DRAFT
ENVIRONMENTAL ASSESSMENT

Raw Water Intake, Pump Station, and Pipeline Easement and Electrical Line Easement

GRANGER LAKE, WILLIAMSON COUNTY, TX

Prepared for

Granger Lake Project Office

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DRAFT
FINDING OF NO SIGNIFICANT IMPACT
ENVIRONMENTAL ASSESSMENT
RAW WATER INTAKE, PUMP STATION, PIPELINE AND ELECTRICAL LINE EASMENT
GRANGER LAKE, WILLIAMSON COUNTY, TEXAS

Description of Action. The United States Army Corps of Engineers (USACE) has assessed potential impacts to the environment that may result from the proposed construction of a raw water intake, pump station, pipeline and associated electrical lines through Wilson H. Fox Park at Granger Lake in Williamson County by the Brazos River Authority (BRA). Currently, the BRA has an existing raw water intake near the confluence of the San Gabriel River on Granger Lake exposing it to siltation issues and suitable water depth problems. This Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) apply to the proposed new facilities to be constructed to meet demands of the projected regional water system. The proposed action would include construction both on and off USACE property. The intake/ pump station would be entirely within USACE property, while only segments of the associated pipeline and electrical lines would be within USACE property. The pump station would be located on the northernmost peninsula in Wilson H. Fox Park. The intake/pump station configuration would be the Microtunneled Intake Pipes configuration, and facilities associated with the intake/pump station include an approximately 91 feet by 50 feet intake/pump station structure. The proposed intake/pump station would require a single permanent easement of 3.55 acres. This would include 0.55 acre for the pump station and on shore access area and 3.0 acres for the intake pipes and safety exclusion zone around the pipes. Underground electrical lines would provide electrical service to the pump station on USACE property. The permanent easement for the electrical lines on USACE property would be 10-feet wide and 3,630-feet long (0.83 acre). Overhead electrical lines would be constructed outside of USACE property for an additional 4,350 feet. The proposed pipeline alignment would connect the proposed intake/pump station to the existing water treatment plant. The 48-inch raw water pipeline would be 19,020-feet long and have a 40-foot permanent easement, totaling 17.51 acres (3.06 acres would be on USACE property). The raw water pipeline would also have a 60-foot temporary construction easement, totaling 21.83 acres (5.00 acres would be on USACE property).

Alternatives Considered. Screening of alternatives included four intake locations, five intake/pump station configurations, and six pipeline alignments. Those alternatives deemed viable were carried forward and analyzed in the EA including the no action alternative, the proposed alternative and a third alternative whose components were the same as the preferred alternative but with a different pipeline alignment.

Anticipated Environmental Effects. Implementation of the preferred alternative would result in the disturbance of approximately 15.44 acres of USACE property. Construction of the intake/pumphouse and pipeline would impact Waters of the U.S. along the shoreline and bottom of Granger Lake. Other potential disturbances on USACE property would include short-term discharge of dredged or fill material, potential for increased erosion during construction, and potential inputs of small amounts of oil and grease from construction related equipment. Impacts to recreational facilities in Wilson H. Fox Park would include the decommissioning of nine camping sites. Following construction, soils would be protected from erosion and re-vegetated with native grass species. The preferred alternative would not have any significant negative impacts to the existing cultural resources, geology, soils, groundwater, wetlands or flood storage within USACE property. The preferred alternative would not adversely affect plant or animal

species that are proposed or listed as threatened or endangered within USACE property. The on-site mitigation plan would include two key components: (1) native tree, shrub, and herbaceous plantings within Wilson H. Fox Park; and (2) the improvement of existing facilities including enlarging 49 campsites/RV pads, increasing electrical service on 37 sites and realigning roads and overflow parking.

Based on review of information contained in this EA, it is concluded that the proposed easement for a raw water intake, pump station, pipeline and electrical line by the BRA is not a major Federal action, which would significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969, as amended. Therefore, the preparation of an Environmental Impact Statement is not required.

_____ _____

Richard J. Muraski, Jr. Date
Colonel, US Army
District Engineer

1.0 INTRODUCTION

The Brazos River Authority (BRA) proposes to construct a new raw water intake, pump station, and transmission pipeline at Granger Lake in Williamson County (**Appendix A, Exhibits 1 and 2**). These facilities are needed to meet the water demands of the City of Taylor as well as other users in eastern Williamson County. The proposed project would be sized to meet the area's water needs through the year 2050. Infrastructure associated with the proposed project includes the new raw water intake and pump station and approximately 3.5 miles of raw water transmission pipeline.

The State of Texas granted the Brazos River Authority a water right permit in 1981 to divert 19,840 acre-feet of water per year from Granger Lake. The lake is identified in the State Water Plan as a water supply source to meet the growing demands of Williamson County, surrounding counties, and areas downstream. In addition, the original document detailing the operation and management components for Granger Lake (previously identified as Laneport Lake) entitled, "Environmental Statement for Laneport, North and South Fork Lakes San Gabriel River, Texas" prepared by the U.S. Army Corps of Engineers (USACE) Fort Worth District on February 24, 1972, identifies water supply as a principal use for Granger Lake. The BRA has a contractual right with the USACE to utilize 100 percent of the storage space in Granger Lake between elevations 440.0 feet above mean sea level (msl) and 504.0 feet above msl, which is the normal pool elevation. The BRA's contract gives them permanent rights to this water and grants them the right to construct plants, pipelines, appliances, and other works that may be necessary and convenient for diversions and withdrawal, subject to approval by the USACE as to design and location. The contract further allows this storage space to be used to impound and withdraw water for anticipated future demands or needs for municipal and industrial water supply.

The service area in eastern Williamson County is projected to experience significant growth during the life of the project. Although increasing water demand and water quality compliance are the needs driving the project, avoidance of sensitive Water Supply Watersheds (WSWs) and other significant environmental resources were a primary consideration in the preparation of this document.

1.1 PURPOSE AND NEED FOR THE PROJECT

Eastern Williamson County, while historically a rural area, has experienced substantial growth in recent years. With growth expected to continue in and around the cities of Taylor, Hutto and Georgetown, this area would likely continue to experience high growth rates into the future. Consequently, water supply planning for the area has become a priority.

The proposed raw water intake would replace an existing intake (the only intake on the lake), which has experienced significant siltation problems due to its location in the vicinity of the confluence of the San Gabriel River and Granger Lake. The sediment that has deposited around the existing intake may have to be dredge to keep the pumps operational. In addition, the intake structure at 492 msl is located in an area where the Granger Lake Stage I normal pool elevation of 504 feet is only approximately 12 feet above the top of the intake screen. This structure has the ability to take water levels in Granger Lake down to 494 msl. The water depth over the screen during the minimum recorded pool elevation of 498.5 feet is approximately 6.5 feet. The existing intake is comprised of two 48" pipes that, combined, are sized for 10 MGD, but typically pump between 10 and 12 MGD. The maximum day demand is expected to exceed 12 MGD by 2018. Therefore, the existing intake is not expected to have adequate capacity to meet projected demands of the regional water system.

2.0 PROPOSED ACTION AND ALTERNATIVES

The proposed project would consist of a new intake/pump station and associated pipeline to the East Williamson County Water Treatment Plant (WTP). Practical alternatives to this project were considered during the planning phase to identify the best approach for supplying service in an economical and environmentally-sound manner. These alternatives are described in the following paragraphs. This section also includes a description of the No Action Alternative.

2.1 NO ACTION ALTERNATIVE

The No-Action Alternative would keep the existing raw water intake at its current location with current capacities. The current location is in a relatively shallow area of the lake subject to high turbidity and sedimentation. As a result, this alternative would continue to subject the intake to water quality and maintenance problems related to sedimentation. During low lake levels, this site would not afford access to deep water and would potentially require dredging for the intake to continue operating. Additionally, the no-action alternative would not provide adequate capacity for the ultimate conditions (i.e., future development) in the region and would not meet the projected demands on the regional water system.

2.2 IDENTIFICATION OF ACTION ALTERNATIVES

The Action Alternatives would consist of building a new intake/pump station on Granger Lake, an associated pipeline, and electrical service lines that would meet the projected demands on the regional water system. Several alternatives were considered for the location of the intake/pump station site, the type or configuration of the intake/pump station, and the pipeline alignment. These alternatives were studied sequentially, beginning with the intake/pump station locations, followed by the configurations, and finally the pipeline alignments, to identify an approach for supplying service in an economic and environmentally-sound manner. The type of pumps to be used in the proposed pump stations and the placement of electrical lines were also considered.

2.2.1 Intake/Pump Station Location Alternatives

Four alternative intake/pump station (I/PS) locations were evaluated early in the planning process. **Appendix A, Exhibit 2A** shows the alternative locations that were initially considered. These alternatives consisted of:

- Alternative I/PS Location A, located on a peninsula in Wilson H. Fox Park, west of the campsites;

- Alternative I/PS Location B, located on the northernmost peninsula in Wilson H. Fox Park;
- Alternative I/PS Location C, located below the dam overlook at the southern end of the dam;
- Alternative I/PS Location D, located near the midpoint of the dam.

After a thorough evaluation including a detailed water quality study (**Appendix B**), Alternative I/PS Location B was determined to be the only feasible alternative. Alternative I/PS Location A would require a prohibitively long dredged intake channel within the lake in order to reach dependable water depths which would result in high construction costs and environmental impacts associated with the dredging activities. Alternative I/PS Location B would consist of a site approximately 120 feet by 250 feet located on a cul-de-sac at the end of a road in Wilson H. Fox Park. Dependable water depths would be relatively close to Alternative I/PS Location B. Alternative I/PS Locations C and D would be on the existing dam, which could potentially compromise the structural integrity of the dam. Additionally, Alternative I/PS Locations C and D would create additional access points to the dam, which would increase dam security concerns. Due to their distance from the WTP, the Alternative I/PS Locations C and D would require a longer pipeline than other location alternatives, which would result in greater economic and possibly other impacts associated with construction.

Therefore, Alternative I/PS Location B was the only intake/pump station location alternative considered to be practicable. Consequently, Alternative I/PS Location B was the only location alternative carried forward for detailed analysis.

2.2.2 Intake/Pump Station Configuration Alternatives

The following five alternative intake configurations were identified and evaluated:

- On-shore intake pump station with microtunneled intake pipes into the lake (referred to as Microtunneled Intake Pipes)
- On-shore pump station with dredged intake channel (referred to as Dredged Channel Intake)
- Off-shore platform tower intake pump station with bridge to shore (referred to as Platform and Bridge Intake)
- Floating intake with on-shore pump station (referred to as Floating Intake)
- On-shore pump station with inclined intake pipe with submersible pump (referred to as Sloped Barrel Intake)

<u>Microtunneled Intake Pipes</u>: An elevation schematic of the Microtunneled Intake Pipes is shown in **Appendix A, Exhibit 3-B and 3-C**. The proposed intake/pump station would include a single permanent easement requiring dimensions of approximately 200 feet by 120 feet (i.e., 0.55 acre) for the pump station and on-shore access as well as approximately 400 feet by 370 feet for the intake pipes in the

lake. This type of intake would consist of two intake pipes to be tunneled underground from the sump on shore to the lake. Tunneling from the sump into the lake would require a special type of construction called microtunneling. Microtunneling would utilize a tunnel boring machine (TBM) operated remotely from the ground surface. A pipe would be attached to the TBM and pushed forward with the machine to the point where the machine would egress into the lake. Before the machine would break the surface, the lake bed would need to be prepared by stripping away any loose sediment, creating a reception pit for the machine. Sediment removal associated with the creation of the reception pit would be an excavation-only activity. Mechanical excavation methods would be utilized, and all excavated sediment and the associated water would be removed from the lake and dewatered at an upland site with total retention. Once the TBM pushed through the lake bed, it would be retrieved and screens with 3/4" mesh openings would be installed on the end of the pipes. The intake pipes would require piles to support the end of the pipe and screen. Steel H-piles would be driven into the lake bed with a pile driver, resulting in no excavation needed to construct the supports.

This intake would involve excavation of a circular sump to be constructed approximately 10 to 20 feet on-shore behind the top of the slope to reduce impact to the slope and eliminate the need for tall retaining walls on the slope. The sump would be excavated vertically with tunnel liner plates or rock anchors and shotcrete used to support the excavation during construction. The interior walls of the sump would then be formed with cast-in-place concrete. The two intake pipes with an inside diameter of 54 inches would be tunneled from the sump into the lake; one from an approximate elevation of 488 msl and one from an elevation of 477 msl. The multiple levels would allow BRA to select the water depth from which to pump water from the lake. The lower intake would be used primarily when lake levels are low. The construction costs of this intake would be approximately 4,500,000 dollars.

Dredged Channel Intake: An elevation schematic of the Dredged Channel Intake is shown in **Appendix A, Exhibit 3 and 3-A**. This intake/pump station configuration would include a permanent easement with dimensions of approximately 130 feet by 200 feet on the shore with additional temporary easement for construction of a cofferdam. This type of intake would involve construction of a rectangular or circular concrete sump near the shoreline. A temporary earthen coffer dam would be required during excavation for the sump and retaining walls. Vertical turbine or submersible turbine pumps would withdraw water from the sump and multiple level intake screens could be installed in the lake side wall of the structure. An intake channel would be dredged to the required lake bed elevation back to the sump. A building would typically be constructed to house vertical turbine pumps and other pertinent

equipment. For submersible turbine pumps, a discharge valve vault would typically be constructed with a separate stand-alone building for electrical and other equipment. The construction costs of this intake would be approximately 8,000,000 dollars.

Platform and Bridge Intake: An elevation schematic of the Platform and Bridge Intake is shown in **Appendix A, Exhibit 4**. This intake/pump station configuration in an existing lake would require marine construction methods. The structure would be supported on concrete drilled shafts or driven steel piles constructed from a floating barge in the water. A concrete platform would then be constructed as the pump floor. An access bridge, typically constructed of pre-cast concrete bents and girders, would then be installed from the platform to the shoreline. The bridge would allow vehicular access to the platform and also provide support for pump station discharge piping, which would typically be attached to the structure. Vertical turbine or submersible turbine pumps would withdraw water from the lake below the platform and multiple level intake screens would be installed on the pump intake column pipes. A building could also be constructed above the platform to house pumps and other related equipment. The construction costs of this intake would be approximately 10,000,000 dollars.

Floating Intake: An elevation schematic of a typical Floating Intake is shown in **Appendix A, Exhibit 5**. Floating intakes would be pre-fabricated units consisting of a concrete and steel pump deck supported on polyethylene encapsulated flotation cells. The unit would typically include a pre-engineered metal building to house pumping equipment, overhead bridge crane, etc. Vertical turbine or submersible turbine pumps would be installed on the pump deck and could allow water intake at multiple levels. The entire unit would be moored in place on the lake bottom and connected to the shore with flexible underwater discharge piping/hoses and electrical cable. The electrical motor control center would typically be located in a building onshore. The construction costs of this intake would be approximately 2,500,000 dollars.

Sloped Barrel Intake: An elevation schematic of the Sloped Barrel Intake is shown in **Appendix A, Exhibit 6**. This intake/pump station configuration would utilize submersible turbine pumps installed in multiple inclined intake barrels. Intake screens would be installed at multiple levels on the inclined barrels. The barrels could be supported by drilled shafts or some other means. A removable bend would be located at the top of each barrel to allow removal of the submersible pumps for maintenance. Discharge pipes from the barrels would be connected in a concrete valve vault constructed onshore. Depending on site-specific conditions, a separate electrical building could be constructed adjacent to the valve vault, or at a remote location that has a higher elevation, if the potential for flooding exists near the shoreline. The

construction costs of this intake would be approximately 3,500,000 dollars.

Vertical turbine pumps and submerged pumps are two different pump types that were considered for the Microtunneled Intake Pipes, the Dredged Channel Intake, the Platform and Bridge Intake, and the Floating Intake configurations. The Sloped Barrel Intake configuration must use submerged pumps. Vertical turbine pumps would have lower construction costs, improved access for maintenance activities, better efficiency and greater longevity than submersible pumps. Submersible pumps would be quieter than vertical turbine pumps due to the motors being under water. PMK Consultants analyzed the expected noise impacts for both pump types during operation of the pump station in a report dated October 25, 2005 (**Appendix F**). Based on the results of the report and the USACE decision to decommission nine camp sites near the pump station, there would be no significant noise impacts from either pump type. Therefore, vertical turbine pumps are proposed for the Microtunneled Intake Pipes, the Dredged Channel Intake, the Platform and Bridge Intake, and the Floating Intake configurations.

For all of the intake/pump station alternatives, either overhead or underground electrical utilities would be needed within Wilson H. Fox Park. The electrical utilities would follow in a separate easement parallel to the pipeline. During the planning phase, investigations into the cost difference between overhead and underground electrical service on USACE property to the pump station indicated that approximately 3,450 linear feet of overhead service would cost $35,000 [$10.14 /linear foot (LF)], while the same length of underground service would cost $438,000 ($126.96/LF). In other words, underground electrical service on USACE property would cost approximately $400,000 more than overhead electrical service on USACE property. However, the cost for overhead electrical service is based on a preliminary cost estimate from Oncor Electric Delivery for 25 foot power poles. Above ground power lines would require taller power poles to meet USACE regulations on clearances for electric lines. Taller power poles would increase the project costs as well as aesthetic impacts of overhead electrical service. The cost for underground electrical service is based on the cost to provide 2-4" schedule 40 PVC conduits, trench and pull boxes as well as Oncor's cost to provide and pull the primary conductors. As the shorter power poles are not allowable, the cost difference between overhead and underground service would not be prohibitive. Therefore, underground electrical service is proposed because it would eliminate aesthetic impacts and increase reliability.

The five intake/pump station configurations were evaluated during the planning stages of the project. The evaluation is summarized in **Table 2-1** in a matrix that compares such factors as constructability constraints, permitting/environmental constraints, access for operation, and maintenance and

Table 2-1 Numeric Evaluation Matrix for the Alternative Intake/Pump Station Configurations

Evaluation Factor[1]	Weight Multiplier	Microtunneled Intake Pipes		Dredged Channel Intake		Platform and Bridge Intake		Floating Intake		Sloped Barrel Intake	
		Rating Score[2]	Weighted Score[3]	Rating Score[2]	Weighted Score[3]	Rating Score[2]	Weighted Score[3]	Rating Score[2]	Weighted Score[3]	Rating Score[2]	Weighted Score[3]
Constructability Constraints											
Ability to Access Deep Water	4	5	20	5	20	3	12	3	12	2	8
Suitability for Selected Site	4	5	20	2	8	3	12	3	12	4	16
Impact on USACE Park	5	3	15	1	5	3	15	4	20	3	15
Environmental Constraints											
USACE Permitting Requirements	5	3	15	1	5	2	10	4	20	4	20
Aesthetics	4	4	16	4	16	1	4	2	8	3	12
Operation And Maintenance Considerations											
Impact on Boating Activities	4	3	12	5	20	1	4	2	8	3	12
Access for O&M	4	4	16	5	20	3	12	2	8	2	8
Pumping Reliability and Maintenance	4	3	12	4	16	5	20	1	4	2	8
Schedule	3	3	9	1	3	2	6	4	12	4	12
Cost	4	3	12	2	8	1	4	5	20	4	16
Total Weighted Score[4]			**147**		**121**		**99**		**124**		**127**
Ranking			**1**		**4**		**5**		**3**		**2**

Notes:

1. Each Evaluation Factor is assigned a weight multiplier ranging from 3 to 5, with 5 being most important
2. Rating scores range from 1 to 5, with 5 being most desirable
3. Weighted Score = Evaluation Factor Weight Multiplier x rating Score (Highest score is most desirable
4. Total Weighted Score for each Alternative is calculated and Alternatives are ranked from 1 to 5 with 1 being most desirable

construction cost.

- The Microtunneled Intake Pipe configuration emerged as the preferred intake configuration as it would allow access to deep water (reliability), have a small footprint within the lake, minimize impacts on lake aesthetics, be cost effective, and it would be relatively easy to maintain.
- The Dredged Channel Intake would require the construction of a temporary coffer dam and approximately 310 feet of dredging totaling approximately 66,500 cubic yards of sediment. Compared to the Microtunneled Intake Pipes configuration, this alternative would have a greater environmental impact on lake ecology, higher construction costs, increased Section 404 permitting requirements, and a larger construction footprint within the lake. Additionally, the construction period would take longer for the Dredged Channel Intake configuration.
- The Platform and Bridge Intake would require a permanent structure within the lake that would have greater aesthetic and recreational impacts, higher project costs, and a longer construction schedule than the Microtunneled Intake Pipes configuration.
- The Floating Intake would require a floating structure within the lake that would have greater aesthetic and recreational impacts, less access to the lower water levels (reliability), and more maintenance issues due to its susceptibility to damage from wave action and lake fluctuations than the Microtunneled Intake Pipes configuration.
- The Sloped Barrel Intake would require six sloped steel pipes supported on piers running from the on-shore pump station down the bank and into the lake. Compared to the Microtunneled Intake Pipes configuration, this configuration would have greater recreational impacts due to the larger footprint within the lake, greater maintenance requirements and less durability associated with the pumps oriented on a slope, and less access to the lower water levels (reliability).

The Microtunneled Intake Pipes configuration is considered the only viable intake/pump station configuration and was carried forward for detailed analysis through the remainder of this document.

2.2.3 Pipeline Alignment Alternatives

Four pipeline alignment alternatives from Alternative I/PS Location B to the regional WTP site were identified early in the study phase and labeled Alternative Pipeline Routes A, B, C, and D. Subsequently, two additional pipeline alignment alternatives were identified and evaluated, Pipeline Routes E and F. All pipelines alternatives would use 48-inch diameter pipe. These were added due to constraints pertaining to USACE policy identified following the feasibility analysis. As stated in a USACE letter dated January 4, 2010 (**Appendix C**), the USACE national policy is that public utility easements should only be authorized on USACE land if there is no viable alternative to the activity or structure being located on USACE lands or waters, or if there is a direct benefit to the Government. Alternative Pipeline Routes A through F are shown in **Appendix A, Exhibit 7A-7F**, and compared in **Table 2-2**.

Table 2-2 Comparison of Alternative Pipeline Alignments

Alternative Routes	Total Length (ft)	Number of Easements Needed*	Acres of Land in Easement			Alternative Deemed Viable
			Federal (USACE)	Private	Total	
A	18,718	19	3.3	13.9	17.2	No
B	19,128	13	11.2	6.4	17.6	No
C	18,138	2	14.9	1.8	16.7	No
D	18,145	7	11.6	5.1	16.7	No
E	19,075	19	3.3	14.1	17.5	Yes
F	19,020	16	3.3	14.1	17.4	Yes

*One of the easements represents the easement that would be required from the USACE.

Alternative Pipeline Routes B, C, and D would be located primarily on USACE land and were withdrawn from further consideration due to the above stated USACE policy (**Appendix C**). Additionally, Alternative Pipeline Routes B and C would potentially impact a rare prairie habitat known as chalk prairie on USACE land. Alternative Pipeline Route A would be shorter than Alternative Pipeline Routes E and F, but it would bisect two private properties that render one property unusable for residential use. Therefore, Alternative Pipeline Route A was withdrawn from further consideration.

Alternative Pipeline Routes E and F would minimize encroachment on USACE land and they would primarily follow the boundary lines of private properties crossed. These two pipeline routes are exactly the same except for the westernmost end of the alignment where Alternative Pipeline Route E would cross in front of a single family residence. Alternative Pipeline Route F would avoid crossing in front of the single family residence by turning north at the property line before crossing behind the residential property. This alignment would also reduce the number of properties impacted and easements required compared to Route E. Pipeline Alignment Alternative F was identified as the preferred alignment alternative.

Both Alternative Pipeline Routes E and F were considered viable alternatives and were carried forward for detailed analysis through the remainder of this document.

2.3 SUMMARY OF ACTION ALTERNATIVES

Four alternative intake/pump station locations were identified, and only Alternative I/PS Location B was identified as a feasible location alternative. Alternative I/PS Locations C and D where not feasible because they would be located on the dam and Alternative I/PS Location A would require a prohibitively

large amount of dredging to reach the desired depths within the lake. Therefore, the proposed site location is Alternative I/PS Location B.

Five alternative intake/pump station configurations were identified, and based on screening analysis of alternative intake/pump station configurations, the concept of microtunneled intake pipes emerged as the only viable configuration because it would have the least amount of environmental impacts, the most reliable intake position, lowest maintenance requirements, lowest aesthetic impacts, and low construction costs. Compared to the Microtunneled Intake Pipe configuration, the Dredged Channel Intake would require a longer construction schedule, would be more expensive, and would have greater environmental impacts associated with dredging activities. The Platform and Bridge Intake would have greater construction costs and greater aesthetic and recreational impacts associated with a permanent structure built in the lake. The Floating Intake would have greater aesthetic and recreational impacts associated with a structure built on the lake surface, and it would be less durable due to its susceptibility to damage. The Sloped Barrel Intake would be less reliable, require more maintenance activities associated with its operation, and it would have greater recreational impacts than the Microtunneled Intake Pipes configuration. Therefore, the Microtunneled Intake Pipes configuration was the only intake/pump station configuration carried forward for detailed analysis through the remainder of this document.

Of the six pipeline alignment alternatives considered, only Alternative Pipeline Routes E and F were considered viable alternatives. Alternative Pipeline Routes B, C, and D would not be considered viable because they would be located primarily on USACE land. Alternative Pipeline Route A would not be considered viable because it would render a property unusable for residential uses. Alternative Pipeline Routes E and F are both carried forward for detailed analysis through the remainder of this document. However, Alternative Pipeline Route E would not be preferred because it would cross in front of a single family residence even though another less intrusive alternative (Route F) would be available. Therefore, Alternative Pipeline Route F emerged as the preferred alignment.

2.4 PROPOSED PROJECT

The proposed project was selected based on a variety of engineering, economic, and environmental factors documented within this assessment. The proposed project would include construction both on and off USACE property. The intake/ pump station would be entirely within USACE property, while only segments of the associated pipeline and electrical lines would be within USACE property. The pump station would be located on the northernmost peninsula in Wilson H. Fox Park (Alternative I/PS Location

B). The intake/pump station configuration would be the Microtunneled Intake Pipes configuration as shown in **Appendix A, Exhibit 3-B**, and facilities associated with the intake/pump station include an approximately 91 feet by 50 feet intake/pump station structure. Vertical turbine pumps would be used within the pump station. The proposed intake/pump station would require a single permanent easement of 3.55 acres. This would include 0.55 acre (i.e., 200 ft x 120 ft) for the pump station and on shore access area and 3.0 acres (i.e., 400 ft X 170 ft with 200-ft radius semi-circle) for the intake pipes and safety exclusion zone around the pipes.

Underground electrical lines would provide electrical service to the pump station on USACE property. The permanent easement for the electrical lines on USACE property would be 10-feet wide and 3,630-feet long (i.e., 0.83 acre). Overhead electrical lines would be constructed outside of USACE property for an additional 4,350 feet.

The proposed pipeline alignment (Alternative Pipeline Route F) would connect the proposed intake/pump station to the existing WTP. The 48-inch raw water pipeline would be 19,020-feet long and have a 40-foot permanent easement, totaling 17.51 acres (3.06 acres would be on USACE property). The raw water pipeline would also have a 60-foot temporary construction easement, totaling 21.83 acres (5.00 acres would be on USACE property).

The existing pump station would be maintained in place for potential emergency use during the first two years of the new pump station's operation. After the new pump station has proven to be reliable, the equipment in the existing pump station would be mothballed and power service disconnected. Currently, Brazos River Authority plans to abandon the facility and remove the pump station facilities in the 2020 timeframe, concurrent with the next WTP Expansion. BRA would keep the property to allow for access to the lake for temporary pumping if needed in an emergency.

2.5 PROJECT ALTERNATIVES CARRIED FORWARD

Three project alternatives were carried forward for detailed analysis throughout the remainder of the document, including:

- the No Action Alternative;
- the Proposed Action Alternative (including Pipeline Route F);
- and the Microtunneled Intake Pipe configuration with Pipeline Route E Alternative ("Pipeline Route E Alternative").

The Proposed Action Alternative and the Pipeline Route E Alternative would be identical except that the Proposed Action Alternative would include Pipeline Route F instead of Pipeline Route E.

3.0 EXISTING ENVIRONMENT

Granger Lake is located six miles south of the City of Granger in Williamson County and northeast of the City of Taylor in the Brazos River Basin (**Appendix A, Exhibits 1 and 2**).

Granger Lake was constructed by the U.S. Army Corps of Engineers (USACE) in 1979 for the purpose of flood control and water supply. The reservoir has a storage capacity of 52,525 acre-feet and a surface area of 4,400 acres at the conservation pool elevation of 504 feet above msl. An additional 192,000 acre-feet of storage is reserved for flood control. As mentioned previously, BRA has contractual rights to the water in Granger Lake (between 440 feet above msl and 504 feet above msl), as agreed to by the Secretary of the Army in April 1981. This contract includes provisions allowing for construction of works that may be necessary or convenient for water diversion or withdrawal.

Granger Lake was opened to the public in 1981 by the U.S. Army Corps of Engineers. Recreation is a major attraction of the lake with 133 camping sites being located within three different park areas. Wildlife management areas administered by the Texas Parks and Wildlife Department cover the vast majority of the land around the lake.

3.1 CURRENT LAND USE

The predominant land use in the project region is agricultural. However, the proposed project would be constructed on both agricultural land (i.e., primarily the pipeline to the WTP) and USACE parkland (i.e., the intake/ pump station). The land use in the parkland is recreational.

Agricultural land uses in the project area are dominated by row crop farming with sorghum, cotton, corn, and wheat being the major crops.

3.2 GEOLOGY AND SOILS

The area surrounding Granger Lake is comprised of several geological areas. The areas along streams and tributaries are classified as Alluvium (Qal). Alluvium is recent floodplain deposits of clay, silt, sand, and gravel. There are two primary geological areas surrounding Granger Lake. One is the Fluviatile terrace deposits, which include terraces along streams (Qt), and areas of high gravel deposits (Qhg). The other is the Navarro group and Marlbrook marl, of which, Navarro and Taylor groups undivided (Knt) is the most well represented. To the west of Granger Lake is the Austin Chalk (Kau), which is mostly microgranular calcite.

At the proposed intake site, the geology is marl from the Upper Cretaceous Navarro and Taylor groups

undivided (Knt). Navarro and Taylor groups undivided is part of the Navarro group and Marlbrook marl, or the upper Taylor marl.

The principal soils in the project area include Branyon clay, 1 to 3 percent slopes; Altoga silty clay loam, 3 to 5 percent slopes, eroded; and Burleson clay, 0 to 1 percent slopes (USDA 1980).

The Branyon clay is found on high ancient terraces and narrow valleys. It is moderately well-drained, has rapid permeability when dry and very slow when wet, medium runoff, and high available water capacity. This soil has a minor erosion hazard. It is primarily used for row crops.

Altoga silty clay loams are found on the high terraces that parallel major streams. This soil type is marked by extensive sheet and gully erosion. This soil type is well-drained with a high available water capacity and moderate permeability. It has a moderate hazard of erosion and medium runoff. This soil is primarily used for agricultural purposes, both as rangeland and for row crops.

Burleson clay is a nearly level soil that occurs on high ancient stream terraces. It is moderately well-drained and similar to the Branyon clays in that it exhibits rapid permeability when dry and very slow permeability when wet. Runoff is low. As with Branyon clay, this soil is primarily used for row crops.

3.3 SURFACE WATER

A water quality data report was prepared for the proposed project to determine the best location and essential water quality parameters for a new raw water intake (Carter & Burgess, 2005). This report provides an overview of the water quality in Granger Lake and was used as the basis for this section. A copy of the conclusions and recommendations of this report is included in **Appendix B**.

Granger Lake has been classified by the Texas Commission on Environmental Quality (TCEQ) as Segment 1247 with the following designated uses:

- Aquatic Life Use –High;
- Contact Recreation Use;
- General Use;
- Fish Consumption Use;
- Public Water Supply Use.

Based on the 2004 water quality assessment conducted by TCEQ, Granger Lake (Segment 1247) is currently meeting all of its designated uses; however, a nutrient enrichment concern was noted due to elevated levels of inorganic nitrogen (nitrate+nitrite). Water quality impairments and concerns were noted for several streams in the watershed. Willis Creek (Segment 1247A), the unclassified tributary

that flows into the northern arm of Granger Lake, was determined to have impairment of the contact recreation use due to elevated bacteria levels, as well as a nutrient enrichment concern from nitrate+nitrite. The San Gabriel River (Segment 1248), which flows into the southern arm of Granger Lake, exhibited elevated dissolved solids concentrations resulting in an impairment of the general use criteria. Mankins Branch (Segment 1248C), an unclassified tributary of the San Gabriel River also has an impairment of the contact recreation use due to high levels of bacteria and nutrient enrichment concerns due to elevated nutrient concentrations and excessive algal growth. The Texas Surface Water Quality Standards (TSWQS) criteria for Granger Lake are listed in **Table 3-1**.

Table 3-1 Texas Surface Water Quality Standards for Granger Lake (Segment 1247)

Chloride (mg/L)	Sulfate (mg/L)	Dissolved Solids (mg/L)	Dissolved Oxygen Minimum (mg/L)	Min pH	Max pH	*Escherichia coli* (cfu/100mL)	Fecal Coliform (cfu/100mL)	Temperature Maximum (F)
50	50	400	5	6.5	9	126	200	90

3.4 GROUNDWATER

Granger Lake lies atop the down dip portion of the Trinity Aquifer. The Trinity Aquifer is made up of early Cretaceous formations known as the Trinity Group. This aquifer occurs in a band extending through the central part of the state, including the eastern two-thirds of Williamson County, from the Red River south to Medina and Uvalde Counties (TWDB 1995). The Trinity Aquifer recharges slowly and only 4 to 5 percent of the precipitation falling over the aquifer contributes as recharge to the aquifer. Water quality in this aquifer is generally lower and more variable than nearby aquifers such as the Edward's Aquifer. The depth of wells in the Trinity Aquifer generally ranges from 50 to 800 feet. However, some exceed depths of 3,000 feet. Wells in the Trinity Aquifer commonly yield 50 to 500 gallons per minute, while some yield as much as 2,000 gallons per minute (USGS 1996).

3.5 BIOLOGICAL RESOURCES

3.5.1 Vegetation

This region (Prairie Parkland Province) consists of prairies and savannas. Like the temperate prairies to the north, it is part of the grassland-forest transition area of the central United States. Due to aridity and probably fires and grazing, this area is dominated by various short and medium-to-tall grasses with a lower densities of hardy tree species. Trees are typically evergreen and are widely spaced and short of stature, rarely more than 25 ft (8 m) tall. Post oak (*Quercus stellata*) and blackjack oak (*Quercus marilandica*) dominate the Cross Timbers region of Texas. Soil is a key factor in local vegetation distribution. Fine, heavy soils generally support grassland vegetation, and coarse, lighter soils are covered with stands of savanna. Bluestem is the principal grass throughout the region (http://www.fs.fed.us/colorimagemap /ecoreg1_provinces.html).

During site visits to the project area, the vegetation in the project area consisted of five basic communities: (1) maintained park, (2) cedar elm/hackberry woodland, (3) fence rows, (4) rangeland, and (5) cropland. An additional vegetation community was identified subsequent to the site visits, a rare prairie habitat site known as chalk prairie. These six communities are described in the following paragraphs.

Maintained park within the project area occurred in the vicinity of the proposed intake/pump station location. It consisted of typical turf grasses, various native grasses, and weeds.

Cedar/hackberry woodland occurred in the vicinity of the proposed intake/pump station location. It consisted of an overstory comprised of cedar elm (*Ulmus crassifolia*), hackberry (*Celtis laevigata*), and Texas ash (*Fraxinus texensis*) with an understory including giant ragweed (*Ambrosia trifida*), greenbrier (*Smilax* sp.), wild carrot (*Daucus* sp.), privet (*Ligustrum* sp.), Virginia creeper (*Parthenocissus quinquefolia*), hawthorn (*Crataegus* sp.), and gum bumelia (*Bumelia lanuginosa*).

Fence rows occurred along portions of some of the alternative pipeline routes and contained trees or saplings. Vegetation along the fence lines was dominated by short and medium-to-tall grasses, hackberry, cedar elm, Osage orange (*Maclura pomifera*), and mesquite (*Prosopis glandulosa*). Fence rows in the project area were narrow, ranging from 10 to 30 feet wide (average of 15 feet width).

Rangeland occurred along the pipeline alternatives. The dominant vegetation within the areas comprised of rangeland consisted primarily of hackberry, mesquite, cedar elm, Texas ash, Osage orange, poison ivy (*Toxicodendron radicans*), switchgrass (*Panicum virgatum*), cactus (*Opuntia engelmannii*),

western ragweed, and Canada wildrye (*Elymus canadensis*).

Cropland in the project area was also located along the pipeline alternatives. The cropland areas consisted primarily of corn (*Zea mays*); however, milo (*Sorghum bicolor*), soybeans (*Glycine max*), and cotton (*Gossypium hirsutum*) are also known to be planted throughout this area.

The chalk prairie site is located on USACE land near the regional WTP site. This area has almost 200 different species of vegetation dominated by native short and medium grass ecotypes adapted to calcareous soils of Texas' Northern Blackland Prairie. This site is used as a native seed source for restoration projects and has been recognized by the USACE's Ecosystem Management and Restoration Research Program (EMRRP).

3.5.2 Wildlife

Various wildlife species are abundant throughout this region, including terrestrial mammals, amphibians, reptiles, fish, and birds. Common mammals prevalent to the area include the whitetail deer (*Odocoileus virginianus*), feral hog (*Sus scrofa*), rabbit (*Sylvilagus floridanus*), squirrel (*Sciurus niger*), and the nine-banded armadillo (*Dasypus novemcinctus*). Multiple species of snakes, lizards, frogs, toads, and turtles are common, including the rat snake (*Elaphe obsolete*), bull frog (*Rana catesbeiana*), Texas spiny lizard (*Sceloporus olivaceus*), and red-eared slider (*Trachemys scripta elegans*). Numerous migratory bird species migrate through central Texas, which is in the bird migration route known as the Central Flyway, at different times throughout the year. Common migratory species seen in the area include the mourning dove (*Zenaida macroura*), scissor-tailed flycatcher (*Tyrannus forficatus*), eastern meadowlark (*Sturnella magna*), lark sparrow (*Chondestes grammacus*), eastern and western kingbirds (*Tyrannus tyrannus* and *Tyrannus verticalis*), black and turkey vultures (*Coragyps atratus* and *Cathartes aura*) , and various waterfowl. Non-migratory species in the region include the rock pigeon (*Columba livia*), bobwhite quail (*Colinus virginianus*), and wild turkey (*Meleagris gallopavo*). Granger Lake aquatic species range from benthic macroinvertebrates to popular game fish including the white bass (*Morone chrysops*), crappie (*Pomoxis annularis*), largemouth bass(*Micropterus salmoides*), and channel and flathead catfish (*Ictalurus punctatus* and *Pylodictis olivaris*).

3.5.3 Threatened and Endangered Species

Federal and state laws provide specific protection to certain rare species, generally called threatened and endangered species. The U.S. Fish and Wildlife Service (USFWS) and Texas Parks and Wildlife Department (TPWD) have listed 17 species for Williamson County (**Table 3-2**).

Table 3-2 Threatened and Endangered Species of Williamson County, TX

Species	State Status	Federal Status	Habitat Description
American Peregrine Falcon *Falco peregrinus anatum*	ST		Migrates through Texas twice per year, to and from their wintering areas in South America; stops on the Texas coast to feed before continuing their migration.
Bald Eagle *Haliaeetus leucocephalus*	ST		Found primarily near seacoasts, rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter.
Black-capped Vireo *Vireo atricapillus*	SE	FE	Nests in Texas during April through July and spend the winter on the western coast of Mexico. They build a cup-shaped nest in the fork of a branch two to four feet above the ground. Nests are usually built in shrubs such as shin oak or sumac. Their primary habitat is rangelands with scattered clumps of shrubs separated by open grassland.
Bone Cave Harvestman *Texella reyesi*		FE	Small, blind, cave-adapted arachnid endemic to a few caves in Travis and Williamson counties, north of the Colorado River.
Coffin Cave Mold Beetle *Batrisodes texanus*		FE	Resident, small, cave-adapted beetle found in small Edwards limestone caves in Travis and Williamson counties.
False spike Mussel *Quadrula mitchelli*	ST		Possibly extirpated in Texas; found in medium to large rivers with substrate varying from mud through mixtures of sand, gravel and cobble; historic river basins are the Rio Grande, Brazos, Colorado, and Guadalupe
Georgetown Salamander *Eurycea naufragia*		C	Endemic, known from springs and waters in and around town of Georgetown in Williamson County.
Golden-cheeked Warbler *Dendroica chrysoparia*	SE	FE	Nests only in central Texas mixed ashe juniper and oak woodlands in ravines and canyons. Warblers eat insects and spiders found on the leaves and bark of oaks and other trees. They use long strips of cedar bark and spider webs to build their nests. They come to Texas in March to nest and raise their young and leave in July to spend the winter in Mexico and Central America.

Species	State Status	Federal Status	Habitat Description
Jollyville Plateau Salamander *Eurycea tonkawae*		C	Known from springs and waters of some caves north of the Colorado River.
Peregrine Falcon *Falco peregrinus*	ST		Reference generally made only to species level. See subspecies descriptions (above) for details.
Red Wolf *Canis rufus*	SE	FE	Extirpated. Formerly known throughout eastern half of Texas in brushy and forested areas as well as on the coastal prairies.
Smooth Pimpleback *Quadrula houstonensis*	ST		Found in small to moderate streams and rivers as well as moderate size reservoirs with mixed mud, sand, and fine gravel substrate; appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms; range is the lower Trinity, Brazos, and Colorado River basins.
Texas fawnsfoot *Truncilla macrodon*	ST		Little known about this species; thought to inhabit rivers and larger streams; intolerant of impoundments; possibly inhabits flowing rice irrigation canals; range is the Brazos and Colorado River basins.
Texas Horned Lizard *Phrynosoma cornutum*	ST		Found in open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March – September.
Timber/Canebrake Rattlesnake *Crotalus horridus*	ST		Inhabits swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland and limestone bluffs in sandy soil or black clay.
Tooth Cave Ground Beetle *Rhadine persephone*		FE	Resident, small, cave-adapted beetle found in small Edwards limestone caves in Travis and Williamson counties.
Whooping Crane *Grus americana*	SE	FE	Large wetland areas; feed on invertebrates, small fish, frogs, etc.; winters at the Aransas National Wildlife Refuge near Rockport on the Texas coast.
FT = Federal threatened, FE = Federal endangered, SE = State endangered, ST = State threatened; C = Candidate			
Source: TPWD. 2011. Annotated County Lists of Rare Species, Williamson County. Accessed 3-29-2011 http://gis2.tpwd.state.tx.us/ReportServer?%2fReport+Project2%2fReport5&rs:Command=Render&county=Williamson USFWS 2011. List of Species by County, Williamson County. Accessed 3-29-2011 http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ListSpecies.cfm			

The two primary threatened and endangered species of concern in this area are the black-capped vireo and the golden-cheeked warbler. Both the black-capped vireo and the golden-cheeked warbler have relatively limited habitat requirements.

The black-capped vireo prefers habitat in early successional stages that consist of scrub-oak growth of heterogeneous height and distribution that reaches close to the ground. These early successional stages of scrub-oak growth were historically maintained by a natural fire regime. However, in the absence of fire these habitat types are dependent upon biological and mechanical practices for habitat maintenance and development.

Golden-cheeked warbler breeding habitat is characterized by mature juniper-oak woodlands (U.S. Fish and Wildlife Service 1992). The preferred habitats are woodlands with a moderate to high density of trees and dense canopy cover at the upper levels. Juniper is most often the dominant tree species. The juniper-oak woodlands preferred by the golden-cheeked warbler typically occur in areas with rugged terrain such as in steep slopes, canyons, and uplands (U.S. Fish and Wildlife Service 1992).

The Mountain Plover (*Charadrius montanus*) is not listed by the USFWS or TPWD as a threatened or endangered species, but during consultation with the TPWD about the proposed project, the TPWD identified the Mountain Plover as a species of conservation concern to the State (**Appendix D**). TPWD actively promotes the Mountain Plover's conservation to help prevent it from becoming listed as threatened or endangered. Mountain Plovers winter in areas with short grass or bare ground, and could use agricultural fields near the proposed project to feed.

No suitable habitat for USFWS or TPWD listed threatened or endangered species, including the golden-cheeked warbler, is available within the proposed project area or Alternative Pipeline Route E.

3.6 CULTURAL RESOURCES

An archeological review of the project was conducted by AR Consultants (**Appendix E**). A review of Texas Historical Commission (THC) and USACE records indicated a site (41WM321) in the area of the proposed pump station. The site was recorded in 1978 and was reported to be approximately 400 meters long and 100 meters wide, extending along the top of the peninsula, consisting of a relatively thin scatter. The southern two-thirds of the site had been disturbed by past farming/agricultural activities and the northern one-third of the site was tree covered and believed to be undisturbed.

When Wilson H. Fox Park was constructed, much of this site was covered with road base material and asphalt for the existing road and campsite pads. It is not clear whether this was done with the

concurrence of the USACE cultural resource managers. AR Consultants inspected the site in August 2005 and concurred with the original site description.

According to the USACE, there are 47 sites located at or below the normal pool elevation of 504 msl. Eighteen sites are located between the elevations of 504 and 500 msl. There are 12 sites between elevations 500 and 490 msl, 11 sites between elevations 490 and 480 msl, and six sites between elevations 480 and 470 msl.

3.7 WETLANDS AND OTHER WATERS OF THE U.S.

Environmental scientists from Carter & Burgess conducted site visits on January 31, 2005; April 21, 2005; and July 26, 2005 to determine the status and extent of waters of the U.S. Waters of the U.S. include rivers, streams (including perennial, intermittent, and ephemeral), bogs, sloughs, lakes, ponds (including stock tanks connected to other jurisdictional waters), and wetlands.

The jurisdictional limits of streams, ponds, and lakes are determined using the ordinary high water mark (OHWM) for each of these water bodies. The length and average width at the plane of the OHWM was recorded to establish a total area for each stream within the project site. The OHWM is defined as:

> "…that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed in the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (33 CFR 328.3)."

Wetlands are those "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions [as defined by the U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency]." Wetlands are delineated using the criteria from the 1987 USACE Wetland Delineation Manual. Wetlands must contain three parameters under normal conditions to be identified as jurisdictional. These three criteria include the presence of: (1) hydric soils, (2) hydrophytic vegetation, and (3) wetland hydrology.

A delineation of waters of the U.S. was conducted within the project area on July 26, 2005. Waters of the U.S. at the proposed intake site include Granger Lake itself. Waters along Alternative Pipeline Route C, which was eliminated during screening analysis of the alternative pipeline routes, include a perennial stream and an ephemeral stream. The OHWM of Granger Lake at the proposed intake structure is shown in **Appendix A, Exhibit 2A** and the OHWM at the crossings associated with the Alternative

Pipeline Route C are shown in **Appendix A, Exhibit 8**.

3.8 FLOODPLAINS

Since flood levels in the project area are largely controlled by the dam on Granger Lake, flood issues are not likely to be a problem for the proposed project. According to the Federal Emergency Management Agency (FEMA), the base flood elevation within the project area has been determined to be 526 feet above msl (source: FEMA Map #48491C0150C, dated September 27, 1991), although the USACE has since raised the base flood elevation to 531 feet above msl. As stated above, the conservation pool for the reservoir is 504 feet above msl. According to preliminary design drawings, the approximate elevation at the proposed intake/ pump station site would be 531 feet above msl, which is one foot higher than the maximum flood level of the 1992 flood that reached 530 feet above msl. The proposed finish floor of the pump station would be at 533 feet above msl and the electrical room would be at 533.5 feet above msl, although a small portion of the building foundation would lie below elevation 531 feet above msl. The electrical room would be contained within the same building as the pump station.

3.9 AIR QUALITY

There are currently no EPA or TCEQ air monitoring stations in Williamson County. Therefore, there are no county-specific data available for the county. However, Williamson County is located within the Austin-San Marcos Metropolitan Statistical Area (MSA). Data from the Environmental Protection Agency (EPA) Air Pollution Database (AQS) for the Austin-San Marcos MSA show that during the year 2005, there have been no (0) days when air quality reached an unhealthy level. However, there have been three (3) days when air quality was considered unhealthy for sensitive groups. The remainder of the year air quality indices were good (198 days) or moderate (47 days) (EPA 2005).

3.10 NOISE

PMK Consultants conducted a noise survey at the proposed intake/ pump station site location on June 28 and 29, 2005 to establish the ambient noise level for this location (**Appendix F**). The noise survey included readings at various locations (selected by USACE personnel) near the proposed pump station location. The closest distance the ambient readings were taken to the proposed pump station site was approximately 125 feet, which was from Campsite 20 (**Appendix F**). **Table 3-3** includes the results of the readings taken during the PMK survey.

Table 3-3 Noise Survey Results at the Proposed Intake/Pump Station Location

Noise Survey
Corps of Engineer's - Granger Lake
Wilson H. Fox Park
Williamson County, Texas
June 28 and 29, 2005
Locations at or near Campsites 20, 21, 24 & 32

Camp site	Distance from Site B	Date	Time	Temp	Relative Humidity	Wind	dBA L99	Comments
20A	125 ft	6/28/2005	1630	94F	35%	calm	45	Insects set level Birds 51, 53 dBA Small Plane 51 dBA
21A	550 ft	6/28/2005	1650	97F	33%	3-4 mph	48	Insects set level
24A	1,040 ft	6/28/2005	1710	95F	33%	1-2 mph	54	Site 24 occupied location moved across road between # 26 & 27 to minimize radio playing Insects set level & radio at #24
32A	1,413 ft	6/28/2005	1725	95F	34%	2-4 mph	52	Insects set level Note: w/insects level will be about 5-10 dBA lower
20B	125 ft	6/29/2005	0615	76F	76%	calm	37	Site 20 occupied moved to #19 Birds 53-57 dBA, crickets and cars on FM road
21B	550 ft	6/29/2005	0625	76F	76%	calm	37	Moved across road from #21 due to A/C on trailer. Some birds and cars on main road 39 dBA
24B	1,040 ft	6/29/2005	0645	76F	76%	calm	36	Crickets, Cars on main road 37 dBA, boat on lake 49 dBA
32B	1,413 ft	6/29/2005	0700	75F	64%	calm	37	Sun just coming up, A/C units on trailers 38-40 dBA, dog in distance 40 dBA

Note: Campsite 20 is closest to BRA proposed pump station

The L99 value is the sound level that exists 99% of the time. This value is essentially the lowest level occurring during the measurement session. Thus, PMK was able to determine the low sound levels during any given measurement time period. On the afternoon of June 28, 2005, the Cicadas and other insects in the area set the ambient sound level in the range of 45 to 54 dBA. Taking out the effects of the insects, it was estimated that the noise levels for these readings would have been reduced by 5 to 10 dBA since they occur in the higher frequencies, as evidenced by the readings taken on June 29.

As shown in the noise report (**Appendix F**), the ambient noise level at the park for an early morning condition was measured at 36 to 37 dBA and is anticipated to be as low as 33 to 35 dBA. This criterion for noise control was established for the proposed pump station if it were located within 125 feet of campsites.

After the noise survey conducted by PMK, the USACE made the decision to decommission nine campsites, thus making the nearest campsite 700 feet away from the proposed intake/ pump station site.

3.11 SOCIOECONOMIC CONDITIONS

Williamson County is a fast-growing area. Census data indicates that in 2003 Williamson County had a population of 303,587. This is an estimated increase of 21.5% from 2000. From 1990 to 2000, the population of Williamson County increased 79.1%. In 2000, the White (non-Hispanic) population of Williamson County was estimated at 73.5%, while the Hispanic population was estimated to be 17.2%. The African-American or Black population of Williamson County was estimated at 5.1% and Asians were 2.6%. Other races made up approximately 7.2%. Economic data for Williamson County is included in **Table 3-4**.

Table 3-4 Economic Data Summary for Williamson County

Economic Data	Williamson County	Texas
Homeownership Rate (2000)	74.2%	63.8%
Median Value of Owner-Occupied Housing (2000)	$125,800	$82,500
Median Household Income (1999)	$60,642	$39,927
Private Non-Farm Employment	72,747	8,161,321
Retail Sales -$1000 (1997)	$1,582,128	$182,516,112
Retail Sales Per Capita (1997)	$7,523	$9,430
Minority-Owned Firms, Percent of Total (1997)	11.3%	23.9%
Women-Owned Firms, Percent of Total (1997)	23.4%	25%
Persons Per Square Mile (2000)	222.6	79.6

Source: Texas Quickfacts, U.S. Census Bureau. http://quickfacts.census.gov/qfd/48/48491.html

3.12 POTENTIAL HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTES

Given the past land uses of the project area (agricultural and parkland); hazardous, toxic and radioactive waste (HTRW) contamination of the subject property is not considered to be an issue.

3.13 AESTHETICS

The current aesthetics of the project area are typical of central-Texas lakes, with steep bluffs and vegetated shorelines. There is an existing power line that crosses over the proposed project site supplying power to the restroom building. The proposed pump station location (i.e., peninsula) and building would be visible from the lake side (i.e., from the north), but should be concealed by vegetation and natural topography from the landside (i.e., from the south). The pump station building would incorporate aesthetically agreeable, architectural features such as split-face CMU or rock veneer, which would be coordinated with the USACE.

3.14 RECREATIONAL RESOURCES

Granger Lake offers a wide variety of recreation opportunities including camping, swimming, picnicking, boating, fishing, hunting, hiking, bird watching, and horseback riding. The proposed intake location would be located within Wilson H. Fox Park, which contains 58 campsites and one boat ramp. Taylor Park, located immediately west of Wilson H. Fox Park, has an additional 48 campsites and another boat ramp.

Other camping areas around the lake include Willis Park (at the west end of the lake), Friendship Park (on the north shore of the lake), and Fox Bottom Primitive Campground (southwest end of the lake).

There are five parks around the lake that have boat ramps. Willis Creek Park has one boat ramp that is operational until lake levels fall below elevation 502 msl. Friendship Park and Taylor Park both have a boat ramp that is operational until lake levels fall below 501 msl. Wilson H. Fox Park has an east ramp and a west ramp that are operational until lake levels fall seven feet below the normal pool elevation of 504 msl.

4.0 ENVIRONMENTAL CONSEQUENCES (DIRECT AND INDIRECT)

Direct and indirect impacts that would result from the proposed intake project are discussed below for each resource presented in Chapter 3. Direct impacts are those effects that are caused by the action and occur at the same time and place as the proposed action. The Council on Environmental Quality (CEQ; 40 CFR 1508.8) defines indirect impacts as those impacts that "are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems." In those cases where no significant difference exists between the alternatives, it has been noted.

4.1 POTENTIAL LAND USE CHANGE

No Action Alternative

The no action alternative would not result in any changes to land use.

Proposed Project Alternative

Land use in a small portion (approximately 200 feet by 120 feet; i.e., 0.55 acre) of the eastern peninsula of Wilson H. Fox Park would be changed from fee-based parkland that is available to the public to a secured water supply intake and pump station facility. A schematic elevation of the proposed intake/pump station (Microtunneled Intake Pipes configuration) is shown in **Appendix A, Exhibit 3-B** and **3-C**. **Exhibit 3-B** shows the permanent easement for the proposed pump station (i.e. 0.55 acre) and the intake pipes (i.e., 3.0 acre). Because of this relatively small amount of land use change, impacts to land use change would be minor.

The proposed pipeline alignment (Alternative Pipeline Route F) would not impact the current land use, which consists of parkland and agricultural lands, as these areas would be returned to pre-construction uses upon installation of the buried pipeline.

Pipeline Route E Alternative

The Pipeline Route E Alternative would have a land use impact different than the Proposed Project Alternative because a portion of the permanent pipeline easement would be in the front yard of a single family residence and would preclude certain uses on the permanent easement such as building permanent structures and possibly other actions.

4.2 GEOLOGY AND SOILS

No Action Alternative

The no action alternative would not result in any impacts to geology and soils.

Proposed Project Alternative

The proposed intake/pump station (Microtunneled Intake Pipes configuration) would result in disturbance to the geology and soils at two locations where microtunneling would be utilized. Before the tunnel boring machine (TBM) would break the surface, 0.20 acres of lake bed would be prepared by removing any loose sediment, creating a reception pit for the machine. Sediment removal associated with the preparation of the reception pit would be an excavation-only activity. Excavated sediment and the associated water would be removed from the lake and dewatered at an upland site with total retention. The total soil disturbance from the pile driven support structures would result in less than 100 square feet of disturbance. Impacts to soil would also result from construction of the sump and the pump station buildings. Construction of this building would result in soil disturbances and compaction. The proposed pipeline alignment (Alternative Pipeline Route F) would also include soil disturbances along the alignment. These soil impacts would be temporary in that the pipeline would be backfilled following construction. **Table 4-1** summarizes the soil disturbances.

Table 4-1 Soil Disturbance Related to Construction

Location	Approximate Length and Width of Soil Disturbance (Feet)	Approximate Area of Soil Disturbance (Acres)
Intake Pipes	110 x 80	0.20
Pump Station	200 x 120	0.55
Pipeline Alternative Route E	19,075 x 100	43.79
Pipeline Alternative Route F	19,020 x 100	43.66

Most of the soil disturbance would be temporary from the construction of the proposed pipeline, and therefore, there would be no significant impact to geology and soils as part of the proposed project.

Pipeline Route E Alternative

Impacts to geology and soils from Pipeline Route E Alternative would be very similar to the proposed project due to the similar acreages of proposed construction. Therefore, there would be no significant impact to geology and soils as part of Pipeline Route E Alternative.

4.3 SURFACE WATER

No Action Alternative

The no action alternative would result in no impacts to surface water.

Proposed Project Alternative

Impacts to surface water quality from construction of the proposed intake/pump station (Microtunneled Intake Pipes configuration) would primarily relate to suspended sediments during construction of the microtunneled intake pipes, which would be controlled using standard operational control BMPs, such as prohibiting sidecasting of dredged material and requiring the construction contractor to comply with the terms and conditions of USACE Nationwide Permit 25. The microtunneled intake pipes would be tunneled underground, and before the TBM would break the surface, 0.20 acres of lake bed would be prepared by dredging approximately 95 cubic yards of loose sediment. Because standard BMPs would be used, impacts to surface water quality from suspended sediment would be minimal, temporary and localized. Therefore, there would be no long term impacts to surface water from construction of the proposed intake/pump station.

Potential impacts to surface water would include accidental leaks or releases of small amounts of fuels, lubricants, etc., stored and used to operate the pump station equipment. Accidental spill avoidance measures would be incorporated into everyday facility operations by a Spill Prevention, Containment and Countermeasure (SPCC) Plan. Additionally, any chemicals would be stored in accordance with state and federal laws. Therefore, no significant impacts to surface water as a result of accidental spills would be expected.

The proposed pipeline alignment (Alternative Pipeline Route F) would not cross any waters of the U.S., and therefore, there would be no impacts to surface water from pipeline construction. The contractor would be required to comply with Texas Pollutant Discharge Elimination System (TPDES) storm water general permit requirements and would be required to use appropriate erosion controls, such as a silt fence or other similar BMPs to control sediment from the pipeline construction area.

Pipeline Route E Alternative

Impacts to surface water from Pipeline Route E Alternative would be the same as the proposed project because the only difference between the two alternatives would be a 55-foot difference in length of pipeline in an area that would not impact surface water. Therefore, there would be no significant impacts to surface water.

4.4 GROUNDWATER

No Action Alternative

The no action alternative would result in no impacts to groundwater.

Proposed Project Alternative

There would be no impacts to groundwater quality or supplies as a result of the construction of the proposed intake/pump station (Microtunneled Intake Pipes configuration) because the groundwater depths in the area would be greater than the proposed project activities and protected by confining, impermeable strata between the land surface and the aquifer. The Trinity aquifer underlies the proposed project area, and according to the Texas Water Development Board Real-Time Groundwater Recorder Database, groundwater depths in the area range between 150 feet and 210 feet. The proposed pump station construction activities would be less than 75 feet deep. Additionally, the footprint of the proposed pump station would be approximately 200 feet by 120 feet and would therefore be too small to affect groundwater recharge or quality.

The proposed pipeline alignment (Alternative Pipeline Route F) construction activities would be less than 12 feet and would therefore not impact groundwater quality or supplies.

Pipeline Route E Alternative

Impacts to groundwater from Pipeline Route E Alternative would be the same as the proposed project because the only difference between the two alternatives would be a 55-foot difference in length of pipeline in an area that would not impact groundwater. Therefore, there would be no impacts to groundwater.

4.5 BIOLOGICAL RESOURCES

4.5.1 Vegetation

No Action Alternative

The no action alternative would result in no impact to vegetation communities.

Proposed Project Alternative

The proposed intake/pump station site would be in Wilson H. Fox Park. Previously paved concrete campsite pads and roads (i.e., a cul-de-sac) are located in the proposed project site. In the non-paved areas, which total about 0.3 acres, vegetation includes mowed grasses and a sparse distribution of trees (**Table 4-2; Appendix A, Exhibit 3-B**). Vegetation impacts at the intake/pump station site would be limited to the mowed grasses within the maintained park and removal of a 6 trees. For all project

components within Wilson H. Fox Park (i.e., the pump station site, pipeline easement, and electrical line easement) a total of 20 trees would be removed. The loss of these 20 trees would be mitigated by planting 120 trees (i.e., 6:1 ratio) as described in the Recreation Mitigation Plan (**Appendix G**).

The proposed pipeline alignment (Alternative Pipeline Route F) would impact four vegetation communities described in Section 3.5.1, as shown in **Table 4-2**. Impacts were determined through field observations and aerial photograph interpretations using ArcMap GIS. The pipeline impacts would be considered short-term temporary impacts as the alignment would be revegetated following pipeline installation. The only exception would be the impacts to fence lines, where trees or saplings, if present, would be removed for pipeline construction. These impacts would be permanent since the woody vegetation component would be removed during construction and not be allowed to return within the permanent pipeline easement.

Pipeline Route E Alternative

Impacts to vegetation from Pipeline Route E Alternative would be the same as the proposed project because the only difference between the two alternatives would be a 55-foot difference in length of pipeline in an area with similar vegetation communities. The loss of 20 trees would be mitigated by planting 120 trees as described in the Recreation Mitigation Plan (**Appendix G**).

Table 4-2 Summary of Permanent Impacts to Vegetation

Alternative Pipeline Routes	Cropland (Acres)	Rangeland (Acres)	Fence Row (Acres)*	Maintained Park (Acres)	Total Vegetation Disturbance (Acres)
Pump Station	0	0	0	0.3	0.3
Alternative Pipeline Route E	7.6	1.5	3.4	5.0	17.5
Alternative Pipeline Routes F	7.5	1.5	3.4	5.0	17.4

*May contain trees or saplings

4.5.2 Wildlife

No Action Alternative

The no action alternative would result in no impacts to wildlife communities.

Proposed Project Alternative

The proposed intake/pump station (Microtunneled Intake Pipes configuration) would impact approximately 130 feet by 200 feet in Wilson H. Fox Park. Wildlife community impacts from the proposed intake/pump station would be insignificant, as the proposed intake/pump station would be located in an area previously disturbed with paved roads and mowed/maintained parkland that is not

considered suitable habitat for local wildlife. Additionally, there are no bird rookeries within the proposed project area.

During construction of the microtunneled intake pipes, there would be temporary displacement of fish. Fish are mobile and would be able to move away from dredging activities if disturbed. There would be a temporary increase in turbidity in the vicinity of the dredged area. This increase in turbidity would be controlled (i.e., only within dredge area) by using standard operational control BMPs, such as prohibiting sidecasting of dredged material and requiring the construction contractor to comply with the terms and conditions of USACE Nationwide Permit 25. Dredging would be completed in a short time-frame (i.e., 1 to 2 weeks during construction phase). The short-term turbidity increase would not significantly lower dissolved oxygen concentrations and as such, hypoxic conditions would not occur in or around the dredging areas. A mesh screen with 7/8-inch openings would be placed over the intake pipes and water velocities at the intake would be limited to less than 0.5 feet per second to limit aquatic species from entering the intake pipes during operation. Therefore, the proposed intake/pump station would not result in significant impacts to aquatic life.

Habitat loss and temporary wildlife disturbance along the proposed pipeline alignment (Alternative Pipeline Route F) would be negligible. The relatively small impact widths of the proposed pipeline and electrical easement (i.e., 40-foot wide pipeline permanent easement, 10- foot wide electrical easement, and 60-foot wide temporary construction easement) would not inhibit permanent migration of wildlife and would not significantly contribute to isolation or degradation of existing populations. Additionally, most wildlife species are mobile, and if temporarily displaced during construction activity, would simply return after construction completed. Any construction activities along the proposed pipeline alignment, including the removal of trees, would be in accordance with the Migratory Bird Treaty Act (MBTA) (16 U.S.C 703-712), and would therefore not be conducted with the intent to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg of any such bird. Any trees with occupied nests would be avoided, as well as any unoccupied nests protected by the Endangered Species Act and the Bald and Golden Eagle Protection Act. Construction timing would not be expected to affect compliance with Federal and State laws, because the proposed project area would primarily be within disturbed areas and existing rights-of-ways absent of trees. The proposed pipeline alignment would not cross any water bodies, so there would be no impact to aquatic organisms related to pipeline construction.

During future operation of the proposed project, human traffic along the proposed pipeline corridor

would be infrequent, consisting of two to four right-of-way inspections per year. The inspection schedule for the first year would include up to 10 site visits (i.e., vehicle trips along the right-of-way). However, given that the inspection crews would be traveling at slow speeds along the right-of-way and the infrequent nature of the inspections, this activity would pose no impact to wildlife. Maintenance, such as mowing, would be performed during the winter months to avoid impacts during the breeding season. Additional wildlife habitat would be created in the proposed pipeline corridor by leaving brush piles at scattered locations to add cover. In addition, the "edge effect" created by the maintained clearing would provide habitat and additional food sources for deer and various bird species. Some of the cleared areas could be reseeded with native species such as little bluestem (*Schizachyrium scoparium*) yellow Indian grass (*Sorghastrum nutans*) and white tridens (*Tridens albescens*) which would provide food sources and habitat for wildlife.

Pipeline Route E Alternative

Impacts to wildlife from Pipeline Route E Alternative would be the same as the proposed project because the only difference between the two alternatives would be a 55-foot difference in length of pipeline in an area with similar vegetation communities. Therefore, there would be no significant impacts to wildlife.

4.5.3 Threatened and Endangered Species

No Action Alternative

The no action alternative would result in no impacts to USFWS or TPWD listed threatened or endangered species.

Proposed Project Alternative

Construction of the proposed intake/pump station (Microtunneled Intake Pipes configuration) would not impact USFWS or TPWD listed threatened or endangered species. The proposed project area is absent of habitat suitable for any threatened or endangered species. Additionally, no occurrences of these species have been noted by regulatory agencies or during on-site observation by qualified biologists in the proposed project area.

The Mountain Plover is not listed by the USFWS or TPWD as a threatened or endangered species, however, the Mountain Plovers is a species of conservation concern to the TPWD (**Appendix D**). Species of conservation concern are not protected by provisions of either the Endangered Species Act or the Texas Parks and Wildlife Code. Mountain Plovers could possibly use the agricultural fields in and around

the proposed pipeline alignment as foraging grounds. No impact to Mountain Plovers are anticipated because the 40-foot wide temporary easement would affect only a small portion of the agricultural lands in the area and any Mountain Plovers in the proposed pipeline area would most likely move away from the temporary construction activities to nearby agricultural lands.

Any future maintenance activities for the proposed intake/pump station would likewise be expected to have no effect on USFWS or TPWD listed threatened or endangered species or the Mountain Plover.

Pipeline Route E Alternative

Impacts to threatened and endangered species from Pipeline Route E Alternative would be the same as the proposed project because the only difference between the two alternatives would be a 55-foot difference in length of pipeline in an area with similar vegetation communities. Therefore, there would be no impacts to threatened or endangered species.

4.6 CULTURAL RESOURCES

No Action Alternative

The no action alternative would result in no impacts to cultural resources.

Proposed Project Alternative

Site 41WM321 is located at the proposed intake/pump station location. Construction of the intake and pump station would cover the southern two-thirds of the site deposit that remains under the paved road. However, no evidence was found that a significant cultural deposit remains at the site. It was the opinion of the archaeological consultant who performed the surveys (AR Consultants), that farming and its associated erosional deflation of the disturbed topsoil had probably eliminated the vertical and horizontal integrity of the southern two-thirds of the site deposit before it was recorded in 1978.

The site appears to be typical of numerous prehistoric sites situated on the edge of the San Gabriel River valley in the Granger Lake area, but it does not appear to be worthy of further investigation in the area of the proposed intake structure. Consequently, it is the opinion of ARC that no further cultural resource investigations are warranted since all construction is planned for the formerly farmed part of the site and peninsula.

Since brush clearing and land modification are not being considered in the northern one-third of the site, which is presently tree covered, then it is recommended that no further testing is needed in this area prior to clearing. This is the only part of the site that might contain undisturbed archaeological deposits.

AR Consultants coordinated their review of the site with the USACE Fort Worth District Archaeologist who concurred that this site would not be adversely impacted provided that the intake/pump station footprint was limited to the southern two-thirds of the site in areas that had already been disturbed when the campsites were built. Project engineers have confirmed that the needed construction can be limited to the previously disturbed areas. Furthermore, AR Consultants found no reason that dredging activities in the lake would require archaeological investigations.

The increased water withdrawal as demands increase in the future would influence Granger Lake water levels. Each year as water demands increase, more water is expected to be withdrawn from the lake. This could impact archeological sites that are positioned at or below the normal pool elevation of 504 msl. There are 30 sites between 504 and 490 msl that may be exposed by fluctuating lake levels. According to projected lake levels, sites located closest to the normal pool elevation may be impacted up to 43 percent of the time by 2030. The existing intake/pump station would also have the same impact, but not at the same frequency. The increase water pumping would not impact the remaining 17 sites located below 490 msl. No recorded sites are known to occur along the proposed pipeline alignment. The vast majority of the proposed pipeline alignment has been previously disturbed by farming activities and would therefore have a low probability to contain cultural resources. If cultural resources were encountered during pipeline construction, the contractor would stop work immediately and coordinate with the USACE archeologists and State Historic Preservation Officer.

Pipeline Route E Alternative

Impacts to cultural resource from Pipeline Route E Alternative would be the same as the proposed project because the only difference between the two alternatives would be a 55-foot difference in length of pipeline in an area with similar vegetation communities. Therefore, impacts to cultural resources are not expected.

4.7 WETLANDS AND OTHER WATERS OF THE U.S.

No Action Alternative

The no action alternative would result in no impacts to waters of the U.S.

Proposed Project Alternative

Impacts to waters of the U.S., including wetlands, are regulated by the Regulatory Branch of the USACE. A delineation of waters of the U.S. was conducted within the project area on July 26, 2005. Approved methodology for the Fort Worth District Regulatory Branch was followed. Waters of the U.S. identified in the project area consisted of Granger Lake itself and two ephemeral streams located along Pipeline

Alignment Route C, which was evaluated and considered to be a non-viable pipeline alternative.

The proposed intake/pump station (Microtunneled Intake Pipes configuration) would result in impacts to waters of the U.S. associated with the H-piles used to support the pipe and screen. This activity would be covered under the terms and conditions of Nationwide Permit 25 (Structural Discharges). Permanent impacts that would result from this alternative (i.e., the footprint of the support members for the intakes) would constitute less than 100 square feet below the ordinary high water mark of Granger Lake. Steel piles would be driven into the lake bed with a pile driver, and then support members would be constructed from concrete poured in a tightly sealed form to total approximately 14 cubic yards of material below the ordinary high water mark. In addition to the permanent impacts from the support structures, temporary impacts would occur during construction (i.e., sedimentation from bottom disturbance during pier installation). Mechanical excavation for the intake reception pit would be an excavation-only activity. Excavated sediment and the associated water would be removed from the lake and dewatered at an upland site with total retention. There would be no return flows from the excavated materials, directly or indirectly, to a water of the U.S., including by introduction to a stormwater drainage system. The only discharge into waters of the U.S. during excavation activities would be incidental fallback. Therefore, impacts to waters of the U.S. would be negligible.

The proposed pipeline alignment (Alternative Pipeline Route F) would not result in any impacts to waters of the U.S. since the alignment would not cross any waters of the U.S.

Pipeline Route E Alternative

Impacts to waters of the U.S. from Pipeline Route E Alternative would be the same as the proposed project because the only difference between the two alternatives would be a 55 foot difference in length of pipeline in an area that would not cross waters of the U.S. Therefore, impacts to waters of the U.S. would be negligible.

4.8 FLOOD STORAGE

No Action Alternative

The no action alternative would result in no changes to flood storage.

Proposed Project Alternative

There would be no net loss of flood valley storage due to the construction of the proposed intake/pump station (Microtunneled Intake Pipes configuration). The building foundation would occupy less than 25 cubic yards below the base flood elevation of 531 msl. This fill would be offset by the additional flood

storage capacity of 857 cubic yards inside the sump between elevations 504 msl and 529.5 msl.

The proposed pipeline alignment (Alternative Pipeline Route F) would not result in any impacts to flood storage because it would not be within the Lake's flood pool or other floodplain. Additionally, excavated materials would be backfilled following placement of the pipeline and pre-construction contours would be restored.

Pipeline Route E Alternative

Impacts to flood storage from the Pipeline Route E Alternative would be the same as the proposed project because the only difference between the two alternatives would be a 55-foot difference in length of pipeline in an area outside of the Lake's flood pool or other floodplain. Therefore, there would be no impact to flood storage.

4.9 AIR QUALITY

No Action Alternative

The no action alternative would result in no impacts to air quality.

Proposed Project Alternative

Very localized, temporary impacts to air quality would occur during construction activities of the proposed intake/pump station (Microtunneled Intake Pipes configuration). These impacts would be the result of dust and emissions from internal combustion engines (e.g., construction vehicles). These impacts would be limited to the area directly around the Intake/Pump Station and would only occur during the construction phase of the project. Standard dust control BMPs (e.g., water application) would be utilized to control dust as needed.

Since the pumps, etc., are electric powered, no impacts to air quality are expected from operation of the intake/pump station facility. Emergency generators would not be required during power outages, since terminal storage is provided at the WTP. Standard operation and maintenance of the intake/pump station would include mowing the approximately 0.2 acre grassed areas around the pump station. Due to the small area that would require mowing, emissions from the mower's internal combustion engine would be negligible.

As with the intake/pump station, impacts to air quality for construction of the proposed pipeline alignment (Alternative Pipeline Route F) would be the result of temporary dust and emissions from construction vehicles. Standard dust control BMPs (e.g., water application) would be utilized to control dust as needed, and therefore, there would be no significant impact to air quality.

Pipeline Route E Alternative

Impacts to air quality from Pipeline Route E Alternative would be similar to the proposed project because the only difference between the two alternatives would be a 55 foot difference in length of pipeline. Therefore, there would be no significant impacts to air quality.

4.10 NOISE

No Action Alternative

The no action alternative would result in no noise impacts.

Proposed Project Alternative

Noise impacts from the proposed intake/pump station (Microtunneled Intake Pipes configuration) would occur during both the construction and operation of the facility. Noise levels would increase during the construction phase in the vicinity of the intake station. However, construction equipment would be fitted with appropriate mufflers in order to minimize noise. Additionally, construction would occur during typical daylight working hours, which would further limit noise disturbance to any potential receptors, human or wildlife.

Noise related to the operation of the pump station at the proposed intake/ pump station site was analyzed by PMK Consultants. They estimated the potential noise impacts by finding "model" locations where these pumps are already in use and taking noise measurements to determine actual noise levels. **Appendix F** contains the PMK Consultants report dated October 25, 2005. This report details the anticipated noise resulting from the pump and provides recommendations for noise reduction. **Table 4-3** summarizes these findings as modeled at Campsite 20, which is located approximately 125 feet from the proposed intake station/pump building.

Table 4-3 Noise Study Summary Findings

Type of Pumps	Building	dBA at Campsite #20	Distance	Required Noise Reduction
Vertical Turbine Pumps	Pump Bldg	42	87	10
	Electrical Bldg (HVAC)	46	120	14

As shown in **Table 4-3**, the anticipated noise levels are slightly above the ambient conditions presented in the previous section. Therefore, engineering measures (e.g., masonry walls, acoustical louvers, etc.) would be employed in the design of the pump station building and associated buildings (e.g., HVAC building), as appropriate, to reduce noise to the current ambient levels. The approximate noise reduction that would be needed to attain pre-construction ambient noise levels for each building (at the

pump station) is shown in the table above. After the noise survey conducted by PMK, the USACE made the decision to decommission nine campsites, thus making the nearest campsite 700 feet away from the proposed intake/pump station. Noise from the proposed intake/pump station would not be a significant problem to area campers given the distance from the campsites.

Noise levels from construction of the proposed pipeline alignment (Alternative Pipeline Route F) would temporarily increase along the proposed pipeline alignment as a result of operation of heavy equipment during trenching and pipe installation. These effects would be temporary and given the undeveloped nature of the proposed pipeline alignment, little or no effects from noise would be anticipated from the construction of the pipeline. As with construction of the intake/pump station, construction of the pipeline would occur during typical daylight working hours, which would further limit disturbance of local residents. Therefore, noise level impacts would be minor and temporary.

Pipeline Route E Alternative

Pipeline Route E Alternative would have a greater noise impact than the proposed project alternative due to the proximity of Route E to a single family residence near the westward end of the project. Increased noise from the construction activities would occur temporarily at the single family residence. Construction would occur during typical daylight working hours to limit potential disturbance to the residents.

4.11 SOCIOECONOMIC CONDITIONS

No Action Alternative

The no action alternative would result in no direct socioeconomic impacts. However, adoption of the no action alternative could result in indirect socioeconomic impacts in that no increased pumping capacity would be afforded. This could affect the water supply for the area impacting development which could negatively impact the economy of the region. However, it is likely that regional planners would seek out other sources of water for the area if Granger Lake were not able to provide adequate amounts. Other sources of water might be more expensive due to the distances over which the water would have to be transported.

Proposed Project Alternative

Temporary increases in local revenues and salaries would occur during the proposed 20 million dollar construction phase of the proposed project. This increase in economic activity during construction would have a “multiplier effect” on the local economy where money spent during construction would expand throughout the local economy.

The Construction and operation of the proposed intake/pump station would increase the capacity and efficiency of the Regional WTP by providing the capacity to pump more water of higher initial (i.e., pre-treatment) quality. The increased quality of the pre-treated water would allow for more efficient treatment processes at the water plant, resulting in lower operating costs for the Regional WTP. Since operating costs are included in the overall water rate structure, any savings would be applicable to all customers served by the East Williamson County Regional Water System.

Pipeline Route E Alternative

Impacts to socioeconomic conditions from Pipeline Route E Alternative would be similar to the proposed project because the only difference between the two alternatives would be a 55-foot difference in length of pipeline. Therefore, socioeconomic impacts would be a temporary increase in local revenues and salaries during construction.

4.12 POTENTIAL HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTES

No Action Alternative

The no action alternative would not result in use or generation of potential hazardous, toxic, or radiological wastes.

Proposed Project Alternative

The construction contractor would be required to employ BMPs and comply with a storm water pollution prevention plan (SWPPP) to control the generation of hazardous, toxic or radiological wastes during the construction phase of the proposed intake/pump station (Microtunneled Intake Pipes configuration). Generation of such wastes is typically related to the potential release of petroleum products (oils, fuels, and lubricants) during fueling and servicing construction equipment or from leaking equipment. If a fuel/lubricant spill occurred, it would be cleaned up immediately by the construction contractor.

No chemicals would be stored at the proposed intake/pump station, other than petroleum products (e.g., fuel) for emergency generators. These generators could be portable, which could potentially limit the amount of petroleum products stored at the intake/pump station. This material would be stored in accordance with local, state and federal regulations. Additionally, the WTP SPCC plan would be modified to address spill procedures for the intake/pump station.

During construction of the proposed pipeline alignment (Alternative Pipeline Route F), oils, fuels, and lubricants could be accidentally released during fueling and servicing construction equipment or from

leaking equipment. If a fuel/lubricant spill occurred, it would be cleaned up immediately by the construction contractor. Therefore, no impacts from generation of potential hazardous, toxic, or radiological wastes would be expected.

Pipeline Route E Alternative

Activities related to the generation and control of hazardous, toxic or radiological wastes from Pipeline Route E Alternative would be similar to the proposed project because the only difference between the two alternatives would be a 55-foot difference in length of pipeline. Therefore, no impacts from generation of potential hazardous, toxic, or radiological wastes would be expected.

4.13 AESTHETICS

No Action Alternative

The no action alternative would not result in aesthetic impacts.

Proposed Project Alternative

The proposed intake/pump station (Microtunneled Intake Pipes configuration) would have an aesthetic impact due to a 40-foot tall structure that would be visible from the lake; however, it would have no aesthetic impact on the surface of the lake because the microtunneled intake pipes would be under water. Aesthetic impacts would be limited to the on-shore pump building with an attached electrical room. Trees and shrubs would be planted around the structures, in accordance with USACE landscape guidance, to provide both visual and acoustic screening.

Temporary aesthetic impacts would result from the construction of the proposed pipeline alignment (Alternative Pipeline Route F). Impacts would include presence of construction equipment during pipeline installation and bare soils following construction until the easement is re-vegetated. Use of post-construction BMPs, such as reseeding, would mitigate temporary aesthetic impacts associated with installation of the pipeline. Therefore, aesthetic impacts would be insignificant and short-lived.

Pipeline Route E Alternative

Pipeline Route E Alternative would potentially have a greater temporary aesthetic impact than the proposed project alternative due to the proximity of Route E to a single family residence. Pipeline construction activities would occur in the front yard of the single family residence. Aesthetic impacts would be temporary and revegetation of the yard would commence immediately as construction activities are completed.

4.14 RECREATION

No Action Alternative

The no action alternative would not result in any impacts to recreation.

Proposed Project Alternative

The proposed intake/pump station (Microtunneled Intake Pipes configuration) would have recreation impacts to Wilson H. Fox Park because campsites would not be available for use during construction activities and nine campsites would be decommissioned near the proposed facility. The temporary park closure would be mitigated by scheduling construction to avoid the peak camping season (June through August).

As shown on **Exhibits 3-B, 3-C, 9-A, and 9-B**, the intake/pump station would be secured by an intruder fence and would not be accessible to the general public. The access drive would be gated at the location where the park loop drive leaves the main access drive and extends parallel to the lake shore.

TCEQ requires a 200-foot "restricted-use" area around intake pipes. Buoys would be used to warn boaters and restrict access to the area. The proposed intake configuration would not result in significant impacts to boating since the proposed intake would be the only one on the lake, and there would be ample boating areas elsewhere on the lake.

The proposed intake/pump station would increase withdrawals from current amounts to meet future water demands, which in turn would influence Granger Lake water levels. This would impact the operation of the five boat ramps around the lake. The operational elevations range from 502 to 497 msl, and when lake levels fall below these elevations, the boat ramps would become inoperable. Projected lake levels would cause the boat ramps at Willis Creek Park to be operational 95 to 81 percent of the time between now and 2030. The projected lake levels would cause the boat ramps at Friendship Park and Taylor Park to be operational 98 to 89 percent of the time, and the two boat ramps at Wilson H. Fox Park to be operational 100 to 98 percent of the time, between now and 2030.

Lake level fluctuations would have varying impacts on recreational boat usage of the lake. During times of drought or increased withdrawal, adverse impacts to some boating activities could be expected due to lower lake levels. Such impacts would likely include a reduction in the amount of boatable acreage (i.e. accessibility) within the lake and an increase in the amount of boating hazards by exposing submerged trees, stumps, rocks, and creating more shallow areas. However, recreational users with smaller watercraft such as flat bottom boats, kayaks, canoes, etc. would likely continue to have access to

much of the lake and would not be impacted.

There are two swim beach sites at Granger Lake. One site is located at Friendship Park and the other is at Wilson H. Fox Park. Low lake levels, due to either increased withdrawals or drought, could make swim beach sites unfavorable for use, which could decrease the frequency of use and reduce the number of recreational activities available.

Wilson H. Fox Park would be closed to public access during pipeline construction, campsite improvements, roadway improvements and repairs, and during construction of the intake/pump station.

No permanent impacts to recreation are expected from the proposed pipeline alignment (Alternative Pipeline Route F). Temporary impacts to recreation would result from the temporary closure of Wilson H. Fox Park during pipeline construction activities.

Recreation impacts would be mitigated according to the Recreation Mitigation Plan (**Appendix G**). Therefore, there would be no long-term adverse impact to recreation.

Pipeline Route E Alternative

Impacts to recreation from Pipeline Route E Alternative would be the same as the proposed project. Recreation impacts would be mitigated according to the Recreation Mitigation Plan (**Appendix G**). Therefore, there would be no long-term adverse impact to recreation.

5.0 CUMULATIVE IMPACTS

Cumulative impacts are more difficult to define and quantify than direct and indirect impacts. According to the President's Council on Environmental Quality, cumulative impacts "result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually but collectively significant actions taking place over a period of time." On-going and planned future projects in the region that are known to the Environmental Information Document preparation team include:

- Concurrent expansion to the regional WTP, as part of a separate project. Impacts associated with the expansion would occur at an existing WTP site and are not expected to be significant when considered within the context of the proposed project.
- Various residential development projects in Williamson County.
- Additional water delivery pipelines may also be required as the demands of the region increase. The exact locations and alignments of any future delivery pipelines are not known at this time and are dependent largely on private development. However, the future projects will be subject to all environmental rules and regulations in place at the time of construction, and cumulative impacts that result are not expected to be significant.

The cumulative impacts for each resource are presented in the sections below. The proposed intake/pump station (Microtunneled Intake Pipes configuration) and proposed pipeline alignment (Alternative Pipeline Route F), as well as Pipeline Alternative Route E, have been carried forward into the cumulative impacts analysis.

5.1 LAND USE

Past land use changes in the region include the conversion of farm/rangeland into Granger Lake (a 4,400 acre lake), construction of the existing pump station, and construction of parks and recreational areas around the lake. Currently, there are no significant on-going land use changes in and around Granger Lake. Reasonably foreseeable future changes to land use within the region would include the conversion of agricultural land use to residential and commercial development. The cumulative effects of land use changes associated with this project, when added to past, on-going, and future activities, would be minor given the minimal amount of land (i.e., 0.55 acre) that would change use from park/recreational use to water intake/pump station use on the peninsula in Wilson H. Fox Park.

5.2 GEOLOGY AND SOILS

The impacts of the proposed project to area soils would be additive to other past, present, and future

actions, primarily related to land development activities (i.e., conversion of farm/rangeland). However, given the amount of undeveloped and relatively undisturbed soil in the project area, and proposed permanent impacts to soils amounting to only 0.55 acre, the cumulative geology and soils impacts would be considered minor.

5.3 SURFACE WATER

Past, on-going, and foreseeable future impacts to surface water include sedimentation from upstream agricultural and development activities in the region. The cumulative effects of sediment impacts to surface water in Granger Lake as a result of the proposed project would be temporary and localized during construction of the proposed facilities. Additionally, migration of sediment from the construction zone would be controlled by using standard operational control BMPs, such as prohibiting sidecasting of dredged material and requiring compliance with the terms and conditions of USACE Nationwide Permit 25. Therefore, cumulative impacts to surface water as a result of the proposed project would be insignificant compared to the past, present, and future sediment contributions from the watershed.

5.4 GROUNDWATER

Given that no impact to groundwater is expected from the proposed action, no cumulative effects would occur.

5.5 BIOLOGICAL RESOURCES

5.5.1 Vegetation Communities

Past, on-going, and future residential and commercial development in the Williamson County area results in loss or conversion of cropland and rangeland. Additionally, the construction of Granger Lake resulted in the inundation and loss of approximately 4,400 acres of rangeland and cropland. The proposed project would result in the removal of 20 trees in USACE property. These 20 trees would be mitigated by planting 120 trees (i.e., 6:1 ratio) as described in the Recreation Mitigation Plan (**Appendix G**). The proposed pipeline would only temporarily impact rangeland and cropland along the pipeline alignments because it would be re-seeded and could still be farmed. Cumulative impacts to vegetation communities resulting from the proposed project would be mitigated or temporary, and would therefore be insignificant compared to the other past, present, and reasonably foreseeable future development in the region.

5.5.2 Wildlife

Cumulative impacts to wildlife would result from additional loss and fragmentation of habitats due to land clearing and construction activities for future residential and commercial development projects. A large proportion of high quality wildlife habitat is located in forested riparian areas along existing waters of the U.S. and these areas are more difficult to develop given federal regulations and engineering constraints, such as topography. The proposed project would not impact forested riparian areas, and wildlife impacts from the pipeline alignment would be temporary because the pipeline alignment would be revegetated. Therefore, cumulative impacts to wildlife in the region as a result of this project would occur indirectly in the form of development of primarily agricultural land for residential uses. The cumulative effect on wildlife resulting from the 0.55 acre impact of the proposed project would constitute a small percentage of any future residential or other development of wildlife habitat in the region.

5.5.3 Threatened and Endangered Species

Given that no impacts to USFWS or TPWD listed threatened or endangered species are expected from the proposed action, no cumulative effects on threatened and endangered species would be expected.

5.6 CULTURAL RESOURCES

The Granger Lake pool area was surveyed for cultural resources before the construction of the lake and all cultural resources on USACE property are protected according to state and federal historic preservation requirements. Accordingly, there would be no on-going or foreseeable future impacts to cultural resources on USACE property. Given that the proposed project is primarily on USACE property or along previously cleared and/or disturbed road rights-of-way and fence lines, there would be no cumulative effects of the proposed project on cultural resources.

5.7 WETLANDS AND WATERS OF THE U.S.

Past impacts to waters of the U.S. in the project area include the inundation and expansion of waters of the U.S. by constructing Granger Lake. Potential on-going and future losses to waters of the U.S. in the region would relate primarily to residential and commercial development in the area, which would be subject to Section 404 of the Clean Water Act. The proposed project would impact less than 100 square feet of the 4,400 acre Granger Lake, and the activities would be designed to meet the terms and conditions of Nationwide Permit 25 (Structural Discharges). Therefore, the proposed project would have negligible cumulative effect on waters of the U.S.

5.8 FLOOD STORAGE

There would be no impact to flood storage from the proposed action, and therefore, there would be no cumulative effects to flood storage.

5.9 AIR QUALITY

Past, on-going, and future impacts to air quality in the region would result from residential and commercial development (i.e., dust and construction vehicle emissions) and other activity (e.g., emissions from passenger vehicle traffic on area roads). The proposed project would have only temporary impacts to air quality (i.e., during construction). Given the relatively good air quality of the project area (see Section 3.9) and the temporary impact of the proposed project, cumulative impacts to air quality resulting from the proposed project would be insignificant.

5.10 NOISE

Past, on-going, and future ambient noise would relate to wildlife (e.g., insects and birds), traffic noise, recreational activities, and agricultural activities. There would be temporary noise impacts from construction of the proposed intake/pump station and pipeline. Operation of the intake/pump station would produce noise but would not be significant because the ambient noise in the park area is similar to the type of noise that would be generated by the pumps (e.g., RV generators and boat engines, etc.) and the pump buildings would be fitted with sound dampening devices (acoustic dampeners, etc.) to minimize operating noise levels. Therefore, the cumulative impacts of incremental increases in temporary (construction) and future (operating) noise from the proposed project would be insignificant.

5.11 SOCIOECONOMICS

The population of Williamson County has been growing steadily over the past several years and is expected to continue to grow in the coming years (~139,000 in 1990, ~249,000 in 2000, and an estimated 373,000 in 2007 according to the U.S. Census Bureau). The proposed project would replace an existing intake pump station and would not influence population growth of Williamson County directly. Therefore, it would not have a cumulative impact on the population in the project area.

The economy of Williamson County is expected to grow in the future as the population grows. The proposed $20 million project would have a temporary beneficial economic impact on the area due to increased local revenues and salaries during construction. Therefore, there would be a temporary positive cumulative impact to the economy in Williamson County.

5.12 POTENTIAL HAZARDOUS, TOXIC AND RADIOLOGICAL WASTES

There have been no known past or on-going releases of potentially hazardous, toxic, and radiological wastes in the project area. There would be no impacts from generation of potentially hazardous, toxic, and radiological wastes as part of the proposed project, and any potentially hazardous materials used during construction and operation of the proposed project would be used and stored in accordance with state and federal regulations. Therefore, there would be no cumulative effects on hazardous, toxic, and radiological wastes.

5.13 AESTHETICS

Past aesthetic impacts in and around Granger Lake include construction of the existing Pump Station and USACE facilities around the lake. There are no known on-going and foreseeable future activities with aesthetic impacts on Granger Lake. The proposed project would have an aesthetic impact on the lake from construction of the pump station, however, this impact is minor given that the facility would be designed to match the existing USACE facilities and incorporate trees and shrubs around the structure in accordance with USACE guidance. The lake shore is controlled by the USACE and TPWD and no development is planned on the shoreline. Additionally, the existing intake/pump station is scheduled to be removed in the 2020 timeframe. Therefore, the proposed project would have only a minor cumulative impact on aesthetics.

5.14 RECREATION

Past and on-going recreation on and around the lake is impacted primarily by periodic low lake levels. Increasing future water demands would result in greater water withdrawals, and subsequently, more frequent and deeper drawdowns. The proposed project would result in fewer campsites at the lake and a 3.0-acre lake surface exclusion zone around the intake pipes. These impacts to recreation would be mitigated according to the Recreation Mitigation Plan (**Appendix G**). Therefore, there would be no long-term cumulative impacts on recreation.

6.0 PERMITS AND OTHER REGULATORY REQUIREMENTS

Several permits and regulatory requirements would potentially apply to the proposed project as described in the following sections.

6.1 CLEAN WATER ACT - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER REQUIREMENTS

- **Storm Water Requirements for Construction Activities** – Authority for this was delegated to Texas (Texas Commission on Environmental Quality) and is provided for in the TPDES General Permit No. TXR150000. This permit would most likely be applicable in the proposed project as total is applicable for activities that disturb areas greater than or equal to 1 acre.
- **Spill Prevention, Containment and Countermeasures Plan** – If petroleum storage on-site would exceed 1,320 gallons, a SPCC would be required. It is possible that an SPCC exists for the Regional WTP. This plan could simply be amended to include the new facility, if it exceeded 1,320 gallons of petroleum storage.

6.2 CLEAN WATER ACT - SECTION 404 AND EXECUTIVE ORDER 11990

- **Nationwide Permit 25 (Structural Discharges)** – for the structural supports of the intake screens.
- No loss of wetlands would occur as a result of this project (EO 11990)

6.3 AIR QUALITY

- Air Permits (Permit By Rule) - Temporary emergency generators at the site would likely be covered under permit-by-rule (PBR), given that they would not be in use more than 10% of the time the facility operates. No registration would be required with the state under the PBR.

7.0 MITIGATION

Mitigation measures that would be employed to avoid, minimize or compensate for potential effects of the proposed project are presented in the following sections.

7.1 SURFACE WATER

A storm water pollution prevention plan would be prepared in adherence to the TPDES general permit (TXR150000). This plan would specify best management practices (BMPs) that would be employed during construction. These measures, along with the terms and conditions of required Section 404 permits would be adhered to during the construction phase.

BMPs would also be employed by the dredging contractor during dredging activities. These BMPs would include measures to reduce and control the effects of turbidity to the immediate dredging area. BMPs would likely include operational control measures such as prohibiting sidecasting of dredged material..

Additionally, a spill prevention, control and countermeasures plan would be prepared that would be in effect during operation of the facility.

7.2 WETLANDS AND OTHER WATERS OF THE U.S.

The proposed intake/pump station (Microtunneled Intake Pipes configuration) was designed to meet the terms and conditions of Nationwide Permit 25 (Structural Discharges). This nationwide permit does not require a pre-construction notification (PCN), and as a result, no compensatory mitigation is expected.

7.3 NOISE

Noise mitigation would occur at the proposed intake/pump station (Microtunneled Intake Pipes configuration) in the form of noise reduction engineering that would be incorporated into design plans. PMK Consulting's report outlined the noise reduction measures that would be incorporated.

If vertical turbine pumps are used, the following measures would apply:

- Quiet AC System located on far side of site and screened
- Pump station ventilation accomplished with low noise louvers and exhaust fans
- Insulated roll-up door to minimize noise transfer
- Size exterior piping to reduce velocities and hydraulic noise
- Orientate maintenance doors away from lake and camp sites.

Landscaping around the intake/pump station would also be designed and installed to reduce potential

noise effects associated with the facility.

7.4 BIOLOGICAL RESOURCES

Native tree plantings to screen the pump station, which would follow USACE landscape standards, would provide mitigation for all trees removed during construction of the facility. Additionally, the pipeline right-of-way would be revegetated with native herbaceous species or with species that would match landowners' existing, adjacent vegetative cover to reduce the potential for erosion. Both of these elements would mitigate impacts to native vegetation and provide increased diversity for wildlife that uses these habitats.

7.5 CULTURAL RESOURCES

As discussed in the impacts section, brush clearing or land modification in the northern one-third of the site, which is presently tree covered, would likely necessitate that limited testing be done in this area prior to clearing. This is the only part of the site that may contain undisturbed archaeological deposits. Following the limited testing, the USACE archeologist would make a decision on how to proceed based on the results.

7.6 AESTHETICS

As previously mentioned, native trees and shrubs would be planted around the proposed intake/pump station structures to provide both visual and acoustic screening as well as minimize the aesthetic impacts of the project. The pump building would incorporate aesthetically pleasing architectural features such as split-face CMU or rock veneer which would be coordinated with the USACE. This, coupled with reseeding of disturbed areas along the proposed pipeline right-of-way, should mitigate aesthetic impacts with the proposed project.

7.7 RECREATION

The BRA and USACE have agreed upon a plan, the Recreation Mitigation Plan (**Appendix G**), that the BRA would implement to compensate for anticipated impacts of the proposed project on recreational facilities due to construction and operation. First, the project would be constructed during the off-peak camping season (September through May) to minimize revenue losses from closure of the park during construction. In addition, the BRA would make improvements to the campground at Granger Lake, including upgrading electrical utilities and roads, and replacing trees removed for construction at a 6:1 ration.

8.0 LIST OF AGENCIES AND PERSONS CONSULTED

8.1 AGENCY COORDINATION

USACE has coordinated with and will continue coordination by sending the draft Environmental Assessment the following agencies. See Appendix H for coordination letters.

- Brazos River Authority
- Texas Parks and Wildlife Department
- Texas Historical Commission
- Texas Commission on Environmental Quality
- U.S. Fish and Wildlife Service
- Environmental Protection Agency

8.2 PUBLIC INVOLVEMENT

A Notice of Availability (NOA) will be sent out for public notification of the review and comment period. The draft EA will be sent to the following resource agencies for review and comment in accordance with coordination requirements as set forth by the NEPA: Texas Parks and Wildlife (TPWD); United States Fish and Wildlife Service (USFWS); Environmental Protection Agency (EPA, Region 6: the State Historical Preservation Office (SHPO) and the Texas Commission on Environmental Equality (TCEQ).

8.3 REFERENCES

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