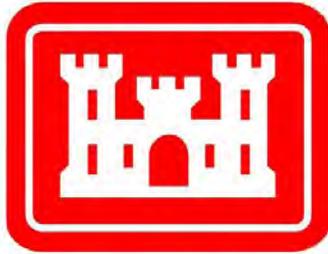

*Draft Environmental Assessment
for the
San Antonio River
Improvements Project*



Prepared for:
US Army Corps of Engineers
Fort Worth District

November 2011

ACRONYMS AND ABBREVIATIONS

AHERA	Asbestos Hazard Emergency Response Act
APAR	Affected Property Assessment Report
AST	Above Ground Storage Tank
CAA	Clean Air Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
HVAC	Heating, Ventilation, and Air Conditioning
IHW	Industrial Hazardous Waste
LPST	Leaking Petroleum Storage Tank
NAAQS	Nation Ambient Air Quality Standards
NRCS	National Resources Conservation Service
NTCHS	National Technical Committee on Hydric Soils
OSC	On Scene Coordinator
RCRA	Resource Conservation and Recovery Act
SARA	San Antonio River Authority
SAROC	San Antonio River Oversight Committee
SVOC	Semi-Volatile Organic Compounds
SWPPP	Stormwater Pollution Prevention Plan
TPWD	Texas Parks and Wildlife Department
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank

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1.0- INTRODUCTION

The United States Army Corps of Engineers (USACE), Fort Worth District and associated non-federal sponsor, San Antonio River Authority (SARA), previously constructed the existing San Antonio Floodway, which is a public works project within the USACE Fort Worth District Civil Works Boundary. The Eagleland Reach Ecosystem Restoration project is an ongoing USACE and SARA Public Works project. USACE is responsible for ensuring that the integrity and primary function of the public works projects are maintained at all times.

The proposed San Antonio River Improvements project requires alterations to the public works projects, and as such, these alterations require USACE approval. The authority for USACE approval of alterations to public works projects operated and maintained by non-Federal sponsors is 33 USC Section 408. Specifically, 33 USC Section 408 states:

“It shall not be lawful for any person or persons to take possession of or make use of for any purpose, or build upon, alter, deface, destroy, move, injure, obstruct by fastening vessels thereto or otherwise, or in any manner whatever impair the usefulness of any sea wall, bulkhead, jetty, dike, levee, wharf, pier, or other work built by the United States, or any piece of plant, floating or otherwise, used in the construction of such work under the control of the United States, in whole or in part, for the preservation and improvement of any of its navigable waters or to prevent floods, or as boundary marks, tide gauges, surveying stations, buoys, or other established marks, nor remove for ballast or other purposes any stone or other material composing such works: Provided, That the Secretary of the Army may, on the recommendation of the Chief of Engineers, grant permission for the temporary occupation or use of any of the aforementioned public works when in his judgment such occupation or use will not be injurious to the public interest: Provided further, That the Secretary may, on the recommendation of the Chief of Engineers, grant permission for the alteration or permanent occupation or use of any of the aforementioned public works when in the judgment of the Secretary such occupation or use will not be injurious to the public interest and will not impair the usefulness of such work.”

In accordance with 33 USC Section 408, any alteration of a USACE Public Works project requires USACE review and approval to ensure that the alteration does not create any direct, indirect, or cumulative adverse impacts to USACE Public Works. In accordance with 33 CFR Section 230, Procedures for Implementing NEPA (Engineering Regulation 200-2-2), a National Environmental Policy Act (NEPA) document must be prepared to address the impacts to the environment as a result of the action.

One USACE Public Works project in question is an ongoing ecosystem restoration project that is currently being conducted at the Eagleland Reach. An Environmental Assessment was completed for this project in July of 2002 and can be found in Appendix E. After a flood event in 1946, the San Antonio River was channelized and San Antonio River Tunnel (SART) was created to protect the area during a 100-year flood event. During construction and channelization, the San Antonio River was transformed from its natural riparian setting into an engineered drainage. The channelization of the river is known as the San Antonio River Floodway, which is another potentially impacted USACE Public Works project. The purpose of the ongoing stream restoration project is to preserve and restore the Eagleland Reach of

the San Antonio River back to its natural setting. This would be completed by restoring native vegetation, restoring meanders, and creating a riffle-pool complex. The area of the ecosystem restoration project that would be affected by the current San Antonio River Improvements Project begins at South Alamo Street and ends at the Union Pacific Railroad tracks near Lone Star Boulevard.

This EA addresses only on the portions of the San Antonio River Improvements Project that would have a potential impact on current USACE Public Works projects.

1.1 – Purpose and Need

The historic San Antonio River has long served as the heart of the city. Each year, the River Walk draws millions of visitors, yet miles of urban river exist beyond the downtown River Walk area and have untapped potential for use by tourists and local citizens. Currently a multi-year project is underway to restore and enhance 13 miles of the San Antonio River both north and south of downtown. In 1998, the San Antonio River Oversight Committee (SAROC) was formed and given the responsibility of overseeing the planning, design, project management, construction, and funding necessary to complete the project. In



Figure 1. View upstream of the Eagleland Reach from the pedestrian bridge.

May of 2008, Bexar County voters approved an extension of the Visitor’s Tax that will provide approximately \$2.3 million for Eagleland Reach. The budget is based on completing some elements in the Amenities Master Plan and enhances previously constructed elements.

The current USACE Eagleland Reach Ecosystem Restoration project is experiencing erosion at the constructed storm water outfalls causing water quality degradation and potential damage to other features of the project. The existing footpaths are not constructed to the Americans with Disabilities Act (ADA) standards causing safety concerns for recreationists utilizing the area. Additional safety concerns of the footpaths include overgrown vegetation and slopes of the footpaths. The current pedestrian sidewalks and configuration of South Alamo Street accessing the site is narrow, reducing traffic safety and commuter access. As part of the San Antonio River Improvements Project, improvements to the existing footpaths and construction of new footpaths within Eagleland reach would be considered fully functional as a stand-alone recreational feature. However, these improvements would allow for connectivity of recreation and neighborhood communities outside of the project area along the San Antonio River as part of the Amenities Master Plan.

The purpose of this project is to place a footpath adjacent to the river and reconstruct storm water outfalls currently entering the river along this segment. These footpaths will be ADA-accessible and would be safer than the existing footpaths. Additionally, improvements would be made to South Alamo Street to improve traffic safety and commuter access to the Eagleland Reach. The project would improve the aesthetics and water quality of the outfalls allowing flow to be filtered by native, aquatic vegetation along short streams before entering the river. The project would continue the efforts of the

ecosystem restoration project by revegetating portions of the reach with native plants, which in turn would help reduce erosion on the river banks and attract native wildlife species including songbirds, wading birds, waterfowl, amphibians, reptiles and small mammals.

1.2 – Location of Proposed Action

The proposed action would be located just south of downtown San Antonio on the San Antonio River. The Eagleland Reach includes the San Antonio River segment from South Alamo Street to The Historic Mission Trails project, near the San Antonio River tunnel outfall at Lone Star Boulevard. The entire project area is encapsulated by previous USACE Public Works projects. Figure 2 shows the location of the proposed action on a USGS topographic map. Figure 3 shows the San Antonio River Improvements project area in relation to current USACE Public Works projects on a 2009 aerial photograph.

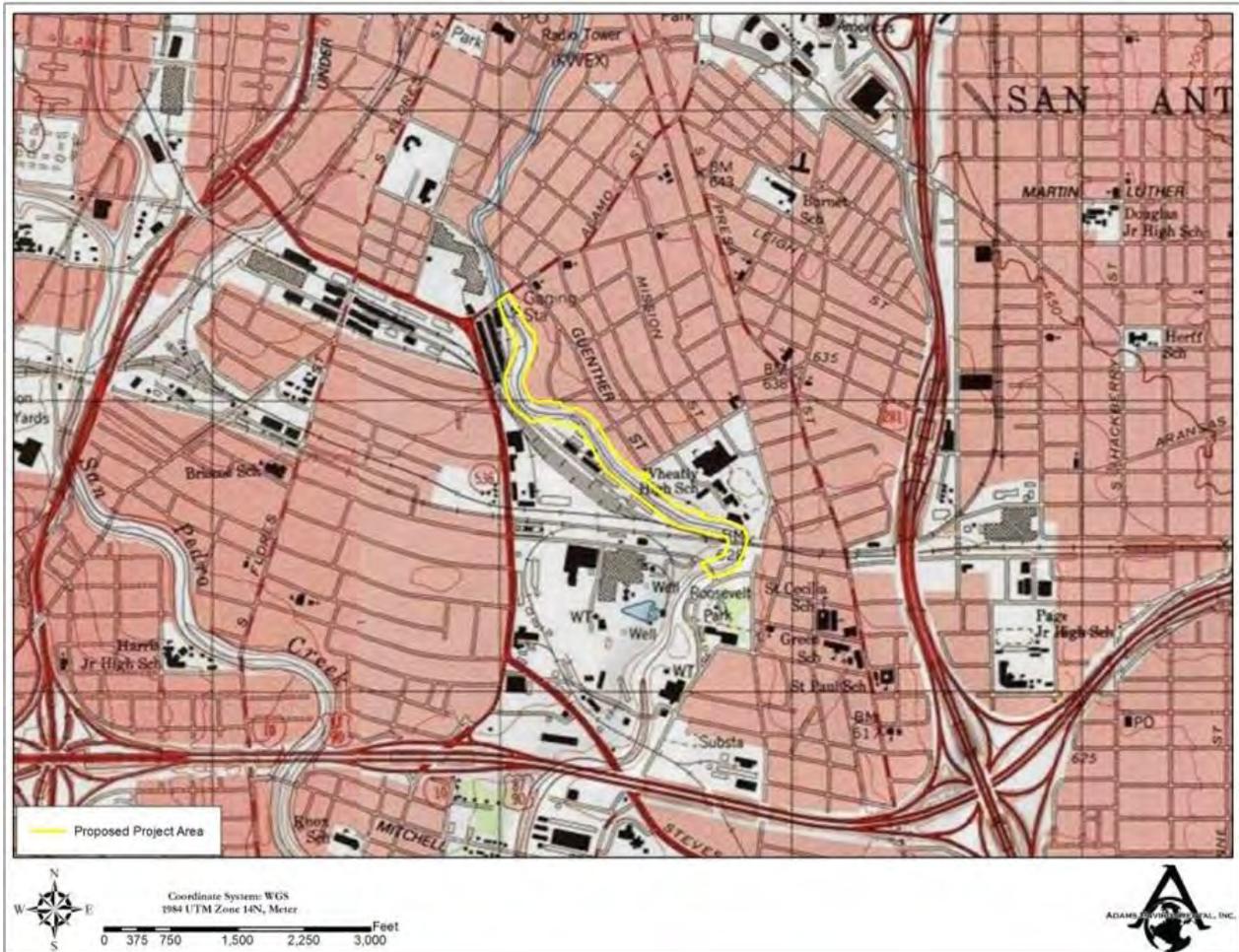


Figure 2. Location of the proposed project on a 7.5 minute USGS topographic map.
(Source: USGS 7.5 minute topographic map, San Antonio East, TX and San Antonio West, TX)

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Figure 3. Location of the San Antonio River Improvements Project and the ongoing Eagleland Reach Ecosystem Restoration Project displayed on a 2009 aerial photograph. (Source: City of San Antonio GIS Department, 2009)

2.0– DESCRIPTIONS OF PROPOSED AND ALTERNATIVE ACTIONS

In the paragraphs that follow, the Proposed Action, Alternative Action, and No-Action Alternative are described. The final selection of the preferred action was based on environmental impacts, economic analysis, and security issues and is discussed in Section 2.4.

2.1 – Proposed Action

The proposed action would incorporate various features in order to satisfy the need and purpose of the project. Figure 4 provides an aerial view of the trail and its major components on an aerial photograph. On South Alamo Street from Probandt Street to Wickes Street, the existing south curb would be relocated to accommodate three 12-foot wide traffic lanes. The two outside lanes would be used for travel, while the middle lane would be for left turns. At the relocated curb, a 12'-6" to 10'-0" wide concrete walk with trees, decorative tree grates, and pedestrian lighting would be added. From Wickes Street to Adams Street, the existing south curb would be reconfigured to accommodate a 14-foot and 13-foot wide travel lane with a 12-foot wide left turn lane and a 7'-6" wide concrete walk with street trees, decorative tree grates and pedestrian lighting. Existing storm water inlets along the southeast curb of South Alamo Street would be relocated or repaired. South Alamo Street Road improvements are part of the entire project; however, only the surface widening improvements of pedestrian walkways on the bridge expanse over the San Antonio River are within the USACE Public Works project. Surface improvements to the bridge will not involve construction activities within the channel or adjacent features of the USACE Public Works project and will not require widening of the existing bridge footprint.

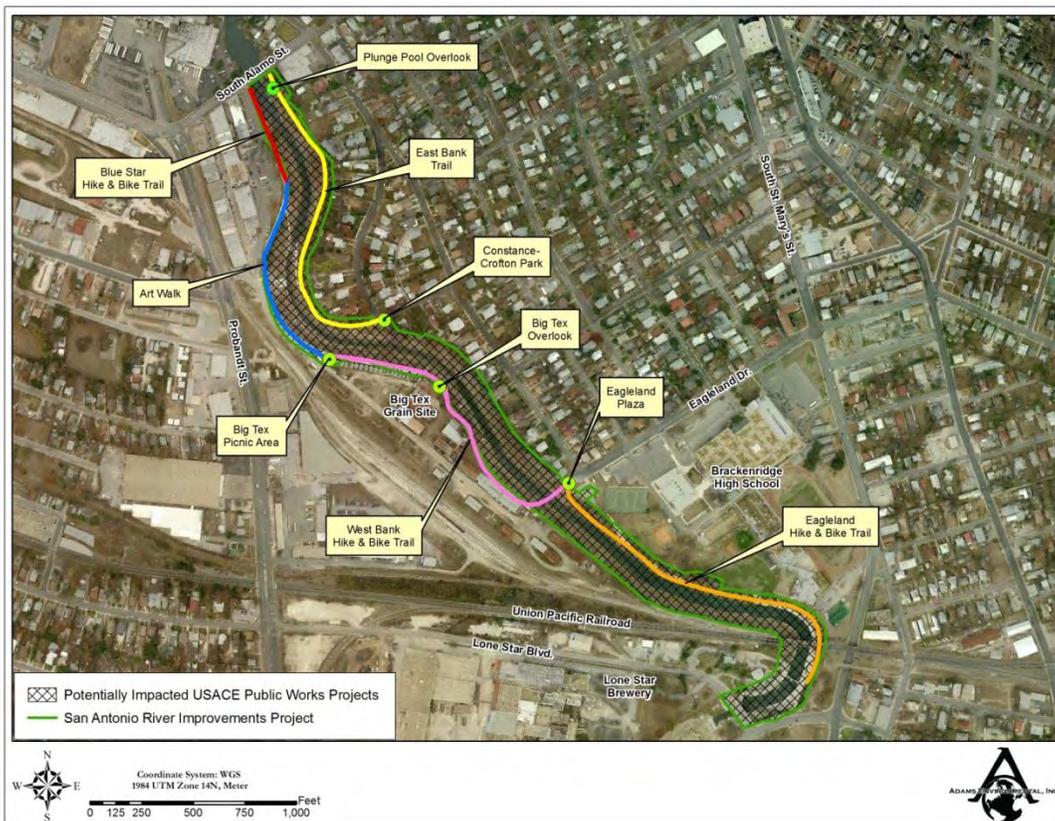


Figure 4. Components of the proposed project alternative.

A plunge pool is currently located at the north end of the Eagleland Reach. At the plunge pool, a concrete paved area would be installed to serve as the end of the existing east bank trail. Drought-tolerant native vegetation would be planted in this area and the ground surface would be covered with decomposed granite and scattered boulders. A certified arborist would trim the existing bald cypress to provide a safe environment and more natural light for plantings. “Moon” lighting would be installed on the trunk and branches of existing bald cypress trees to provide lighting for park patrons after sunset.

The existing Blue Star Hike and Bike Trail, which is adjacent to the Blue Star Complex, would be improved and updated. The existing East Bank Trail, which runs along the eastern bank of the river from South Alamo Street to Constance-Crofton Park, would be reconstructed. From Constance-Crofton Park to the existing stone check dam, the existing trail would be moved to the edge of the river. The relocated trail would be five feet wide with a three-foot wide grasscrete maintenance strip. Grasscrete is a porous type of cement in which grass can be planted to provide a vegetated but structurally strong surface. The existing stone retaining wall would remain in place. The existing segment of the trail extending from the existing stone check dam to approximately 450 linear feet north would remain in place, but a four-foot decomposed granite maintenance strip with a stone boulder wall arranged in saw tooth pattern would be added. The remainder of the existing East Bank Trail to the plunge pool overlook would be removed and replaced with a five-foot wide concrete walk and a three-foot wide grasscrete maintenance strip. Two sets of concrete stairs would be inserted in the existing stone retaining wall to provide access to the river from the neighborhood. Areas commonly frequented by park users to access the river would be planted in native short grasses. Compared to mid and tall grasses, these shorter, often sod-building species are much more resistant to heavy use and would maintain vegetative cover and decrease erosion in those areas.

At Constance-Crofton Plaza, the existing concrete retaining wall would be amended with stone veneer capped with natural stone. A stacked natural boulder retaining wall would be placed in front of the existing sheet piling wall. The area would be landscaped with native plants. The existing rip rap drainage area would be reconstructed to feature bio-ponds landscaped with native wetland plants. A conceptual drawing of one of these bio-ponds is depicted in Figure 5 to the right.



Figure 5. Conceptual drawing of the bio-pond at the Constance-Crofton Plaza outfall.

The Art Walk, located on the west bank of the San Antonio River from the southern end of the Blue Star Complex to the Big Tex Picnic Area, would incorporate arched, cantilevered metal shade structure art portals. A conceptual drawing of this Art Walk is provided in Figure 6 below. Cut stone seating would be installed at each art portal, and low stone retaining walls would be constructed, where required, for slope support. Adjacent to the art walk, an existing soil cement trail would be removed and relocated with a new soil cement trail. Natural stone steps would be added to provide improved access to the



Figure 6. Conceptual drawing of the Art Walk located on the west side of the San Antonio River.

existing stone check dam. Minor regrading and native plantings would improve storm water infiltration and to minimize sheet flow over the river bank.

A secondary five-foot wide concrete trail would be constructed to provide access to seating and picnic areas in the Big Tex Picnic Area at the southern end of the Art Walk. The site would feature ornamental metal benches and ADA accessible metal picnic tables and would be landscaped with decomposed granite, native stone boulders, and drought resistant native plants.

Freestanding stone walls would also be constructed. The stone walls and picnic tables would be placed outside of the 100-year floodplain and would be adequately secured. Two historic metal dam structures would be removed from the South Alamo Street dam and reused in the picnic area pavilion.

A secondary four-foot wide concrete walk with cut stone benches, decomposed granite, and native boulders would be constructed at the overlook adjacent to the Big Tex Grain Site. Additionally, the Eagleland Hike and Bike Trail, which runs along the west bank of the river from Eagleland Plaza to Lone Star Blvd., would be randomly landscaped with drought resistant native plants.

Two types of modifications to the existing drainage outfalls are proposed for this project. The first modification would add a drop manhole with stone veneer at the existing outfall. Riprap would be removed and a new drainage pipe would be installed underground from the drop manhole to the river. The second modification would remove any riprap or concrete associated with the drainage outfall. Cut natural stone check dams (12 to 18 inches in height)



Figure 7. Conceptual drawing of a typical reconstructed concrete outfall under the Proposed Action.

landscaped with native plants would be incorporated to slow the direct flow of water into the river and provide improved filtration of stormwater. New riprap with a natural stone boulder border would be

constructed to armor slopes to resist damage from flood flow and safely channel drainage to the river. A conceptual drawing of an outfall is depicted in Figure 7 above.

2.2 – Alternative Action 1

Under Alternative Action 1, most components of the Proposed Action would still be implemented. Alternative Action 1, however, proposes to construct a new pedestrian bridge to be used to cross the San Antonio River at South Alamo Street. In addition, a raised “tree house”-like area would be built within the existing cypress tree providing a gathering space for viewing of the river. This area would consist of small canopies built on a large wooden platform raised on stilts to the level of South Alamo Street. A conceptual drawing of this tree house is shown to the above in Figure 8.



Figure 8. Conceptual drawing of the “tree house” design under Alternative Action 1.

Alternative Action 1 would also construct a stone footpath to facilitate crossing from the East Bank Trail to the West Bank Trail. This footpath would replace an existing low-head weir and would consist of a 2-foot high compacted stone base covered by a concrete structure with 11 protruding stepping stone pedestals. On top of each pedestal would be a cut stepping stone. Additionally, there would be a concrete weir that would extend to both sides of the bank at the same height as the concrete pedestals.

2.3 – No-Action Alternative

Under the No-Action alternative, the current design and functionality at the existing Eagleland stretch of the San Antonio River would be maintained in its existing condition. Storm water would continue to flow freely into the San Antonio River from the existing outfalls without any opportunity to be captured and bio-filtered. The existing trail would be maintained in its current condition and would not be ADA-accessible or provide a connection between the River Walk and the Mission Reach of the San Antonio River.

2.4 – Comparison of the Actions

Table 1 below provides a list of the major components included in each of the actions being analyzed by this EA.

Table 1. Construction components included with each alternative.

	Proposed Action	Alternative Action 1	No-Action Alternative
Concrete paved area at plunge pool (north end of project area)	X	X	
Widen South Alamo Street	X	X	
Relocate and repair stormwater inlets	X	X	
Relocate bus stop	X	X	
Landscape most of the park area with native plants	X	X	
Install “moon lighting”	X	X	
Generally improve outfalls to minimize erosion and maximize native plant community development	X	X	
“Tree house” built at plunge pool overlook		X	
New handrail installed at existing Blue Star Hike and Bike Trail	X	X	
Reconstruction of East Bank Trail	X	X	
Replace existing low-head weir with stone footpath		X	
Construction of bio-ponds at Constance-Crofton Plaza	X	X	
Construction of Art Walk	X	X	
Move metal dam structures to Art Walk picnic area	X	X	
Construction Big Tex Picnic Area	X	X	
Construction of Big Tex Overlook	X	X	
Drainage Reconstruction	X	X	
Construct pedestrian bridge to cross the river at South Alamo Street		X	

3.0– AFFECTED ENVIRONMENT

Based on the nature of the activities that would occur under the proposed action and alternatives, it has been determined that the following resources could be impacted by this project:

- Land use
- Noise
- Air quality
- Water resources
- Floodplains
- Safety
- Visual aesthetics
- Recreation
- Hazardous Materials
- Biological resources
- Cultural resources
- Geology
- Soils
- Socioeconomics

Each of these aspects of the potentially affected environment are described in detail in the sections that follow. Table 2 below shows all natural and anthropogenic resources considered for analysis by this EA. An explanation of why certain resources were excluded from this EA is also provided.

Table 2. Resources considered for this Environmental Assessment.

Resource	Included?	Reason Not Included
Geology	Yes	
Climate	No	Climate is not expected to be affected by the actions included with this project.
Land Use	Yes	
Noise	Yes	
Safety	Yes	
Recreation	Yes	
Soils	Yes	
Vegetation	Yes	
Wildlife	Yes	
Air Quality	Yes	
Endangered and Threatened Species	Yes	
Visual Aesthetics	Yes	
Cultural Resources	Yes	
Geology	Yes	
Prime Farmland	No	No prime farmland is found on the project area.
Wild and Scenic Rivers	No	No wild or scenic rivers are found within the proposed project area.
Surface Water	Yes	
Groundwater	Yes	
Wetlands and Waters of the U.S.	Yes	
Floodplains	Yes	
Hazardous Materials	Yes	
Socioeconomics	Yes	
Environmental Justice	Yes	

3.1 – Land Use

The Eagleland Reach is currently used as urban parkland with gravel and concrete pedestrian footpaths. Through the San Antonio River Floodway project, this area has been designed for local flood control via outfall structures to convey storm water from adjacent neighborhoods and streets to the San Antonio River. Additionally, the land is currently being protected and maintained in order to restore the original ecosystem along the San Antonio River by the Eagleland Ecosystem Restoration project. Adjacent to this stretch of the San Antonio River are both commercial and residential properties, as well as Brackenridge High School.

Directly adjacent to the west of the northern portion of the project area is the Blue Star Arts Complex. This mixed-use commercial/residential complex houses many art studios used for photography, sculpting, painting and other artistic professions. Interspersed with these studios are loft-style apartments and commercial businesses.



Figure 9. Blue Star Brewing Company, located within the Blue Star Arts Complex.

Big Tex Grain Site is adjacent to the project area on the west side toward the middle of the project area. This is an abandoned industrial site that was used for grain production and vermiculite exfoliation. South of this site is the Lone Star Brewery, which has been vacant since 1996.

To the east of the proposed project area and at the northern terminus is a commercial building called Insko Distributing, which is a wholesale distributor of heating, ventilation, and air conditioning (HVAC) equipment, parts, and supplies. South of Insko Distributing and adjacent to the project site is an upper income residential area known as the King William Historic District. On the southern end of this District, east of the proposed project area, is Brackenridge High School. To the south of the project area is Roosevelt Park, a public parkland with a swimming pool, playground, and other various recreational amenities. The land use adjacent to the proposed project area is depicted in Figure 10 below.

The proposed project is located within the San Antonio River Watershed. According to TPWD's map, *Natural Sub-regions of Texas*, the project area lies within the sub-region known as the Blackland Prairie. According to the TPWD's map, *The Vegetation Types of Texas* (McMahan et al, 1984), the project area lies within an area classified as Urban, which includes areas that are highly developed, with landscaped vegetation and features.

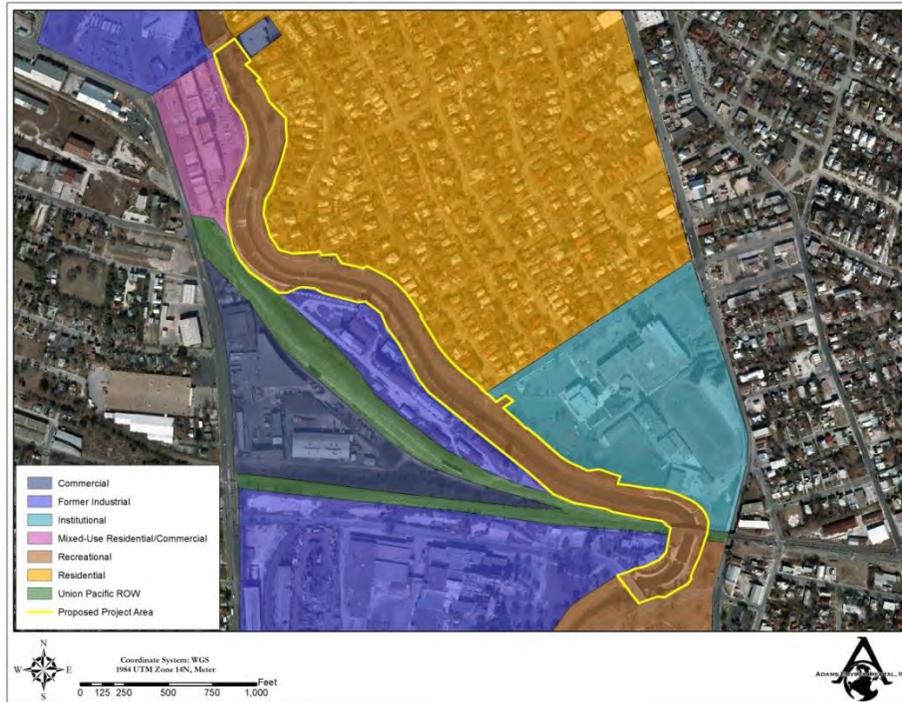


Figure 10. Land-use on and adjacent to the proposed project area. (Source: Site reconnaissance)

3.2 – Noise

The City of San Antonio Municipal Code, Article III, Chapter 21, states that any noise exceeding 63 decibels in a residential area is considered a nuisance. In business-zoned areas, the tolerance is increased to 70 decibels, and in industrial-zoned areas it is increased to 72 decibels. During the site reconnaissance, no sensitive noise receptors such as hospitals and churches were observed. Noise is currently not a significant problem within the proposed project area.

During the field reconnaissance, it was noted that most noise emanates from two major sources. Trains using the railroad track adjacent to and crossing over the proposed project area on the southern end are one significant source of noise. The river itself is a source of noise as it flows over the flood gates underneath South Alamo Street and over the currently existing low-head weir. Periodic noise also results from landscape maintenance equipment. A minor source of noise on the project site is pedestrians and park users.



Figure 11. Train using the railroad tracks on the Union-Pacific Railroad, which creates a large amount of noise in the proposed project area.

The Blue Star Brewery, located in the Blue Star Arts Complex, occasionally allows live music to be played on the deck outside of their facility, contributing to the noise levels on an irregular basis. Any other noise on the proposed project area comes from traffic on South Alamo Street, including the public transit system that stops near the entrance to the Blue Star Arts Complex.

3.3 – Air Quality

The Clean Air Act (CAA), Title 40 CFR Parts 50 and 51, dictates that the National Ambient Air Quality Standards (NAAQS), established by the EPA, must be maintained nationwide. The NAAQS were established to protect the public health and welfare with an adequate margin of safety. The NAAQS include standards for six “criteria” pollutants: ozone (O₃), nitrogen dioxide (NO₂), carbon monoxide (CO), “respirable” particulates (particulate matter less than 10 microns in diameter [PM₁₀]), sulfur dioxide (SO₂), and lead (Pb). These standards include short-term standards (1-hour, 8-hour, or 24-hour periods) for pollutants with health effects.

The proposed project area is located in Bexar County, Texas, which has been classified as an ozone early action compact attainment area under the federal 8-hour ozone national ambient air quality standards; therefore, it is not subject to the stringent rules associated with non-attainment. The site currently has no sources of air emissions in place, with the exception of periodic use of combustion engines for landscape management and minor repair activities. Minor releases of sulfur dioxide and hydrogen sulfide may occur in stagnant water along the river due to normal biological activity. Traffic and passing trains contribute an insignificant amount of air pollution. Also, no major stationary, point sources of air emissions are located in adjacent properties.

3.4 – Water Resources

Surface Water

Section 303(d) of the Clean Water Acts requires all states to identify and monitor impaired bodies of water within the state’s boundaries. This portion of the San Antonio River is included on this list due to an impaired fish community. The segment, designated as 1911_09, was first listed in 2006 and is classified as 5c, meaning additional information must be collected before a total daily maximum load is scheduled.

The water in the Eagleland Reach is usually clear, except during and shortly after storm events, when storm water is discharged into the river. The only stagnation observed on this segment is at the bend of the river, right before it flows under the Union Pacific railroad track. Here the water becomes slightly stagnant along the banks, encouraging the establishment of small populations of algae. Accumulation of litter and other trash in this segment of the river is minimal. The only potential sources of pollution are the storm water outfalls, which convey typical urban pollutants, such as sulfates, nitrates, oils, and suspended solids from streets, structures, and landscaped areas into the river. During observations, no water was flowing from these outfalls, which are depicted on an aerial map in Figure 13. The overall condition of the river at this point would be considered fair based on the pollutant load originating from upstream sources. As part of previous USACE projects, natural elements such as riffle-pool complexes were constructed in the Eagleland Reach to improve water quality and provide habitat for aquatic wildlife. An example of one of these complexes can be observed in the middle segment of this segment of the river, beginning near the site of the future Big Tex Overlook.

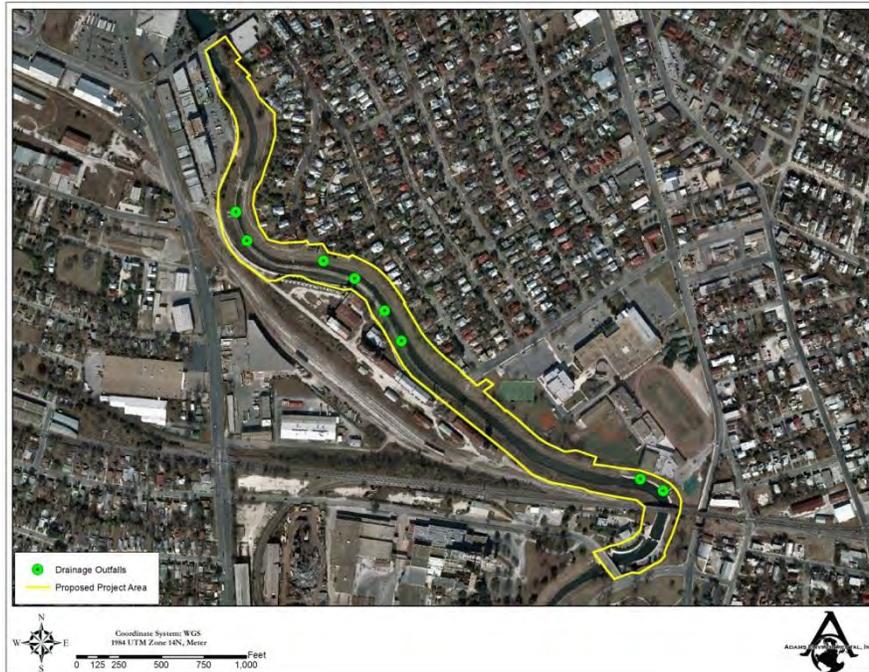


Figure 12. Drainage outfall locations depicted on a 2009 aerial photograph. (Source: Site reconnaissance)

Ground Water

The proposed project area is partially located over the Edwards Aquifer, but the majority of the area is located over the Trinity Aquifer. This aquifer is a hydrologically connected aquifer system extending from the Red River in North Texas southward into Bexar County and provides water to all or parts of 20 counties. The Trinity Aquifer is predominantly composed of sands, silts, conglomerates, and limestones. Aquifer thickness in the artesian portion ranges from less than 80 feet to more than 500 feet. The Edwards Aquifer extends from Bracketville, TX east-northeast to Austin, TX. This aquifer is 300-700 feet thick and is composed of porous, water-bearing, honey-combed limestone. The project area does not lie on the recharge or contributing zones of either aquifer. An aquifer map is depicted in Figure 14. A map depicting the proposed project area overlain on the *Geologic Atlas of Texas* is provided in Figure 15.

A shallow groundwater table is typically found in this area and feeds into the San Antonio River. Generally, the level of the San Antonio River is indicative of the level of the groundwater in the area. Additionally, the alluvial materials lying under the project site filter much of the storm water to this water table. The shallow groundwater table is underlain by impermeable materials, preventing leaching of pollutants into drinking water aquifers. No current sources of pollution are found on the project site.

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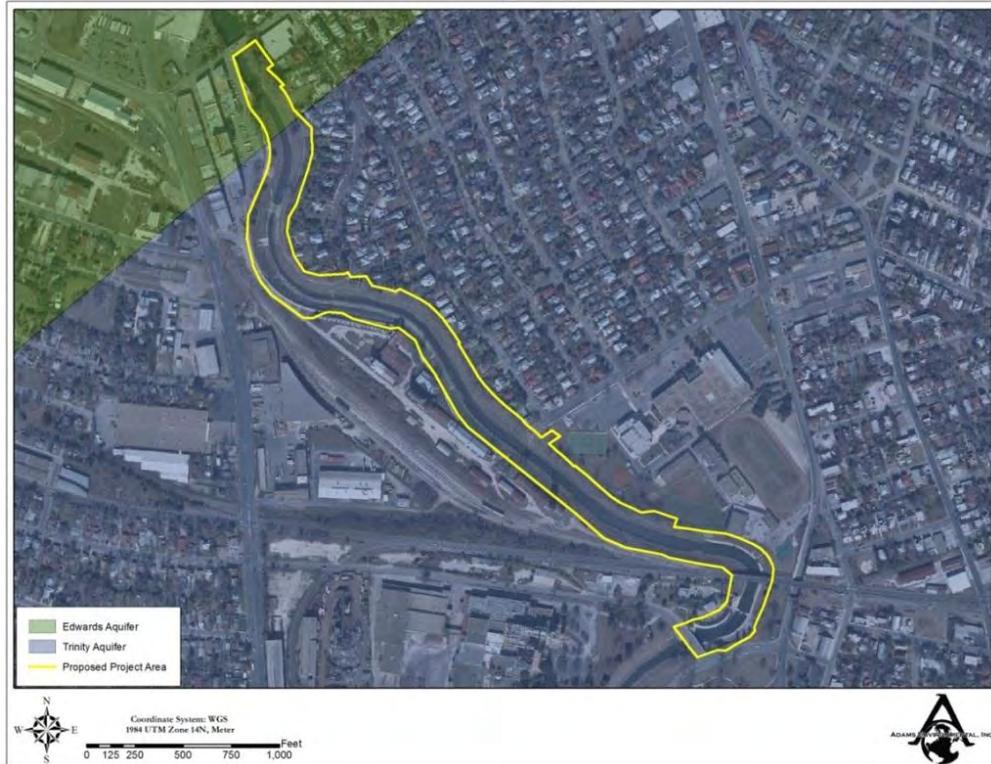


Figure 13. Aquifers underlying the proposed project area. (Source: Major Aquifers of Texas, TNRIS)

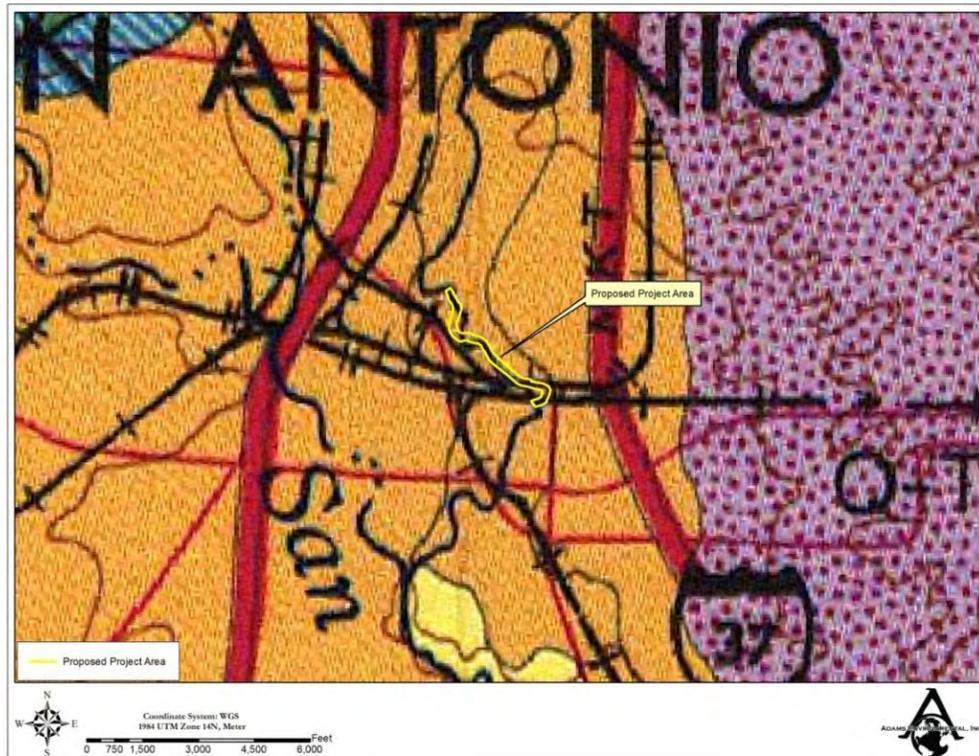


Figure 14. The proposed project area on the *Geologic Atlas of Texas*. The project area is underlain by Fluvialite terrace deposits (Qt).

Wetlands and Waters of the U.S.

The San Antonio River is designated as a jurisdictional water by the USACE. With the exception of fringe wetlands located along the banks of the San Antonio River, no wetlands are found within the boundaries of the proposed project area.



Figure 15. Location of Waters of the U.S. and wetland fringe. (Source: City of San Antonio GIS Department, 2009)

3.5 - Floodplains

The proposed project area lies almost entirely within the 100-year floodplain of the San Antonio River. A floodplain map is depicted in Figure 16 below.



Figure 16. The Eagleland project area with respect to the 100- and 500-year floodplains. (Source: FEMA Q3 Floodplain data)

3.6 – Safety

Current conditions at the project site, including the presence of an existing hike and bike trail, have provided access to the river in a safer, more structured manner than previously available. Additionally, the existing trail has created greater opportunity for law enforcement to access and patrol. A goal of the proposed project is to continue to upgrade safety conditions along the trail. This work would include reducing the steepness of the slope at the entrance to the trail from the Blue Star Arts Complex and increasing access conditions for emergency vehicles. A picture of the entrance slope can be seen below in Figure 16. An example of the existing trail is shown below in Figure 17.



Figure 17. Slope down to the trail from the Blue Star Arts Complex.



Figure 18. Existing trail on the east bank of the river.

3.7 – Visual Aesthetics

Currently, the proposed project area is only periodically maintained, and the vegetative community consists of naturally propagating invasive species and native seeding efforts along the river banks and side slopes. Invasive species are eradicated as much as possible; however, some invasive species are still thriving, such as johnsongrass, giant ragweed, bermudagrass, and elephant ear, as seen in Figure 18 below. Figure 19 below shows that several invasive species have encroached into the proposed project area and are establishing significant, dense populations. As part of the ongoing USACE restoration project, a document is currently in place to guide the maintenance of the Eagleland Reach. This document was prepared by Neiman Environments, Inc, in the fall of 2009 and is a living document that may or may not adapt as new data or technologies present themselves.

The area surrounding the Eagleland Reach is predominantly commercial and industrial. The historic King Williams district is located nearby and adds a historic component to the visual aesthetics of the area. At the present time, the project area is not contributing to the historic or current vernacular of the landscape.

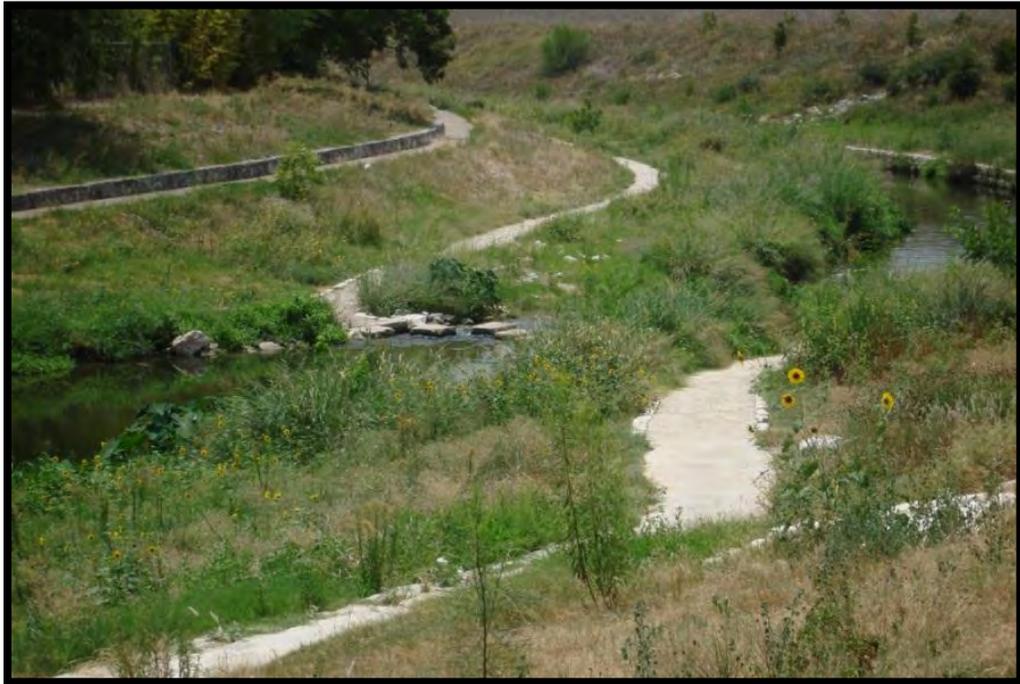


Figure 19. Unmaintained vegetation located in the proposed project area.



Figure 20. Invasive species growing along the bank of the river.

3.8 – Recreation

Currently the site has footpaths that can be used for hiking, jogging, sightseeing, birdwatching, and observation of other wildlife along the banks of the San Antonio River.

3.9 - Hazardous Materials

A field reconnaissance was conducted to identify on-site or adjacent property sources of hazardous wastes or items of special environmental concern. Additionally, GeoSearch, a regulatory database provider, was contracted to identify any known environmental concerns on or adjacent to the proposed project site. These evaluations did not include sub-grade investigations of the project site.

During the field reconnaissance, no stressed or dead vegetation (not related to drought conditions), chemical odors, staining, or other chemical, physical and biological indicators were observed, indicating that the site was not being significantly affected by unseen sources of hazardous materials.

Based on a reconnaissance of the site and evaluation of the regulatory database, no environmental concerns such as underground or aboveground storage tanks (USTs/ASTs), leaking petroleum storage tanks (LPST), Resource Conservation and Recovery Act (RCRA) (federal) or industrial hazardous waste (IHW) (state) hazardous waste generators/storage/spills, landfills, or other environmental concerns were identified on the project site. Additionally, based on a review of the regulatory database, no state or federal environmental “superfund” sites or voluntary clean-up (VCP) sites were identified at the project site.



Figure 21. Abandoned Big Tex Grain Site facility.

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A review of regulatory database information indicated that four adjacent properties, depicted in Figure 21 below, have historically engaged in regulated practices. These properties include:

- Big Tex Grain Company, Inc./WR Grace & Company Construction Products (354 Blue Star Street; 401 Blue Star Street) - This facility is listed as a PST site, industrial hazardous waste generator, Voluntary Cleanup Program facility, and is listed in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS).

The facility formerly supported one 4,000-gallon diesel fuel UST, which was installed in 1968 and removed from the ground in August of 1995. A second 4,000-gallon gasoline tank was installed in January of 1985 and removed from the ground in August 1995. Neither of the tanks was reported as a LPST.

The facility was also enrolled in the Texas VCP in June of 2007. Little information is available in the database; however, the constituents of concern include asbestos, semi-volatile organic compounds (SVOCs), and pesticides. A previous EA prepared for the Eagleland project site (found in Appendix E) documented a portion of the findings of a subsurface investigation performed in 2002. Although no constituents were identified for portions of the initial project slated for excavation, elevated levels of the pesticides Chlordane and Heptachlor were detected along the southern portion of the west bank. Both of these compounds were used at relatively high application rates for control of termites in buildings and other structures in the past. More than likely, the materials were used for termite control in the past for the facility. No pertinent information regarding the facility's CERCLIS status was discussed in the regulatory database.

The Big Tex Grain facility was subject to an asbestos abatement project as documented on the EPA On-Scene Coordinator (OSC) website:

(http://www.epaosc.org/site/site_profile.aspx?site_id=3784)

The following information was available on the website:

ERRS completed transportation and disposal of the impacted soils. Approximately 1925 tons of soil and debris was disposed of at the Allied Waste-Tessman Road Landfill located in San Antonio, Texas.

ERRS completed restoration operations within excavated grids, approximately 2240 cubic yards of clean soil was delivered and spread into excavation areas. Material was tamped down to the original grade.

ERRS crews completed the decontamination of the two site building previously identified to be impacted. START conducted AHERA indoor clearance sampling of the decontaminated building. START utilized the on-site microscopist to ensure that the sample filter media was not overloaded and was in good shape to ship to LabCor, Portland for analysis.

On 01/19/2009, the EPA received the results of the AHERA indoor clearance sampling. The two previously identified buildings (21 and 23) that contained unacceptable levels of amphibole asbestos were successfully decontaminated and the results were well below the AHERA action level of 70 structures per cubic centimeter. These building are now deemed clean and are ready for reuse.

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During all site operations, continuous on site and off site air monitoring was conducted. Constant dust suppression operations have shown to be effective, and no site operations have generated dust levels that have exceeded site action levels

- WR Grace & Company was identified in the regulatory database as an IHW facility; however, no details were provided on the type or amounts of waste generated. The facility was not reported as an IWH storage, transfer, or treatment location. The facility is currently inactive.
- Star Seed & Grain (357 Blue Star Street) - This facility was reported as a PST site. The facility was identified as formerly supporting one 5,000-gallon gasoline storage tank. There appears to be errors in the installation (June 1986) and removal (July 1986) dates; however, the facility's status indicates that the tank has been removed from the ground.
- Brackenridge High School (400 Eagleland Drive) - This facility was reported as a TIER II Chemical Reporting (TIER II) facility as well as the subject of an Affected Property Assessment Report (APAR). TIER II facilities are required to provide the types, amounts, and locations of hazardous chemicals at their locations to local first responders so that they would be aware of any potential hazards if responding to an emergency. Being identified as a TIER II facility does not mean that a property has a documented history of environmental releases or spills. Brackenridge High School was registered as a TIER II facility due to a large amount of sulfuric acid stored in its on-site chiller room/tower area.

This facility was also identified as having an APAR prepared in November of 2008. The APAR was prepared in response to an IHW corrective action, and the status is listed as on-going.



Figure 22. Location of properties adjacent to the project area that have historically engaged in regulated practices.
(Source: GeoSearch Radius Report, 2011)

3.10 – Biological Resources

Vegetation

According to TPWD's map, *Natural Sub-regions of Texas*, the project area lies within the sub-region known as Blackland Prairie, which is located in the Blackland Prairies ecoregion. This ecoregion is characterized by a high degree of plant community diversity, due to its variety of different soils. The natural vegetation of this region is usually dominated by tallgrass prairies on its uplands and woodlands and forests on its bottomlands. The TPWD's map, *The Vegetation Types of Texas* (McMahan et al, 1984) indicates that the project area lies within the vegetation type designated as Urban. No typical plants are associated with this vegetation type, as it is highly developed and usually consists of maintained vegetation. Figure 22 shows the location of the project area in relation to the *Vegetation Types of Texas*.

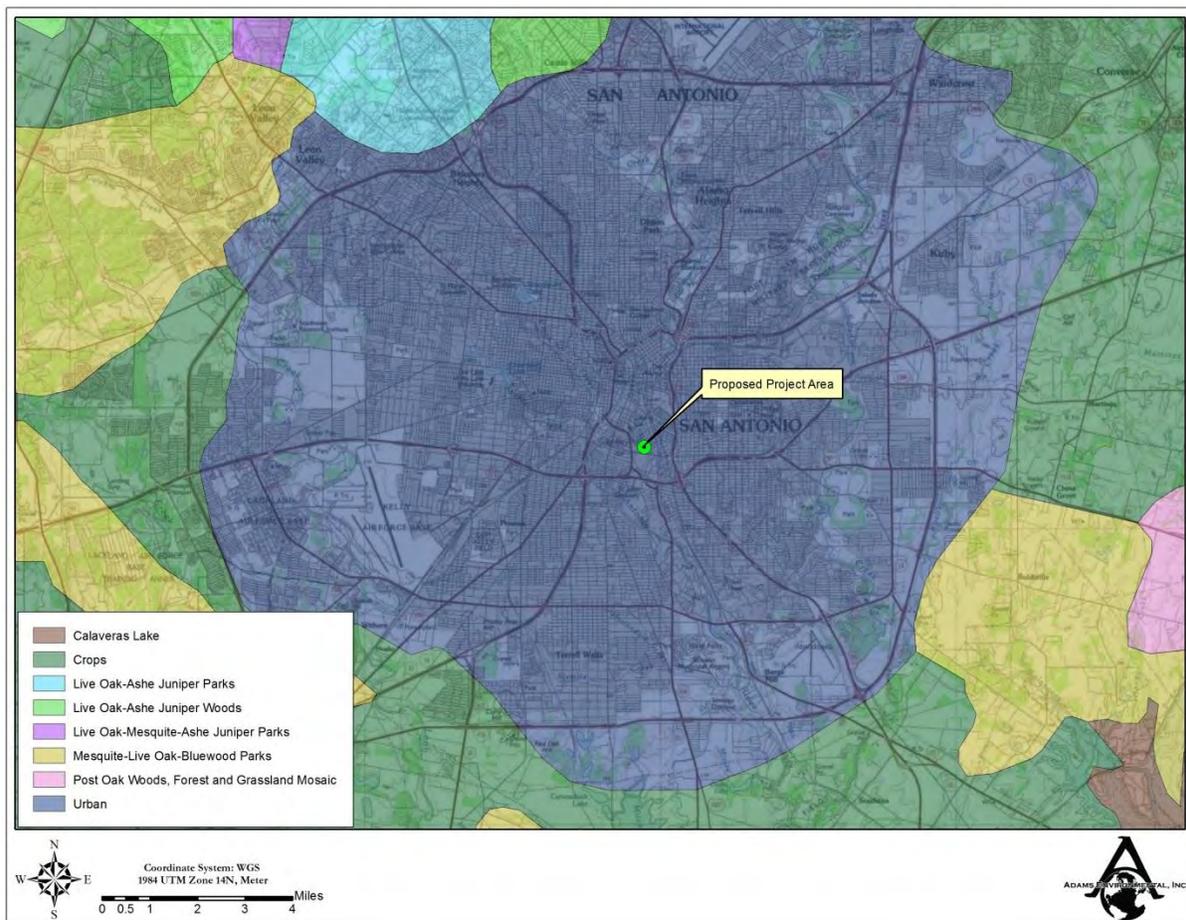


Figure 23. The proposed project area in relation to *The Vegetation Types of Texas*.

A field reconnaissance of the project site revealed the presence of three general vegetative communities, which can be seen on an aerial photograph in Figure 24 below:

- Herbaceous riverbank community,
- Herbaceous slope community
- Woody canopy community.

The herbaceous riverbank community consists of a fringe wetland dominated by hydrophytic vegetation extending from the edge of the San Antonio River to a distance of three to five feet from the river bank. This plant community is comprised of numerous herbaceous plants and a few woody species, which have been both naturally established and planted as part of the ongoing USACE restoration project. Dominant herbaceous species include switchgrass (*Panicum virgatum*), seedbox (*Ludwigia sp.*), smartweed (*Polygonum sp.*), and elephant ear (*Colocasia esculenta*). Overall, woody species comprise less than 5% of the riverbank community and consist primarily of pecan (*Carya illinoensis*), American sycamore (*Platanus occidentalis*), bald cypress (*Taxodium distichum*), and black willow (*Salix nigra*).

The herbaceous slope community is located on the engineered side slopes of the river channel and extends to the tree line at the top of each slope. This is a highly diverse plant community, consisting predominantly of herbaceous plants interspersed with planted woody species. Dominant vegetation in this plant community includes bermudagrass (*Cynodon dactylon*), annual sunflower (*Helianthus annuus*), and silver bluestem (*Bothriochloa saccharoides*). Other common species observed in the herbaceous community were dayflower (*Commelina erecta*), prairie coneflower (*Ratibida columnaris*), false ragweed (*Parthenium hysterophorus*), sideoats grama (*Bouteloua curtipendula*), indiagrass (*Sorghastrum nutans*), and maxamillian sunflower (*Helianthus maxamilliani*). Woody species observed in this community include American sycamore and pecan.

The woody canopy community consists of mature woody species at the top of the river channel and adjacent to surrounding properties. Trees in this community are mature and well-established. Understory herbaceous vegetation is less dense and diverse than that observed in the other plant communities, though patches of herbaceous vegetation consistent with the slope community have established within canopy breaks. Dominant trees in this plant community include bald cypress, pecan, sugar-hackberry (*Celtis sp.*), American sycamore, and American elm (*Ulmus americana*). Woody vines observed in the community include Virginia creeper (*Parthenocissus quinquefolia*), poison ivy (*Toxicodendron radicans*), and grape (*Vitis sp.*). Understory herbaceous dominants in this plant community include dayflower, Turk's cap (*Malvastrum arboreum var. Drummondii*), peppervine (*Ampelopsis arborea*), and straggler daisy (*Calyptocarpus vialis*).

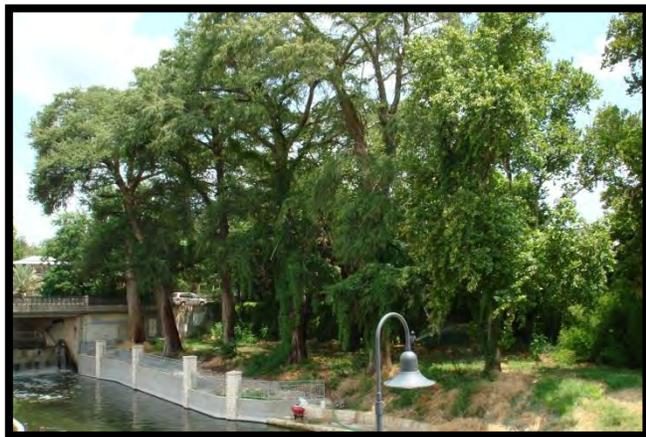


Figure 24. Grove of cypress trees located near the plunge pool at the north end of the proposed project area.

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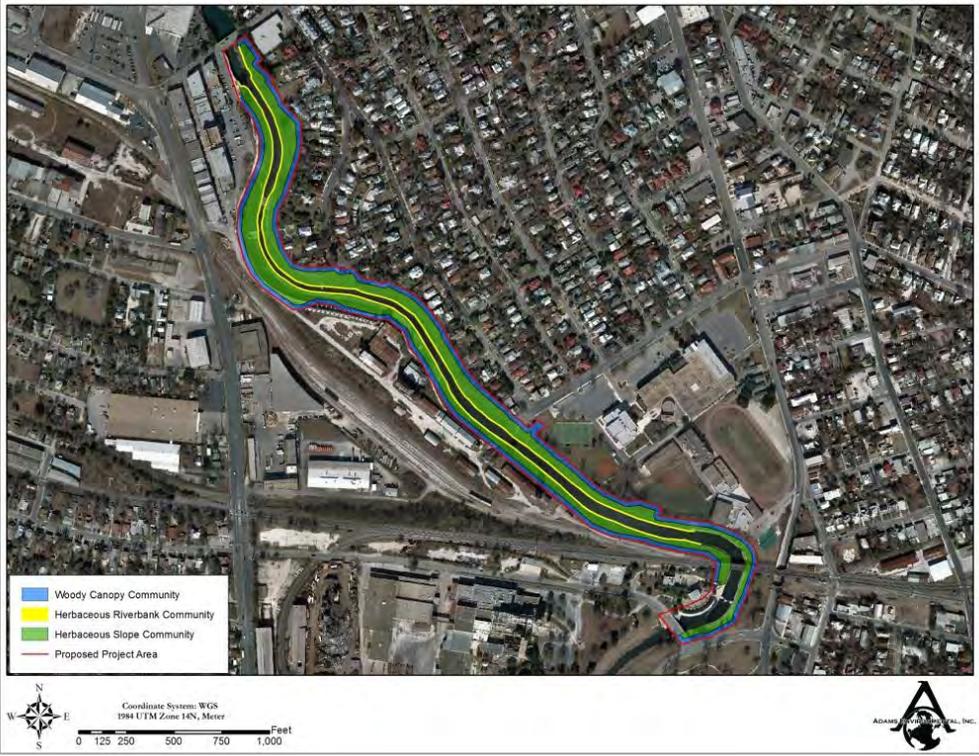


Figure 25. Typical locations of three different vegetation communities located within the proposed project area. (Source: Site reconnaissance)

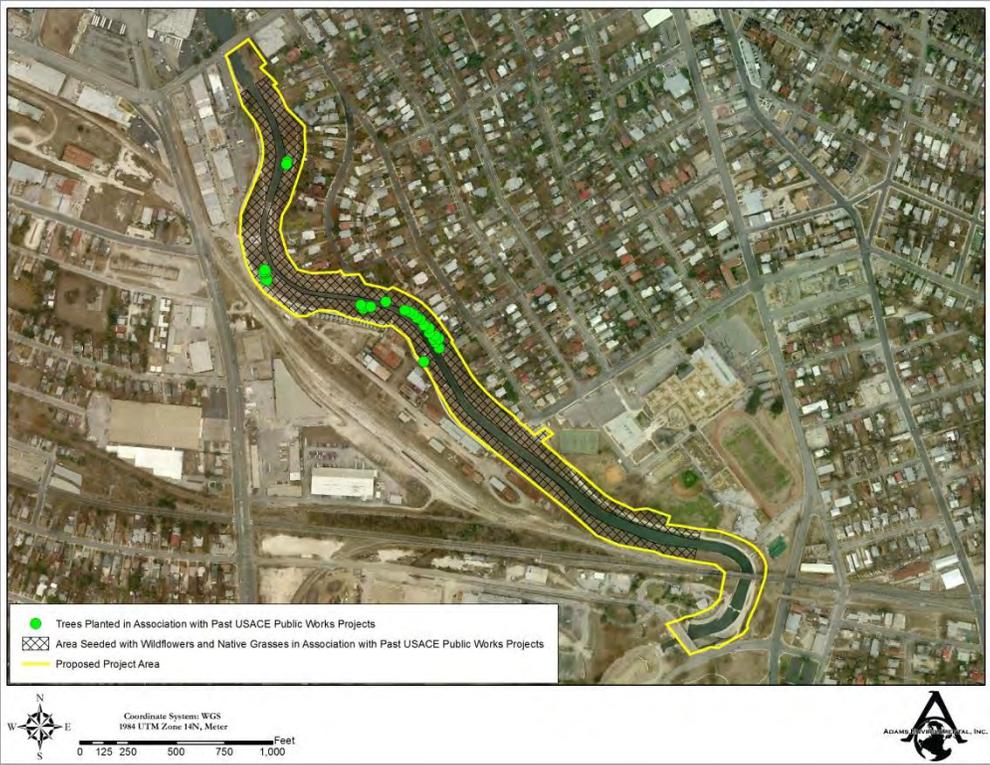


Figure 26. Previous plantings associated with past USACE Public Works projects.

According to the *Soil Survey of Bexar County*, the project site is located on the Loamy Bottomland Range Site. Typical climax species of vegetation include switchgrass, big bluestem, indiangrass, little bluestem, four-flower trichloris, plains lovegrass, southwestern bristle-grass, vinemesquite, and big cenchrus. These species would be expected on areas that are relatively undisturbed. Species that typically increase on this range site when grazing or other impacts are removed include silver bluestem, sideoats grama, Texas wintergrass, plains bristlegrass, and Arizona cottontop. Plant species indicating that the site is disturbed include buffalograss, curly mesquite, white tridens, fall witchgrass, hooded windmillgrass, Hall's panicum, perennial three-awn, whorled dropseed, red grama, bermudagrass, mesquite, huisache, retama, spiny hackberry, and condalia. Although the site is currently maintained to some degree, the presence of switchgrass and Indiangrass indicate that the site is somewhat undisturbed in places. Additionally, the presence of sideoats grama indicates that the site may be recovering from past soil disturbances. Overall, the vegetative community would be considered healthy and improving.

Wildlife

Typical wildlife species expected to utilize the site include those species adapted to urban floodplains. These species may include, but are not limited to, white-winged dove (*Zenaida asiatica*), mourning dove (*Zenaida macroura*), house sparrow (*Passer domesticus*), barn swallow (*Hirundo rustica*), great-tailed grackle (*Quiscalus mexicanus*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), little blue heron (*Egretta caerulea*), yellow-crowned night heron (*Nyctanassa violacea*), mallard (*Anas platyrhynchos*), black vulture (*Coragyps atratus*), double-crested cormorant (*Phalacrocorax auritus*), northern mockingbird (*Mimus polyglottos*), whiptail lizard (*Cnemidophorus sp.*), spiny soft-shelled turtle (*Apalone spinifera*), striped skunk (*Mephitis mephitis*), eastern fox squirrel (*Sciurus niger*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), eastern cottontail (*Sylvilagus floridanus*), and various fish species.

Endangered and Threatened Species

Most of the habitat on the project area is heavily impacted by urban development and not conducive to supporting populations of endangered, threatened or special status species. Thus, the potential for any of these species to be present is very low. A review of the endangered and threatened species from USFWS and TPWD showed that Golden Orb (*Quadrula aurea*) was the only endangered or threatened species with potential habitat in the project area. The Golden Orb's suitable habitat consists of sand and gravel in some locations and mud at others. It is intolerant of impoundment in most instances and is found within the Guadalupe, San Antonio, and Nueces River basins. This species is threatened in the state of Texas. A search of the National Diversity Database was performed on July 26, 2011 that found no special status species within the proposed project area.

3.11 – Cultural Resources

Section 106 of the National Historic Preservation Act of 1966 requires that Federal agencies take into account the effects of their undertakings on historic properties. A previous EA was completed in 2002 that included the proposed project area, and a Finding of No Significant Impact was issued. This EA stated that a "USACE archaeologist conducted a visual reconnaissance of the area and identified no historic structures within the proposed project area." Since then, efforts to identify and evaluate cultural and archaeological resource properties for the proposed project area were described in a letter from Post, Buckley, Schuh & Jernigan, Inc. to The Texas Historical Commission on April 11, 2006. A determination of no historic properties present was submitted to the Texas Historical Commission, in a letter dated June 13, 2008. SHPO concurred with the sufficiency of the inventory and the report of no historic properties present determination. Copies of these letters are attached in Appendix B. USACE

determined that additional cultural and/or archeological resources studies were unnecessary for this EA. Reliance on previous reports and EAs is sufficient to evaluate cultural and archeological resources at the project site.

3.12 – Geology

The proposed project area overlies the geologic outcrop designated as fluvial terrace deposits (Qt). This formation is predominantly gravel, limestone and chert, but may also consist of organic material, gravel, sand, silt, and clay. The formation is alluvial in origin and deposited along the low terraces of the San Antonio River above the flood level. These outcrops do not normally contain sensitive geologic features or recharge structures. Figure 15 in *Section 3.4 – Ground Water* shows the proposed project area on the *Geological Atlas of Texas*.

3.13 – Soils

According to the *Soil Survey of Bexar County, Texas*, the proposed project area overlies soils that are members of the Venus-Frio-Trinity soil association. The Venus-Frio-Trinity association is characterized as deep, calcareous soils on bottom lands and terraces. Venus soils have a friable, grayish-brown, strongly calcareous surface layer that is clay loam or loam in texture and 7 to 20 inches thick. These soils mostly occur as low terraces that are not impacted by flooding. Approximately 45 percent of the association consists of Venus soils. Frio soils, which are occasionally flooded, have a friable, dark grayish-brown to grayish-brown, calcareous surface layer that is clay loam in texture and about 20 inches thick. Frio soils make up about 20 percent of the association. Trinity soils are deep, dark-colored, calcareous, slowly permeable clays that are developing in clayey alluvium. Trinity soils are generally 48 to 60 inches thick. About 15 percent of the Venus-Frio-Trinity soil association consists of Trinity soils. Minor soils that are members of this association include 7 percent Karnes soils, 5 percent Lewisville soils, 3 percent gullied land, and 5 percent Patrick soils.

Figure 25 shows soils mapping units on the project area according to the Natural Resources Conservation Service (NRCS) in the *Soil Survey of Bexar County*. During field observations, soils were largely covered by dense ground vegetation appeared to be mostly Frio clay loams. Positive identification of soils was not possible because the soil profiles were destroyed when the San Antonio River was channelized many years ago.

Frio soils consist of limy alluvial soils that are moderately deep, grayish-brown or dark grayish brown, and nearly level. Frio soils are poorly drained to moderately well drained. The permeability of Frio soils is moderately slow and the available water capacity is good. Generally, these soils are well suited for use as cropland, pastureland, and are moderately suited for most recreational uses. The main limitations of the Frio soils are the hazards to flooding and water erosion. The soil is good for establishment of woody and herbaceous plants adapted to riparian corridors. The local NRCS and the National Technical Committee on Hydric Soils (NTCHS) lists Frio clay loam (Fr) as a hydric soil. Frio soils are listed as containing hydric soil inclusions by the local NRCS and are listed as hydric by the NTCHS.

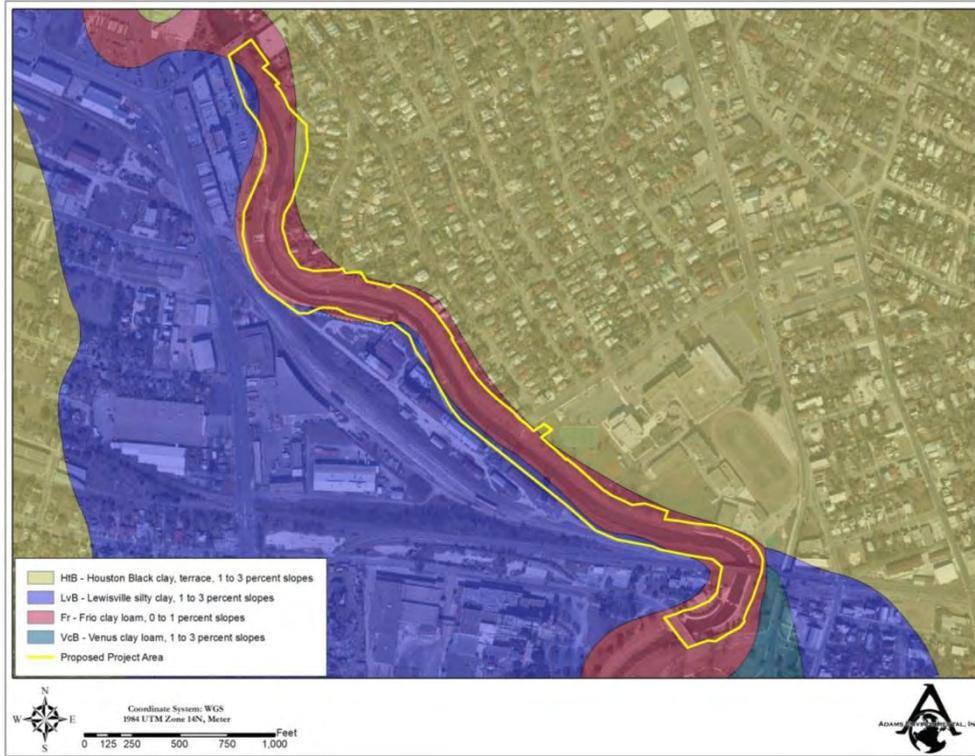


Figure 27. Locations of soil mapping units in relation to the proposed project area. (Source: Bexar County Soil Survey, 1996.)

3.14 – Socioeconomic Conditions

U.S. Census data from Block (B) and Block Groups (BG), within one Census Tracts (CT), was collected to provide a comparative representation of the demographic composition of the project area. Table 4 provides population, race, and ethnicity totals and percentages within the project area. Figure 26 and 27 show the locations of the census tracts, block groups, and blocks.

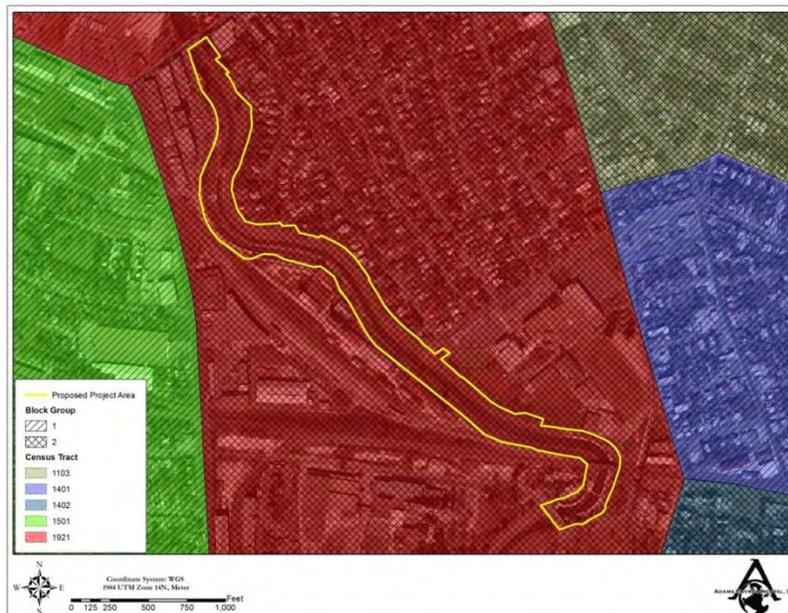


Figure 28. Census tracts and block groups located on or adjacent to the project area. (Source: 2010 Census Data, TNRIS)

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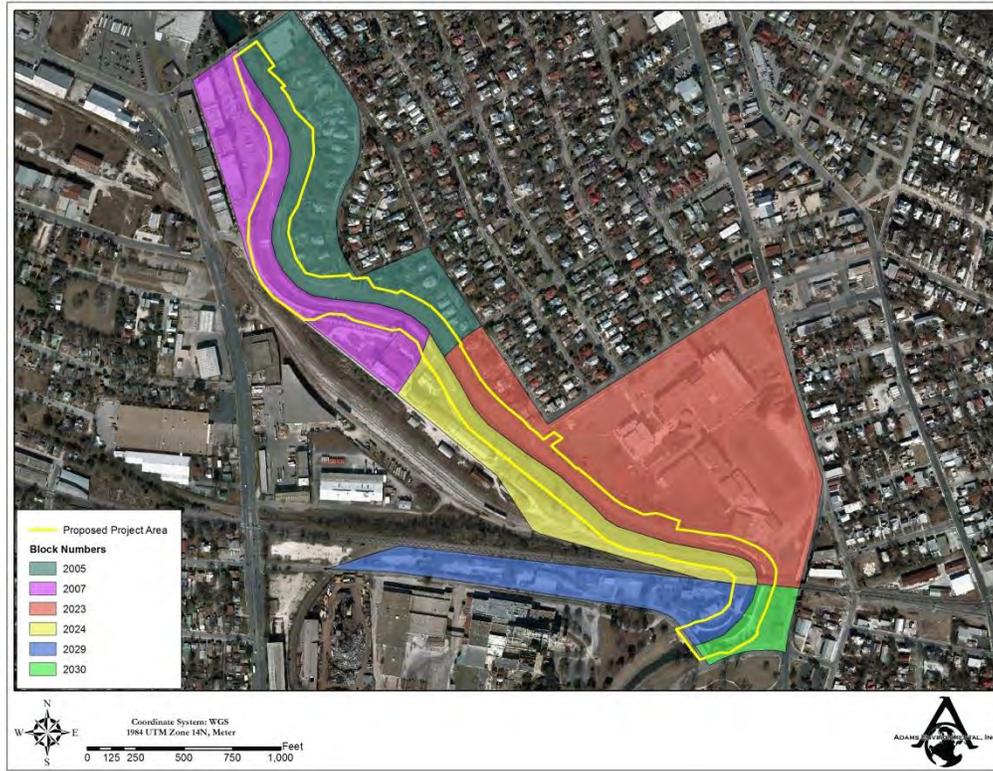


Figure 29. Locations of Blocks located within the proposed project area. (Source: 2010 Census Data, TNRIS)

Table 3. Ethnicity data for the proposed project area.

	Texas	Bexar County	City of San Antonio	Census Tract 1921	Block Group 2	Block 2005	Block 2007	Block 2023	Block 2024	Block 2029	Block 2030
Total Population	25,145,561	1,714,773	1,327,407	2,077	1,127	52	19	15	0	0	0
White Alone	11,397,345 (45.3%)	519,123 (30.3%)	353,106 (26.6%)	852 (41.0%)	419 (37.2%)	23 (44.2%)	17 (89.5%)	7 (46.7%)	0	0	0
Hispanic or Latino	9,460,921 (37.6%)	1,006,958 (58.7%)	838,952 (63.2%)	1,155 (55.6%)	688 (61.0%)	27 (51.9%)	2 (10.5%)	8 (53.3%)	0	0	0
Black or African American alone	2,886,825 (11.5%)	118,460 (6.91%)	83,365 (6.28%)	19 (0.91%)	7 (0.62%)	1 (1.92%)	0 (0%)	0 (0%)	0	0	0
American Indian and Alaska Native alone	80,586 (0.32%)	3,809 (0.22%)	2,771 (0.21%)	3 (0.14%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0	0	0
Asian alone	948,426 (3.77%)	39,561 (2.31%)	30,596 (2.30%)	27 (1.30%)	6 (0.53%)	0 (0%)	0 (0%)	0 (0%)	0	0	0

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Native Hawaiian and Other Pacific Islander alone	17,920 (0.07%)	1,806 (0.11%)	1,097 (0.08%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0	0	0
Some other race alone	33,980 (0.14%)	2,881 (0.17%)	2,105 (0.16%)	5 (0.24%)	2 (0.18%)	0 (0%)	0 (0%)	0 (0%)	0	0	0
Population of two or more races	319,558 (1.27%)	22,175 (1.29%)	15,415 (1.16%)	16 (0.77%)	5 (0.44%)	1 (1.92%)	0 (0%)	0 (0%)	0	0	0
¹ Source: US 2010 Redistricting Data – PL94-171 – P2											

As shown in Table 4, African American, Hispanic, and other minority populations exist within the general vicinity of the project. However, there are no distinct neighborhoods, ethnic groups, or other specific groups directly adjacent to the proposed project area.

Limited English Proficiency

Executive Order 13166, “Improving Access to Services for Persons with Limited English Proficiency,” requires agencies to examine the services they provide, identify any need for services to those with Limited English Proficiency (LEP), and develop and implement a system to provide those services so that LEP persons can have meaningful access to them.

It should be noted that 2010 Census Data was not available for this dataset. The 2005-2009 American Community Survey 5-Year Estimates dataset was used in order to extract this information. Because of this, the geospatial representation of the data was based on the 2000 Census geography, thus placing the proposed project area in Census Tract 1502 for the purposes of this dataset. Table 5 lists the census data and percent of population 5 years and older who speak English “Not Well or “Not at All” in the project area. It can be concluded the project and surrounding area supports a population that is generally higher in the percent of Spanish speakers that have limited English proficiency. Results of a field reconnaissance (windshield survey) indicate that no non-English signs, advertisements, or other posted information are apparent in the proposed project area.

Table 4. Limited English Proficiency (LEP) Populations

	Texas	Bexar County	City of San Antonio	Census Tract 1502
Total	21,826,536	1,452,234	1,209,663	1,186
Spanish Speakers (Speaks English Not Well + Not at All)	2,803,845 (12.85%)	178,875 (12.32%)	163,192 (13.49%)	255 (21.5%)
Languages Other Than Spanish (Speaks English Not Well + Not at All)	363,068 (1.66%)	15,142 (1.04%)	12,546 (1.04%)	6 (0.51%)

¹ Source: 2005-2009 American Community Survey 5-Year Estimates – B16001

² 2010 Census Data not available for this dataset at the time of creation of this CE.

Environmental Justice

Executive Order (EO) 12898 “Federal Actions to Address Environmental Justice in Minority Populations and Low- Income Populations” requires each Federal agency to “make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations.” There are identified three fundamental principles of environmental justice:

1. To avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority populations and low-income populations;
2. To ensure full and fair participation by all potentially affected communities in the transportation decision-making process;
3. To prevent the denial of, reduction in or significant delay in the receipt of benefits by minority populations and low-income populations.

Disproportionately high and adverse human health or environmental effects are defined as adverse effects that:

1. Are predominately borne by a minority population and/or a low-income population or
2. Will be suffered by the minority population and/or low-income population and are appreciably more severe or greater in magnitude than the adverse effects that will be suffered by the non-minority population and/or non-low-income population.

A minority population is defined as a group of people and/or a community experiencing common conditions of exposure or impact that consists of persons classified by the U.S. Bureau of the Census as Black or African-American; Asian; American Indian or Alaska Native; Native Hawaiian or other Pacific Islander; Hispanic or Latino; or other non-white persons, including those persons of two or more races. A low-income population is defined as a population whose median household income is at or below the U.S. Department of Health and Human Service (HHS) poverty guidelines. The HHS poverty guideline for a family of four in the United States in 2011 is \$22,350 (U.S. Department of Health and Human Services, 2011).

4.0 - ENVIRONMENTAL CONSEQUENCES

4.1 – Land Use

Proposed Action

Under the proposed action, land use would basically remain unchanged. Landscaping would be more intensive and definitely improved. Park use would likely increase. More than likely, the park would attract pedestrian traffic in the surrounding areas and may attract more patrons to the Blue Star Brewery and Arts Complex. The presence of an improved park facility also may attract more commercial businesses such as restaurants and tourists attractions to the area. The Eagleland Reach Restoration purpose would be continued through the preservation of the natural setting of the area. Footpaths would be clearly defined to discourage patrons from traveling off-trail. The San Antonio Floodway would continue to protect the surrounding land from flooding.

Alternative Action

The alternative action would likely have the same impact to land use as the proposed action.

No-Action Alternative

Land use would remain the same with no change. Current USACE Public Works projects would continue their existing functions.

Conclusion: The proposed and alternative actions have the potential to change land use in the area by potentially attracting new businesses and consumers to the area. The park area would also be improved by these two actions, while the no action alternative would result in the park area remaining in its current state, attracting less patrons and new business than the other two alternatives. Current USACE Public Works projects would continue their existing functions.

4.2 – Noise

Proposed Action

Under the proposed action, long term noise levels would basically remain unchanged. Some temporary increases in noise would result from the use of heavy equipment during construction. No other new sources of noise would be created by this action. The majority of use of the park would be hikers, bikers, and park patrons, all of which are not significant sources of noise. Thus, the impacts to noise because of this action would be negligible.

Alternative Action

The impact of the alternative action on noise would be the same as the proposed action, resulting in no significant impacts.

No-Action Alternative

Noise would remain the same with no change.

Conclusion: All three actions would not significantly impact noise on the project site, surrounding areas, or existing USACE Public Works projects.

4.3 – Air Quality

Proposed Action

Construction activities on the proposed project area may result in short-term elevation of particulate matter in the air in the immediate vicinity of construction. The source of this particulate material would be blowing dust and some carbon originating from diesel engines and heavy construction equipment. Also, use of construction equipment may cause localized, minor increases on carbon monoxide on the short term. However, these increases would be considered insignificant compared to the levels already occurring due to vehicular and air traffic.

Alternative Action

The impact of the alternative action on air quality would be the same as the proposed action, resulting in no significant change in air quality.

No-Action Alternative

Air quality would remain the same with no change. No fugitive dust impacts would be realized since construction would not take place.

Conclusion: All three actions would not significantly impact air quality in the project area or existing USACE Public Works.

4.4 – Water Resources

Surface Water

Proposed Action

Under the proposed action, surface water quality would be slightly improved. The project area is currently considered impaired and continuing previous efforts to establish native vegetation and improve natural landscaping along the river would serve as a bio-filter to ensure that runoff into the river is somewhat reduced of suspended sediments. Many of the outfalls would be developed into step pools and water features, which would filter, aerate, or even allow some breakdown of organic matter in outfall flows. The park often fosters ownership by the surrounding community, encouraging patrons to conserve and protect water resources. Best Management Practices will be implemented as part of the stormwater pollution prevention plan (SWPPP) and include, but are not limited to, the following:

- Preserving the maximum amount of natural vegetation and buffer zones
- Permanent seeding and hydro mulching
- Silt fencing and hay bales

Alternative Action 1

Due to the removal of the existing low-head weir and construction of a new structure, a greater impact would be imparted as compared the proposed action. Since the low-head weir spans the San Antonio River from bank to bank, construction-related activities would impart more impact on surface water than would the outfalls discussed under the proposed action. Sediment deposits may have formed a sediment slug over time behind the currently existing weir. Removal of the weir would cause this sediment slug to be forced downstream, which could potentially bury existing benthic and microhabitats. This would have no impact on the San Antonio Floodway's current function.

Minor temporary disturbance would also be anticipated due to the reconstruction of the outfalls discussed under the Proposed Action.

No Action Alternative

Surface water would remain the same with minimal change. No real improvement in water quality would be anticipated and the park area may slowly become degraded due to minimal use and attention by the surrounding community.

Conclusion

The proposed and alternative actions would result in an overall improvement in surface water quality. The no action alternative would more than likely result in no change in water quality with the potential for minor degradation in water quality in the future. No alternative would have any impact on existing USACE Public Works projects.

Ground Water

Proposed Action

Groundwater would not be impacted by the proposed action due to the fact that the geologic formation underlying the shallow groundwater table is relatively impermeable. The shallow groundwater table would remain unchanged because sources of pollution of this layer are not on the project site and no new sources would be created by the project. No impacts would be caused by construction because any ground disturbance would be shallow.

Alternative Action 1

The impact of the alternative action on groundwater would be the same as the proposed action.

No-Action Alternative

The impact of the no-action alternative on groundwater would be the same as the proposed action, but no construction would take place.

Conclusion

All three actions would not impact groundwater.

Wetlands and Waters of the U.S.

Proposed Action

Fringe wetlands would not be impacted by the construction of the new project. Any impact made by construction would be minor and is permitted under a currently approved Nationwide Permit 39 (Project Number 2009-00477). Vegetation in fringe wetlands would be encouraged through natural propagation of existing species, providing more habitat for fish, water fowl, wading birds, and other aquatic vertebrates and invertebrates. Furthermore, the site would remain natural in state without any maintenance of wetland vegetation. Over time, a net increase in native biodiversity would be expected.

Alternative Action 1

The impact of the alternative action on wetlands would be the same as the proposed action.

No Action Alternative

No impact would be made to fringe wetlands or waters of the U.S. under the No-Action Alternative.

Conclusion

The Proposed Action and Alternative Action 1 would encourage the enhancement of existing fringe wetlands. The No-Action would maintain fringe wetlands in their current state and encourage their further natural development without requiring additional plantings.

4.5 – Floodplains

Proposed Action

Construction activities and other actions associated with this project would not result in a change in the flood capacity or flow of the San Antonio River and would therefore not cause any significant change in water surface elevation levels (WSEL) or flood velocity. HEC-RAS modeling was used to verify that changes in hydrology along this river segment are insignificant and that WSEL and velocity changes were negligible when modeled for the 10, 25, 50, 100, and 500 year floods. The model calculated WSEL and velocities for each storm event for both existing conditions in the reach (Scenario 1) and for conditions following construction of all proposed improvements (Scenario 3). An analysis of the data indicated that there were no significant changes in WSEL following construction than those currently present in the system. Therefore, there is no significant change in channel hydrology or floodplains resulting from the proposed project. The hydrology model data is available for review upon request.

Alternative Action 1

Alternative Action 1 removes a low-head weir and replaces it with a stone footpath and a new concrete weir. A HEC-RAS model was used to verify that the change in this structure would not result in any significant changes to WSEL or water velocity. Floodplains would not be affected by this alternative.

No-Action Alternative

Floodplains would remain in their current state under the No-Action Alternative.

Conclusion

All three actions would not impact floodplains within USACE Public Works boundaries.

4.6 – Safety

Proposed Action

Under the proposed action, a new 12'-6" to 10'-0" wide concrete walk would be added to South Alamo Street. This would vastly increase safety for pedestrians allowing easy passage by patrons traveling in opposite directions on the path. Lighting would be added to this walkway, as well as to the Cypress trees at the plunge pool. Lighting improves safety and security for park users during the evening. Currently, the entrance to the trail from the Blue Star Complex is steep and slippery. The new design would alleviate this by creating natural stone steps down to the trail.

The existing east bank trail would be replaced with a five-foot wide concrete walk with a three-foot grasscrete maintenance strip. This would allow emergency vehicles sufficient access to the area, as well as move the trail further away from the steep drop-off that currently exists adjacent to the path.

Alternative Action 1

Impacts would be similar to those described under the Proposed Action.

No-Action Alternative

No construction would occur. This would leave all aspects of the project in its current condition, which currently present safety hazards to users of the trail and does not allow proper access for emergency vehicles to the area.

Conclusion

Safety within current USACE Public Works would be increased under the Proposed Action and Alternative Action 1 as compared to the No-Action Alternative.

4.7 – Visual Aesthetics

Proposed Action

Under the proposed action, landscaping would consist of native plantings and would be implemented along the trail and in all components of the design. This design would mimic the historic and current vernacular landscape and architecture of the area and would significantly improve the current visual appeal of the site, while being aesthetically pleasing to park patrons. The vegetation restoration under current USACE project would continue, but the trails would be maintained to keep vegetation from overgrowing them. The removal of invasive species would be continued. Presence of a well-defined trail with signs discouraging off-trail use would encourage park users to remain on the trails and not walk off the path.

Alternative Action 1

Impacts would be similar to those described under the Proposed Action.

No-Action Alternative

Vegetation would continue to grow over the trails. Trails would remain in their current degrading state. Overall, the visual aesthetics of the site would continue to degrade, eventually becoming unappealing and even unusable by the general public.

Conclusion

The Proposed and Alternative actions would have a more positive impact on the visual aesthetics of the current USACE Public Works projects than the No-Action Alternative

4.8 – Recreation

Proposed Action

Under the proposed action, footpaths would be improved and vegetation would be maintained to keep the footpaths clear. Due to this, patrons would be more likely to use the area for recreational purposes, such as hiking, jogging, bird watching, etc.

Alternative Action 1

Impacts would be similar to those described under the Proposed Action.

No-Action Alternative

The No-Action alternative would keep the area in its current state, but would be less appealing to patrons to use for recreational purposes.

Conclusion

The Proposed Action and Alternative Action 1 would be more likely to encourage patrons to facilitate the area for recreational purposes than under the No-Action Alternative.

4.9 – Hazardous Materials

Proposed Action

The proposed action is not anticipated to add any additional sources of hazardous materials or disturb any existing hazardous, toxic or radioactive waste sites. All contaminated areas discussed in Section 3.9 will not be impacted by the proposed action.

Alternative Action

Like the proposed action, the alternative action is not anticipated to add any additional sources of hazardous materials.

No-Action Alternative

Sources of hazardous materials would be negligible with no change anticipated.

Conclusion: All three actions are not anticipated to result in new sources of hazardous materials or disturb any existing hazardous, toxic or radioactive waste sites.

4.10 – Biological Resources

Wildlife

Proposed Action

Some temporary displacement of wildlife may occur during reach improvements; however, most of the wildlife associated with these areas include populations of birds that can easily move to adjacent habitat. Any wildlife that may emigrate from the site would likely return to the area upon completion of construction. Impacts to wildlife would be considered temporary and minor. Additionally, wildlife habitat would likely improve as the native plant community becomes established.

Alternative Action 1

Impacts to wildlife would be similar to those described under the Proposed Action.

No-Action Alternative

No impact would be anticipated to wildlife under the No-Action Alternative.

Conclusion

Temporary impacts to wildlife habitat would be imparted by the Proposed Action and Alternative Action 1. Over time, however, habitat would improve due to native vegetation succeeding invasives. No compensatory mitigation of wildlife would be required.

Vegetation

Proposed Action

Under the proposed action, herbaceous vegetation planted during the Eagleland Reach Ecosystem Restoration Project would be temporarily impacted by excavation and construction of the new trails and park amenities. However, plans include planting of native herbaceous grasses, which would allow for a more rapid recovery of the site. Because of this rapid recovery, any impacted herbaceous species would be anticipated to fully recover following implementation of the proposed project. In fact, vegetation may be improved overall if native species begin to replace invasives, such as bermudagrass, and fill in areas dominated by early successional species. Any trees planted by current USACE Public Works projects would not be impacted. Some areas may be periodically mowed, but most of the site would be allowed to grow in a natural state. Walks and overlooks would encourage park patrons to remain on trails and not trample and otherwise destroy vegetation. Thus, the proposed action should result in an overall positive improvement in the vegetative community.

Alternative Action 1

Effects would be the similar to those described under the Proposed Action. However, the stilts that would be installed to support the raised “treehouse” platforms would impart significant damage to the

root structures of the large heritage cypress on the banks of the San Antonio River. These trees are all approximately 36 inches or greater in diameter at breast height. This damage could result in significant damage or death to the trees. Loss or damage of these trees would potentially impact the visual aesthetics for park patrons, sources of shade and habitat for migratory birds, and terrestrial wildlife.

No-Action Alternative

Vegetation would remain the same with a slow change towards establishment of native climax species. This may be hampered by the continued impact of park patrons on vegetation along the river banks and off trails.

Conclusion: Alternative Action 1 would impact vegetation slightly more than the proposed action due to damage or death of cypress trees. The Proposed Action and Alternative Action 1 would improve vegetation slightly better than the No-Action Alternative. The No-Action alternative would likely result in improved vegetative condition within current USACE Public Works projects, but at a much slower rate than the other alternatives.

Endangered and Threatened Species

In general, the proposed action, alternative action, and no action alternative would have minimal impacts on endangered, threatened, or special status species. Habitat supporting these species is not present on the proposed project area, and the proposed project area is too developed to be attractive to the species. The fact that the site would be used as a park and ecological restoration area lends itself to perpetuating the improvement of habitat for any species that might be present. The Golden Orb, the only endangered or threatened species with potential habitat in the project area would not likely be negatively impacted.

Proposed Action

Potential for any of the species to be present on the site is low, even when habitat exists due to the high level of urbanization in and around the project site. On the long term, the environment would be improved for any endangered or threatened species because of the nurturing of a natural habitat and the protective character of a park environment.

Alternative Action

The impact of the alternative action on endangered, threatened and special status species would be the same as the proposed action, potentially resulting in an overall future improvement of habitat.

No Action Alternative

The habitat for endangered, threatened and special status species would remain the same with no short term construction impacts. Habitat may improve in the future, but not to the extent of the proposed action or alternative action.

Conclusion

All three actions would not significantly impact endangered, threatened, or special status species. The alternative and proposed actions would improve habitat slightly better than the no action alternative on the long term.

4.11 – Cultural Resources

Proposed Action

No impacts to cultural resources would occur under the Proposed Action. However, given the number of sites that have been discovered on the adjacent Mission Reach project, an archaeological monitor will be present during earth moving activities that go beyond 75cm (approximately 2.4 feet) below the current ground surface to capture any *prehistoric* sites that may have been overlooked by the USACE visual reconnaissance in 2002 and the historic research conducted in 2006.

Alternative Action 1

No impacts to cultural resources would occur under Alternative Action 1.

No-Action Alternative

No impacts to cultural resources would occur under the No-Action Alternative.

Conclusion

All three alternatives would result in no impact to cultural resources.

4.12 – Geology

Proposed Action

Geologic formations outcropping on the project site would not be significantly impacted by the proposed action. Any excavation and construction conducted as part of the project would only result in temporary impacts to surface features. All areas impacted by construction would be brought back to original contours after completion and no permanent changes in surface terrain are expected. The project would not significantly change the flow of water on the site, thus impacts to geology caused by water erosion are also not anticipated.

Alternative Action

The impact of the alternative action on geology would be the same as the proposed action, resulting in no significant impacts to geologic formations.

No Action Alternative

Geology would remain the same with no change.

Conclusion: All three actions would not significantly impact geology of the area.

4.13 – Soils

Proposed Action

Soils on the project site would not be significantly impacted by the proposed action. Any excavation and construction conducted as part of the project would only result in temporary impacts to surface features. Because the site has already been subjected to extensive excavation in the past, it is doubtful that the soil profiles would be significantly changed. All areas impacted by construction would be brought back to original contours after completion, and no permanent changes in the soil surface are expected. Top soils on excavated areas would be stockpiled and then spread over excavated areas following construction activity to encourage vegetative growth and prevent exposure of subsoil. The project would not significantly change the flow of water on the site, thus impacts to soils caused by water erosion are also not anticipated. However, potential for erosion during excavation is relatively

high and Best Management Practices would be used to ensure that loss of soils and erosion is minimized.

Alternative Action

The impact of the alternative action on soils would be the same as the proposed action, resulting in no significant impacts.

No Action Alternative

Soils would remain in the same condition with no change. However, overall impact would be less due to the fact that no excavation or construction would occur.

Conclusion

All three actions would not significantly impact soils of the project area.

4.14 – Environmental Justice

The Proposed Action, Alternative Action 1 and the No Action Alternative would have no impact on environmental justice in the project and surrounding area because the project would have positive impacts on the surrounding communities. It provides a place for all ethnic groups to enjoy and does not focus positive or negative impacts on any specific ethnic group.

4.15 – Socioeconomics

Proposed Action

Socioeconomics would not be negatively impacted by the proposed action. In fact, an improved park area would attract more patrons to the area. Those patrons would more than likely use the restaurants and other attractions in the surrounding community and may increase the economic returns to those businesses. Additionally, new businesses may be attracted to the area, providing employment opportunities for minority populations and economically disadvantaged populations. In conclusion, the proposed action may result in a slight improvement in the economy of the project area.

Alternative Action

The impact of the alternative action on socioeconomics would be the same as the proposed action.

No Action Alternative

Socioeconomics would not be improved by the No Action Alternative due to the fact that the river corridor would remain in its current condition and not attract more patrons to the area. This may have slight negative impacts on the economy of the surrounding community.

Conclusion

In general, the Proposed Action and Alternative Action would have positive impacts on the economy of the surrounding community, while the No Action Alternative would have no or maybe slightly negative impacts on the surrounding community.

4.16 – Summary of Impacts to Resources

Table 8 below shows each environmental resource and whether or not it is impacted by each of the project alternatives.

Table 5. Effects on environmental resources by each alternative.

Resource	Proposed Action	Alternative Action 1	No-Action Alternative
Land Use	Positive Impact	Positive Impact	No Impact
Noise	No Significant Impact	No Significant Impact	No Significant Impact
Air Quality	No Significant Impact	No Significant Impact	No Significant Impact
Surface Water	Positive Impact	Positive Impact	No Impact
Ground Water	No Significant Impact	No Significant Impact	No Significant Impact
Wetlands and Waters of the U.S.	Positive Impact	No Impact	No Impact
Floodplains	No Impact	No Significant Impact	No Impact
Safety	Positive Impact	Positive Impact	No Impact
Visual Aesthetics	Positive Impact	Positive Impact	No Impact
Recreation	Positive Impact	Positive Impact	No Impact
Hazardous Materials	No Impact	No Impact	No Impact
Vegetation	Positive Impact	Negative Impact	No Impact
Wildlife	No Significant Impact	No Significant Impact	No Impact
Endangered/Threatened Species	No Significant Impact	No Significant Impact	No Significant Impact
Cultural Resources	No Impact	No Impact	No Impact
Geology	No Significant Impact	No Significant Impact	No Significant Impact
Soils	No Significant Impact	No Significant Impact	No Significant Impact
Environmental Justice	No Impact	No Impact	No Impact
Socioeconomics	Positive Impact	Positive Impact	Slightly Negative Impact

5.0 – IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable resource commitments are defined as the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource, such as fossil fuels or minerals that cannot be replaced within a reasonable time period. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action, such as an archaeological site.

Proposed Action

Irreversible and irretrievable resource commitments would be minor for the proposed action. The only resources necessary to accomplish the proposed action would primarily be fossil fuels for transport of construction items, as well as for operation of heavy equipment used to complete the proposed action. Overall, the proposed action would protect and conserve natural resources of the San Antonio River.

Alternative Action 1

Irreversible and irretrievable commitment of resources used under Alternative Action 1 would be similar to those described under the Proposed Action. The positive protection and conservation of resources would also be the same.

No-Action Alternative

Under the No-Action Alternative, the parkland would remain in its current state and no further action would occur. Thus, overall, the No-Action Alternative would result in no irreversible or irretrievable loss of resources compared to the Proposed Action and Alternative Action 1.

6.0 – CUMULATIVE IMPACTS

40 CFR § 1508.7 defines a cumulative impact as “an impact on the environment which results 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 minor but collectively significant actions taking place over a period of time.”

Three USACE Public Works projects exist within or in the immediate vicinity of the proposed project area and may be beneficially impacted through implementation of the proposed project. Descriptions of these projects are as follows:

San Antonio Floodway Project

The San Antonio Floodway Project includes channel improvements, installation and modification of drainage structures, clearing, widening, straightening, deepening, modification of highway and railroad bridges, road relocations, and sodding and seeding of embankment and channel slopes on the San Antonio River, Alazan Creek, Apache Creek, Martinez Creek, San Pedro Creek, and Six Mile Creek, which equates to approximately 22 miles of flood control improvement. The Eagleland Reach falls within this 22 miles. Additional project features include the construction of concrete and steel piling floodwalls and culverts and two deep tunnel systems beneath the downtown San Antonio area. The tunnels are located under San Pedro Creek and under the San Antonio River.

Mission Reach Project

The Mission Reach project occurs along eight miles of the San Antonio River immediately downstream from the Eagleland Reach and represents the initial steps toward adding the later authorized purposes of ecosystem restoration and recreation to previously channelized streams. Features are designed to maintain the existing level of flood risk mitigation while restoring aquatic ecosystem function lost due to channelization.

The Mission Reach includes restoration of pool-riffle-run sequences, river remnants, off-channel pools, sinuosity, and aquatic and riparian vegetation. Recreation is included as an ancillary, non-disruptive component of the restoration to facilitate learning, enjoyment, and interpretive opportunities for the role of the natural riverine environment in the establishment of four Spanish Colonial Missions. These missions are part of the Missions National Park, which are situated along the 8-mile Mission Reach. When complete, the Mission Reach project will restore approximately 435 acres of riverine ecosystem and provides 56,000 linear feet of multi-purpose trails.

The first mile of the Mission Reach channel work has been completed, and the remaining seven miles are under construction.

Eagleland Reach Ecosystem Restoration Project

The Eagleland Reach Ecosystem Restoration Project restored approximately three-quarter river miles of the San Antonio River that was adversely affected by previous Federal actions. Implementation of the project allowed USACE to restore terrestrial and aquatic habitats that had degraded since construction of the San Antonio Floodway Project. Ecosystem restoration consisted of restoring native vegetation within the flood channel right-of-way, restoring meanders in the river channel, and creating a riffle-pool complex. The result is a more natural, meandering river corridor that continues to provide flood control. Native trees and shrubs were planted along the side slopes, the top of bank, and within the flood control channel wherever channel flood flow capacity allowed. Open areas were planted with native grasses and forbs. A rock riffle structure was placed in the base flow channel to create a riffle-pool complex. The project restored approximately thirteen acres of terrestrial and nine acre-feet of aquatic habitat within the project area.

Proposed Action

The Proposed Action does not have any substantial direct or indirect impact on any resource. Access to the proposed project area would not be substantially increased, and land in the area is not available for development or redevelopment. Additionally, since implementation of the proposed project would have no adverse effects on the flood control aspect of the San Antonio Floodway System, the project is unlikely to result in any negative cumulative impacts. The project is complimentary to a larger, San Antonio Amenities Master Plan that would eventually tie together and improve the San Antonio River corridor as well as the Salado Creek, Leon Creek, and Medina River Corridors; however, this project is not dependent on the construction of any other project and would be implemented in full regardless of any other area projects. The cumulative impact of this project, when considered with regard to other area projects, would result in a net positive enhancement of natural resources and water quality of the San Antonio River basin and would provide an uninterrupted hike and bike trail protecting and featuring archeological, historic, and natural resources of the area for the citizens of San Antonio.

Positive impacts from the project would enhance those beneficial impacts already imparted by similar USACE projects along the river. Water quality in the Mission Reach downstream would be enhanced due to the removal of suspended solids through vegetative filtering within the Eagleland Reach. The

promulgation of native seed stock from restoration of the riparian community along the Eagleland Reach would extend to downstream reaches of the river. This would work synergistically with vegetative restoration efforts in downstream reaches and especially within the Mission Reach. Since terrestrial and aquatic organisms are able to migrate from reach to reach, the increase in available habitat within the Eagleland Reach is beneficial beyond the boundaries of the project. Additionally, expanding the trail system to form a connective corridor between reaches is also beneficial to public health by providing safe, accessible way to enjoy and experience the natural character of the river. Elements of the Eagleland Reach Ecosystem Restoration Project would be enhanced under the proposed action.

Alternative Action 1

Cumulative impacts for Alternative Action 1 are the same as for the Proposed Action.

No-Action Alternative

The No-Action Alternative would cause no cumulative impacts to the environment. However, no positive cumulative impacts would be realized, unlike the Alternative Action 1 and Proposed Action.

7.0 – FINDINGS AND CONCLUSIONS

The proposed alternatives have been evaluated in this EA. No significant impacts to the human environment are identified from the implementation of the Proposed Action. Vegetation impacts would be temporary and restored onsite with native species. The Proposed Action is not likely to adversely affect threatened or endangered species, and all impacts to wetlands/waters of the U.S. would be minimal and fall within the limits of a Nationwide Permit.

Taking into account the findings of this section, an EIS would not be necessary. Accordingly, a Draft Finding of No Significant Impact (FONSI) was prepared for the selected action.

8.0 – PUBLIC INVOLVEMENT

8.1 – Agency Coordination

This section discusses consultation and coordination that will occur during preparation of this document. This includes contacts made during development of the proposed action, other alternatives considered, and writing of the draft EA. Copies of agency coordination letters are presented in Appendix C. Formal and informal coordination would be conducted with the following agencies:

- U.S. Army Corps of Engineers (USACE, Fort Worth District),
- State Historic Preservation Office (SHPO),
- U.S. Fish and Wildlife Service (USFWS),
- Environmental Protection Agency (EPA),
- Texas Parks and Wildlife Department (TPWD), and
- Texas Commission on Environmental Quality (TCEQ).

8.2 – Public Information

In accordance with NEPA, a 30-day review period of the draft EA will be provided via a Notice of Availability (Appendix D), posting of the document on the Fort Worth District Website www.swf.usace.army.mil, and a local mailing.

9.0 - RESOURCES

1. 2005-2009 American Community Survey Five Year Estimates.
2. FEMA Floodplain Map for San Antonio, Texas – Panel Number 48029C0454E.
3. Geologic Atlas of Texas, San Antonio Sheet, Revised 1982.
4. GeoSearch NEPA Special Status Species Report, Eagleland, Job Number 31219, July 26, 2011.
5. GeoSearch Radius Report, Eagleland, Job Number 30919, December 20, 2010.
6. Natural Sub-regions of Texas, Preserving Texas' Natural Heritage. LBJ School of Public Affairs Policy Research Project Report 31, 1978.
7. Texas Commission on Environmental Quality (TCEQ), Draft 2004 Texas 303(d) List.
8. Texas Commission on Environmental Quality's Construction of Storm Water Permit
<http://www.tceq.state.tx.us/assets/public/permitting/waterquality/attachments/stormwater/03txr150000.pdf>
9. Texas Department of Transportation, Air Quality guidelines, 1999.
10. Texas Parks and Wildlife Annotated County Lists of Rare species for Bexar County (latest revision October 10, 2011).
[http://gis2.tpwd.state.tx.us/ReportServer\\$gis_epasde_sql?%2fReport+Project2%2fReport5&rs:Command=Render&county=Hidalgo](http://gis2.tpwd.state.tx.us/ReportServer$gis_epasde_sql?%2fReport+Project2%2fReport5&rs:Command=Render&county=Hidalgo)
11. Texas Parks and Wildlife's Vegetation Types of Texas
http://www.tpwd.state.tx.us/publications/pwdpubs/pwd_bn_w7000_0120/
12. U.S. 2010 Redistricting Data.
13. U.S. Department of Agriculture Natural Resources Conservation service, Soil Survey of Bexar County, Texas.
14. USGS 7.5 Minute topographic map, San Antonio East and San Antonio West, TX.
15. Vegetation Types of Texas, McMahan et al, 1984.