulatory requirements for pollution control equipment on construction vehicles and stationary equipment, as well as fugitive dust control measures, will further limit the areal extent of any impacts for all actions including the project. Long term adverse cumulative impacts are considered unlikely.

6.0 Findings and Conclusions

This document has evaluated the proposed project and related potential environmental impacts, concluding that the proposed action would not significantly affect the environment, including aquatic habitats in the project area. Although the No Action Alternative would result in current project area conditions continuing with few of the effects associated with the project, it would not meet the project purpose to increase the existing interceptor capacity and support economic development by making future sewer capacity available.

The proposed action would not result in changes to land use or water use, or result in significant changes to the quality or quantity of the aquatic environment. No significant adverse effects on the aquatic or terrestrial habitat from the project, or to threatened, endangered or protected species under the Endangered Species Act are expected. There are no permanent or long-term impacts to ambient air quality. No significant impacts on mineral resources or needs would arise from the project. There are no impacts to historical and cultural resources. There would be no adverse impact to socioeconomic resources. Impacts to vegetation and wildlife are temporary. Unavoidable permanent wetland loss will be mitigated at an established mitigation bank through a purchase of bank credits. TRA will debit credits from a USACE approved mitigation bank for the 0.77 acre of permanent losses. The proposed project will support growth and expansion of the community with expanded sanitary sewer capacity.

Consequently, there are no significant environmental impacts associated with the proposed action. This project is not a major federal action and any proposed impacts can be mitigated to a level of non-significance; therefore, an Environmental Impact Statement is not required. Because the project impacts individually and cumulatively do not rise to the level of a significant adverse effect on the human environment, mitigation is not required to reduce impacts to the level of non-significance, except as noted herein.

7.0 Public Involvement

7.1 Public Review

A Notice of Availability (NOA) advertizing the opportunity to review the Draft EA will be made available for public comment during a 30-day comment period. A copy of the NOA is included in Appendix G. Comments received will be addressed in the final EA.

7.2 Agency Review

A separate environmental document was created for the Texas Water Development Board. This document was sent to multiple federal, state, and local agencies for review. Two agencies provided comment letters. The comment letters are included in Appendix G. Comment letters received during review of the Draft EA will also be included in the Final EA.

This document will be sent to the following agencies for review and comment:

- State Historic Preservation Office
- U.S. Fish and Wildlife Service
- Federal Environmental Protection Agency, Region 6
- Texas Parks and Wildlife Department
- Texas Commission on Environmental Quality

7.2.1 U.S. Fish and Wildlife Service. In the transmittal letter to the FWS, it was proposed that the proposed project would have "No Effect" on any listed species or critical habitats. The FWS acknowledged receipt of the report and indicated that no further consultation would be required as long as the agency authorizing this work (U. S. Army Corps of Engineers) also concurred that that the project would have "No Effect". Each federal agency is responsible to determine if the project will adversely impact the environment.

7.2.2 Texas Parks and Wildlife Department. The TPWD requested several items be revised in the Final TWDB EA prepared for funding purposes. A response letter was provided to the TPWD on June 22, 2009. This letter is included in Appendix G.

First, the area of disturbance was requested. This was determined by the width of the temporary and permanent right-of-ways and the information was provided to TPWD. The project description (Section 2-7 of this report) was revised to include information on the temporary and permanent easements. Second, impacts to the vegetation for the total project area needed to be addressed. The Draft Environmental Assessment included

reference to the Wildlife Habitat Appraisal Procedure, which only evaluated the habitat for the wetlands and other USACE regulated waters. The WHAP information is provided in this report unchanged as a description of existing site conditions. The reference to the WHAP was removed from the TWDB document. The site conditions described in the WHAP were reviewed and confirmed by a field investigation on June 11 and 12, 2008.

8.0 References

Black & Veatch. 1996. *Trinity River Authority of Texas. Relief Interceptor EF-2. Project Memorandum: Alignment and Operation/Capacity*.

Black & Veatch. 1997. *Trinity River Authority of Texas. Relief Interceptor EF-2. Project Memorandum: Alignment and Operation/Capacity Option 4 (Revised).*

Black & Veatch. 1999. *Trinity River Authority of Texas. Elm Fork Relief Interceptor EF-2. Preliminary Jurisdictional Determination of Waters of the United States.*

Black & Veatch. 2000. *Wildlife Habitat Appraisal Elm Fork Relief Interceptor Segment EF-2. Trinity River Authority of Texas*.

Black & Veatch. 2004. *Trinity River Authority of Texas, Phase IV Infiltration/Inflow Assessment*.

Coffee, D. R., R. H. Hill, and D.D. Ressel. 1980. *Soil Survey of Dallas County, Texas*. U. S. Department of Agriculture, Soil Conservation Service.

Fugro Consultants. 2005. *Draft Geotechnical Investigation. Elm Fork Relief Interceptor, Segment EF-2. Irving, Texas.*

Geoarch Consultants. 2000. *An Archaeological Survey of the Elm Fork Trinity River Relief Interceptor Pipeline. Dallas County, Texas.*

Appendix A

Figure A-1 Project Location

Figure A-2 Location of COE Regulated Wetlands and Waters

Figure A-3 Alternative 1, 60-inch Parallel

Figure A-4 Alternative 2, 84-inch Replacement

Figure A-5 Alternative 3, 108-inch Relief

Figure A-6 Alternative 4, 72-inch and 108-inch Relief

Appendix B

USGS 7.5-minute Topographic Map
Irving, TX Quadrangle

Natural Resources Conservation Service Soils Data
Soil Map, Dallas County, Texas

Prime and other Important Farmlands, Dallas County, Texas

FEMA Flood Insurance Rate Map
Map Panel Number 48113C0310J

Appendix C

Sheet M-1, 108” Interceptor Aerial Crossing
(Irving Flood Control P.S.#1 @ STA. 45+00)

Sheet M-2, 108” Interceptor Aerial Crossing
(South of SH-183 @ STA. 8+42)

Sheet M-3, 72” Line “E” Aerial Crossing
(Lake Carolyn) Station 39+00

Sheet TC-2, 72” Line “E” Spillway Crossing
Lake Sitatunga

November 5, 2010 Memorandum
108-inch Interceptor Trench Embedment Provisions

Appendix D

Table D-1, Impacted Wetlands and Other Waters of the U.S.

Table D-2, Waters Upload Sheet

Table D-3, Hydrologic Function

Table D-4, Biogeochemical Function

Table D-5, Habitat and Food Web Support

Appendix E

Wildlife Habitat Appraisal

Appendix F

City of Irving Generalized Future Land Use Map

City of Irving New Development Locations Map from June 2008

Appendix G

Letters of Comment

November 17, 1998 Facsimile from the Fish and Wildlife Service

February 19, 1999 letter to the U.S. Army Corps of Engineers

January 5, 2000 letter from the Texas Historical Commission

December 17, 2008 acknowledgement from the U.S. Fish & Wildlife Service

December 19, 2008 letter from the Texas Parks & Wildlife

June 22, 2009 letter to the Texas Parks & Wildlife

Notice of Availability

December 20, 2011 letter to Mr. Michael Jansky, U.S. EPA Region 6

December 20, 2011 letter to Mr. Tom Heger, Texas Parks and Wildlife Department

December 20, 2011 letter to Ms. Kathy Boydston, Texas Parks and Wildlife Department

December 20, 2011 letter to Mr. Thomas Cloud, Jr., U.S. Fish and Wildlife Service

December 20, 2011 letter to Mr. David W. Galindo, Texas Commission on Environmental Quality

December 20, 2011 letter to Mr. Stratford Williams, Wichita Executive Committee

December 20, 2011 letter to Mr. Ronal D. Twohatchet, Comanche Indian Tribe of Oklahoma

December 20, 2011 letter to Mr. Don Tofpi, Kiowa Indian Tribe of Oklahoma

December 20, 2011 letter to Mr. Mark Wolfe, Texas Historical Commission