



United States  
Department  
Of Agriculture

Natural  
Resources  
Conservation  
Service

**SUPPLEMENTAL  
WATERSHED PLAN No. 2 &  
ENVIRONMENTAL ASSESSMENT  
For  
Rehabilitation of Floodwater Retarding  
Structure No. 4  
of the  
Martinez Creek Watershed  
Bexar County, Texas**

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Prepared By:  
U.S. Department of Agriculture  
Natural Resources Conservation Service

In Cooperation With:  
Alamo Soil and Water Conservation District  
San Antonio River Authority

APRIL 2005

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**SUPPLEMENTAL WATERSHED WORK PLAN AGREEMENT NUMBER 2**

Between the

**Alamo Soil and Water Conservation District  
Local Organization**

**San Antonio River Authority  
Local Organization**

**(Hereinafter referred to as the Sponsoring Local Organizations)**

and the

**Natural Resources Conservation Service  
United States Department of Agriculture  
(Hereinafter referred to as the Service)**

Whereas, The Watershed Work Plan Agreement for Martinez Creek Watershed, State of Texas, executed by the Sponsoring Local Organization(s) named therein and the Service, became effective on the 7<sup>th</sup> day of August, 1959; and

Whereas, the Supplemental Watershed Work Plan Agreement for Martinez Creek Watershed, State of Texas, executed by the Sponsoring Local Organizations (SLO) named therein and the Service, became effective on the 5th day of September 2003; and

Whereas, in order to carry out the watershed work plan for said watershed, it has become necessary to modify said Watershed Work Plan Agreement; and

Whereas, in order to extend the watershed plan for said Floodwater Retarding Structure (FRS) No. 4 beyond its evaluated life, it has become necessary to modify said watershed agreement; and

Whereas, the rehabilitation of said FRS No.4 has been authorized under the authority of the Watershed Protection and Flood Protection act (PL83-566) as amended by the Watershed Rehabilitation Amendments (PL-106-472) provides the authority for rehabilitation; and

Whereas, it has become necessary to modify said watershed work plan by modifying Floodwater Retarding Structure (FRS) No. 4 to bring it up to current performance and safety standards and to extend the service life of the dam for an additional 100 years; and

Whereas, a Supplemental Watershed Work Plan/Environmental Assessment which modifies the Watershed Work Plan for said watershed has been developed through the cooperative efforts of the Sponsoring Local Organization(s) and the Service, which plan is annexed to and made a part of this agreement; and

Now, therefore, the Secretary of Agriculture through the Service and the Sponsoring Local Organizations hereby agree upon the following modifications of the terms, conditions, and

stipulations of said watershed agreement,

(1) Paragraph No. 23 is added to the plan agreement with respect to the Rehabilitation of Floodwater Retarding Structure (FRS) No. 4:

The percentages of the total rehabilitation costs to be paid by the Sponsoring Local Organization and the Service are as follows:

| <u>Rehabilitation of</u> | <u>Sponsoring<br/>Local Organizations</u> | <u>Service</u> | <u>Estimated<br/>Project Cost</u> |
|--------------------------|---|----------------|-----------------------------------|
| FRS No.4                 | 35 %                                      | 65 %           | \$801,700                         |

NRCS is responsible for the engineering services and project administration costs (\$224,700) it incurs. However, these costs are not used in the calculation of the federal cost share. Therefore, they are not included in Estimated Project Cost above. Also, costs of water, mineral and other resource rights, as well as federal, state and local permits are the responsibility of the Sponsoring Local Organization and are not counted toward local cost share.

An amount up to the percentage rate specified may be satisfied by the Sponsoring Local Organization for rehabilitation cost of an element such as engineering, real property acquisition or construction. The decision to, and arrangements for, such action will be negotiated between the Sponsor Local Organizations and the Service and will be included in a project agreement executed immediately before implementation. The costs to the Service will not exceed 100 percent of the construction cost.

(2) Paragraph No. 24 is added to the Plan Agreement as follows:

The sponsors will be responsible for the operation and maintenance (O&M) and replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with agreements to be entered into before issuing invitations for bids for construction work. The term of this new O&M agreement will be for a period of 100 years, which is the life expectancy of the rehabilitated structure.

(3) Paragraph No. 25 is added to the Plan Agreement as follows:

The sponsors agree to develop an Emergency Action Plan (EAP) before any rehabilitation construction activities begin stating the responsibilities for the development, implementation and review of actions necessary to provide safety to individuals downstream of the structure should extreme flooding occur.

The Sponsoring Local Organizations and the Service further agree to all other terms, conditions, and stipulations of said watershed agreement not modified herein.

**Alamo Soil and Water Conservation District**  
Local Organization

By Steve Depue

Title Chairman

Date April 5, 2005

The signing of this agreement was authorized by a resolution of the governing body of the Alamo Soil and Water Conservation District adopted at a meeting held on April 5, 2005

Alfon Schwick  
(Secretary, Local Organization)

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**San Antonio River Authority**  
Local Organization

By Karyn A. Rolter

Title General Manager

Date April 5, 2005

The signing of this agreement was authorized by a resolution of the governing body of the San Antonio River Authority adopted at a meeting held on May 15, 2002

Anna Ramsey  
(Secretary, Local Organization)

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**Natural Resources Conservation Service**  
**United States Department of Agriculture**

Approved By Lyndy D. Butler  
NRCS State Conservationist

Date APR 13 2005

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## SUMMARY OF SUPPLEMENTAL PLAN/ENVIRONMENTAL ASSESSMENT

**Project name:** Rehabilitation of Floodwater Retarding Structure (FRS) No. 4, Martinez Creek Watershed, Bexar County, Texas

**Sponsors:** Alamo Soil and Water Conservation District and the San Antonio River Authority (SARA)

**Description of preferred alternative:** This alternative consists of lowering the sediment pool by 3.6 feet, replacing the 24 inch pipe with a 42 inch principal spillway and raising the dam 2.8 feet to comply with current safety and performance standards. The evaluated life of the structure will be extended for an additional 100 years.

### **Resource Information:**

**Size of planning area:** 1,656 acres

**Prime and important farmland (acres):** None

**Number of minority farmers:** None

**Wetlands:** Principal spillway will be lowered by 3.6 feet creating an 18.5 acre Lacustrine wetland.

**Fisheries:** An 18.5 surface acre fishing area will be created.

**Endangered species:** None

**Cultural resources:** No historic properties (i.e. eligible for National Register of Historic Places)

**Problem identification:** Urban development since FRS No. 4 was originally constructed has resulted in the dam not meeting current dam safety standards. Since a failure of the dam would result in potential loss of life and significant damage to downstream properties, the dam has been reclassified from low hazard to high hazard. Approximately 450-550 people downstream are at risk should the dam fail. This is a conservative figure, considering it is based only on people living downstream of FRS No. 4. It does not include people who might be recreating at a city park within the breach area, and any people who might be in public and commercial buildings downstream at the time of a breach. This estimate also does not include motorists on FM Road 1976 and Gibbs-Sprawl Road located immediately below the dam, nor does it include motorists on FM Road 78, Upper Seguin Road, and FM Road 1516, which would also be affected by a breach.

In the event of a dam failure several highway bridges on the above mentioned roads would be severely damaged, as well as a bridge trestle belonging to Union Pacific Railroad. Approximately 30-40 trains utilize this rail line per day. Although floodwaters from a breach would not overtop the trestle, anticipated damage to the bridge trestle and rail grade would result in the re-routing of rail traffic for a minimum of one day, thus severely impacting the efficiency of the railroad operation.

**Alternative plans considered:** Alternative plans considered were (1) Future Without Project (Controlled Breach of FRS No. 4); (2) Decommission of FRS No. 4 (Remove the footprint of FRS No. 4); and (3) Rehabilitation of FRS No. 4 by raising the top of dam 2.8 feet, replacing the 24 inch principal spillway pipe with a 42 inch pipe, and lowering the sediment pool elevation by 3.6 feet.

In addition, several other alternatives were considered but were eliminated from detailed study. These included flood plain management, liability insurance, zoning, flood warning systems, flood proofing of properties, installation of storm water detention structures, and relocation of properties out of the breach area and/or floodplain.

**Brief description of each alternative:**

**Alternative No. 1 – Future Without Project**

This alternative consists of making a breach in the dam of sufficient size to safely pass the 100-year, 24-hour frequency flood event. This breach would be a minimum size opening in the dam from top of dam down to the valley floor, which would eliminate the structure's ability to store water. Downstream flooding conditions would be similar to those that existed prior to the construction of the dam. This course of action would minimize the sponsor's dam safety liability but would not eliminate all liability. The breach location will necessitate removal of the principal spillway components. The material (about 30,000 cu yd) will be placed in the present easement area. The remaining exposed area (about 10 acres) will be vegetated to control erosion.

Since the 100 year floodplain would be enlarged due to the absence of flood protection, planned downstream development would be altered to account for the enlarged 100-year floodplain. Upstream land values would not be affected. The dam and land currently covered by the sediment pool will be maintained as a greenbelt area. This alternative would also necessitate the City of Converse to modify FM Road 1976 and Gibbs-Sprawl Road, and SARA to stabilize the stream channel. The estimated cost of this alternative is \$565,000.

**Alternative No. 2 - Decommission FRS No. 4.**

Decommissioning removes the storage function of the dam and reconnects, restores, and stabilizes the stream and floodplain functions. Although complete removal of the embankment is not always required for decommissioning, partial removal of the embankment would not be aesthetically or socially acceptable due to the expressed concern of leaving unsightly sections of the dam. The principal spillway and the earthen embankment will be removed. Material will be placed in the sediment and detention pools and the existing sediment pool. All exposed areas will be vegetated as needed for erosion control (34 acres). Riparian vegetation will be established along the stream (10 acres). Channel work will be installed to reconnect the stream channel through the sediment pool. The land currently covered by the dam and sediment pool will be maintained as a greenbelt area. Development plans mentioned for Alternative No. 1 would also apply to this alternative. Decommissioning FRS No. 4 would also necessitate the City of Converse to modify FM Road 1976 and Gibbs-Sprawl Road, and SARA to stabilize the stream channel. Estimated cost is \$1,699,800.

**Alternative No. 3 – Rehabilitation of FRS No. 4.**

This alternative consists of lowering the sediment pool by 3.6 feet, replacing the 24 inch pipe with a 42 inch principal spillway and raising the dam 2.8 feet to comply with current

safety and performance standards and to extend the service life of the dam for an additional 100 years. The City of Converse has expressed interest in modifying Converse North Park (located east and upstream of the sediment pool) to include water based recreational activities associated with the sediment pool. Any recreational modifications planned by the City of Converse will be financed by the city and are not included in project costs. Planned development downstream of the dam would not be affected due to the current 100-year floodplain being maintained. Upstream land values will not be affected by the project. Estimated cost is \$1,026,400.

**Project purpose:** Flood Prevention.

**Principal project measure:** Rehabilitation of FRS No. 4.

|                       |                      |                    |              |
|-----------------------|----------------------|--------------------|--------------|
| <b>Project costs:</b> | <u>Federal funds</u> | <u>Other Funds</u> | <u>Total</u> |
|                       | \$745,800            | \$280,600          | \$1,026,400  |

**Structural measure:** Rehabilitation of FRS No. 4 by raising the top of dam 2.8 feet, replacing the 24 inch principal spillway pipe with a 42 inch pipe, and lowering the sediment pool by 3.6 feet.

**Project benefits:** Benefits are based on continuing protection to the downstream area, enhancing incidental upstream recreation, and avoiding projected costs associated with the absence of FRS No. 4. Total average annual benefits are estimated to be \$108,000, which include updated original downstream benefits (\$6,000), continued downstream protection (\$79,700), enhancing incidental upstream recreation (\$13,500), elimination of the need to modify FM Road 1976 and Gibbs-Sprawl Road (\$7,100), and reducing downstream flood insurance administration costs (\$1,700). Also, potential risk to loss of life (450-550 residents located within breach area) from a dam failure would be minimized.

**Other impacts:** The aesthetics of the area, the wetland values and the recreational opportunities will be maintained and enhanced. Current downstream property values will be unaffected. Because the downstream floodplain area would not increase, plans for future development can continue without modifications. In the absence of FRS No. 4, more frequent flooding would occur to Converse City Park (located downstream of FRS No. 4), which includes several ball fields, a large pavilion, play areas, and a swimming pool. Also, without FRS No. 4, an additional 16 residential property owners would need to buy flood insurance.

**Land use changes:** There will be no land use changes as the area is now urban or zoned as urban. Land planned for future development is also within the urban area.

**Environmental values changed or lost:** No compensatory mitigation is planned. Installation of the preferred alternative will disturb only a minimal amount of grassland vegetation. Disturbed areas will be replanted with coastal bermudagrass.

# **SUPPLEMENTAL WATERSHED PLAN No. 2 & ENVIRONMENTAL ASSESSMENT**

## **INTRODUCTION**

The Martinez Creek Watershed Plan was approved for operation in August 1959 under the authority of Public Law 83-566, as amended. The Plan provides for application of conservation practices for watershed protection and flood prevention. The local sponsors of the watershed project are Alamo Soil and Water Conservation District and the San Antonio River Authority (SARA). Federal assistance is being provided by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS).

The watershed, located in Bexar County, Texas, is comprised of 56,000 acres (about 87.5 square miles). A total of six floodwater retarding structures were constructed in the watershed during 1962 through 1966.

Within the Martinez Creek Watershed major changes in land use from a rural setting to an urban setting has occurred in large portions of the watershed. This land use change has occurred upstream and downstream of most of the floodwater retarding structures in the Martinez Creek Watershed. Floodwater Retarding Structure (FRS) No. 5 was planned for rehabilitation by Watershed Supplement 1, which was approved September 5, 2003.

This Supplemental Watershed Plan and Environmental Assessment was prepared to implement the rehabilitation of FRS No. 4 in order to meet current performance and safety standards. The Watershed Protection and Flood Protection act (PL83-566) as amended by the Watershed Rehabilitation Amendments of 2000 provides the authority for rehabilitation. The service life of FRS No. 4 will be extended for an additional 100 years.

## **PURPOSE AND NEED**

The purposes of FRS No. 4 rehabilitation are to maintain present level of flood control benefits and comply with the current performance and safety standards. FRS No. 4 was built in 1964 in a rural setting and is now surrounded by urban development. In particular, there are 174 properties (of which 165 are residential) located downstream within the breach area. Approximately 450-550 people living within the residential properties would be at risk should the dam fail. This potential risk to loss of life has caused the dam to be reclassified as a high hazard dam. Motorists on FM Road 1976 and Gibbs-Sprawl Road below the dam would also be in harm's way. Because of urban encroachment, there is a need to protect downstream properties and infrastructure, and reduce the potential risk to loss of life. The rehabilitation of FRS No. 4 would ensure the service life of the dam for a minimum of 100 years.

## **PROJECT SETTING**

This Supplemental Plan/Environmental Assessment is for the watershed upstream of FRS No. 4 and the downstream area affected by a breach of the existing dam (Appendix C). FRS No. 4 is constructed in the upper reaches of West Salitrillo Creek, a tributary of Martinez Creek. A

description of the Martinez Creek Watershed can be found in the Martinez Creek Watershed Work Plan dated October 1958.

FRS No.4 has a drainage area of 1,656 acres. The area is located within the city limits of Converse, Bexar County, Texas. All of the 1,656 acres is either urbanized or projected to be urbanized within the near future. Land use is residential, commercial, parks and open areas.

Average annual rainfall is slightly less than 28 inches. Normal temperatures range from an average high of 94 degrees Fahrenheit in July and August to an average low of 42 degrees in January. The normal frost-free period of 279 days extend from February 24 to November 30.

#### **Description of Existing Dam**

FRS No. 4 was constructed in 1964 and had a projected service life of 50 years. It was constructed as an earth fill dam with a vegetated auxiliary spillway. The principal spillway is a 24-inch diameter reinforced concrete pipe connected to a 24-inch by 72-inch restricted flow inlet. Flow is restricted by a cover access plate at the top of the riser. Two 10-inch by 10-inch weir notches in the side wall of the riser, set at 0.8 ft below the principal crest elevation, drain the sediment pool. The total storage capacity below the elevation of the auxiliary spillway is 853 acre-feet with 255 acre-feet reserved for sediment accumulation over a 50-year period. The remaining 598 acre-feet is reserved for floodwater detention storage. The maximum height of the dam is 31 feet. The surface area of the current sediment pool is about 34 acres.

Currently, FRS No. 4 does not contain permanent water within the sediment pool. Because of liability concerns associated with a nearby city park, a previous landowner of the sediment pool and dam requested SARA to keep the lower gate on the principal spillway open. Even after a change in ownership, the gate remained open at all times, therefore only impounding a shallow, small body of water within the sediment pool area. However, in dealing with the current landowner of the dam and sediment pool, SARA has learned that permanent water would be allowed once rehabilitation of FRS No. 4 is complete. Due to the topography upstream and west of the dam and sediment pool, future development within this area is suspect. Thus, even with permanent water planned for the sediment pool, upstream land values were held constant.

City of Converse officials have expressed interest to modify Converse North Park, which is adjacent to and upstream of FRS No. 4 on the east side, once FRS No. 4 is rehabilitated. In order to facilitate water based recreational activities within the park, small earthen peninsulas jutting out into the sediment pool will be constructed during rehabilitation of FRS No. 4. Because these peninsulas will be formed through the routine excavation process and placement of excess spoil material, there will not be any additional cost associated with this construction activity. Thus, city officials are interested in including such water based recreational activities within the modified park. Any recreational modifications to the park will be financed by the city and are not included in project costs. The sponsors will ensure that permanent water is available and will no longer be willing to afford the landowner this discretion in the future. Information concerning annual visitor-days was not available from the City. However, the City of Live Oak operates and maintains a park adjacent to FRS No. 5, located about 1.5 miles from FRS No. 4. Using historical information provided by the City of Live Oak concerning water based recreation within their park and considering the urban area nearby FRS No. 4, it was estimated that Converse North Park would experience similar visitation, resulting in about 700 people utilizing the park annually to participate in water based recreational activities.

SARA built FRS No. 4 with assistance from the NRCS as part of the Martinez Creek Watershed Project. Martinez Creek Watershed, approved in 1959, provided watershed protection and agricultural flood damage reduction. The project also provided protection to roads and bridges. Since FRS No. 4 was constructed in a rural area, there was no planned protection to urban properties. The drainage area of the floodwater retarding structure was predominantly agriculture (cropland and grassland).

When Martinez Creek Watershed was planned, the original intent of the floodwater retarding structures was to protect agricultural areas downstream. The FRS was classified as low-hazard in regards to threat to loss of life. Less than 100 people lived in the basin and the economy was almost entirely agricultural. However, forty years later the population has significantly increased, with the City of Converse (population 11,500 based on 2000 Census) now a suburb of the expanding San Antonio metropolitan area. From 1970 to 1980, the population of Converse increased 254 percent. From 1990 to 2000, Converse grew 29 percent -- the largest recorded growth in the northeast community. According to Trans-Texas Water Program projections, Converse is expected to be the largest suburban city in the northeast San Antonio Metropolitan area by the year 2010, with a population of more than 20,000.

With 450-550 people living and working in properties downstream as well as FM Road 1976 below the dam, FRS No. 4 is now considered a high-hazard dam. When Martinez FRS No. 4 was built in 1964 for flood prevention and watershed protection, urban development was not anticipated. While the FRS provides an estimated \$108,000 in annual monetary benefits, far more valuable are the human lives positively impacted through its presence. Therefore, due to this boom in development, the dam needs to be upgraded to meet current performance and safety standards and ensure continued protection of the watershed and the lives of people downstream. The watershed area of FRS No. 4 is completely developed to urban or projected to be completely developed in the near future.

FRS No. 4 was constructed as a low hazard dam designed to store the sediment expected to accumulate over a 50-year period and provide floodwater storage. Sufficient floodwater detention storage was provided for a 4 percent chance of the auxiliary spillway functioning in any year (25-year frequency).

The embankment is in excellent condition. A thick stand of coastal bermudagrass covers the front and back slopes and auxiliary spillway. SARA fertilizes the embankment as needed to maintain this protective cover. No brush or trees are allowed to grow on the embankment. The inlet and principal spillway were visually inspected and an internal camera was used to inspect the conduit. Both are in excellent condition. The dam has no stability or foundation problems.

### **Geology and Soils**

The dam is geographically located on the west fork of Salitrillo Creek in Converse Texas, within the rolling hills of the Blackland Physiographic province.

Gently rolling hills of low relief characterize the topography in this portion of the Blackland Prairie. Rocks underlying the Martinez Creek Watershed are predominantly fine-grained siltstone, clay, and marl of Cretaceous and Eocene age. Upper Cretaceous Navarro Group and Marlbrook Marl occur in the Central part of the watershed, while Pecan Group Chalk outcrops in the uppermost headwater region of the watershed. The Eocene Midway Group underlies the

main channel of Martinez Creek in the downstream portion of the watershed. Coarser Quaternary terrace deposits occur along the watershed margins, with recent alluvium deposits in the stream valleys (Bureau of Economic Geology, 1983).

Geologically, the site is located on claystone and siltstone of the undivided Cretaceous Age Navarro Group and Marlbrook Marl ("upper Taylor marl"). The upper marl is similar to the Escondido Formation that outcrops west of San Antonio. The claystone on the site is described as silty, and breaks down with difficulty to moderately to highly plastic clay. There are small localized areas within the claystone that include slight amount of carbonates.

Alluvial soils in the valleys tend to be fine-grained because they are derived from the fine-grained bedrock. Clay deposits contain montmorillonite especially if derived from the lower portion of the Navarro Group (Bureau of Economic Geology, 1983). Those clays tend to have a high shrink-swell potential. The alluvium contains local thin layers and lenses of gravel.

Soils in the vicinity of the FRS No. 4 dam, spillway, and reservoir area are typical of the south central Texas rolling Blacklands. Moderately sloping to steep upland soils include Austin silty clay, Houston Black clay, and Stephen silty clay (USDA, June 1991 Reissued).

### **Sedimentation**

The fine-grained rocks and soils, gentle topography and stable landuse suggest comparatively low sedimentation rates. Historic sedimentation rates in the vicinity of the watershed are comparatively low for Texas (Bernard et.al., 1995).

Investigations indicate that the dam, including the principal spillway, is structurally sound and is being properly maintained. A recent sediment survey, completed in 2004, indicates that there are over 100 years of available sediment storage capacity remaining. The sediment in the sediment and detention storage areas was not tested as it will not be disturbed during the rehabilitation of the structure.

Original planned sediment volume was 255 ac-ft. The actual sediment rate was 1.7 ac-ft /yr. The remaining sediment volume was 187 ac-ft. The estimated future sediment rate is 0.84 ac-ft/yr. The sediment volume for the rehabilitated structure is 100 ac-ft that is now available by the lowering of the sediment pool elevation.

### **Cultural Resources**

No prior cultural resources identification activities have taken place in association with the original Martinez FRS No. 4 project. The dam and reservoir was constructed in 1964, prior to passage and implementation of the National Historic Preservation Act and other historic preservation laws that now require NRCS (Soil Conservation Service at that time) to consider effects to significant cultural resources.

A search of the Native American Consultation Database was conducted to determine if there were any Indian tribes that might attach religious or cultural significance to historic properties that could be located in the proposed project area. This was done in accordance with 36 CFR 800.2 (c)(i) of the Advisory Council on Historic Preservation Regulations. Two tribes were listed that have land area claims that included Bexar County, Texas – the Mescalero Apache Tribe of the Mescalero Reservation, New Mexico and the Lipan Apache Tribe and Bands

thereof. NRCS has contacted the Tribal Historic Preservation Officer to determine if the tribes have an interest in the project area.

A search of the Texas Archeological Sites Atlas, completed in October 2003, did reveal that a survey had been conducted in the area of the city park and one prehistoric archeological site was recorded approximately 400 feet upstream from FRS No. 4.

The 1991 survey conducted by University of Texas at San Antonio Center of Archeology Research (Wright, 1992) for the City of Converse covered approximately 42 acres that is within the flood pools of FRS No. 4. Site 41BX979 is described as a light scatter of lithic artifacts with no distinct concentration of materials. There were not any diagnostic artifacts found at that time. The site was not eligible for the National Register of Historic Places or State Archeological Landmark nomination.

NRCS and the Texas State Historic Preservation Officer have agreed that a cultural resources survey should be completed on all areas of new disturbance associated with potential rehabilitation measures. The cultural resources survey was completed in October 2003 including a reexamination of 41BX979. The NRCS has determined pursuant to 36 CFR 800.4(d) that there are no properties included in or eligible for the National Register of Historic Places within the area of potential effect (letter report on file). The SHPO concurred in the determinations on January 14, 2004 (letter on file).

#### **Prime Farmland**

There is no prime farmland located in the project area. The Farmland Protection Policy Act of 1981, as amended, states in 7 CFR 658.2 "farmland does not include land already in or committed to urban development or water storage". Inasmuch as all of the project area is committed to urban development or water storage there is no prime farmland located in the project area.

#### **Wildlife Resources**

FRS No. 4 is located within the city limits of Converse in Bexar County, Texas. The watershed for this site is heavily urbanized. Landuse adjacent to the structure is designated as a park, and private undeveloped lands. The land cover is predominantly poor condition rangeland, low seral plant community. Predominance of vegetation is limited to low quality annual and perennial cool and warm season grasses and forbs. The area below the dam is poor condition rangeland, predominantly Texas wintergrass (*Stipa leucotricha*), honey mesquite, Huisache (*Acacia smallii*) mixed brush canopy. FRS No. 4 currently provides habitat for small mammals, neo-tropical songbirds, and shore birds. Various species of reptiles and amphibians also inhabit the project site. No viable fisheries are currently associated with the project site.

#### **Threatened and Endangered Species**

FRS No. 4 is located in Bexar County where the black-capped vireo (*Vireo atricapillus*), golden cheek warbler, (*Dendroica chrysoparia*), and various species of karst dwellers, are known to occur or may occur. These species are listed as Endangered by the U.S. Fish and Wildlife Service (USFWS). The site is located approximately 1.5 miles southeast of Interstate 35 within the city limits of Converse. Vegetation consists of invader and low seral woody, grasses and

forb species as described in Wildlife Section. Consultation with USFWS indicated that no known sighting or nests have been identified in the immediate area.

The site is also located in Karst Zone 5. Karst Zones 3 and 4 require a visual reconnaissance of the areas to be impacted for sinks or caves. Karst Zones 1 and 2 have a high probability or possibility of known invertebrates and their desired habitat. They require specific USFWS protocols by a qualified geologist or geohydrologist. Karst Zone 5 areas require no action. A visual reconnaissance of the areas to be impacted revealed no karst habitat, or karst dwelling species present.

It has been concluded that there are no federal or state listed endangered species or their habitat located in the project site.

#### **Wetlands**

FRS No. 4 currently provides approximately 34 acres of Palustrine habitat (mud flat). Stream channels above the site and below the project site area are narrow and limited to flow only during periods of moderate to heavy rainfall.

#### **Status of Operation and Maintenance**

SARA is responsible for the operation and maintenance of FRS No. 4. The Alamo Soil and Water Conservation District provides assistance, as needed, in the operation and maintenance. Inspections of the dam indicated that the dam is being operated and maintained properly. The City of Converse actively enforces EPA's Storm Water Pollution Prevention Plans (SWPPPs) concerning new development, and prevents development from encroaching upon the 100-year floodplain.

The dam is in excellent condition. A thick stand of coastal bermudagrass covers the front and back slopes and auxiliary spillway. SARA fertilizes the embankment as needed to maintain this protective cover. No brush or trees are allowed to grow on the embankment. The inlet and principal spillway were visually inspected and an internal camera was used to inspect the conduit. Both are in excellent condition.

## PROBLEMS AND OPPORTUNITIES

The basic concern is the safety of FRS No. 4 and the potential problems that failure of the dam would cause. Approximately 450-550 people downstream are at risk should the dam fail. This estimate is based only on people living downstream of FRS No. 4. It does not include people who might be recreating at a city park within the breach area, and any people who might be in public and commercial buildings downstream at the time of a breach. This estimate also does not include motorists on FM Road 1976 and Gibbs-Sprawl Road located immediately below the dam, nor does it include motorists on FM Road 78, Upper Seguin Road, and FM Road 1516, which would also be affected by a breach. The primary objective of the project is to minimize the risk of failure and to assure that the structure will continue to function safely in the future.

Although FRS No. 4 is functioning as originally planned and providing downstream flood damage protection from the 25-year, 24 hour storm, there is a possibility of the dam failing from overtopping if a storm occurs greater than the structure was constructed to control. Total estimated damages from a catastrophic breach of FRS No. 4 would approach \$14.5 million and the potential risk to loss of life would be tremendous.

## SCOPE OF ENVIRONMENTAL ASSESSMENT

A scoping process was used to determine the issues significant in defining the problems, and formulating and evaluating alternatives. Scoping included a public meeting, written request for input from state, local and federal agencies, and a coordination meeting with appropriate agencies. A steering committee of sponsors and local citizens was also formed to solicit input.

Table A presents the results of the scoping process.

| <i>Table A – Identified Concerns</i>                          |                          |  |                |
|---|--------------------------|--|----------------|
| <b>Economic, social, environmental, and cultural concerns</b> | <b>Degree of Concern</b> | <b>Degree of Significance to Decision Making</b> | <b>Remarks</b> |
|   |                          |  |                |
| Dam Safety  | High                     | High   |                |
| Human Health & Safety   | High                     | High   |                |
| Flood Damages   | High                     | High   |                |
| T&E Species   | Low                      | Low  | No Impact      |
| Cultural Resources  | Low                      | Low  | No Impact      |
| Prime Farm Lands  | Low                      | Low  | None Present   |
| Wetlands  | Low                      | Low  |                |
| Air Quality   | Low                      | Low  |                |
| Water Quality   | Medium                   | Medium   |                |
| Water Quantity  | Medium                   | Medium   |                |
| Aesthetics  | High                     | High   |                |
| Sedimentation   | Medium                   | Medium   |                |
| Land Values   | Medium                   | Medium   |                |
| Fish & Wildlife Habitat                                       | Medium                   | Medium   |                |
| Recreation  | Medium                   | Medium   |                |
|   |                          |  |                |

## BREACH ANALYSIS AND HAZARD CLASSIFICATION

Martinez Creek Watershed FRS No. 4 does not meet current dam design and safety requirements. The dam was originally constructed in 1964 as a class A (low hazard) structure for the purpose of protecting downstream agricultural lands from flooding. Exceptional population growth in the area since 1964 has dramatically changed the land use to predominately suburban. As result of this population growth, many residents and roadways are now at risk from a catastrophic breach of FRS No. 4..

The NRCS hazard classification now identifies this dam as a class C (high hazard) structure. The Texas Commission on Environmental Quality, Safe Dams Program, has agreed on the classification of the structure as a "high hazard". The high hazard classification is based on the potential risk to loss of life in homes, on roadways, railroad, and community recreational facility existing in the downstream dam breach flood zone area. FRS No. 4 has been identified as a high hazard dam as a result of (1) urban development in the area that will be potentially affected by a breach of the dam, and (2) FM Road 1976, located downstream, a major transportation route in Converse. Gibbs-Sprawl Road intersects FM Road 1976 just east of the creek, parallels the creek for several hundred feet, passes underneath the railroad bridge trestle, and then veers away from the creek and up a hill out of the floodplain, never actually crossing the creek. However, because of its proximity to the creek, portions of this road flood often, thus necessitating frequent maintenance. This road is used primarily by truck traffic associated with a concrete products facility at the top of the hill, and as a shortcut by motorists heading to and from residential areas east of the creek. Because of its frequent maintenance needs and truck traffic, this road is not a significant traffic route, and thus was not used for consideration of the high hazard classification of FRS No. 4. However, since a portion of Gibbs-Sprawl Road is lower than FM Road 1976 and due to its proximity to West Salitrillo Creek, driving conditions can be hazardous during major storm events.

Breach studies indicate that FM Road 1976 would be overtopped by approximately 12 feet and Gibbs-Sprawl Road by about 15 feet if the dam failed, resulting in property and infrastructure damages. There are 174 properties downstream of the dam, of which 165 are residential, that would be at-risk in the event of a breach, resulting in 450-550 people being subjected to potential risk to loss of life. The breach floodwater surface would be 7 feet or greater in several buildings, and many buildings, of which most are residential, would experience water depths of 6 feet or greater. Because of the number of at-risk properties and the location of FM Road 1976 and Gibbs-Sprawl Road, the threat of loss of life downstream of the dam would be extreme.

Several normal faults are located in the surrounding area of the site trending approximately N 62° E. One fault is located approximately 4,600 feet north of the site. Probabilistic ground motion values as measured in 0/0g for this site indicates low seismicity. Because the faults can be considered inactive, there is no risk of failure due to seismic activity.

Although the structure is presently sound, there is always the risk of failure. The most likely cause of FRS No. 4 failing is by overtopping. In the unlikely event that the structure was overtopped and failed the most serious failure would be a breach in the highest point. This would result in a breach hydrograph that has a peak discharge of 30,000 cubic feet per second (cfs). See Appendix C, Breach Inundation Map.

## CONSEQUENCES OF DAM FAILURE

All of the structural components of the dam are in very good condition. The dam does not meet current safety standards for a dam in this location and there is a risk of the dam failing from overtopping. An analysis of the dam indicated that a storm of the Probable Maximum Flood (PMF) would overtop the dam. The risk of dam failure is low but the consequences of such a failure if it were to occur would likely be catastrophic.

If FRS No. 4 were to fail, 174 properties located downstream would be flooded. These include 165 residential properties, 1 commercial property, and 8 public properties. Property damages resulting from breach waters are estimated at over \$13 million. This figure does not include damages to residential streets, utilities, yards, and parked vehicles within the breach area. The following table depicts the number and type of properties flooded by depth from a breach.

*Table B - Properties Flooded by Depth From Breach of FRS No. 4*

| Depth (ft) <sup>1</sup> | Type of Property |            |        |
|-------------------------|------------------|------------|--------|
|                         | Residential      | Commercial | Public |
| < 1                     | 8                | 1          | -      |
| 1-2                     | 17               | -          | 2      |
| 2-3                     | 28               | -          | -      |
| 3-4                     | 31               | -          | 2      |
| 4-5                     | 42               | -          | 2      |
| 5-6                     | 28               | -          | 1      |
| 6-7                     | 9                | -          | -      |
| 7-8                     | 2                | -          | -      |
| 8-9                     | -                | -          | 1      |
| Total                   | 165              | 1          | 8      |

<sup>1</sup> Relative to first floor elevation

More devastating than monetary damages would be the potential risk to loss of life. As reflected in Table B, nearly half of the residential properties would have over 4 feet of water above the first floor elevation. If such flooding were to occur at night, loss of life could not only be disastrous but also extreme. Seven of the eight public properties subject to flooding from a breach are located within Converse City Park. These structures include a pavilion, a pool house, and concession stands associated with ball fields. The other public property is a storage shed located in a cemetery.

If the dam fails, FM Road 1976, a major traffic thoroughfare, would be overtopped by approximately 12 feet of water at a maximum velocity of 14 feet per second (Table C). All vehicles on FM Road 1976 would be washed downstream, the road surface would be damaged, and the FM Road 1976 bridge would most likely be washed away or at least impassable. Traffic would be disrupted while the bridge and the roadway are being repaired, thus affecting about 15,000 motorists per day. Breach waters would overtop Gibbs-Sprawl Road by about 15 feet. Traffic on Gibbs-Sprawl Road would be disrupted, also, but to a much lesser degree than FM Road 1976.

About 200 feet downstream from FM Road 1976 is a bridge trestle owned and operated by Union Pacific Railroad (Table C). Although the rails would not be overtopped, the high velocity of the breach waters would produce major damage to the trestle and rail grade. Union Pacific

officials estimate that 30 to 40 trains utilize this rail line every day. Floodwater damages to the bridge trestle and rail grade from a breach of FRS No. 4 would result in costly delays and re-routing of trains. Based upon historical situations dealing with damaged rail lines, Union Pacific officials estimated that costs to the railroad would be at least \$1 million for each day the rail line is out of service. Costs could conceivably be in the millions of dollars, but due to the urgency of returning rail service to the line, a conservative estimate of one day of down time would be expected.

Three other thoroughfares within the City of Converse cross West Salitrillo Creek downstream of the railroad: FM Road 78, Upper Seguin Road, and FM Road 1516 (Table C). Because of its location, height, and length, the railroad grade located upstream from these three roads would retard the breach water temporarily, thus reducing the full destructive force of the water based upon the volume allowed through the trestle opening. However, the amount of water passing through the trestle would still be enough to overtop FM Road 78 by 3 feet, Upper Seguin Road by 8 feet, and FM Road 1516 by 6 feet. The bridge on FM Road 78 would probably only experience surface damage to the roadway. But, because of the water's depth and velocity, the other two bridges most likely would either be washed away or suffer tremendous damage. Even though structural damages to the lower two bridges would occur, the threat of loss of life due to motorists being on or near these bridges at the time of flooding was considered low. This assumption is based on (1) the stream distance downstream from the railroad bridge (about 1.4 miles for Upper Seguin Road and 1.7 miles for FM Road 1516) and (2) city officials having time to stop or warn traffic that far downstream. Total estimated infrastructure damages from a breach (excluding the railroad costs) would be about \$500,000.

**Table C – Effects of Breach of FRS No. 4 to Downstream Crossings**

| Downstream Crossing   | Depth Over Crossing (ft)<br><sup>1/</sup> | Daily Traffic Count (#) |
|---|---|-------------------------|
| FM 1976   | 12  | 15,000                  |
| Union Pacific RR  | <sup>2/</sup>                             | 30-40                   |
| Gibbs-Sprawl Rd.  | 15  | NA                      |
| FM 78   | 3   | NA                      |
| Upper Seguin Rd.  | 8   | NA                      |
| FM 1516   | 6   | NA                      |
| <sup>1/</sup> Average velocity for all crossings is approximately 12 feet per second. |   |                         |
| <sup>2/</sup> Rails are not overtopped.   |   |                         |

Total estimated damages from a catastrophic breach of FRS No. 4 would be about \$14.5 million. As a result of a breach approximately 30,000 cubic yards of fill material from the dam would move downstream, clogging stream channels and increasing flooding on roads and bridges.



**FM 1976 Crossing on West Salitrillo Creek immediately above the Union Pacific Railroad trestle and below FRS No. 4. A breach of FRS No. 4 would overtop FM 1976 by 12 feet.**



**Gibbs-Sprawl Road Crossing under Union Pacific Railroad Trestle would be completely submerged to a depth of 15 feet by a failure of FRS No. 4.**

## ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

A wide range of non-structural and structural measures were considered singly and in combination as alternatives were formulated. Non-structural measures included flood plain management, liability insurance, zoning, flood warning systems, flood proofing of properties, installation of storm water detention structures and relocation of properties out of the breach area and/or floodplain. These non-structural alternatives were cost prohibitive. Structural measures included planned breach of the dam, decommissioning (removal) of FRS No. 4, adding a larger multi-stage principal spillway, raising the dam, and increasing the capacity of the auxiliary spillway.

Another structural alternative, partial decommissioning of the dams, was also considered but eliminated from detail study due to the expressed concern of leaving unsightly sections of the dam. Decommissioning removes the storage function of the dam and reconnects, restores and stabilizes the stream and floodplain functions. Although complete removal of the dam is not always required for decommissioning, partial removal of the dam would not be aesthetically or socially acceptable and would not be supported by the nearby residents

Channel work was determined to be needed to reconnect the upstream channel and the downstream channel through the sediment pool as a means to stabilize the entire channel section if the dam was removed. Channel work would include re-establishing the original meanders of the channel to stable grades for control of headcutting and stream bank erosion. All work including re-vegetation would be completed as much as possible to return the site to original conditions that were present prior to construction of the dam. Purchasing liability insurance was dropped from consideration because it did not provide an acceptable solution to the loss of life threat. Modifications to current floodplain studies and purchase of new easements were incorporated into the alternatives that included removal or breaching of the dam. An alternative considered but rejected as economically unfeasible was the alternative to purchase all inhabitable properties downstream of the dam within the breach area and relocating the residents. The estimated cost of this alternative (\$21,434,000) was based on complying with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. 4601 et. seq. as implemented by 7 C.F.R. Part 21).

Failure of the dam would result in significant damage and potential risk to loss of life. If the dam fails SARA would then be liable for the downstream damages. SARA considered the following options in deciding the most likely course of action:

- Modify the dam to comply with current safety standards with Federal assistance.
- Modify the dam to comply with State dam safety requirements without Federal assistance.
- Take no action and accept the risk of the dam failing sometime in the future.
- Breach the dam to eliminate the risk of failure from a catastrophic storm event.

After considering the options, SARA decided that their best option in the absence of Federal assistance is to breach the dam and eliminate the risk of the damages from a failure. Accepting the risk of the dam failure was deemed unacceptable and no entity was identified which would accept the responsibility of the present dam.

## FORMULATION OF ALTERNATIVES

A 100-year project life was established as well as a 100-year period of analysis. All alternatives were planned to function for a minimum of 100-years with proper maintenance. Alternatives are eligible for financial assistance under the Watershed Protection and Flood Protection Act (PL83-566) as amended by the Watershed Rehabilitation Amendments of 2000 (Public Law 106-472). To be eligible for federal assistance, an alternative must meet the requirement as contained in the Watershed Rehabilitation Amendments of 2000.

The Future Without Project alternative serves as a baseline to evaluate the other alternatives. It depicts the most probable future conditions in the absence of a federally assisted project. SARA is the entity that owns the easements for the dam, and is responsible for determining what action to take if the dam is not brought up to current performance and safety standards.

Based on conditions set forth by the Future Without Project baseline, present conditions were developed. The dam does not meet current safety standards for a dam in this location and there is a risk of the dam failing from overtopping. An analysis of the dam indicated that the Probable Maximum Flood (PMF) would overtop the dam. Appendix C shows the area that will be flooded if the dam breached during passage of a storm of this magnitude.

After considering the options, SARA decided that their best option in the absence of federal assistance was to breach the dam and eliminate the risk of the damages from a dam failure. Accepting the risk of the dam failure was deemed unacceptable and no entity was identified which would accept the responsibility of the present dam.

Alternatives eligible for financial assistance under The Watershed Protection and Flood Prevention Act (PL83-566) as amended by the Watershed Rehabilitation Amendments of 2000 and alternatives ineligible for financial assistance were developed. To be eligible for federal assistance, an alternative must meet the requirement as contained in Public Law 106-472.

### **Alternatives Studied**

The following is a description of the alternative plans that were developed:

#### **Alternative No. 1 – Future Without Project**

This alternative consists of making a breach in the dam of sufficient size to safely pass the 100-year, 24 hour frequency flood event. This breach would be a minimum size opening in the dam from top of dam down to the valley floor, which would eliminate the structure's ability to store water. Downstream flooding conditions would be similar to those that existed prior to the construction of the dam. This course of action would minimize the sponsor's dam safety liability but would not eliminate all liability. The breach location will necessitate removal of the principal spillway components. The material (about 30,000 cu yd) will be placed in the present easement area. The remaining exposed area (about 10 acres) will be vegetated for soil erosion control.

The remaining dam and the land currently covered by the sediment pool would be maintained as a greenbelt area. Current plans to develop property located in the area downstream of the dam, west of the tributary, and north of FM Road 1976 would be altered

(a reduction of about 6 acres) to insure no development takes place within the enlarged 100-year floodplain. Plans to develop the area south of the dam, east of the tributary, and north of FM Road 1976 into an outdoor, recreational business (probably a golf driving range) would not be affected. Upstream property values would not be affected. This alternative would also necessitate the City of Converse to modify FM Road 1976 and Gibbs-Sprawl Road, and SARA to stabilize the stream channel. The estimated cost of this alternative is \$565,000.

#### **Alternative No. 2 - Decommission FRS No. 4**

Decommissioning removes the storage function of the dam and reconnects, restores, and stabilizes the stream and floodplain functions. Although complete removal of the embankment is not always required for decommissioning, partial removal of the embankment would not be aesthetically or socially acceptable due to the expressed concern of leaving unsightly sections of the dam. The principal spillway and the earthen dam will be removed. This action would eliminate the structure's ability to store water. Material will be placed in the sediment and detention pools and the existing sediment pool. All exposed areas will be vegetated as needed for erosion control (34 acres). Riparian vegetation will be established along the stream (10 acres). Channel work will be installed to reconnect the stream channel through the sediment pool. The land currently covered by the dam and sediment pool will be maintained as a greenbelt area. Development plans mentioned for Alternative No. 1 would also apply to this alternative. Decommissioning FRS No. 4 would also necessitate the City of Converse to modify FM Road 1976 and Gibbs-Sprawl Road, and SARA to stabilize the stream channel. Estimated cost is \$1,699,800.

#### **Alternative No. 3 - Rehabilitation of FRS No. 4.**

This alternative consists of lowering the sediment pool by 3.6 feet, replacing the 24 inch pipe with a 42 inch principal spillway and raising the dam 2.8 feet to comply with current safety and performance standards and to extend the service life of the dam for an additional 100 years. The sediment pool area will be decreased from 34 to 18.5 acres in size, but will now retain permanent water due to closing of the lowest gated opening. Removal of accumulated sediment is not necessary. The City of Converse plans to modify Converse North Park to include water based recreational activities associated with the sediment pool. Any recreational modifications planned by the City of Converse will be financed by the city and are not included in project costs. Planned development downstream of the dam would not be affected due to the current 100-year floodplain being maintained. FM Road 1976 and Gibbs Sprawl will not be modified. Estimated cost is \$1,026,400.

For water and related land resources implementation studies, standards and procedures have been established in formulating alternative plans. These standards and procedures are found in "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G)". According to P&G, an alternative that reasonably maximizes net national economic development benefits is to be formulated. This alternative is to be identified as the national economic development (NED) plan. During the process of formulating alternatives, the NED alternative was determined to be one of the three alternatives listed above.

## EFFECTS OF ALTERNATIVES

The following is a description of the effects that each alternative will have on the economic, social, environmental, and cultural concerns identified during the scoping process determined to be significant to decision making. The present conditions are described to provide a better understanding of the effects.

### **Dam Safety**

- **Present Conditions** – The dam does not meet current safety standards for a dam in this location and there is a risk of the dam failing from overtopping. An analysis of the dam indicated that a storm of the Probable Maximum Flood (PMF) would overtop the dam. The risk of dam failure is low but the consequences of such a failure if it were to occur would likely be catastrophic. A breach study was made to determine the effects of a one time catastrophic breach of the existing dam. The breach of the existing dam was considered to be overtopping of the dam with a breach as wide as the maximum height of the dam. The flow from the breach would overtop FM Road 1976 with approximately 12 feet of water at a maximum velocity of 2.5 feet per second. Gibbs-Sprawl Road would be overtopped by about 15 feet of water. A Union Pacific bridge trestle and rail grade would suffer damages resulting in 30-40 trains being rerouted. Three other bridges downstream would be inundated by 3 to 8 feet of water. The breach of FRS No. 4 would flood 174 properties, a city park with ball fields, a swimming pool, and playground equipment.
- **Alternative No. 1** - The threat of the dam failing would be removed through a controlled breach of the dam thereby eliminating any concern for dam safety. Modification of FM 1976 would remove the threat of loss of life to occupants of vehicles. The section of Gibbs-Sprawl Road located within the 100-year floodplain would be closed. Alternate traffic routes would be utilized.
- **Alternative No. 2** - The threat of the dam failing would be removed by decommissioning the dam and removing the footprint. Other conditions as described in Alternative No. 1 would apply.
- **Alternatives No. 3** - The risk of the dam failing from overtopping would be reduced by raising the effective height of the dam thereby reducing the threat of a catastrophic breach from over topping.

### **Human Health & Safety**

- **Present Conditions** –Although the dam is structurally safe, there is a threat of failure from overtopping by the occurrence of an event in excess of the 25-year, 24-hour storm. There is a significant threat to human life and safety from dam failure. The breach of FRS No. 4 would flood 165 residential properties, 1 commercial property, 8 public properties, a city park, and several residential streets. Approximately 450-550 people would be subject to potential risk to loss of life. Also, four bridges over West Salitrillo Creek would be inundated with 3-12 feet of water and another road by 15 feet of water, thus endangering motorists.
- **Alternative No. 1** - No threat from failure. However, potential threat from flooding would increase.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** - Threat to human life and safety from a dam failure would be reduced. Flood protection would continue for residents downstream of FRS No. 4.

### Flood Damages

- **Present Conditions** – The current dam provides complete protection from the 25-year, 24-hour event storm by passing a storm event of this magnitude through the auxiliary spillway.
- **Alternative No. 1** - Downstream flooding and damages to property and infrastructure would increase. The City of Converse would incur costs from repairing increased flood damages to bridges, roadways and facilities in Converse City Park. The limits of the 100-year floodplain would increase, which would affect future development. Also, an additional 16 residential property owners would need to purchase flood insurance. In the absence of the dam, City officials indicated that FM Road 1976 would be modified and a section of Gibbs-Sprawl Road would be closed in order to alleviate flood damages to the roadway and consequential effects to traffic.
- **Alternative No. 2** - Same as Alternative No. 1
- **Alternative No. 3** - There would be increased protection from flooding. Threat of a catastrophic breach would be significantly reduced due to FRS No. 4's ability to endure a PMF without overtopping the dam. The City of Converse would not incur additional repair costs to infrastructure or costs of modifying FM Road 1976 and closing a section of Gibbs-Sprawl Road. No additional property owners would need to purchase flood insurance.

### Wetlands

- **Present Conditions** – FRS No. 4 provides approximately 34 acres of mud flat, (Palustrine system) habitat that was created by the original construction of the site. This created wetland provides habitat for reptiles and amphibians, waterfowl, and wading birds. Stream channels above and below the site are narrow and limited to flow only during periods of moderate to heavy rainfall. There are no wetlands located below the dam in the project area.
- **Alternative No. 1** - This alternative will modify a 34 acre Palustrine system that will be vegetated with native grasses and forbs indigenous to the Blackland prairie. SARA would be expected to meet minimum state standards in a least costly method to address wetland losses.
- **Alternative No. 2** - This alternative will modify a 34 acre Palustrine system that will be vegetated with native grasses and forbs indigenous to the Blackland prairie. Riparian vegetation will be established through planting and natural regeneration. SARA would be responsible for any mitigation costs.
- **Alternative No. 3** - This alternative will create 18.5 acres of deep to shallow water habitat (Lacustrine System); the remaining 15.5 acres of Palustrine system will be retained.

### Threatened and Endangered (T&E) Species

- **Present Conditions** - The affected habitat is not conducive for the black-capped vireo and golden checked warbler. Current habitat is open city parkland with scattered black willow (*Salix nigra*). Listed T&E avian species habitats can be described as mature ash juniper and scrub oaks species. Consultation with U.S. Fish and Wildlife Service indicated that no known sighting or nests have been identified in the immediate area. The project area is also located in Karst Zone 5. No additional reconnaissance is required.
- **Alternative No. 1** - No Effect.
- **Alternative No. 2** - No Effect.
- **Alternative No. 3** - No Effect.

### Cultural Resources

- **Present Conditions** – No known cultural resources occur within the affected area.
- **Alternative No. 1** - There would be potential to affect cultural resources (should any be present) in areas where earth fill from dam is placed and in areas of modification of bridge and channel stabilization measures.
- **Alternative No. 2** - There would be potential to affect cultural resources (should any be present) in previously undisturbed areas where earth fill from dam is placed and in areas of modification of bridge and channel stabilization measures.
- **Alternative No. 3** - NRCS has conducted a cultural resources survey of the proposed rehabilitation work areas and no known cultural resources will be affected by this alternative.

### Air Quality

- **Present Conditions** - No air quality problems have been specifically identified.
- **Alternative No. 1** - Impacts will be of a temporary nature associated with earthmoving and other construction activities. These conditions will only be present during construction activities and until the disturbed areas are re-vegetated.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** - Same as Alternative No. 1.

### Water Quality

- **Present Conditions** - No water quality problems have been specifically identified. However, data on the quality of runoff and in the sediment pool is limited. There is a potential of pollutants from the urbanized area being carried in the runoff. Also, organic material and sediment deposited in the sediment pool affects the quality of the water.
- **Alternative No. 1** - Impacts will be of a temporary nature associated with earthmoving and other construction activities. Sediment in stream flow will be carried downstream.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** - Impacts will be of a temporary nature associated with earthmoving and other construction activities. These conditions will only be present during construction activities and until the disturbed areas are re-vegetated. Storm Water Pollution Prevention Plan (SWPPP) required under the Texas Pollutant Discharge Elimination System (TPDES), Texas Commission on Environmental Quality (TCEQ) Storm Water Construction General Permit would minimize any degradation of water quality during construction.

### Water Quantity

- **Present Conditions** – The stream is ephemeral and only flows during periods of moderate and heavy rainfall. Currently, permanent water is not available in the sediment pool.
- **Alternative No. 1** – During storm events, flow will move downstream adding to volume and peaks as it moves, thus increasing the floodplain to conditions existing prior to construction of the dam.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** - During construction the sediment pool would be ineffective for a period of 2 to 3 months while the outlet pipe is being replaced. This condition will only be present until the lowest gated port is closed following construction. The volume of future permanent water will be affected as the result of a reduction in sediment pool capacity over time.

### **Aesthetics**

- **Present Conditions** – Presently the sediment pool does not contain permanent water. After runoff storm events, the sediment pool drains, leaving a shallow pool of water in a low area. The dam and auxiliary spillway areas are mowed frequently and maintained by SARA.
- **Alternative No. 1** – This alternative would leave a significant portion of the embankment in place. This alternative would alter the 34 acre sediment pool which currently impounds a shallow pool, and its associated wetlands.
- **Alternative No. 2** - Most residents would consider it unattractive and unacceptable to leave a significant portion of the embankment in place. Therefore, only a complete removal of the footprint was considered. This alternative also removes the 34 acre sediment pool which currently impounds a shallow pool and its associated wetlands. The dam, auxiliary spillway, and pool areas would be restructured to reflect the pre-project condition and reestablished to native adapted species. The plant community would mature in time and provide habitat for birds and other species.
- **Alternative No. 3** - The sediment pool area will be decreased from 34 to 18.5 acres in size. The lowest gated port opening has been left open in the past but will be closed following rehabilitation of FRS No. 4. Therefore, 18.5 acres of permanent water will be available, thus providing a more attractive environment. The remaining 15.5 acres will still be a palustrine system.

### **Sedimentation**

- **Present Conditions** – Sedimentation of the reservoir was surveyed and 100 acre-feet remain. At the current sediment rate this will permit an additional 100 years of sediment storage. The sediment contained in the sediment and detention areas of the structure was not tested as it will not be disturbed during construction.
- **Alternative No. 1** - Current sediment will remain in the area with re-vegetation. Stream borne sediment will travel downstream.
- **Alternative No. 2** - Same as Alternative 1.
- **Alternative No. 3** – Sediment volume of the structure will be provided for the next 100 plus years.

### **Land Values**

- **Present Conditions** – Within the next 3-5 year period, the landowner plans to develop land located downstream of FRS No. 4. These plans include the development of property located south of the dam, west of the tributary, and north of FM Road 1976 for residential and commercial use. Another landowner plans to develop the area south of the dam, east of the tributary, and north of FM Road 1976 into an outdoor recreational business, probably a golf driving range. Because of the topography of the land located west and upstream of the dam and sediment pool, future development of the area was not considered in the design of FRS No. 4.
- **Alternative No. 1** – Current plans to develop property located south of the dam, west of the tributary, and north of FM Road 1976 would be altered to insure no development takes place within the enlarged 100-year floodplain. About 6 acres would be added to the modified 100-year floodplain. Since no inhabitable development can take place within the 100-year floodplain, the fair market value for these 6 acres would be affected negatively. Plans to develop the area south of the dam, east of the tributary, and north of FM Road 1976 into an outdoor recreational business would not be affected. Upstream

land values would also not be affected. Without flood protection, the 100-year floodplain will be enlarged within the current urban and built-up area, thus negatively affecting an additional 16 residential property values.

- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** - Since the 100-year floodplain would remain unchanged, land values within to-be developed areas would not be affected. Even with permanent water in the sediment pool, upstream land values would also remain unchanged due to the low probability of upstream development. By keeping the 100-year floodplain as is, there is not a need for additional purchase of flood insurance, thus maintaining property values for 16 residences.

#### **Fish and Wildlife Habitat**

- **Present Conditions** – FRS No. 4 is located within the city limits of Converse, in Bexar County, Texas. The watershed for this site is heavily urbanized. Landuse adjacent to the site is designated as a city park with usage by surrounding homeowners. The land cover is predominantly poor condition rangeland, low seral plant community infested with honey mesquite (*Prosopis glandulosa*). Migratory waterfowl, song bird, reptiles and amphibians frequent the sediment pool.
- **Alternative No. 1** - This alternative will over time impact migratory waterfowl as the sediment pool begins to dry and more upland vegetation begins to establish. Periodic flooding of the flood plain will recharge small depressions as habitat for small shore birds, song birds, reptiles and amphibians.
- **Alternative No. 2** - This alternative will remove existing habitat for migratory waterfowl. Limited habitat for shorebirds will be available. As riparian vegetation becomes established habitat improve for song birds, some reptiles and amphibians. The mesic environment preferred by many reptiles and amphibians will be reduced to that associated with the stream channel.
- **Alternative No. 3** - This alternative will create 18.5 acres of deep to shallow water habitat (Lacustrine system) for enhanced fisheries and wildlife habitat while 15.5 acres of mud flat habitat (Palustrine system) will remain in its present condition. It is expected that the 18.5 acres will gradually fill with sediment over the life of the project and gradually revert back to a Palustrine system.

#### **Recreation**

- **Present Conditions** – The City of Converse is responsible for maintenance of the park grounds adjacent to the lake (Converse North Park), and the park located downstream (Converse City Park). There are recreation facilities such as picnic tables, pavilions, playgrounds, ball fields, a swimming pool, as well as restrooms. Concerning Converse North Park, the City of Converse was unable to estimate the number of people who visit the park each year. Because the sediment pool does not contain permanent water, there are not any water based recreational activities associated with it.
- **Alternative No. 1** - Converse North Park will remain as is. Frequency and depth of flooding will increase in Converse City Park.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** – Since 18.5 acres of permanent water will be available, City of Converse officials are interested in including water based recreational activities within Converse North Park, thus increasing the number of visitor days by 700 annually. Frequency and depth of flooding will remain unchanged in Converse City Park.

## COMPARSION OF ALTERNATIVES

Table D compares effects of each of the alternatives.

| <i>Table D – Comparison of Effects of Alternatives</i> |   |   |   |
|--|---|---|---|
| Resource Concerns                                      | Alternative No. 1   | Alternative No. 2   | Alternative No. 3   |
| <b>NED Account</b> <sup>1</sup>                        |   |   |   |
| Project Investment                                     | \$565,000   | \$1,699,800   | \$1,026,400   |
| Annual Benefits  | \$0   | \$0   | \$108,000   |
| Annual Costs   | \$32,900  | \$97,500  | \$63,000  |
| Net Monetary Benefits                                  | (\$32,900)  | (\$97,500)  | \$45,000  |
| <b>EQ Account</b> <sup>2</sup>                         |   |   |   |
| Water  | The potential for permanent water in the sediment pool (34 acres) would be greatly diminished.                          | The potential for permanent water in the sediment pool (34 acres) would be greatly diminished.                          | Maintain permanent water in sediment pool, but reduced from 34 to 18.5 acres.   |
| Land   | Minor erosion during construction. Sediment pool converted to open area.  | Minor erosion during construction. Sediment pool converted to open area.  | Minor erosion during construction. 10 acres disturbed during construction. Sediment pool converted to permanent water.  |
| Air  | Minor adverse during construction.  | Minor adverse during construction   | Minor adverse during construction.  |
| Plants & Animals                                       | Loss of 34 acres of wildlife habitat. Area would be vegetated to native species, preferred by resident wildlife species | Loss of 34 acres of wildlife habitat. Area would be vegetated to native species, preferred by resident wildlife species | Moderate effects as a portion of the palustrine system would be changed to a lacustrine system. A more diverse habitat will be developed for aquatic and terrestrial wildlife species. Fish habitat created with 18.5 acre sediment pool. 15.5 acres would remain in palustrine system. |
| Threatened & Endangered Species                        | No effect   | No effect   | No Effect   |
| <b>RED Account</b> <sup>3</sup>                        |   |   |   |
| Land Values  | Values will be negatively affected in downstream area, but no effect to region.   | Values will be negatively affected in downstream area, but no effect to region.   | Values maintained in downstream area, but no effect to region.  |
| <b>OSE Account</b> <sup>4</sup>                        |   |   |   |
| Human Resources  | Reduced threat to loss of life.   | Reduced threat to loss of life.   | Reduced threat to loss of life. Increased Flood Protection.   |
| Recreation   | Converse North Park - no effect; Converse City Park – increased frequency and depth of flooding.                        | Converse North Park - no effect; Converse City Park – increased frequency and depth of flooding.                        | Converse North Park – increased water-based activities; Converse City Park – no effect.   |
| Cultural Resources                                     | No effect   | No effect   | No effect   |

<sup>1</sup> NED – National Economic Development

<sup>2</sup> EQ – Environmental Quality

<sup>3</sup> RED – Regional Economic Development

<sup>4</sup> OSE – Other Social Effects

Table E compares the monetary effects and associated impacts of the alternatives:

**Table E – Monetary Effects of Alternatives <sup>1/</sup>**

| Item   | Alternative No. 1      | Alternative No. 2  |                    | Alternative No. 3       |                    |
|--|------------------------|--------------------|--------------------|-------------------------|--------------------|
|  | Future Without Project | Decommission FRS 4 | Change in Benefits | Rehabilitation of FRS 4 | Change in Benefits |
|  | Benefits               | Benefits           | Change in Benefits | Benefits                | Change in Benefits |
| Original Downstream Benefits <sup>2/</sup>     | \$0                    | \$0                | \$0                | \$6,000                 | \$6,000            |
| Flood Insurance Administration Savings         | \$0                    | \$0                | \$0                | \$1,700                 | \$1,700            |
| Downstream Infrastructure <sup>3/</sup>        | \$0                    | \$0                | \$0                | \$7,100                 | \$7,100            |
| Additional Incidental Recreation <sup>4/</sup> | \$0                    | \$0                | \$0                | \$13,500                | \$13,500           |
| Urban Flood Damage Reduction                   | \$0                    | \$0                | \$0                | \$79,700                | \$79,700           |
| <b>Total</b>                                   | <b>\$0</b>             | <b>\$0</b>         | <b>\$0</b>         | <b>\$108,000</b>        | <b>\$108,000</b>   |

<sup>1/</sup> All numbers reflect 2003 prices.

<sup>2/</sup> Updated using applicable indices and updated data.

<sup>3/</sup> Reflects avoidance of modification of costs to FM Road 1976 and Gibbs-Sprawl Road.

<sup>4/</sup> Adjusted for cost of modifying Converse North Park

### RISK & UNCERTAINTY

The areas of risk and uncertainty related associated with this project lie in the accuracy of estimating flood flows, flood elevations, cost estimates associated with each alternative, property values, the reliability of future projections, and the assessment of impacts on damages. The uncertainty of flood flows and water surface elevations has the potential for increased damages as new properties are converted from agricultural to residential and commercial use. It is possible these uncertainties could lead to increased risk to human life in the event of a dam breach. Hydrologic methods and computer modeling used in this analysis are consistent with the standards of practice at this time. However, the tributary is ungaged and no verification of storm flows is possible. Cost estimates were developed from available historic data. Factors discovered during actual design, notably the bearing capacity of the existing structure and availability of suitable material for construction could affect these estimates. The potential impacts for each alternative are estimated using techniques that relate potential damage to lost opportunity. However, these methods are in part based on professional judgment and actual experience could be different.

Within the context of this study effort, all alternatives were considered on a comparable basis. There does not appear to be any area that using different procedure or making more intensive studies would have resulted in a different decision.

### RATIONALE FOR PLAN SELECTION

As mentioned earlier, an alternative that reasonably maximizes net national economic development benefits is to be formulated. This alternative is to be identified as the national economic development (NED) plan. Alternative No. 3 – Rehabilitation of FRS No. 4 by raising the top of dam 2.8 feet, lowering the principal spillway crest by 3.6 feet and replacing the 24 inch principal outlet pipe with a 42-inch pipe – is the NED plan and will increase the nation's economic output. Annual benefits total \$108,000 and annual cost is estimated at \$63,000,

resulting in a net annual benefit of \$45,000. This results in a benefit to cost ratio of 1.7:1.0. The existing dam has already provided significant flood protection downstream.

Alternative plans, including the NED plan, were formulated in consideration of four criteria or tests: completeness, effectiveness, efficiency, and acceptability. These tests were applied to each of the alternatives. All alternatives meet the tests of completeness. Alternative Nos. 1 and 2 are not effective in addressing the core problem of removing the safety hazard while assuring that the dam will maintain present level of flood control benefits into the future. Alternative Nos. 1 and 2 were not acceptable to the local people because they failed to meet identified project purposes. Alternative No. 3 is the most efficient way to accomplish the desired objectives of removing the safety hazard and assuring continued performance and is the preferred alternative.

### **CONSULTATION & PUBLIC PARTICIPATION**

At the beginning of this study, the appropriate state and local agencies were informed of the effort and invited to offer input. Several coordination meetings were held with SARA, the Alamo Soil and Water Conservation District Board and dam safety representatives of Texas Commission on Environmental Quality. Representatives of U.S. Fish & Wildlife Service and Texas Commission on Environmental Quality participated in a field review of the proposal on February 26, 2003. The U.S. Army Corps of Engineers made a field visit to the site on April 3, 2003. The U.S. Environmental Protection Agency and Texas Parks and Wildlife Department were also invited but did not send a representative.

A public meeting was held at the City of Converse on February 5, 2004 informing the public of the initiation of planning and requesting oral and written input. The notice of the meeting was posted and published in the local newspaper. A steering committee made up of representatives of the Sponsors, city officials from the City of Converse, local homeowners and other interested citizens was organized. Input received from the group was used to scope items of concern in developing the environmental assessment and the development and evaluation of alternatives.

**Comments on the Draft Supplemental Watershed Plan/Environmental Assessment were requested from the following federal, state, and local agencies and organizations:**

Governor - State of Texas  
Texas Office of State-Federal Relations (State Single Point of Contact)  
Texas State Soil and Water Conservation Board  
Texas Commission on Environmental Quality  
Texas Parks & Wildlife Department  
Texas Water Development Board  
Texas Agricultural Experiment Station  
Texas Historical Commission  
US Army Corps of Engineers, Ft. Worth District  
USD1-Bureau of Reclamation  
U.S. Environmental Protection Agency  
U.S. Fish and Wildlife Service  
USDA-Forest Service  
Bexar County Commissioners Court  
Alamo Soil and Water Conservation District

Local Steering Committee members  
San Antonio River Authority

**Discussion and Disposition of comments from letters received on the Draft Supplemental Watershed Plan/Environmental Assessment (Plan/EA).**

Not all agencies and groups requested to comment on the Plan/EA submitted comments. The responding agencies and groups' comments and the disposition of each are as follows:

**Texas Water Resources Institute**

**Comment:**

The agency had no comment but wanted to thank the NRCS for the valuable service it provides to Texans in assisting with flood control through these and similar projects.

**Response:** Noted

**Texas State Soil & Water Conservation Board**

**Comment:**

This project is essential to maintain the flood control benefits the structure currently provides and to comply with current performance and safety standards. We strongly support this project and commend the project sponsors and NRCS for implementing this rehabilitation effort.

**Response:** Noted

**Texas Commission on Environmental Quality**

**Comment:**

A review of the project for General Conformity impact in accordance with 40 CFR Part 93 and Title 30, Texas Administrative Code section 101.30 indicates that the proposed action is located in Bexar County, which is currently unclassified or in attainment of the National Ambient Air Quality Standards for all six criteria air pollutants. Therefore, general conformity does not apply.

Although any demolition, construction, rehabilitation or repair project will produce dust particulate emissions, these actions should pose no significant impact upon air quality standards. Any minimal dust and particulate emissions should be easily controlled by the construction contractors using standard dust mitigation techniques.

**Response:** Dust and particulate emissions during construction will be controlled.

**PREFERRED ALTERNATIVE**

Alternative No. 3 is the preferred alternative. The dam will be modified to meet current performance and safety standards for a high hazard dam. The modification will consist of

rehabilitation of FRS No. 4 by raising the top of dam 2.8 feet, replacing the 24 inch principal spillway pipe with a 42 inch pipe, and lowering the sediment pool by 3.6 feet to comply with current performance and safety standards and extending the service life of the dam. The detention pool area would increase slightly due to the decreased size of the sediment pool.

Construction activities will result in the disturbance of approximately 10 acres. The removal of vegetation will only be that necessary to allow rehabilitation of the structure. Disturbed areas will be reestablished to vegetation to reduce erosion that could occur due to soil disturbance. The footprint of the existing dam will be increased slightly due to the increased dam height and flattening of the back slope of the dam to a 3:1 slope.

The sponsors will develop an Emergency Action Plan (EAP) before any rehabilitation construction activities begin stating the responsibilities for the development, implementation and review of actions necessary to provide safety to individuals downstream of the structure should extreme flooding occur.

### **COMPLIANCE WITH LOCAL, STATE, AND FEDERAL LAWS**

All applicable local, state, and federal laws will be complied with in the installation of this project. Construction activities will require a Storm Water Pollution Prevention Plan (SWPPP). The Corps of Engineers has indicated that the project will require authorization under Section 404 of the Clean Water Act, and that the project likely falls within the scope of an existing nationwide permit (NWP#3, Maintenance). Any applicable permits required by the U.S. Army Corps of Engineers will be obtained before any construction activities begin.

Efforts to identify cultural resources have been conducted in compliance with Section 106 and Section 110 (f) and (k) of the National Historic Preservation Act. No historic properties were identified in the areas and no known sites are recorded in the vicinity.

Ensuing disturbances associated with rehabilitation measures will be monitored for the presence of undiscovered sites. In the event of such discovery, appropriate actions will be taken in accordance with the State Level Agreement among NRCS and the Texas State Historic Preservation Officer, the National Programmatic Agreement among NRCS, the National Conference of State Historic Preservation Officers, and the Advisory Council on Historic Preservation, and NRCS General Manual 420, Part 401 guidance.

### **OPERATION AND MAINTENANCE**

The project will be operated and maintained by the sponsors. SARA has the primary responsibilities for maintenance of FRS No. 4. A new Operation and Maintenance (O&M) Agreement will be developed with SARA and the Alamo Soil and Water Conservation District for FRS No. 4 for the 100-year evaluated life of the structure. Operation and Maintenance (O&M) activities include but are not limited to inspections, maintenance and repairs of the principal spillways, dam, vegetation and the auxiliary spillway. Based on data from SARA, it is estimated that O&M activities will cost about \$5,000 per year.

## FINANCING ARRANGEMENTS

The installation of the project will be financed jointly by SARA and the NRCS. NRCS will use funds appropriated for this purpose. The percentages of the eligible project costs including construction, engineering, project administration, and land rights to be paid by SARA and the NRCS are as follows:

|                               | <u>SARA</u> | <u>NRCS</u> | <u>Estimated<br/>Project Cost</u> |
|-------------------------------|-------------|-------------|-----------------------------------|
| Rehabilitation of<br>FRS No.4 | 35 %        | 65 %        | \$801,700                         |

An amount up to the percentage rate specified may be satisfied by SARA for cost of an element such as engineering, real property acquisition or construction. The decision to, and arrangements for, such action will be negotiated between the sponsors and NRCS and will be included in a project agreement executed immediately before implementation. NRCS costs will not exceed 100 percent of the construction cost.

NRCS is responsible for the engineering services and project administration costs (\$224,700) it incurs. However, these costs are not used in the calculation of the federal cost share. These costs are, however, included in the Estimated Installation Cost (Table 1). Also, costs of water, mineral and other resource rights, as well as federal, state and local permits are the responsibility of SARA and are not counted toward local cost share. See Table 2 in Appendix E for a complete distribution of total rehabilitation costs.

**LIST OF PREPARERS**

| Name & Present Title                                   | Education                     | Experience (Years) |
|--|-------------------------------|--------------------|
| Steve Graham, P.E, Director Watershed Management, SARA | B.S. Civil Engineering        |                    |
| Jim Blair, Flood Control Infrastructure Manager, SARA  | B.S. Forestry                 |                    |
| Fernando Garza, District Conservationist, NRCS         | B.S.                          | 30                 |
| James Neighbors, Resource Conservationist, NRCS        | M.S. Range Management         | 36                 |
| James Featherston, Agricultural Economist, NRCS        | M.S. Agricultural Economics   | 28                 |
| Bryan Moffatt, Geologist, NRCS                         | B.S. Geology                  | 25                 |
| Calvin Sanders, Cultural Resources Specialist, NRCS    | M.A. Anthropology             | 23                 |
| Ronnie Skala, P. E. Hydraulic Engineer, NRCS           | B.S. Agricultural Engineering | 25                 |
| Russell Castro, Wildlife Biologist, NRCS               | B.S. Wildlife Management      | 24                 |
| David Strakos, Civil Engineering Technician – NRCS     | High School Diploma           | 26                 |
|  |                               |                    |

The local steering committee provided invaluable information, local concerns, and reviews during the development of the environmental assessment.

## REFERENCES

1. Bernard, J., L. Steffen, T. Iivary, and F. Reckendorf. 1995. *Reservoir Sediment Survey Information System (RESIS): Reservoir Descriptions, Sediment Deposition Rates, and Location Correlation with the National Inventory of Dams for the NRCS South Central Region*. USDA, NRCS, Washington, D.C.
2. Bureau of Economic Geology. 1983. *Geologic Atlas of Texas: San Antonio Sheet*. Bureau of Economic Geology, Austin, Texas.
3. Texas Archeological Sites Atlas. USGS Shertz, Texas Quad.
4. USDA Soil Conservation Service. August 1959. *Work Plan, Martinez Creek Watershed*.
5. USDA Soil Conservation Service. June 1991 Re-Issued. *Soil Survey, Bexar County Texas*.
6. Wright, Kenny. 1992. *An Archaeological Survey of Converse City Park Expansion, North Branch, Bexar County Texas*. University of Texas at San Antonio, Center for Archaeological Research.

## APPENDIXES

- APPENDIX A: Comment Letters Received on the Draft Supplemental Plan/Environmental Assessment
- APPENDIX B: Vicinity Map
- APPENDIX C: Breach Inundation Map
- APPENDIX D: Project Map
- APPENDIX E: Table 1 – ESTIMATED INSTALLATION COST  
Table 2 – ESTIMATED COST DISTRIBUTION – STRUCTURAL AND NONSTRUCTURAL MEASURES  
Table 3 Revised – STRUCTURAL DATA  
Table 4 – ANNUAL COSTS  
Table 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS  
Table 6 – COMPARSION OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

**APPENDIX A**

**COMMENT LETTERS RECEIVED ON THE DRAFT SUPPLEMENTAL  
PLAN/ENVIRONMENTAL ASSESSMENT**



# Texas Water Resources Institute

THE AGRICULTURE PROGRAM

1500 Research Parkway, Suite 240

2118 TAMU

College Station, TX 77843-2118

Phone: 979.845.1851 Fax: 979.845.8554 Web: <http://twri.tamu.edu>

*Bednarz*

January 28, 2005

Dr. Larry D. Butler  
State Conservationist  
Natural Resources Conservation Service  
101 South Main Street  
Temple, Texas 76501-7602

Dear Dr. Butler:

On behalf of the Texas Water Resources Institute, I have reviewed the Draft Plan Supplement and Environmental Assessment (EA) on the proposed rehabilitation of Floodwater Retarding Structures No. 4 of Martinez Creek Watershed, Bexar County, Texas.

I have reviewed the plans and have no comments or concerns regarding their analyses or recommendations.

I would, however, like to thank NRCS for the valuable service it provides to Texans in assisting with flood control through these and similar projects.

Sincerely,

C. Allan Jones

Director,

Texas Water Resources Institute

Assistant Vice Chancellor,

Agriculture and Life Sciences

Associate Director,

Texas Agricultural Experiment Station

CAJ/rp

FEB 01 2005





# TEXAS STATE SOIL & WATER CONSERVATION BOARD

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28 Jan 05

FILE COPY

*Bednarz*

Larry D. Butler, State Conservationist  
USDA Natural Resources Conservation Service  
101 South Main  
Temple, Texas 76501-7602

Re: FRS 4 Martinez Creek Watershed

Dear Dr. Butler:

We have reviewed the Draft Plan Supplement and Environmental Assessment on the proposed rehabilitation of Floodwater Retarding Structure No. 4 of the Martinez Creek Watershed, Bexar County, Texas.

This project is essential to maintain the flood control benefits the structure currently provides and to comply with current performance and safety standards. We strongly support this project and commend the project sponsors and NRCS for implementing this rehabilitation effort.

Sincerely,

Richard Egg, P.E.  
Engineer

cc. Rex Isom

JAN 31 2005

Kathleen Hartnett White, *Chairman*  
R. B. "Ralph" Marquez, *Commissioner*  
Larry R. Soward, *Commissioner*



FAC COPY

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

*Bednarz*

March 4, 2005

Larry D. Butler, Ph.D.  
Natural Resource Conservation Service  
101 South Main Street  
Temple, Texas 7 6501-7602

Re: TCEQ GEARS #6379-Proposed Rehabilitation of Floodwater Retarding Structure No. 4 of Martinez Creek Watershed, Bexar County

Dear Doctor Butler:

The Texas Commission on Environmental Quality (TCEQ) has reviewed the above-referenced project and offers the following comments:

A review of the project for General Conformity impact in accordance with 40 CFR Part 93 and Title 30, Texas Administrative Code §101.30 indicates that the proposed action is located in Bexar County, which is currently unclassified or in attainment of the National Ambient Air Quality Standards for all six criteria air pollutants. Therefore, general conformity does not apply.

Although any demolition, construction, rehabilitation or repair project will produce dust and particulate emissions, these actions should pose no significant impact upon air quality standards. Any minimal dust and particulate emissions should be easily controlled by the construction contractors using standard dust mitigation techniques.

Thank you for the opportunity to review this project. If you have any questions, please call Mr. Forrest Brooks at (512) 239-4900.

Sincerely,

A handwritten signature in cursive script that reads "Thomas W. Weber".

Thomas W. Weber  
Chief Engineer's Office

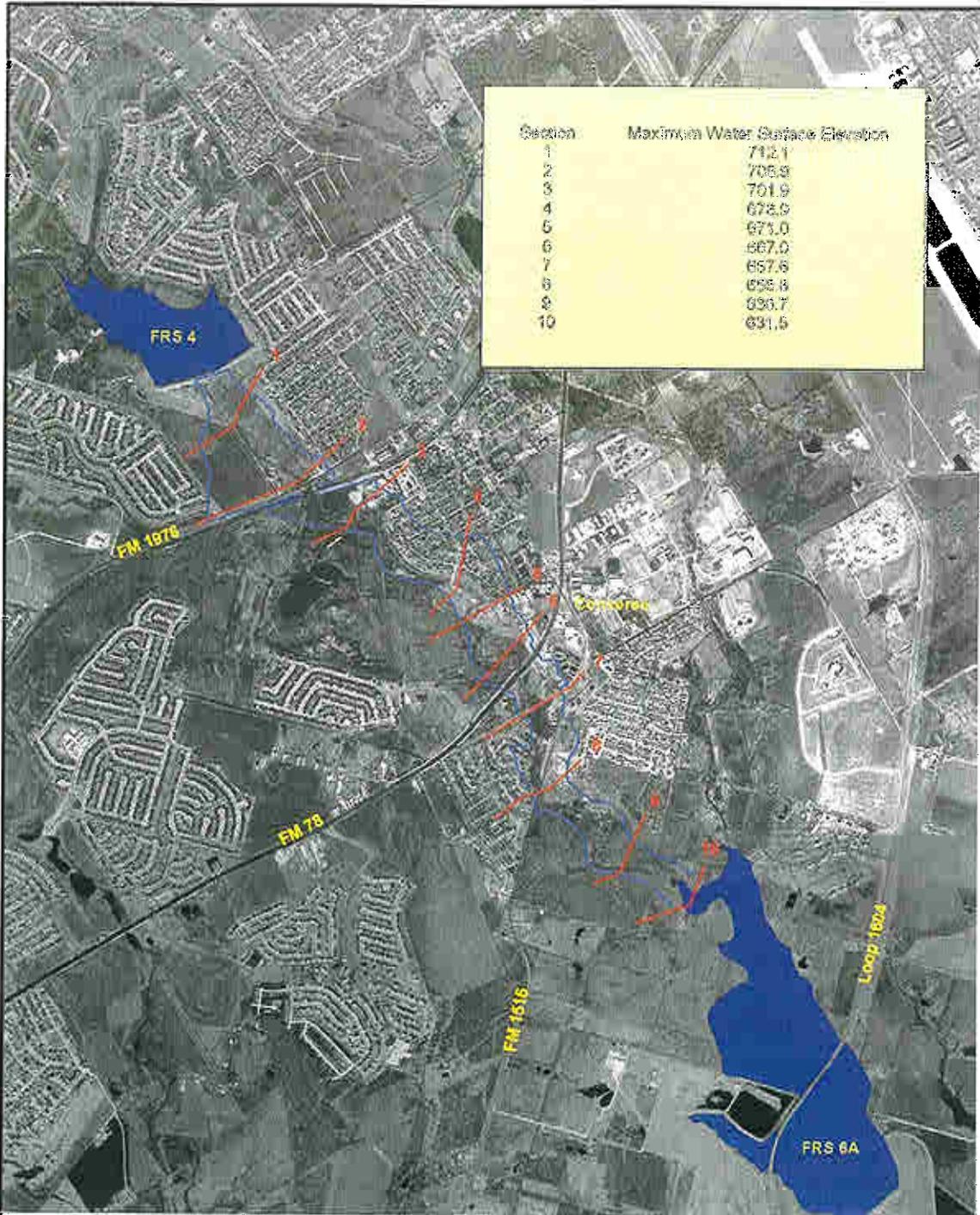
MAR 14 2005



**APPENDIX C**

**Breach Inundation Map**

.....

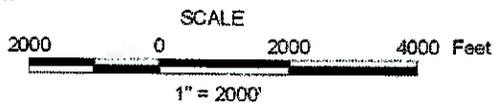


Martinez Creek Watershed  
FRS 4  
Breach Inundation Map



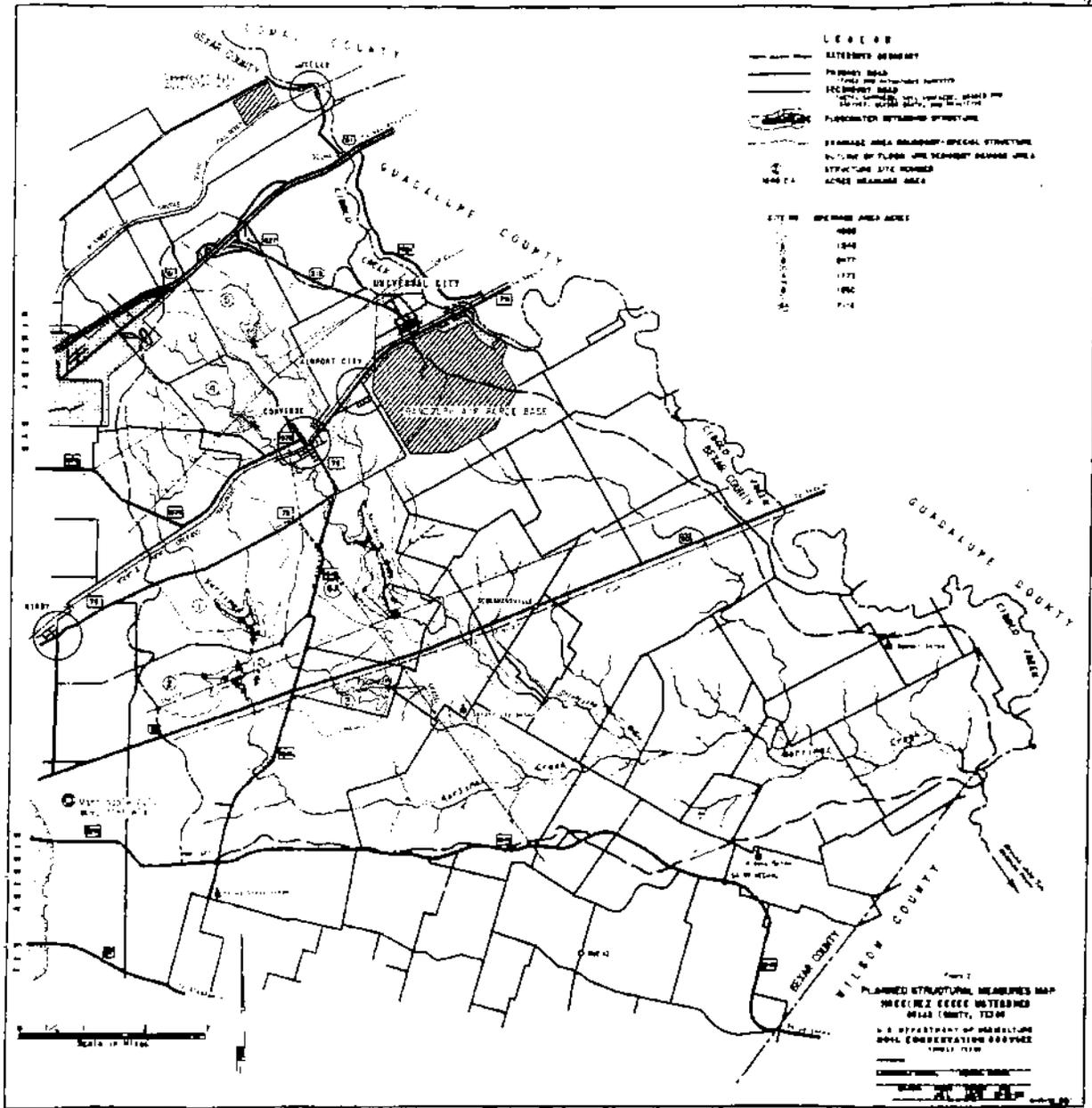
LEGEND

-  Limits of Breach Flood
-  Section



# APPENDIX D

## Project Map



**APPENDIX E**

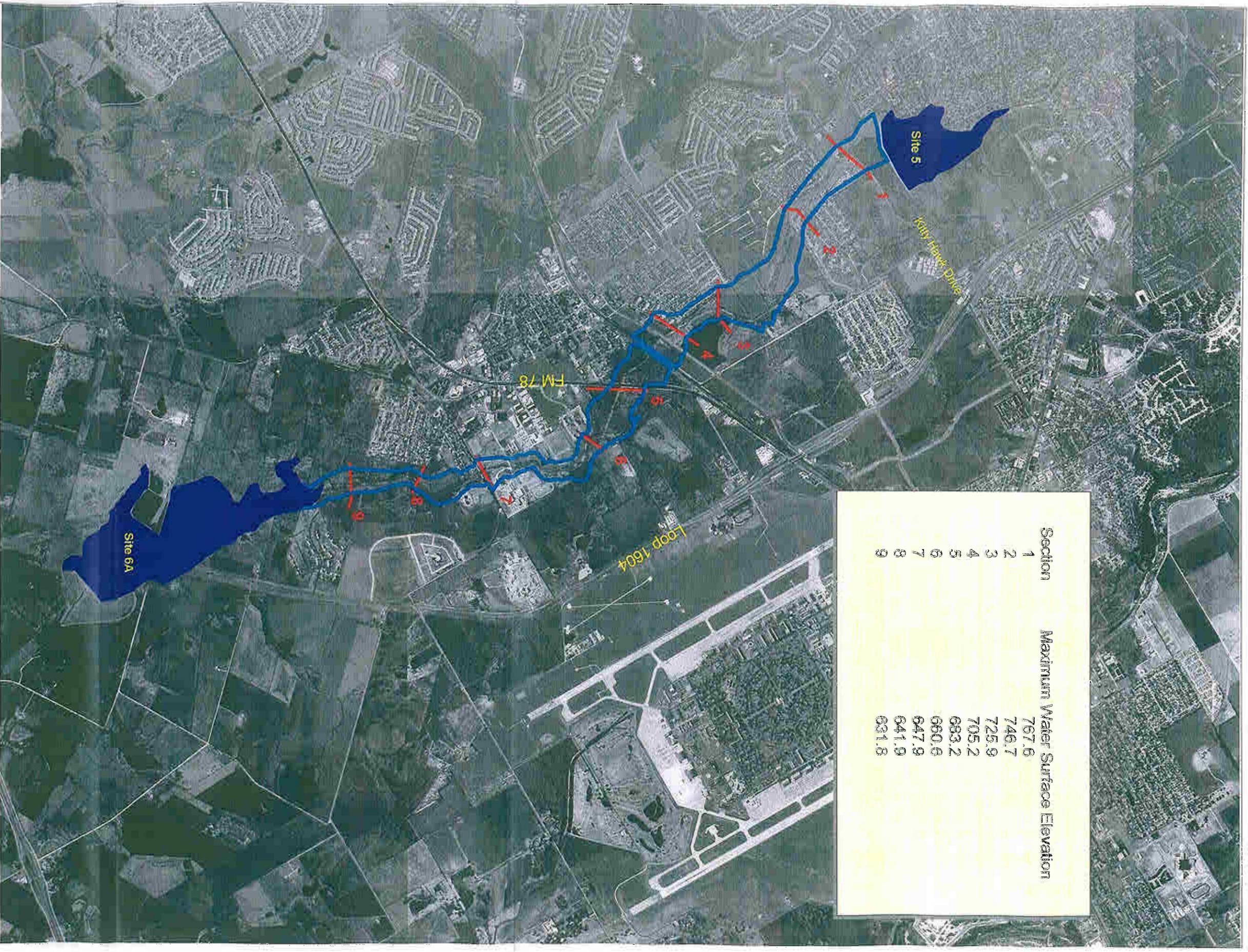
**TABLE 1 - ESTIMATED INSTALLATION COST**

**FRS No. 4**  
**Martinez Creek Watershed, Texas**  
**(Dollars) <sup>1/</sup>**

| <b>Installation Cost Item</b> | <b>Unit</b> | <b>Number</b> | <b>Estimated Costs <sup>2/</sup></b> |                    |                    |
|-------------------------------|-------------|---------------|--------------------------------------|--------------------|--------------------|
|                               |             |               | <b>Federal Funds</b>                 | <b>Other Funds</b> | <b>Total</b>       |
| Rehabilitation of FRS No. 4   | No.         | 1             | \$745,800                            | \$280,600          | \$1,026,400        |
| <b>Total Project</b>          |             |               | <b>\$745,800</b>                     | <b>\$280,600</b>   | <b>\$1,026,400</b> |

<sup>1/</sup> 2003 Prices.

<sup>2/</sup> Federal Funds include NRCS Technical Assistance (\$224,700), which is not included when calculating eligible federal cost share. Therefore, federal cost share is based on Estimated Project Cost of \$801,700.



| Section | Maximum Water Surface Elevation |
|---------|---------------------------------|
| 1       | 767.6                           |
| 2       | 746.7                           |
| 3       | 725.9                           |
| 4       | 705.2                           |
| 5       | 683.2                           |
| 6       | 660.6                           |
| 7       | 647.9                           |
| 8       | 641.9                           |
| 9       | 631.8                           |

**LEGEND**



Limits of Breach Flood



Section

**Martinez Creek Watershed  
Site 5  
Breach Inundation Map**



**APPENDIX E**

**TABLE 2 – ESTIMATED COST DISTRIBUTION - STRUCTURAL AND NON-STRUCTURAL MEASURES**

**FRS No. 4**

**Martinez Creek Watershed, Texas**

**(Dollars) <sup>1/</sup>**

|                                | Installation Cost<br>Federal Funds <sup>2/</sup> |                         |                           |                        | Installation Cost – Other Funds |                         |                 |                           |                      |                               |
|--------------------------------|--|-------------------------|---------------------------|------------------------|---------------------------------|-------------------------|-----------------|---------------------------|----------------------|-------------------------------|
|                                | Construction                                     | Engineering<br>Services | Project<br>Administration | Total Federal<br>Funds | Construction                    | Engineering<br>Services | Land<br>Rights  | Project<br>Administration | Total Other<br>Funds | Total<br>Installation<br>Cost |
| Rehabilitation<br>of FRS No. 4 | \$521,100  | \$108,700               | \$116,000                 | \$745,800              | \$203,600                       | \$40,000                | \$17,000        | \$20,000                  | \$280,600            | \$1,026,400                   |
| <b>TOTAL</b>                   | <b>\$521,100</b>                                 | <b>\$108,700</b>        | <b>\$116,000</b>          | <b>\$745,800</b>       | <b>\$203,600</b>                | <b>\$40,000</b>         | <b>\$17,000</b> | <b>\$20,000</b>           | <b>\$280,600</b>     | <b>\$1,026,400</b>            |

<sup>1/</sup> 2003 Prices.

<sup>2/</sup> Federal Engineering Services and Project Administration costs are not included when calculating eligible federal cost share. Therefore, federal cost share is based on Estimated Project Cost of \$801,700.

**APPENDIX E**  
**REVISED TABLE 3 - STRUCTURAL DATA**  
**FRS No. 4**  
**Martinez Creek Watershed, Texas**

| Item   | Unit               | FRS No.4 |
|--|--------------------|----------|
| <b>Class of structure</b>                        |                    | high     |
| <b>Seismic zone</b>                              |                    | 0        |
| <b>Uncontrolled drainage area</b>                | mi <sup>2</sup>    | 2.59     |
| <b>Runoff Curve Number (1-day) (Avg. AMC)</b>    |                    | 76       |
| <b>Time of concentration (T<sub>c</sub>)</b>     | Hrs                | 1.7      |
| <b>Elevation top of dam</b>                      | ft                 | 745.5    |
| <b>Elevation crest of auxiliary spillway</b>     | ft                 | 738.0    |
| <b>Elevation crest principal spillway</b>        | ft                 | 724.0    |
| <b>Maximum height of dam</b>                     | ft                 | 34       |
| <b>Volume of fill</b>                            | yd <sup>3</sup>    | 156,600  |
| <b>Total capacity (auxiliary spillway crest)</b> | ac-ft              | 872.3    |
| Sediment Pool                                    | ac-ft              | 100.0    |
| Floodwater retarding Pool                        | ac-ft              | 772.3    |
| <b>Surface area</b>                              |                    |          |
| Sediment pool                                    | acres              | 18.5     |
| Floodwater retarding pool                        | acres              | 85.9     |
| <b>Principal spillway</b>                        |                    |          |
| Rainfall volume (1-day)                          | in                 | 9.9      |
| Rainfall volume (10-day)                         | in                 | 16.0     |
| Runoff volume (10-day)                           | in                 | 10.08    |
| Type   |                    | concrete |
| Diameter   | in                 | 42       |
| Capacity   | ft <sup>3</sup> /s | 261      |
| <b>Auxiliary spillway</b>                        |                    |          |
| Vegetated  |                    |          |
| Bottom width                                     | ft                 | 200      |
| Exit slope                                       | %                  | 6.0      |
| Frequency of operation                           | % chance           | 1.0      |
| <b>Auxiliary spillway hydrograph</b>             |                    |          |
| Rainfall volume                                  | in                 | 13.2     |
| Runoff volume                                    | in                 | 10.04    |
| Storm duration                                   | hrs                | 6        |
| Velocity of flow (V <sub>s</sub> )               | ft/s               | 8.9      |
| Maximum reservoir water surface elevation        | ft                 | 740.6    |
| <b>Freeboard hydrograph</b>                      |                    |          |
| Rainfall volume                                  | in                 | 30.5     |
| Runoff volume                                    | in                 | 27.01    |
| Storm duration                                   | hrs                | 6        |
| Maximum reservoir water surface elevation        | ft                 | 745.5    |
| <b>Storage capacity equivalents</b>              |                    |          |
| Sediment volume                                  | in                 | 0.80     |
| Floodwater retarding volume                      | in                 | 5.60     |

**APPENDIX E**

**TABLE 4 – ANNUAL COSTS**  
**FRS No. 4**  
**Martinez Creek Watershed, Texas**  
**(Dollars) <sup>1/</sup>**

| <b>Evaluation Unit</b> | <b>Project Outlays</b>                                   |  | <b>Total</b>    |
|------------------------|--|--|-----------------|
|                        | <b>Amortization of Rehabilitation Cost <sup>2/</sup></b> | <b>Operation, Maintenance and Replacement Cost</b> |                 |
| <b>FRS No.4</b>        | <b>\$58,000</b>  | <b>\$5,000</b>                                     | <b>\$63,000</b> |
| <b>Grand Total</b>     | <b>\$58,000</b>  | <b>\$5,000</b>                                     | <b>\$63,000</b> |

<sup>1/</sup> Price base 2003

<sup>2/</sup> Amortized for 100 years at 5.625 percent

**APPENDIX E**

**Table 5 - Estimated Average Annual Flood  
Damage Reduction Benefits  
FRS No. 4  
Martinez Creek Watershed, Texas  
(Dollars)<sup>1/</sup>**

| Item                              | Estimated Average Annual Benefits <sup>2/</sup> |
|-----------------------------------|---|
| Floodwater                        |   |
| Crop and Pasture                  | \$0   |
| Other Agricultural                | \$0   |
| Nonagricultural (Road and Bridge) | \$6,000   |
| Subtotal                          | \$6,000   |
|                                   |   |
| Sediment                          |   |
| Overbank Deposition               | \$0   |
|                                   |   |
| Erosion                           |   |
| Flood Plain Scour                 | \$0   |
|                                   |   |
| <b>TOTAL</b>                      | <b>\$6,000</b>                                  |

<sup>1/</sup> Price Base: 2003 prices.

<sup>2/</sup> Original downstream benefits updated using applicable indices and updated data.

**APPENDIX E**

**Table 6 - Comparison of Benefits and Costs for Structural Measures**

**FRS NO. 4**

Martinez Creek Watershed, Texas

(Dollars)<sup>1/</sup>

| Item   | Average Annual Benefits        |                              |  |  |   | Average Annual Cost <sup>4/</sup> | Benefit/Cost Ratio |
|--|--------------------------------|------------------------------|--|--|---|-----------------------------------|--------------------|
|  | Damage Reduction <sup>2/</sup> | Urban Flood Damage Reduction | Flood Insurance Administration Savings | Additional Incidental Recreation <sup>3/</sup> | Avoidance of Modifications to Downstream Infrastructure |                                   |                    |
| Rehabilitation of Floodwater Retarding Structure No. 4 | \$6,000                        | \$79,700                     | \$1,700                                | \$13,500                                       | \$7,100   | \$108,000                         | 1.7:1.0            |

<sup>1/</sup> Price Base: 2003 prices

<sup>2/</sup> From Table 5

<sup>3/</sup> Adjusted for cost of modifying Converse North Park

<sup>4/</sup> From Table 4