

**PECAN CREEK, GAINESVILLE, TEXAS
DETAILED PROJECT REPORT
And
INTEGRATED ENVIRONMENTAL ASSESSMENT**

**APPENDIX H
SECTION 404 (b)(1) ANALYSIS**

I. Project Description

a. Location

The proposed flood damage reduction project is located on Pecan Creek, a tributary to the Elm Fork, Trinity River, within the city of Gainesville, Texas.

b. General Description

A complete description of the proposed project including maps and figures that augment the description are included in the main text of the report to which this analysis is appended. A summary of project features is provided below.

The recommended plan consists of a grass-lined trapezoidal channel, beginning approximately 400-feet below Olive Street and continues downstream, ending just 360-feet below Gordon Street. The total channel modification project aspect of the project has an aggregate length of 7,860-feet, a 30-foot bottom width, and 1 vertical on 3.5 horizontal side slopes. Top width of the constructed channel would average about 100 feet. Seven bridges, Garnett, Main, Broadway, California, Scott and Belcher Streets, and a foot-bridge would be replaced. Water, gas, electric, telephone, and sewer utility lines would also be relocated.

Approximately 25-acres of lands for project construction, operation, and maintenance will be acquired.

The recommended plan also includes environmental mitigation. The currently identified mitigation area is located between the U.S Highway 82 and Smith Street, and is comprised of acquiring and managing a corridor extending 150 feet from the center line of the channel on each side of Pecan Creek. The environmental mitigation area would be approximately 22.05 acres including an existing 1.35 acres of grassland and 20.70 acres of riparian forest upstream of the project. The grassland would be managed as native grassland and the riparian forest would be improved by selective tree and shrub replacement and removal of non-native invasive species, primarily shrub species of privet.

c. Authority and Purpose

Pecan Creek, Gainesville, Texas, Local Flood Damage Reduction Feasibility Study is authorized by Section 205 of the 1948 Flood Control Act, as amended. The objective of the study is to examine flood damage reduction alternatives along Pecan Creek in Gainesville, Texas, and recommend a flood damage reduction project for implementation if one could be

found that is technically and economically feasible, environmentally acceptable, and supported by the city of Gainesville.

d. General Description of Dredged or Fill Material

(1) General Characteristics of Material

The material would be derived primarily from the channel banks along Pecan Creek. About ten percent of the material is small rock and the remainder is clay, silt and loam. Other fill material utilized would include 24-inch rock rip rap and 6-inch bedding material.

(2) Quantity of Material

Approximately 725 cubic yards of soil derived from cutting the channel would be reutilized as backfill on side slopes of the channel if the material suitable. If the soil is unsuitable it would be removed from the project and placed in a non- environmentally sensitive area. It is estimated that 645 cubic yards of rip rap and 165 cubic yards of bedding material would be placed during construction of the channel. .

(3) Source of Material

Rock for rip rap and bedding would be obtained offsite from commercial sources.

e. Description of the Proposed Discharge Site(s)

(1) Location

Discharge into waters of the United States would occur along the banks and bottom of the 30 foot bottom width excavated Pecan Creek Channel. Surplus material would be removed from the project area and deposited into a disposal site that would not impact waters of the United States.

(2) Size

The surface area of the channel at top of the bank would be approximately 20 acres in size.

(3) Type of Site

The disposal site would be confined (not placed in openwater). Disposal will be conducted in the dry, compacted and followed by stabilization with vegetation on the 3.5:1 side slopes.

(4) Type(s) of Habitat

The disposal activity would impact low to moderate quality stream habitat. Initial excavation would remove approximately 3355 linear feet of concrete. Excavation to form the channel would also impact moderate quality riparian forest and grasslands habitats along 2280 linear feet of channel that has previously been realigned and 2225 feet of channel that has been only minimally disturbed by past activities associated with use of the urban environment.

(5) Timing and Duration of Discharge

Discharges would occur over the entire construction period which is estimated to be at maximum one year. It is anticipated that once the project begins, there would continual construction until completed. As this is an apparent intermitted stream it is not deemed necessary to restrict the time of year that the discharge occurs as it is not anticipated that

important biological functions occur within the project area that would be disrupted by the project.

f. Description of Disposal Method

Equipment used to excavate and to backfill the channel would be done by front end loaders, possibly with rippers, other heavy excavation equipment including bulldozers, dump trucks and possibly clam shells to place rip rap.

II. Factual Determinations

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope

The profile slope of the proposed channel is .24% and the existing profile slope is about .27% (18.7 feet of drop compared to 20.7 feet).

(2) Sediment Type

Significant levels of sediment within the channel bottom occur only within the lower one third of the project area where pools have formed following previous realignment. The sediment within this reach is a silty clay.

(3) Dredged/Fill Material Movement

After the material is placed in the channel bottom and side slopes, it would be compacted and stabilized by vegetative plantings. Only minor movement of fill material would occur after stabilization.

(4) Physical Effects on Benthos

Benthos is limited in the existing system due to the presence of an existing concrete and flagstone lined channel through 3355 linear feet of the project area . In addition 2280 hundred linear feet of the channel has previously been straightened. Within the remainder of the channel to be effected, the channel width is narrow, approximately 5 to 8 feet at normal flows. Within the previously unaffected reach, the bottom is interbedded shale and limestone. Reconfiguration of the channel bottom would result in temporary impacts to benthos of the stream but would ultimately provide more habitat for benthos that currently exists. Removal of the existing concrete channel would result in the addition of over 3300 linear feet of soil substrate channel bottom that would provide habitat for benthic organisms.

However, sponsor is considering a betterment option that would result in the construction of approximately 2410 liner feet of pilot channel. A pilot channel is hard surfaced, in this case possibly with flagstone to match proposed flagstone retaining walls and formal wetlands. Should this feature be implemented, improvements to benthos habitat would be restricted to the approximately 945 linear feet of channel.

(5) Other Effects

No other effects are anticipated.

(6) Actions Taken to Minimize Impacts

Alternatives were investigated during the study as displayed in the main report, including an upstream detention area and several channel configurations. The smallest channel width examined was selected as the recommended project. In addition the upper end of the project would be stabilized with rock (transition zone) to prevent head cutting that would adversely affect the creek channel above the project area. Environmental mitigation would provide long term protection of riparian resources including water quality and wildlife habitat within the reach of the creek above the project to near US Highway 82. Upstream detention was found to be non-cost effective due to real estate costs, environmental impact to riparian resources and the detention would not eliminate the need to do channelization within the study area.

b. Water Circulation, Fluctuation and Salinity Determinations**(1) Water, Consider effects on:****(a) Salinity**

The project would not impact salinity in Pecan Creek.

(b) Water Chemistry (pH.etc.)

No current water quality data is available for this stream in the project area, however, no long term impacts to water chemistry are anticipated from project implementation as the stream structure and function will be similar after project completion.

(c) Clarity

Temporary disruption to water clarity is expected during construction. After the channel is completed and stabilized, water clarity would be similar to that found in the stream now.

(d) Color

No changes in color are anticipated following construction.

(e) Odor

No changes in odor should occur following construction

(f) Taste

The stream is not used as a potable water source within any portion of the area that would be impacted by the project.

(g) Dissolved Gas Levels

Only minor changes are expected to dissolved gas levels. The removal of the concrete lined sections would result in slight increase in roughness and provide potential for increasing dissolved oxygen uptake into the channel. In addition, the upper 100 feet of the channel (upstream transition zone) will be stabilized with rock to prevent head cutting from occurring. This area of increased roughness could also help increase dissolved oxygen content of the stream when waters are flowing.

(h) Nutrients

The project as proposed would not increase nutrient loading to the stream.

(i) Eutrophication

Eutrophication is not evident in the project reach and there would be no factors changed that would impact eutrophication of the aquatic system of Pecan Creek

(2) Current Patterns and Circulation

Flow and Water Circulation

(a) Current Patterns and Flow

The Pecan Creek watershed is largely rural. Patterns of flow are dependent on the distribution and intensity of rainfall over this area. The normal patterns of precipitation result in minor fluctuations of flow intensity through the system. Heavy thunderstorms can induce large flows and higher water surface elevations. Circulation basically does not change as the system has no braids or large instream detention. The project as proposed would not alter flows or circulation patterns, but would decrease the water surface elevations, causing less out of bank flows that cause damages to existing structures in the urban area.

(b) Velocity

There would be a minor decrease in velocity for most flow events through the existing channelized sections of the stream as the project would widen the cross sectional area of the channel. During higher events, however, there could be minor velocity increases, as the events that under existing conditions spread over a portion of the floodway would be retained within the channel. Overall, any areas where velocities that would might induce scour would be protected with suitable erosion control techniques.

(c) Stratification

Stratification in this shallow intermittent reach of the stream does not occur now in the stream nor would it occur following project implementation.

(d) Hydrologic Regime

Within the project area the existing flows varies from an approximate 1900 cubic feet per second for the 2 year flood to approximately 9900 cubic feet per second for the 100 year event. More frequent events were not computed but vary from essentially no flows during and following dry summer conditions to a few cubic feet per second for several days following local rainfall.

(3) Normal Water Level Fluctuations

Under existing conditions water surface elevation fluctuates by 7 to 10 feet between the 2 year and 100 year flood events, depending on location within the study area. After completion of the described channel, water level fluctuations would be similar to what exists above and below the project reach. Within the channelized reach, water surface elevation fluctuations would be similar in magnitude (7 to 10 feet) but the water surface elevation for

the 2 year event would be decreased by as much as 4.5 feet and the 100 year event elevation would be diminished by as much as 4.8 feet.

(4) Salinity Gradients

No changes to salinity gradient would occur

(5) Actions That Will Be Taken to Minimize Impacts

Only minor impacts to water circulation parameters have been identified. These impacts were minimized as a result of the minimization of the channel reach impacted and to the minimization of channel width.

e. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site

Only temporary increases in suspended particulates and turbidity levels would occur during construction. Most fill would occur in the dry . There would be some movement of these materials downstream of the construction zone should high flow events occur prior to stabilization.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column

(a) Light Penetration

Changes to light penetration would occur during construction associated with minor turbidity increases. After project completion, and stabilization, the clarity of the stream would return to preconstruction levels.

(b) Dissolved Oxygen

Dissolved oxygen would likely increase as a result of aeration over the transition zone composed of rock substrate. Temporary lowering of dissolved oxygen could occur during construction. Effects of the project to dissolved oxygen would not extend downstream of the construction zone.

(c) Toxic Metals and Organics

No toxic metals occur in the study area or would be added by the project. Organics from petroleum storage previously contaminated an area upstream of the project however; restoration of that site has been initiated. No adverse effects area anticipated in the project area

(d) Pathogens

No pathogens would be added to the water column as a result of this project.

(e) Aesthetics

Sponsor is reviewing and considering addition of in-channel features that would improve scenic quality of the channel. Small wetlands, pavestone paths and other features might be included also. The purpose of these features would be to add aesthetic improvement to the project in the vicinity of the water body.

(f) Others as Appropriate

No other effects to water column are anticipated

(3) Effects on Biota

No measurable effects on biota within the water column are anticipated from construction or operation of the project.

(a) Primary Production, Photosynthesis

No measurable effects on biota within the water column are anticipated from construction or operation of the project.

(b) Suspension/Filter Feeders

No measurable effects on biota within the water column are anticipated from construction or operation of the project.

(c) Sight Feeders

No measurable effects on biota within the water column are anticipated from construction or operation of the project.

(4) Actions taken to Minimize Impacts

Areas along the channel will be reshaped with the intent of preserving the channel's natural meanders in order to carry low flows and preserve the environmental quality within the creek banks. Surface runoff will be allowed to naturally flow over the creek banks, or natural-lined ditches will be utilized on the overbanks to collect runoff and discharge flows to natural low-lying areas along the creek

d. Contaminant Determinations

No known contamination exists within the area that would be directly affected by the project.

e. Aquatic Ecosystem and Organism Determinations**(1) Effects on Plankton and Nekton**

There appears to be only minor sources of organics reaching the aquatic system. There are no major sources of nutrients upstream of the project that would stimulate plankton blooms. The stream is relatively clear in the upstream reaches and appears to be intermittent not too far upstream of the project area. Pools likely remain throughout the year however plankton populations likely as evidenced by the observed clear water during low flows supports only minor plankton populations. Plankton populations although low would be temporarily impacted by the project but would return following construction.

(2) Effects on Benthos. No additional effects other than those previously discussed were identified.

(3) Effects on Aquatic Food Web

Temporary disruptions to food web would occur during construction. However, it is anticipated that all trophic levels would return to preconstruction levels shortly after construction is completed. Construction would impact only a small proportion of the entire Pecan Creek channel length and therefore no catastrophic effects are anticipated. Predatory fish, mammals and birds that utilize the energy produced by this system would be able to utilize the food sources of adjacent aquatic reaches and riparian woodlands. After project

construction, the food web would be restored through natural regeneration and as a result of significant ecosystem mitigation efforts as described in the project report.

(4) Effects on Special Aquatic Sites.

(a) Sanctuaries and Refuges

NA

(b) Wetlands

No wetlands were identified within the area to be impacted by the project. An area upstream of the project has wetland characteristics however the project would not impact the hydrology, vegetation or soils of that site.

(c) Mud Flats

No mud flats were observed within the study area to be impacted by the project

(d) Vegetated Shallows

No vegetated shallows were observed in the area to be impacted by the project.

(e) Coral Reefs

Not applicable

(f) Riffle and Pool Complexes.

No effect to riffle pool sequences would occur as no riffles were identified within the reach to be impacted by the project.

(5) Threatened and Endangered Species

The project would not affect any federally listed threatened or endangered species.

(6) Other Wildlife

The project would impact terrestrial and aquatic habitat as indicated in the project report. An environmental mitigation plan has been recommended that would compensate for losses to these habitats. The plan is described within the main body of the project report and within the project description provided in this analysis

(7) Actions to Minimize Impacts

Plan formulation activities

f. Proposed Disposal Site Determinations.

(1) Mixing Zone Determination

Most fill would occur within areas of the channel while in a dry state and only minimal mixing would occur, primarily due to churning of shallow waters by equipment traversing the channel bottom. Disposal of surplus material would occur at an offsite location that is not within waters of the United States.

(2) Determination of Compliance with Applicable Water Quality Standards Pecan Creek is a tributary to Elm Fork Trinity River above Ray Roberts Lake which has been identified as Segment 0824. No specific uses or criteria were identified that apply directly to the reach of Pecan Creek that would be directly impacted. The uses and criteria listed for surface waters in Segment 0824 were reviewed to determine compliance. The uses include contact recreation, and high aquatic life. Temporary construction impacts within the immediate area of construction could at times impact dissolved oxygen and reduce this criteria below the lower limit of 5.0 mg/l however the zone impacted would be small and would not reach downstream to Segment 0824. Temperature (maximum 90) is likely exceeded for short times during the day within the existing channelized reach during maximum heating of summer conditions and would likely be exceeded during similar periods with the new channel. Temperature in the receiving segment 0824 would not be significantly impacted. No other criteria are likely to be exceeded as a result of the project.

(3) Potential Effects on Human Use Characteristic

(a) Municipal and Private Water Supply

NA

(b) Recreational and Commercial Fisheries

Recreational fisheries are limited to fishing for pan fish or crawfish, most likely by youth living in the area adjacent to the channel. No signs of recreational fisheries activities were identified. No significant impact to recreational fisheries is anticipated. No commercial fisheries were identified within the project area

(c) Water Related Recreation

No additional effects to water related recreation are anticipated

(d) Aesthetics

Aesthetics from construction of the project should improve as the channel is converted from existing concrete to grass lined in some reaches. In addition, the project will incorporate some features designed specifically to improve the channel appearance.

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

Slight effects would occur to channel banks adjacent to city parks. No other sites of the types listed occur in the project area.

g. Determination of Cumulative Effects on the Aquatic Ecosystem

As identified in the project report, a remediation action is underway several miles upstream of the project area that would provide possible cumulative benefits to riparian and aquatic habitats.

h. Determination of Secondary Effects on the Aquatic Ecosystem

No secondary effects on the aquatic ecosystem were identified

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FINDING OF COMPLIANCE
FOR
PECAN CREEK, GAINESVILLE, TEXAS

1. No significant adaptations of the guidelines were made relative to this evaluation.
2. Three different channel widths alternatives were reviewed in the final array. Upstream detention was found to not be economically justified detention. Three alternative disposal sites were also reviewed for this project. Use of two the alternative sites could adversely impact riparian vegetation on Pecan or Wheeler Creeks. The third site has no waters of the United States identified within its boundaries or area of effect.
3. The planned disposal of dredged material within the construction area would not violate established State water quality standards for Pecan Creek. The disposal operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
4. Use of the selected disposal sites will not harm any endangered species or their critical habitat.
5. The Proposed disposal of dredged material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values will not occur. Riparian forest impacts were identified that required development of a compensatory riparian forest mitigation plan. The plan was developed and will be implemented.
6. Appropriate steps to minimize potential adverse impacts of the discharge on aquatic systems include use of suitable erosion control technologies including the implementation of procedures to protect against erosion and sedimentation during and after construction..
7. On the basis of the guidelines the proposed disposal site for the discharge of dredged material is specified as complying with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.

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