

# **SAN ANTONIO RIVER / SAN PEDRO CREEK FLOOD DAMAGE MITIGATION ASSESSMENT TECHNICAL MEMORANDUM**

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HDR Project No: 19210

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# SAN ANTONIO RIVER / SAN PEDRO CREEK FLOOD DAMAGE MITIGATION ASSESSMENT

02/15/06

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## BACKGROUND

This technical memorandum is a preliminary flood damage mitigation assessment of potential flood mitigation measures that may protect areas along San Pedro Creek and the San Antonio River that exhibit potential flooding problems during a 100-year storm event where property damage or hazardous conditions may occur. This document is intended to be a preliminary, planning level document that identifies measures that may be candidates for floodplain mitigation projects. The information presented is at a feasibility level only and does not constitute a full incremental flood damage assessment analysis. The level of effort for this scope of work is commensurate with a feasibility or preliminary design focused on regional flood protection planning for a watershed or section of a watershed.

The project was conducted using accepted US Army Corp of Engineers (USACE) flood damage assessment methods. The proposed flood protection measures incorporated projects proposed from previous HDR studies such as Flood Damage Mitigation Assessment (FDMA) Phase I (April 2004) and San Antonio River Improvement Project (SARIP). The purpose of the FDMA Phase I project was to identify and catalog areas along San Pedro Creek and the San Antonio River that exhibit potential flooding problems during a 100-year storm event. An electronic copy of this report is located in Section 1 of the Appendices. The FDMA Phase I and this current project were produced as a result of a grant awarded to the San Antonio River Authority (SARA) by the Texas Water Development Board (TWDB). A copy of the TWDB grant application is located in Section 2 of the Appendices. The SARIP included design features such as a lock and dam, channel widening, bridge reconstruction, and bank wall construction. The SARIP is currently in the final design phase and construction is anticipated to begin late 2006 or early 2007.

The costs associated with the candidate projects that were identified in this study were annualized and compared to the annual avoided damaged values (benefits) from the USACE Hydrologic Engineering Center Flood Damage Assessment (HEC-FDA) software program resulting in benefit-cost ratios. The candidate projects were ranked using criteria based on a project score determined from the Bexar Regional Watershed Management (BRWM) ranking matrix.

The revised study reaches are approximately five miles of San Pedro Creek from the confluence with the San Antonio River upstream to West Laurel Street and approximately seven and a half miles of the San Antonio River from Lonestar Avenue to the River Road neighborhood, south of Mulberry Avenue.

## SURVEY DATA

The topographical information that was used in the HEC-FDA program was aerial photogrammetric ground elevation data provided by Geodetix, Inc and ground "windshield" surveys that were performed by SARA staff. Geodetix, Inc. produced an AutoCAD file of ground elevation points taken near structures that were identified by HDR as being located in the 500-year floodplain. These ground elevations were derived by sampling existing photogrammetric ground topography models. The AutoCAD file was used in ArcView Version 9.0 in conjunction with aerial photographs

to determine the approximate ground elevation for each structure. This ground elevation information was entered into the HEC-FDA structure database for each structure. The AutoCAD files are included on the HDR CD in Section 10 of the Appendices.

SARA personnel conducted field surveys of representative properties in several of the flooded areas that were identified in the FDMA Phase I project. The type of information that was collected was structure type, structure photograph, structure use, foundation slab elevations, foundation type, and the Bexar County Appraisal District (BCAD) information. From this data, HDR created a criteria for slab thickness based on structure type for each flooded area that was applied to all similar type structures in that specific flooded area. For example, if the SARA staff surveyed two residential structures with slab foundations in a particular area with an average slab height of one foot, then all residential structures with slab foundations in that area would be assigned a slab height of one foot. The slab elevation was entered into the HEC-FDA structure database. The SARA windshield surveys are included on a CD in Section 3 of the Appendices.

Several of the studied mitigation options involved raising or modifying existing bridges. As part of this study, HDR structural engineers visited the study bridges and performed a visual evaluation of the bridge type, potential for historic structure listing, and methods or related problems in regard to modifying the bridge. This field information was used to evaluate the opinions of conceptual costs for modifying the study reach bridges. The bridge survey information is included in Section 5 of the Appendices.

## HYDROLOGY

The base hydrologic model for the San Antonio River watershed was created through the Limited Mapping Maintenance Project (LMMP) process undertaken for the San Antonio River and San Pedro Creek LMMP. The model incorporates the watersheds for the San Antonio River and tributaries to the San Antonio River including San Pedro Creek, Zarzamora Creek, Alazan Creek, Olmos Creek, Apache Creek, Martinez Creek, and Six Mile Creek. The San Antonio River hydrologic model was constructed using the HEC-1 modeling software. This model is included on the LMMP CD in Section 1 of the Appendices.

## HYDRAULICS

The baseline hydraulic model used for this project was the HEC-RAS model created for the San Antonio River and San Pedro Creek LMMP. The LMMP floodplain map used for this project was delineated by Freese and Nichols Engineering in Micro Station, converted to an ArcGIS shape file, and projected from NAD 27 to NAD 83. At the time of this report, the floodplain delineation was in draft form. This model is included on the LMMP CD in Section 1 of the Appendices.

The LMMP hydraulic model was modified to evaluate the impacts of various mitigation options such as channel modification, floodwalls, detention in one location, and bridge improvements. HEC-RAS models from the San Antonio River Improvement Project (SARIP) Museum Reach Project were used to determine the reduction in water surface elevation through-out the Urban and Park segments of the SARIP project. The segment of SARIP hydraulic model was imported into the LMMP model. This model is included on the HDR CD in Section 10 of the Appendices.

## FLOOD DAMAGE ANALYSIS

The flood damage analysis was performed using the risk-based analysis software HEC-FDA Version 1.2. The software was developed to assist USACE staff in the analysis of the economic aspect of flood damage reduction projects. The HEC-FDA flood mitigation analysis integrates hydrologic and hydraulic data along with economic data during the flood mitigation option evaluation. Risk-based analysis procedures are used to quantify uncertainty in discharge-

exceedance probability, stage-discharge, and stage-damage functions and incorporate it into the economic and engineering performance analysis of alternatives. HEC-FDA stores hydrologic and economic data necessary for an analysis, computes expected annual damage and equivalent annual damages and implements the risk-based analysis procedures.

Risk-based analysis incorporates a description of uncertainty in discharge-frequency, elevation-discharge relationships in the economic and performance analyses of alternatives. The process uses the Monte Carlo simulation, a statistical sampling-analysis method, to compute the expected value of damage and damage reduced, while accounting for the impact of uncertainty. Risk-based analysis thus provides an opportunity to make more informed decisions.

The HEC-FDA model consists of three different data sets that are used during the equivalent annual damage calculations. These data sets are the geometry of the stream and damage reaches, the water surface profile information for each mitigation option, and the property value economic database.

The base year was set to 2004 and the study analysis year was set at 2024. The study analysis year is described in HEC-FDA guidance documents as a most like future year that is a development projection for a specific future year and is usually twenty to thirty years out from the base year. The expected annual damage is assumed to be constant beyond the most likely future year. This being said, the equivalent annual damage analysis performed by HEC-FDA for each plan is performed for analysis period of 50 years, which will be discussed later in the report.

**Geometric and Evaluation Plan Setup**

The initial step in setting up the HEC-FDA model is defining the geometry of the study stream. The study streams definition was based on the HEC-RAS LMMP model, such as San Pedro Lower, San Antonio Mid, etc. The damage reaches that were used in the study were based on the damage reaches that were identified in the Flood Damage Assessment Phase I Study performed by HDR. The preliminary damage reaches were based upon the limits of the 100-yr floodplain and were expanded as needed for this study to encompass the limits of the 500-yr floodplain. The damage reaches are defined in the program by beginning and ending station numbers and whether the area is located on the left, right, or both banks. These damage reaches are consistent with the previous report designations. Table 1 lists the damage reaches used for this study.

**Table 1 – HEC-FDA Damage Reaches**

Damage Reach Name	Reach Description	Stream Name
San Antonio River		
SAR03	River Road: Armour to Anastacia	SAR UP
SAR04	River Road: Craig Place to E Woodlawn	SAR UP
SAR05 DS	San Antonio River downstream of the tunnel inlet	SAR MID
SAR05 Upper	San Antonio River upstream of the tunnel inlet	SAR Catalpa
SAR06	Newell to IH35	SAR MID
SAR07	9th Street to IH 35	SAR MID
SAR08 and SAR09	Brooklyn to IH 35	SAR MID
SAR10	Navarro to Brooklyn	SAR MID
SAR11	Convent to Navarro	SAR MID
SAR12	N. St. Mary's to Navarro	SAR MID
SAR13	Martin to Augusta	SAR MID
SAR14	Houston to Travis	SAR MID
SAR15	Commerce to Houston	SAR MID
SAR16	Upstream of BlueStar Art Complex	SAR MID

SAR17	Downstream of Guenther Street	SAR MID
SAR19	Downstream of Alamo Street	SAR MID
SAR20	Downstream of BlueStar Art Complex	SAR MID
San Pedro Creek		
SPC01	Between Cypress and Fredericksburg	SPC Upper
SPC02_03	W. Travis to SPC Tunnel Inlet	SPC Lower
SPC04	Alamo Street to upstream of Arsenal	SPC Lower
SPC05	Between RR Tracks and Alamo	SPC Lower
SPC06	W. Cevallos Street	SPC Lower
SPC07	Furnish and San Marcos Streets	SPC Lower
SPC08	Between Furnish and Sonora Streets	SPC Lower
SPC09	Between Nogalitos Street Bridge and Ralph Road	SPC Lower
SPC10	Between S. Flores and Nogalitos Street Bridges	SPC Lower
SPC11	Between S. Flores and Mockert Street	SPC Lower
SPC12	Mitchell to S. Flores	SPC Lower
SPC13_SPC14	Probandt to Mitchell	SPC Lower

Once the streams and damage reaches were defined, a plan representing each flood mitigation option was defined. The baseline existing conditions plan for this study was the LMMP model. For each flood mitigation option, such as bridge improvements and channel modifications, modeled in HEC-RAS, a HEC-FDA plan was created. Table 2 lists the names of the HEC-FDA plans.

**Table 2 – HEC-FDA Plan Names**

Plan Name	Plan ID
<b>San Antonio River</b>	
Without	Without project condition
SARIP	SARIP
SAR05 FW	Floodwall at SAR05
RiverRoad FW	Floodwall for SAR03-SAR04
<b>San Pedro Creek</b>	
Without	Without project condition
SPC01 Opt 2	Channel Improvements
SPC01 Opt 1	Floodwall Option
SPC Opt 1	Improve Probandt Bridge
SPC Opt 2	300 ft channel Probandt to Mitchell
SPC Opt 3	SPC13 and SPC14 Floodwall
SPC Opt 4	Improve Mitchell Bridge
SPC Opt 5	Improve Probandt and W Mitchell St Bridge
SPC Opt 6	SPC 250' Channel between W Mitchell and Flores Street Bridges
SPC OPT 7	Floodwalls in SPC14, SPC13, and SPC12 area
SPC OPT 8	Improve Probandt, Mitchell and Flores Bridges
SPC OPT 9	Floodwall in SPC04
SPC OPT10	Channel Modification in SPC04
SPC Opt 11	Detention Pond Reduced Flows
SPC OPT 12	Floodwall in SPC05
SPC OPT 13	Floodwall in SPC06
SPC OPT 14	Floodwall in SPC07
SPC OPT 15	Floodwall in SPC08

SPC OPT 16	Floodwall in SPC09
SPC OPT 17	Floodwall in SPC10
SPC OPT 18	Floodwall in SPC 11
Flores Bridge	Improve Flores Bridge
Prob Flor Mitch	Improve Probandt, Flores, and Mitchell St. Bridges
Nogalitos Bridge	Nogalitos Bridge Improvements
Furnish Bridge	Improve Furnish Bridge
Pr,Mit,Flo,Nog	Improve Probandt, Mitch, Flores St. and Nog Bridges
Prob-Furnish Brs	Improve Probandt, Mitch, Flores St., Nog and Furn Bridges
Cevallos Bridge	Improve Cevallos Bridge
Prob-Cevallos	Improve Probandt to Cevallos Bridges
Prob-Nog ChMod	Channel Mods from Probandt to Nogalitos
Flor-Nog ChanMod	Flores to Nogalitos Channel Mods
Nog_to FurniChan	Nogalitos to Furnish Channel Mods
Nog_to RRChan	Channel Mods from Nogalitos to RR
RR--Alamo Chan	Channel Mods from RR to Alamo St

**Hydrologic and Hydraulic Data Setup**

For each flood mitigation plan, HEC-FDA requires a water surface profile data set that consists of eight flood events. The storm events used for this analysis are the 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, 100-yr, 250-yr, and 500-yr. For each flood mitigation option modeled in HEC-RAS, a set of water surface profiles representing the water surface elevation along the stream is created, one for each of the discharges of the eight flood events. This data is exported from HEC-RAS as a text file and imported into HEC-FDA for each damage reach.

The floodwall analysis was not performed in HEC-RAS like the other flood mitigation options. HEC-FDA has a levee option where the elevation of the floodwall is entered in a damage reach and applied to the length of the damage reach. The baseline water surface profiles were used for a floodwall analysis.

Discharge-exceedance probability functions with uncertainty and stage-discharge functions with uncertainty are established at this point in the model.

**Economic Database**

Damage categories and structure occupancy types must be defined before the structure database is compiled. Damage categories, such as commercial or residential, are defined to group structures with similar characteristics, called structure occupancy types in HEC-FDA. Structure occupancy types are subcategories of the damage category and represent different types of structures. For example, One-Story Residential and Two-Story Residential are structure occupancy types of the Residential damage category. The structure occupancy types that were used for this were provided by SARA. These predefined structure occupancy types defined the depth-percent damage functions, uncertainty associated with first floor and structure value, and content/structure ratio uncertainty for several structure occupancy types. An electronic copy of this data is included on the HDR CD in Section 10 of the Appendices.

The uncertainty can be defined as none (no uncertainty), normal, triangular, or log normal probability density functions. The depth-damage functions and uncertainty parameters are unique for each occupancy type. For the structures that were determined to be in the 500-yr floodplain, the structure occupancy type was determined from the BCAD website. The damage categories and occupancy types that were defined for this study are shown in Table 3.



**Table 3 – HEC-FDA Damage Categories and Structure Occupancy Types**

<b>Study Damage Category</b>	<b>Structure Occupancy Type</b>	<b>HEC-FDA ID</b>
<b>Residential</b>	One-Story Apartment	Apt_1_Story
	Duplex	Duplex
	Two-Story Single Family Home	Single_Fam2story
	One-Story Single Family Pier and Beam Home	Single_Fam_PB
	One-Story Single Family Slab Foundation Home	Single_Fam_Slab
<b>Commercial</b>	Auto Repair Business	Auto_Repair
	Bar or Tavern	Bar_Tavern
	Day Care Center	DayCare
	Gas Station	GasStation
	General Office Building	Gen_Office
	General Retail Store	Gen_Retail
	Hotel	Hotel
	Manufacturing Facility	Manufacturing
	Medical Office	Medical
	Motel	Motel
	Office Building	Office_Building
	Combined Office and Manufacturing Facility	Office_Mft_Fac
	Restaurant	Restaurant
	Warehouse	Warehouse
<b>Govt_Public</b>	Church	Church
	Government Owned Building	Gen_Pub_Struct
	School	School
	Post Office Building	Post_Office
	Radio Tower Station	Radio_Tower
	Government Office Building	Govt_Office

HEC-FDA requires the following information for each structure: a unique identification number, station number, bank location, structure value, ground elevation, slab height, damage category, occupancy type, and stream reach.

Each structure that was entered into the HEC-FDA economic database was assigned a unique alpha-numeric identification number. The San Pedro Creek structure identification numbers begin with “SPC” and are numbered sequentially, e.g. SPC01. The San Antonio River structures were designated with a “SAR” and numbered sequentially, e.g. SAR01.

The station number of the structure was determined using the stationing of the LMMP HEC-RAS model. Station numbers were interpolated when needed to best describe the structure location.

A GIS analysis was performed to determine the structures that were located in the 100-yr and 500-year floodplain. A 100-yr floodplain GIS shapefile was provided by SARA. The 500-yr floodplain shapefile was created from Micro Station files provided by SARA. The parcel address information was contained in a BCAD parcel shapefile. The floodplain shapefiles were used to “clip” the BCAD parcel shapefile to determine the parcels that were located within the floodplain boundaries. The

results from this clip were edited to remove any duplications and parcels that did not contain structures. For instances where the structure was not completely covered by the floodplain, a conservative approach was applied and the entire improved value of the property was maintained as the property value for that parcel.

The land value, improved value, and structure occupancy type were determined using 2004 BCAD data obtained from the BCAD website. The BCAD website does not provide property or land value information on parcels that are owned by government agencies but information about structure and lot size are often reported. For the government owned facilities, the structure occupancy type was determined by BCAD, staff knowledge of the location, or internet research. The building area and lot size was determined from BCAD when available or by measurements taken using ArcView. An HDR registered architect was consulted to determine the average cost per square foot of new construction for the structure occupancy types for the government owned structures (see Table 4). The cost per square foot values were applied to the building areas to determine an average property value. To determine the land value, a minimum number of three parcels, adjacent to the parcel of interest were averaged to determine an average cost per square foot. These average land values were applied to the area of the lot to calculate an average cost for the lot.

**Table 4 – Structure Occupancy Type Cost/SF Values**

<b>Occupancy Type</b>	<b>Cost per Square Foot</b>
Government Office Building, 1-4 Stories	\$130-140
Church	\$100
Government Housing, 1-2 Stories	\$100-120
Historical Home	\$120
Museum	\$200
Day Care Center	\$120
Middle School, 1-2 Stories	\$90

The stage-damage function with uncertainty and reach stage-damage function with uncertainty is calculated by HEC-FDA after the structure inventory has been completed.

**Equivalent Annual Damage Analysis**

HEC-FDA calculates the flood damage associated with each plan in average annual equivalent terms. Equivalent damage computations can be performed for a plan after the base and most likely future analysis years conditions have been computed. The expected annual damage for each year in the analysis period is computed, discounted back to present value and annualized to get the equivalent value over the analysis period. The analysis period used for this project was 50 years and the discount rate was 5.625%.

The Monte Carlo statistical sampling method is used to derive the expected annual damage for each damage reach in each flood mitigation analysis plan. The expected annual damage is the mean damage obtained by integrating the damage exceedance probability curve for the damage reach. The damage-exceedance probability function is obtained from the discharge-exceedance probability, stage-discharge, and stage-damage functions derived from at the damage reach index locations. The inclusion of uncertainty for these variables requires a numerical integration approach be applied. Without uncertainty, the damage-exceedance probability curve can be obtained without resorting to numerical simulation approaches.

The Monte Carlo simulation is the numerical integration approach. It relies on an exceedance probability analysis of samples of the contributing random variables obtained from the generation of random numbers.

## MITIGATION OPTIONS

Structural flood mitigation measures that can be applied to the San Antonio River or San Pedro Creek channels fall into two general categories: peak flow reduction measures and channel modification measures. The peak flow reduction measures include watershed land use and impervious cover management and/or flow diversion or detention to reduce the overall flow peak magnitude (and the corresponding water surface elevations) through the basin drainage areas. Channel modification measures are used to lower, or contain, the base flood elevations by increasing the flood conveyance efficiency of the significant drainage channels in a particular basin. Channel modification can include roughness modifications (debris and vegetation removal, “n” value reduction), modifications of the channel geometry (conveyance area, slope, cross section), obstruction removal (bridge and other structure modifications), and the construction of additional levees or floodwalls to contain the base flood elevations. Non-structural flood mitigation measures include Permanent Relocation, or “buy-outs”, to reduce the number of private properties and structures that could be damaged by flooding.

The San Antonio River and San Pedro Creek watersheds and contributing areas for this project are urbanized. Changing the existing land use practices and impervious cover characteristics of an urbanized watershed is impractical because of the multitude of land owners and the extremely high costs associated with altering or limiting land use and impervious cover characteristics. Therefore, this flood mitigation measure was not considered a viable alternative for this study and was not included as an option in the analysis.

### Flood Mitigation Measures

Several flood reduction measures are available for use in the urban setting of these study reaches such as detention, channel roughness reduction, channel geometry modifications, bridge modifications, floodwalls, and levees. These options were evaluated individually and in combination. The applicability of each of these measures is discussed in the following sections.

#### Detention

The San Antonio River, upstream and in the areas of the study reach, has both existing detention and diversion facilities in place. The San Antonio River Tunnel (SART) diverts flow “under” the downtown areas of San Antonio and provides increased flood protection between the tunnel inlet (downstream of Hwy. 281) and the tunnel outlet (downstream of the Blue Star area). Olmos Dam provides detention for over 32 square miles of contributing area and provides flood peak attenuation for areas downstream of the dam. Because the San Antonio River watershed is urbanized, a major constraint when considering the application of flood mitigation measures is the difficulty in acquiring additional right-of-way. The acquisition of additional right-of-way for the construction of flood detention or diversion measures can involve large costs and undesirable impacts to the existing property owners. Therefore, the placement of new detention or diversion facilities on the San Antonio River was not considered at this level of the study.

The San Pedro Creek Tunnel (SPCT) diverts flood flows for a portion of the San Pedro Creek watershed from Kingsbury Street to Guadalupe Street. There are no significant, existing detention facilities on San Pedro Creek. The San Pedro Creek watershed is also heavily urbanized. No detention options for San Pedro Creek were investigated during the previous study phase. During this study phase, the City of San Antonio identified one potential detention site on San Pedro Creek within the confines of a vacant lot located south of Cevallos between San Pedro Creek and Nogalitos Street. A detention pond in this area was investigated that would have a lateral weir inlet

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BEXAR REGIONAL WATERSHED MANAGEMENT  
TEXAS WATER DEVELOPMENT BOARD  
Flood Damage Mitigation Assessment

with a gravity flow outlet. Total detention pond storage area would be maximized by using near vertical wall construction for the detention pond side walls. The results of this analysis are provided in subsequent sections of this report.

### **Roughness Reduction**

Roughness reduction includes modifying the channel and overbank surfaces to reduce their resistance to flow (reducing the composite Manning's "n" value used in the HEC-RAS model). These modifications can include a channel vegetation removal or thinning program, removal of existing flood debris within the channel or on bridges that impedes flood flows, or by modifying the channel surface so that it includes smoother surfaces such as grass lined channels, concrete rip-rap, or other surface treatments that would reduce the roughness without adding undue maintenance requirements.

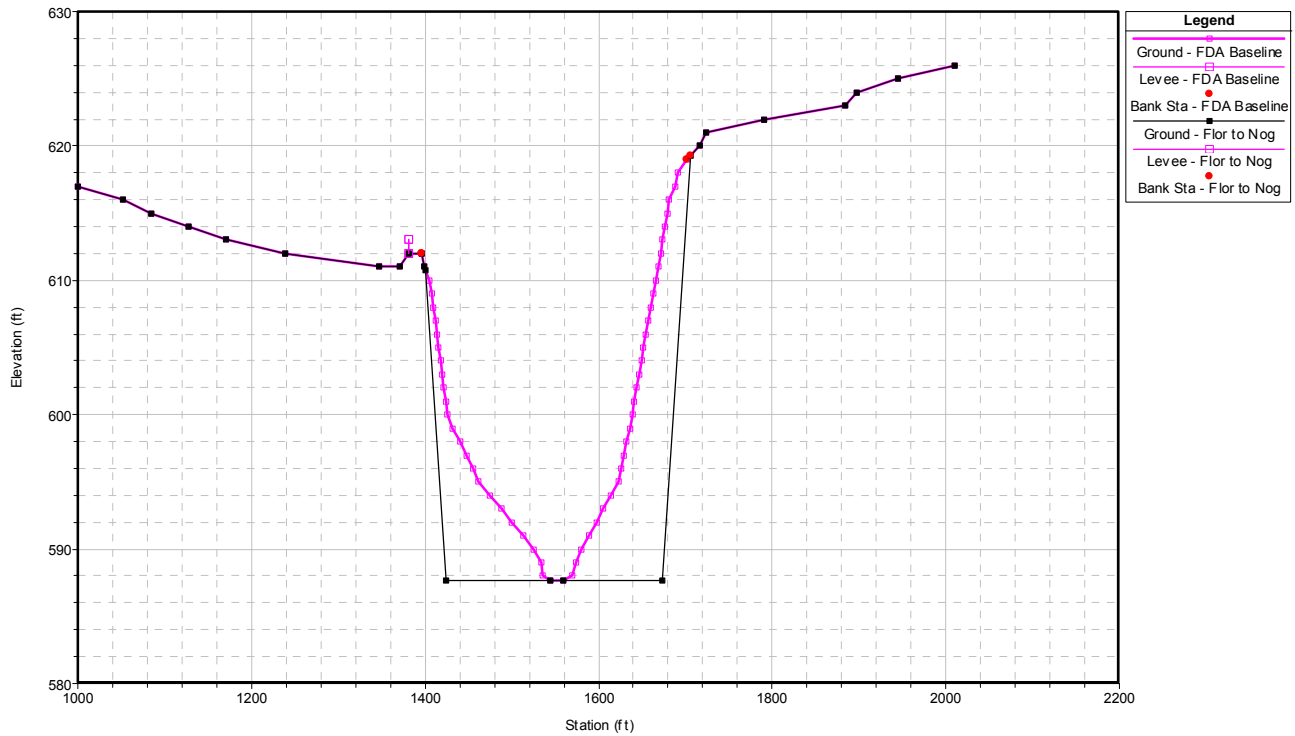
Within the study reach, the San Pedro Creek channel has been modified in the past and now presents a channel with grass lined overbanks and a pilot channel with broken rubble toe protection along the much of its length. Other portions of San Pedro creek are contained in concrete lined channels or fully enclosed in storm water culverts. Consequently, much of San Pedro Creek has already been optimized in terms of its roughness characteristics and this flood mitigation measure was generally not considered as a principal option.

The San Antonio River from Hildebrand downstream to Hwy. 281 retains much of its original plan form with some modifications to the channel bed in the Brackenridge Park area and through the Brackenridge Golf Course. The Catalpa-Pershing channel has been heavily modified and almost completely lined with concrete. Downstream of Hwy 281, the river is an earthen (vegetated) channel to Lexington Avenue. It should be noted that some portions of the river alignment in this area have been altered by past projects. From Lexington Avenue to Nueva Street, the San Antonio River is channelized and the majority of the channel lining is concrete (except in the River Loop area). From Nueva Street to the SART outlet, the channel has a rubble lined pilot channel with grass lined overbanks for the majority of its length with some portions fully concrete lined. As with San Pedro Creek, roughness reduction was not considered as a viable option due to the previous river improvements.

### **Channel Geometry Modifications**

Channel geometry modifications were considered in areas of San Pedro Creek where practical. In selected locations, improvements to the channel to increase the net conveyance area were included as an option. The channel improvements included steepening the overbank or channel side slopes to widen the overall channel without exceeding the limits of the current right-of-way. The effects of the geometry modifications were included in the modified HEC-RAS models by using the channel improvement tools with a consistent bottom width and 1:1 side slopes. Figure 1 shows a typical modified cross section. This analysis provides an efficient, feasibility level sensitivity analysis of the channel modification effects. The channel gradient was not modified.

San Pedro Cr and Upper San Antonio River Plan: 1) Flor to Nog 2) FDA Baseline  
 River = San Pedro Reach = Lower RS = 5300 53+00



**Figure 1 – Typical Modified Cross Section**

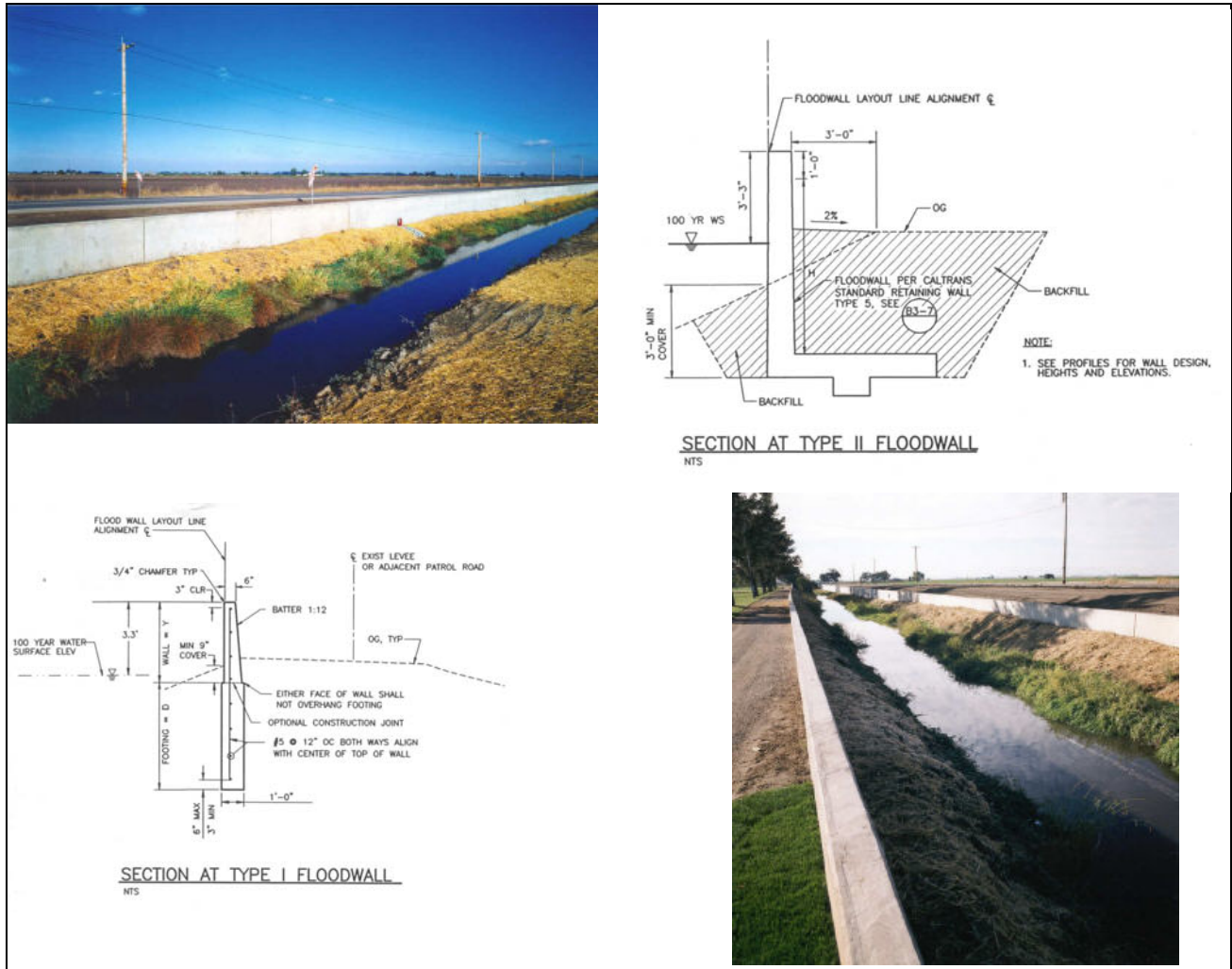
The SARIP Museum Reach – Urban Segment preliminary design plan includes modification of the channel geometry from Lexington Street upstream to Josephine Street. The effects of these improvements were considered in this analysis.

**Bridge Modifications**

Bridge modifications consist of modification of a bridge so that it does not impede flood flows and raise the base flood elevations. The affects of bridge modifications in this analysis were included in the model runs by observing the affect of completely removing a bridge to determine the overall sensitivity of the flood elevations to this modification. Bridge modifications were analyzed both individually and in conjunction with downstream improvements, including modifications to downstream bridges.

**Floodwalls**

Floodwalls provide a viable option in areas with shallow to moderate flooding. They have the significant advantage of requiring minimal right-of-way requirements. Low floodwalls are also cost competitive for low depth and limited right-of-way applications when compared to other improvement alternatives such as levees. However, floodwalls must be designed to meet FEMA and COE standards and can impose significant costs on the project. Floodwalls were included in the analysis for areas with shallow to moderate flooding depths. Due to the limited right-of-way conditions for much of San Pedro Creek and limited areas of the San Antonio River, the small footprint of floodwalls make them a viable option in these areas. Details and photographs of floodwalls are shown in Figure 2.



**Figure 2 – Floodwall Details and Photos**

**Levees**

Levees consist of earthen barriers to flood waters. They are typically constructed with a minimum 12 foot top width, 3:1 waterside slopes, and 2:1 landside slopes and must be designed according to FEMA and COE guidelines. Levee construction can require a large amount of right-of-way acquisition and materials and can be costly. Due to the constrained right-of-way of the study reaches, levee construction was not considered as a preferred alternative.

**Permanent Relocation**

A non-structural project flood mitigation alternative was permanent relocations or “buy-outs”. Permanent relocations involve the acquisition of flood-prone properties by the City or other municipal entity in order to reduce the threat to life and safety to the general public and to remove structures from the floodplain that would be damaged during a flood event.

For each mitigation area, permanent relocation options were compiled for two cases: properties and structures only within the 100-year flood plain and properties and structures within the 100-year and 500-year floodplains. Parcel addresses for each of these cases were summarized and broken down by flood damage area.

To evaluate the economic feasibility of performing permanent relocations for each flood damage area, the permanent relocation costs were calculated for each case using the following formula:

$$\text{Permanent Relocation Cost} = (\text{Structure value} \times 1.14) + (\text{Land value} \times 1.15)$$

Structure values and land values were derived from the 2004 BCAD database. Detailed cost estimates and breakdowns for the permanent relocation costs by damage area are included in Section 6 of the Appendices. The permanent relocation costs were annualized using a 50-year planning period and a discount rate of 5.625%. These annualized costs were then compared directly to the avoided damages for each specific damage area to determine a B/C ratio.

**Opinions of Conceptual Cost Assumptions**

In order to compare the relative cost impacts required to implement the flood mitigation measures, opinions of conceptual costs for each analyzed flood protection element are included in this report. The costs presented in this report are conceptual, feasibility or planning level costs. Actual implementation and construction costs are likely to differ from the costs presented in this report depending on the final design configuration, construction conditions, market forces, seasonal groundwater and stream flow variations, environmental factors, and other elements that may influence the cost of the improvements.

A conceptual cost estimate was developed for each mitigation alternative included in this report. Conceptual quantity take-offs for each mitigation item element were performed and summarized. Unit costs for each quantity were then applied to the quantities to arrive at conceptual construction costs. Unit costs were taken from estimating guides, City of San Antonio unit cost data, and from previous bid tabulations for projects with similar cost elements. To account miscellaneous construction items and unknown cost factors, a 40% contingency item was included in each opinion of conceptual cost.

The conceptual costs were then annualized using a 50-year planning period and a discount rate of 5.625%. The annualized conceptual costs were used to compare directly to the annualized benefits (avoided damages) that were correspondingly calculated for each mitigation alternative.

The SARIP Museum Reach improvement costs are not included in these cost estimates as the mitigation measures presented in this report pertain to additional measures that would either be included in the SARIP project or constructed after the project.

**San Pedro Creek**

This section describes each damage reach, the number of flooded structures, causes of flooding, and the mitigation options that analyzed.

**SPC14 – Probandt Street to S. Flores Street**

This residential area is located along the right bank of the southern most portion of San Pedro Creek (see Figure 3). The average flooding depths during the 100-year flood event in this area range from 0.05' to 2.35'. The floodplain spills out of the banks in two distinct low lying areas and impacts eight structures during the 100-yr flood event and 14 structures during the 500-yr flood event. The flooding depths during the 100-yr flood around the flooded structures range from 0.05' to 0.84'. The flooding is caused by back water from the Probandt Street Bridge, back water due to the confluence with the San Antonio River, and low lying pockets of land along the right bank. The low chord of the bridge deck is at an elevation of 600.50' and the 100-year water surface elevation is 602.77; which creates pressure flow through the bridge.

The options that were evaluated for this area were bridge improvements, floodwalls, channel modifications, and permanent relocations. A 450' long floodwall with a height of 5.6' would be required to protect the structures that are flooded by the 100-yr storm event. The channel modification analysis included increasing the channel bottom width to 300' beginning upstream of Probandt Street Bridge and ending downstream of W. Mitchell Bridge.

**SPC13 – Probandt Street to W. Mitchell Street**

This residential area is located in the left bank of the southern most portion of San Pedro Creek (see Figure 3). The average flooding depths during the 100-year flood event in this area range from 0.07' to 2.54'. The floodplain extends along the entire length of this reach between Probandt Street and W. Mitchell Street flooding eight structures during the 100-yr flood event and 32 structures during the 500-yr flood event. The flooding depths during the 100-yr flood around the flooded structures range from 0.07' to 2.20'. The flooding is caused by back water from the Probandt Street Bridge, back water due to the confluence with the San Antonio River, and low lying pockets of land along the left bank.

The options that were evaluated for this area were bridge improvements, floodwalls, channel modifications, and permanent relocations. A 1900' long floodwall with a height of 5.6' would be required to protect the structures that are flooded by the 100-yr storm event. The channel modification analysis included increasing the channel bottom width to 300' beginning upstream of Probandt Street Bridge and ending downstream of W. Mitchell Bridge.



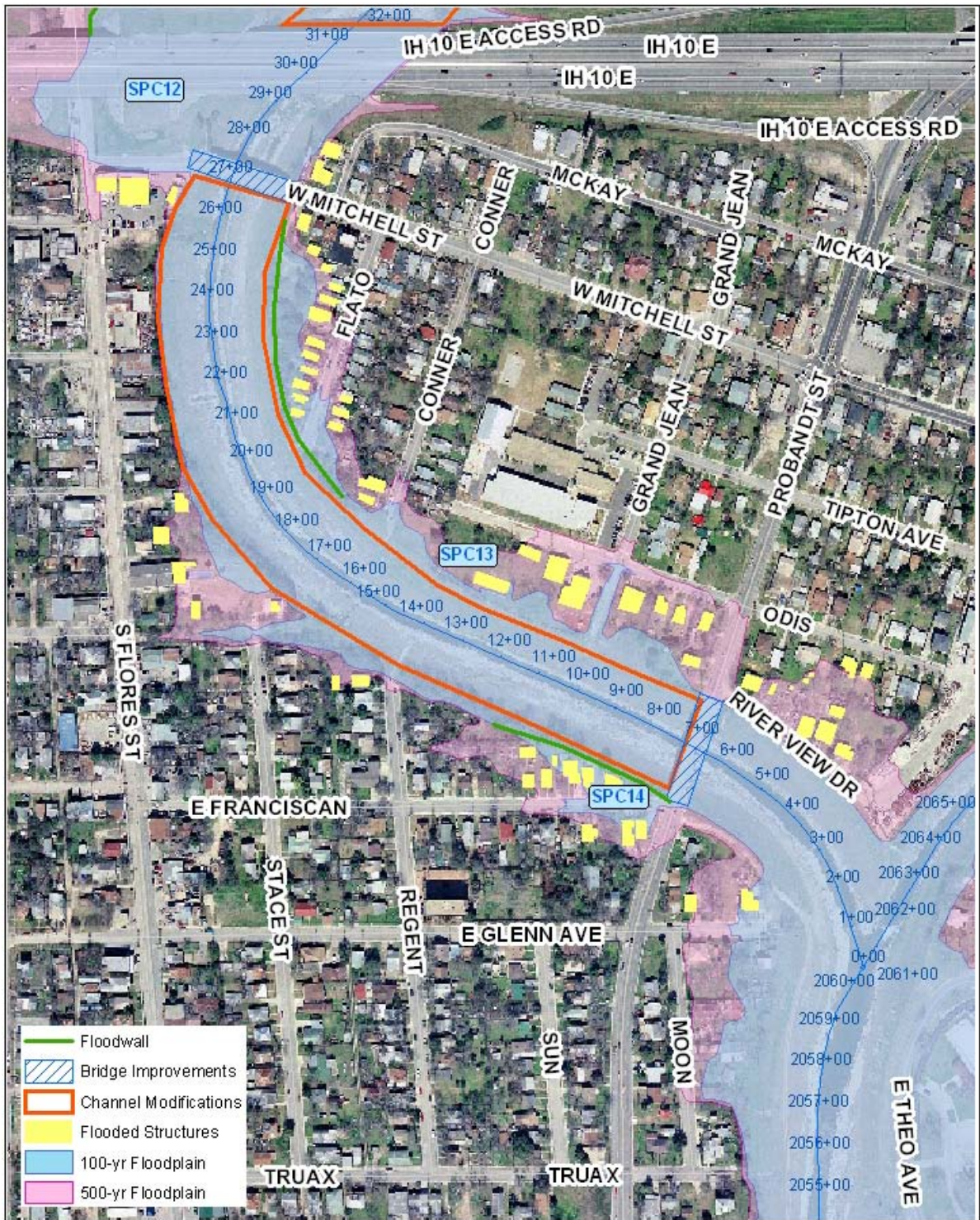


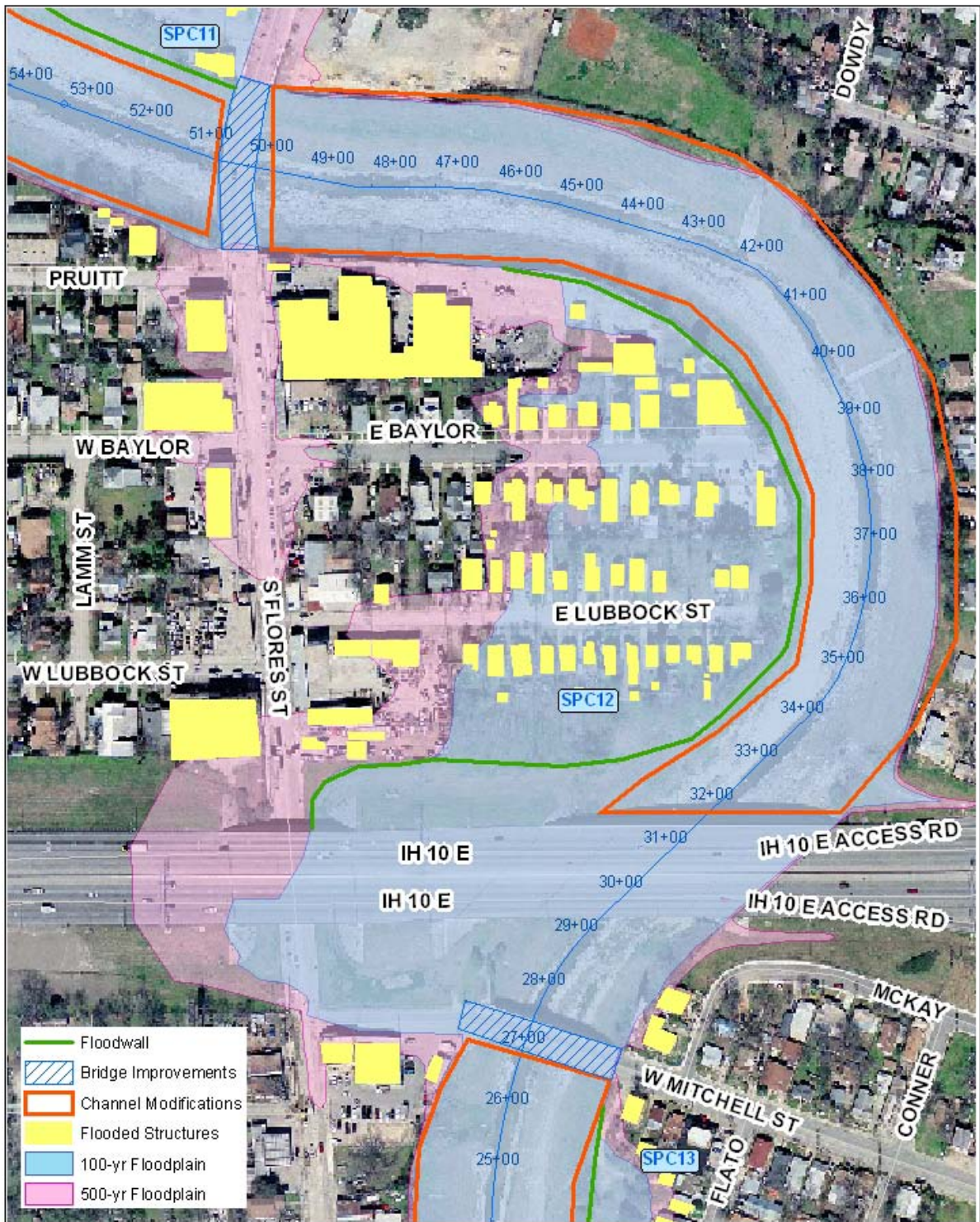
Figure 3 – SPC13 and SPC14 Location Map

**SPC12 – E. Baylor and E. Lubbock Street Area**

This area is located between W. Mitchell Street and S. Flores Street along the right bank of San Pedro Creek (see Figure 4). The average flooding depths during the 100-year flood event in this area range from 0.07' to 6.25'. There are 37 structures flooded during the 100-yr flood event and 47 structures flooded during the 500-yr flood event. The structures that flooded during the 100-yr flood are mainly residential structures along E. Baylor and E. Lubbock Streets. The 500-yr floodplain extends further down E. Baylor, E. Lubbock, and S. Flores Streets and impacts several commercial structures. The floodplain is wide in this area primarily due to the low elevation of the land along the bend of the creek, though backwater from Probandt Street Bridge and W. Mitchell Street Bridge contributes to the flooding problems. The low chord of the W. Mitchell Street Bridge deck is at an elevation of 603' and the 100-year water surface elevation is 607.03'.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and permanent relocations. A 3000' long floodwall with a height of 9.3' would be required to protect the structures that are flooded by the 100-yr storm event. The required height excludes the floodwall from being a practical solution. The channel modification analysis included increasing the channel bottom width to 250' beginning upstream of W. Mitchell Street Bridge and ending downstream of S. Flores Street Bridge.





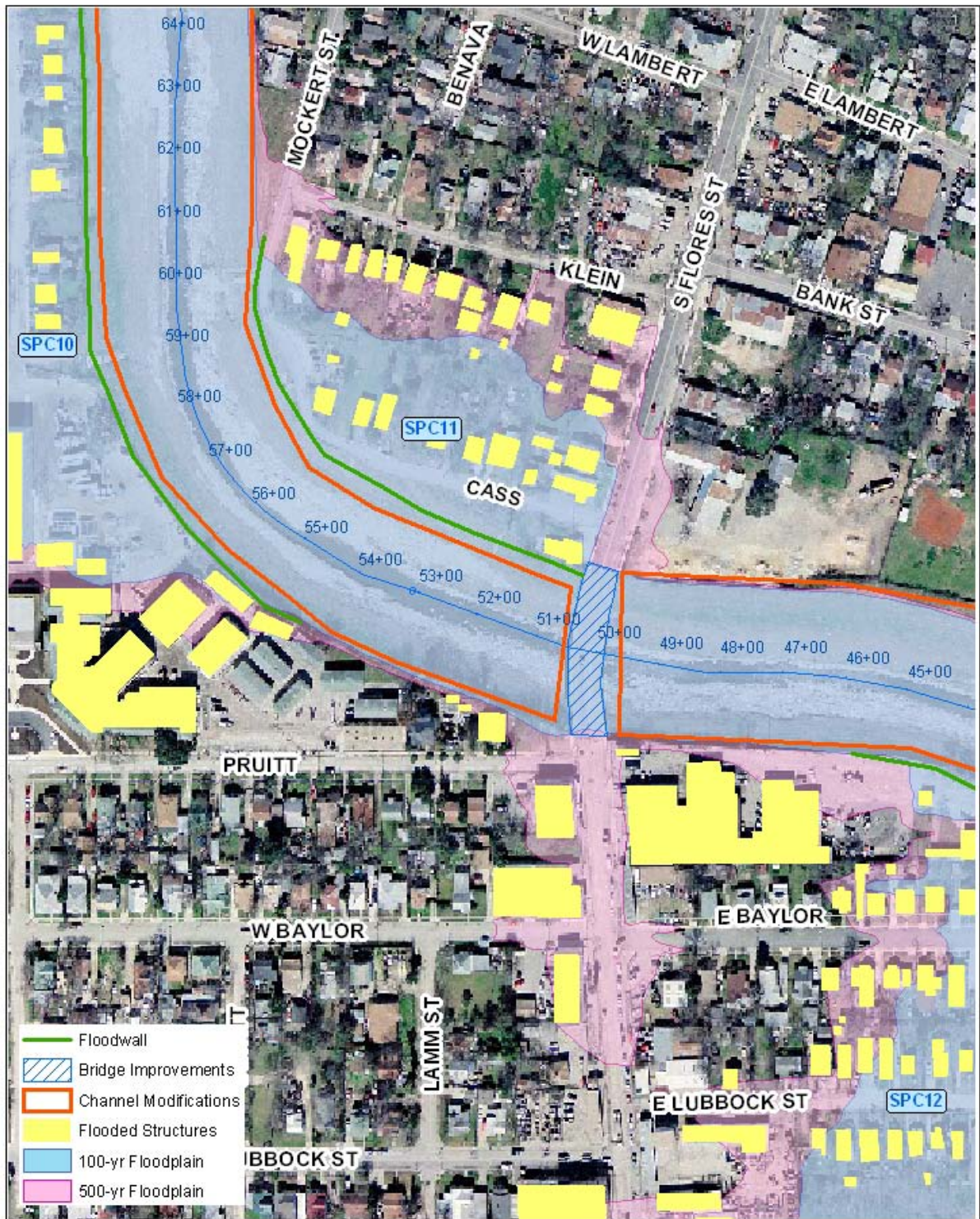
**Figure 4 – SPC12 Location Map**

**SPC11 – Cass Street Area**

This residential area is located upstream of S. Flores Street Bridge along the left bank of San Pedro Creek (see Figure 5). The average flooding depths during the 100-year flood event in this area range from 0.29' to 2.54'. There are 14 structures flooded during the 100-yr flood event and 27 structures flooded during the 500-yr flood event. The floodplain impacts structures Cass, Klein, and S. Flores Street due to the low elevation of the land, though backwater from downstream bridges contributes to the flooding problems. The low chord of the S. Flores Street Bridge deck is at an elevation of 610' and the 100-year water surface elevation is 613.54'.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and permanent relocations. A 1400' long floodwall with a height of 5.6' would be required to protect the structures that are flooded by the 100-yr storm event. The channel modification analysis included increasing the channel bottom width to 250' beginning upstream of S. Flores Street Bridge and ending downstream of Nogalitos Street Bridge.





**Figure 5 – SPC11 Location Map**

**SPC10 – Halstead Street Area**

This primarily residential area is located between S. Flores Street and Nogalitos Street along the right bank of San Pedro Creek (see Figure 6). The average flooding depths during the 100-year flood event in this area range from 0.21' to 6.22'. There are 36 structures flooded during the 100-yr flood event and 56 structures flooded during the 500-yr flood event. A portion of the Harris Middle School Campus is located in the 100-yr and 500-yr floodplain. The remaining flooded structures are residential homes located on Glass Street, Alvarez Place, Cass Street, and Halstead Street. The flooding is caused by the low elevation of the residential area and backwater from the Probandt Street, W. Mitchell Street, and S. Flores Street Bridges.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and permanent relocations. A 1985' long floodwall with a height of 9.3' would be required to protect the structures that are flooded by the 100-yr storm event. The required height excludes the floodwall from being a practical solution. The channel modification analysis included increasing the channel bottom width to 250' beginning upstream of S. Flores Street Bridge and ending downstream of Nogalitos Street Bridge.



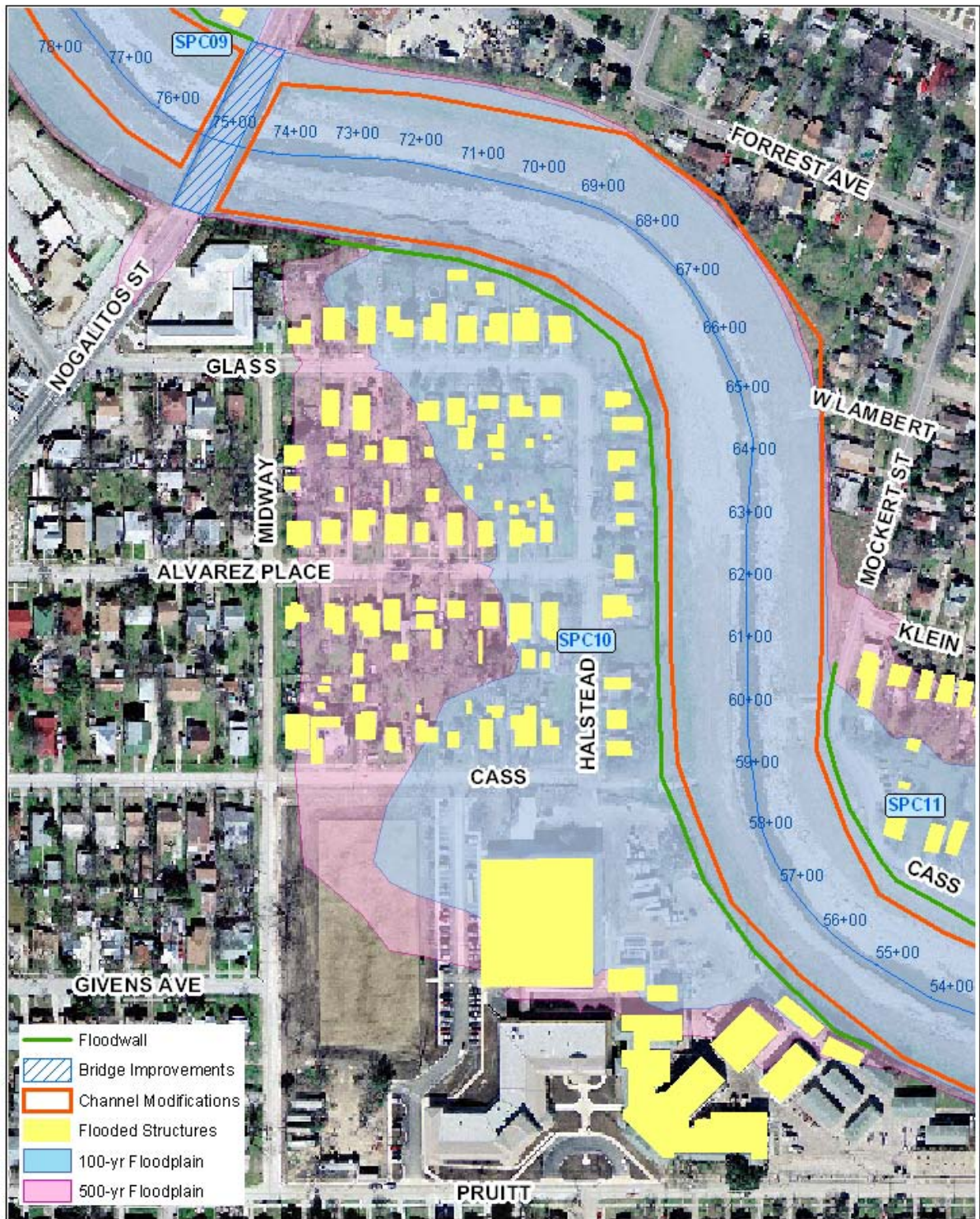


Figure 6 – SPC10 Location Map

**SPC09 – Nogalitos Street and Ralph Avenue Area**

This commercial area is located directly upstream of Nogalitos Street Bridge and Ralph Avenue along the left bank of San Pedro Creek (see Figure 7). The average flooding depths during the 100-year flood event in this area range from 0.05' to 0.27'. There are 10 structures flooded during the 100-yr flood event and 11 structures flooded during the 500-yr flood event. Backwater from downstream bridges causes shallow flooding in this area. The low chord of the Nogalitos Street bridge deck is at an elevation of 617' and the 100-year water surface elevation is 619.66'.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and permanent relocations. An 800' long floodwall with a height of 3.5' would be required to protect the structures that are flooded by the 100-yr storm event. The channel modification analysis included increasing the channel bottom width to 250' beginning upstream of Nogalitos Street Bridge and ending downstream of Furnish Street Bridge.

**SPC08 – IH35 and Furnish Area**

This residential area is located at IH35 and Furnish Street along the left bank of San Pedro Creek (see Figure 7). The average flooding depths during the 100-year flood event in this area range from 0.04' to 1.99'. There are 10 structures flooded during the 100-yr flood event and 81 structures flooded during the 500-yr flood event. The flooding is caused by the low elevation of the residential area and backwater from downstream bridges. The low chord of the Furnish Street Bridge is 619.29' and the 100-year water surface elevation is 624.64'. The bridge is under approximately three feet of water during the 100-year flood event.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel improvements, and permanent relocations. A 500' long floodwall with a height of five feet would be required to protect the structures that are flooded by the 100-yr storm event. The channel modification analysis included increasing the channel bottom width to 250' beginning upstream of Furnish Street Bridge and ending downstream of the railroad tracks.

**SPC07 – S. San Marcos and Furnish Street Area**

This commercial area is located at IH35 and S. San Marcos along the right bank of San Pedro Creek (see Figure 7). The average flooding depths during the 100-year flood event in this area range from 0.87' to 1.52'. There are two structures impacted in this area during the 100-yr and 500-yr flood event. The flooding is caused by the low elevation of the area and backwater from downstream bridges.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and permanent relocations. A 560' long floodwall with a height of 4.6' would be required to protect the structures that are flooded by the 100-yr storm event. The channel modification analysis included increasing the channel bottom width to 250' beginning upstream of Furnish Street Bridge and ending downstream of the railroad tracks.



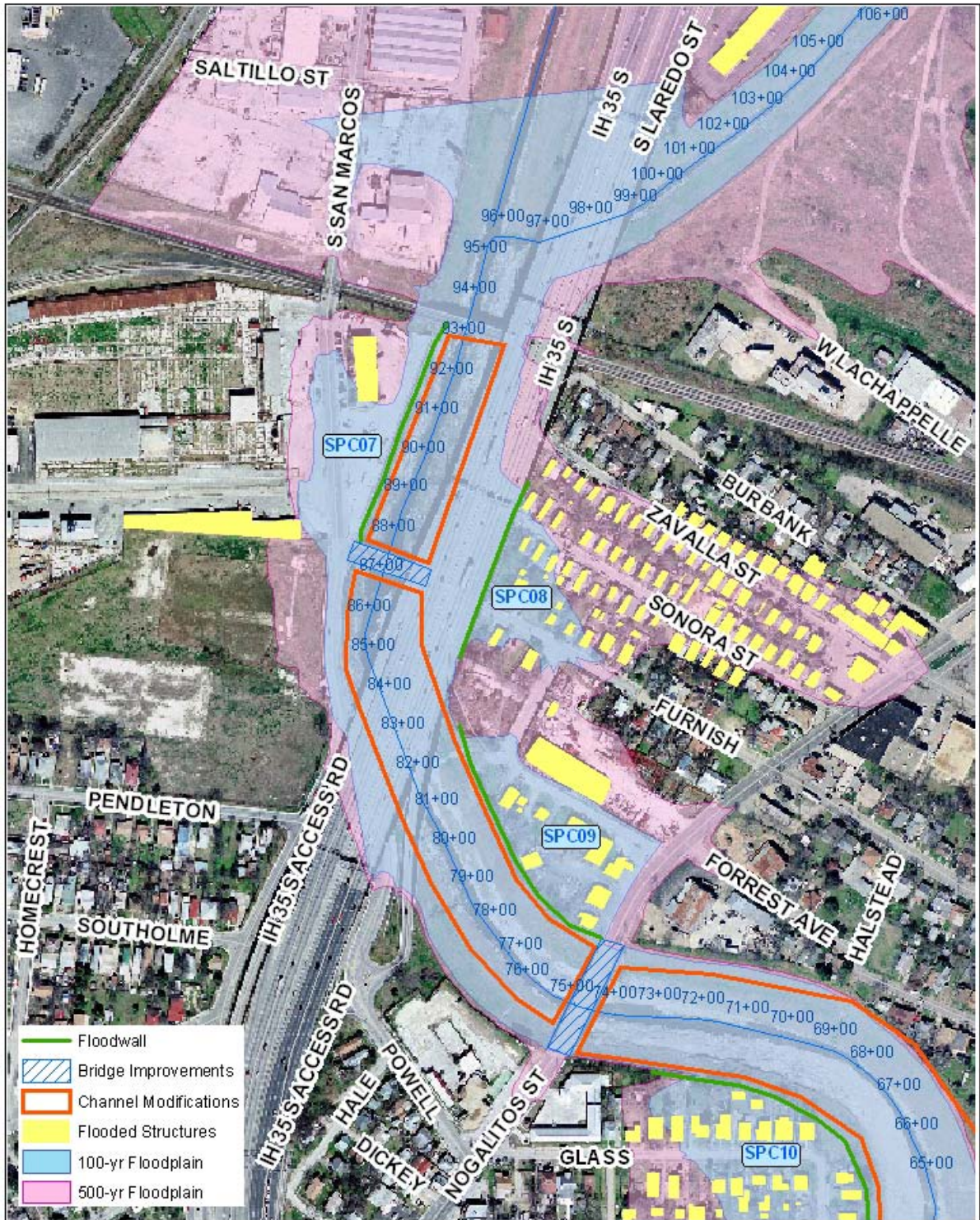
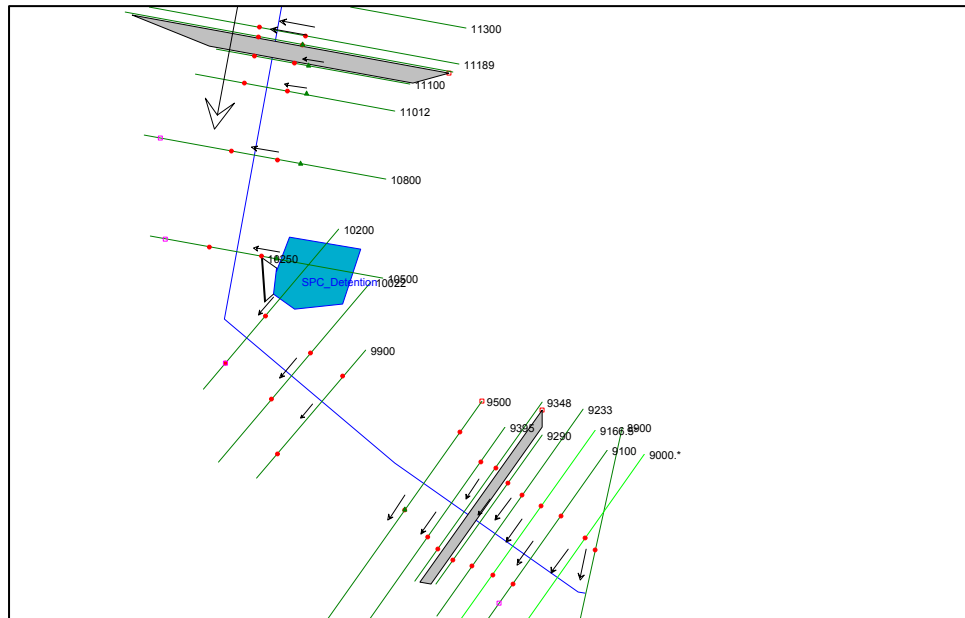


Figure 7 – SPC07, SPC08, and SPC09 Location Map



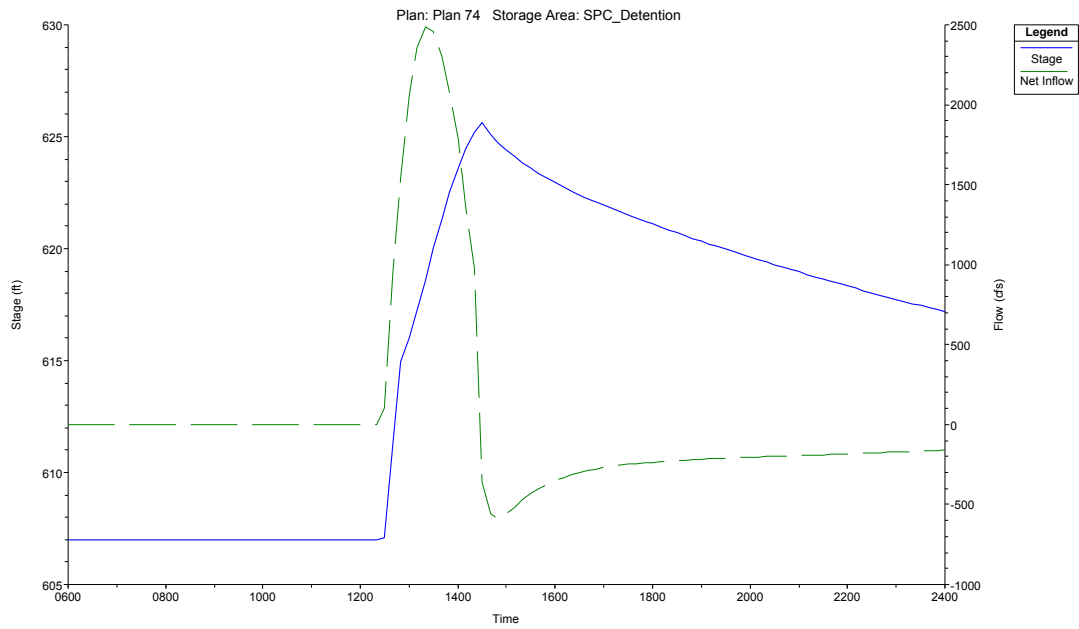




**Figure 9 – HEC-RAS Detention Model Schematic**

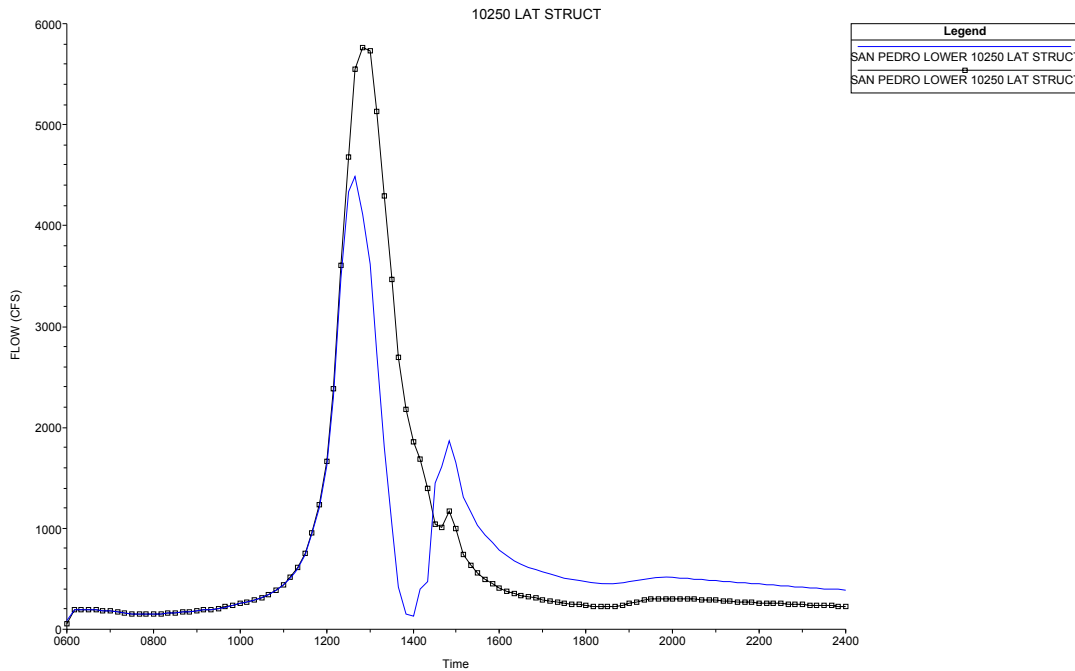
The optimized detention pond configuration consisted of a pond with an average floor elevation of 607 feet. The natural ground surface elevation in this area is approximately 627 feet. The floor elevation of the pond was set 2 feet above the San Pedro Creek thalweg elevation to allow the pond to drain by gravity only. The inflow weir was modeled as a broad crested weir 50 feet long. The outflow structure was configured as a 4 x 4 concrete box culvert from the low point of the pond discharging into San Pedro Creek. The outflow structure was also modeled with a flap gate to prevent San Pedro creek flows from backing into the proposed detention pond through the outflow pipe.

Figure 10 shows the net inflow and stage performance characteristics of the detention pond during a 100-year flood event on San Pedro Creek. The dashed line in the figure represents the inflow in cfs to the pond (if positive) and from the pond (if negative). The solid line represents the stage or water level within the pond during the flood event. The figure shows that the pond fills rapidly during a flood event and reaches its peak elevation (and storage capacity) within one to two hours. After the peak flood flow passes, the pond then begins to slowly return flood waters to San Pedro Creek over a period of several hours.



**Figure 10 – Detention Pond Stage and Net Inflow**

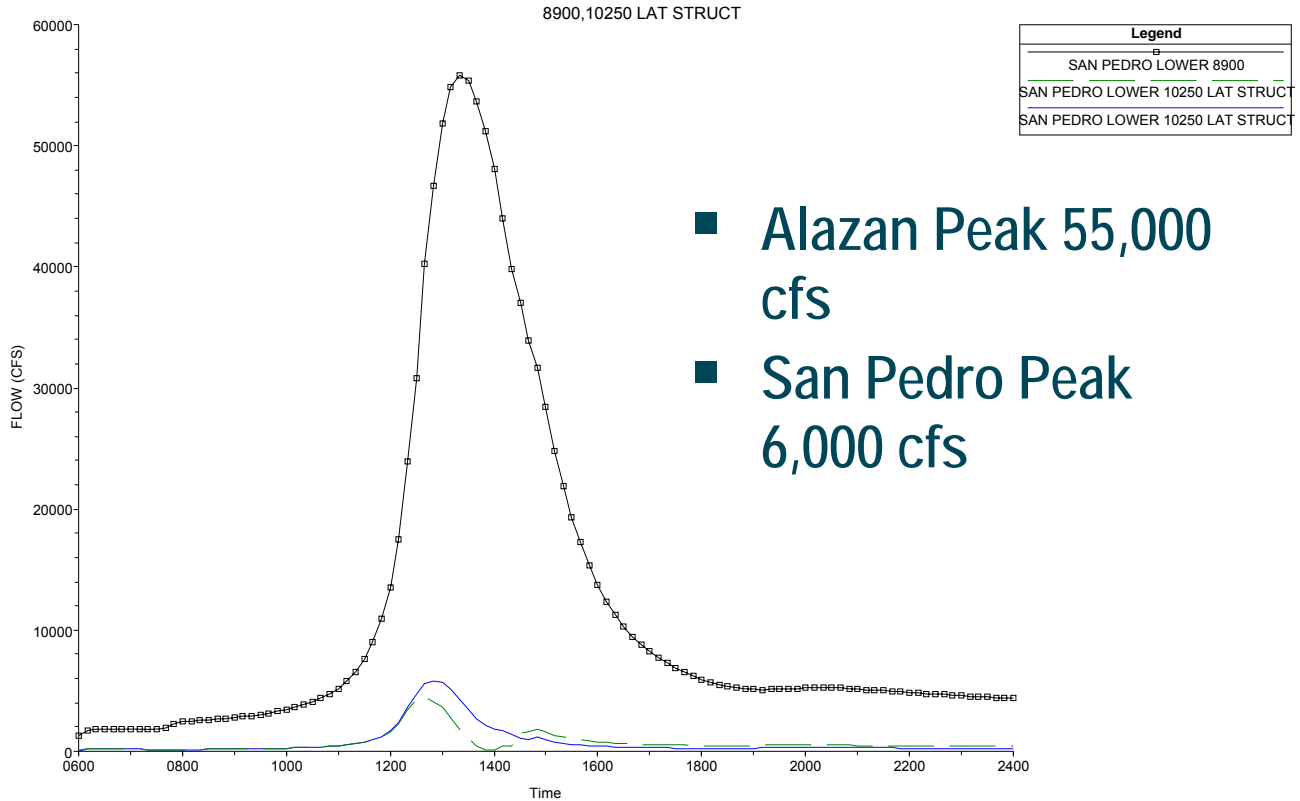
Figure 11 shows the effects of the detention on the San Pedro Creek hydrograph. The line shown with square data points represents the hydrograph upstream of the detention facility. The solid line with no data points represents the hydrograph downstream of the detention facility and the effects of the detention pond in regard to attenuating the peak hydrograph.



**Figure 11 – San Pedro Creek Hydrographs**

The peak flow in San Pedro Creek upstream of the detention facility is approximately 6,000 cfs. The detention facility has the effect of reducing the peak flow by approximately 1,500 cfs resulting in a peak flow downstream of the facility of approximately 4,500 cfs. However, close inspection of the downstream hydrograph shows a low flow point of near 100 cfs followed by a resumption of flow in

the San Pedro Creek Channel. This was inconsistent with the expected outflow from the detention facility. Further analysis of the flood behavior during the 100-year event revealed that this was due to the backwater effects of the flood flows contributed to the system by Alazan Creek just downstream of the detention facility. Figure 11 is a relative comparison of the timing and magnitude of the San Pedro Creek hydrograph just downstream of the confluence with Alazan Creek and the San Pedro Creek hydrograph(s) just upstream of the confluence point.



**Figure 12 – Comparison of Alazan and SPC Hydrographs**

The timing of the peak downstream of the confluence coincides with the low flow point at the shown in Figure 12. The large peak causes a backwater effect on the upstream San Pedro Creek channel which in turn causes a temporary cessation of flows in San Pedro Creek just upstream of the confluence as the peak from Alazan Creek is conveyed downstream of the confluence. Due to the large contribution by Alazan creek, which is almost ten times larger than the San Pedro Creek flows upstream of the confluence, and the hydrograph timing the proposed detention facility would have little beneficial effect downstream of the confluence with Alazan Creek. However, the conceptual costs and avoided damages (FDA results) for the conceptual detention facility were calculated and are presented in this report.



**SPC06 – IH35 and W. Cevallos Street Area**

This commercial area is located at IH35 and W. Cevallos Street along the right and left banks of San Pedro Creek (see Figure 13). The average flooding depths during the 100-year flood event in this area range from 0.17' to 0.44'. There are two structures flooded during the 100-yr flood event and 15 structures flooded during the 500-yr flood event. The flooding in this area is caused by the low elevation of the commercial area, backwater from downstream bridges, and the confluence with Apache Creek. The low chord of the W. Cevallos Street Bridge deck is at an elevation of 626.62' and the 100-year water surface elevation is 629.44'.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and permanent relocations. A 2150' long floodwall with a height of 3.5' would be required to protect the structures that are flooded by the 100-yr storm event. The channel modification analysis included increasing the channel bottom width to 250' beginning upstream of the railroad tracks and ending downstream of the railroad tracks that are located upstream of W. Cevallos.

**SPC05 – Railroad to S. Alamo Street**

This commercial area is located between railroad tracks and S. Alamo Street along both the right and left banks of San Pedro Creek (see Figure 13). The average flooding depths during the 100-year flood event in this area range from 0.16' to 2.93'. There are eight structures flooded during the 100-yr flood event and 16 structures flooded during the 500-yr flood event. The flooding is caused by the low elevation of the commercial area and backwater from downstream bridges.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and permanent relocations. A 1290' long floodwall with a height of six feet would be required to protect the structures that are flooded by the 100-yr storm event. The channel modification analysis included increasing the channel bottom width to 250' beginning upstream of the railroad tracks and ending downstream of the railroad tracks that are located upstream of S. Alamo.

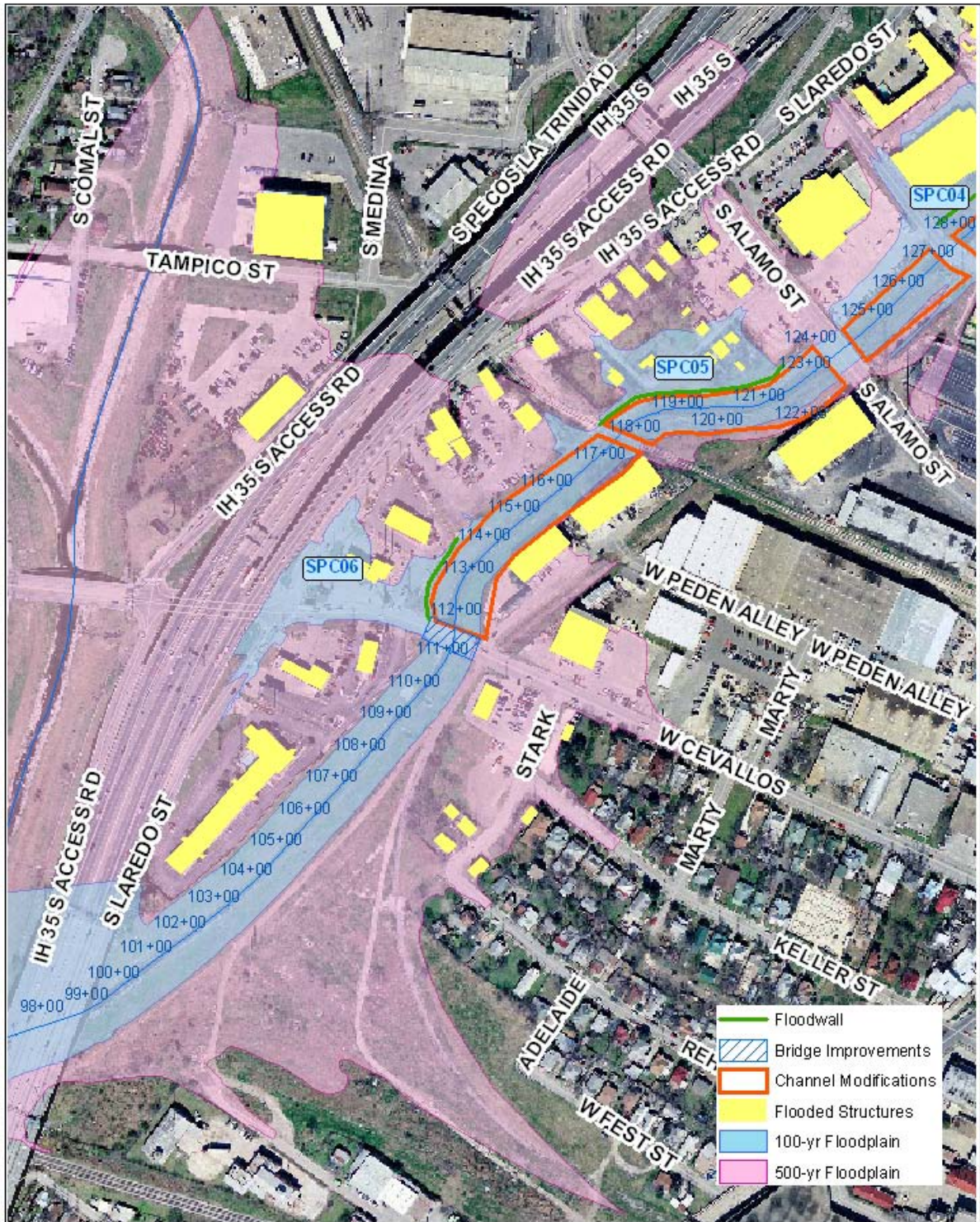


Figure 13 – SPC05 and SPC06 Location Map

**SPC04 – S. Alamo Street to El Paso**

This commercial area is located between S. Alamo Street and El Paso Street along both the right and left banks of San Pedro Creek (see Figure 14). The average flooding depths during the 100-year flood event in this area range from 0.04' to 4.29'. There are 17 structures flooded during the 100-yr flood event and 32 structures flooded during the 500-yr flood event. The flooding in this area is caused by the low elevation of the commercial area, backwater from downstream bridges, insufficient size of the existing channel, the San Pedro Creek Tunnel outlet, and the presence of the long culvert between Camp Street and Guadalupe Street.

The flood mitigation measures evaluated for this area were bridge improvements, floodwall, channel modifications, and permanent relocations. A 2000' long floodwall along each bank with a height of 9.3' would be required to protect the structures that are flooded by the 100-yr storm event. The required height excludes the floodwall from being a practical solution. The channel modification analysis included increasing the channel bottom width to 250' beginning upstream of the S. Alamo Street Bridge and ending downstream of Arsenal Street.



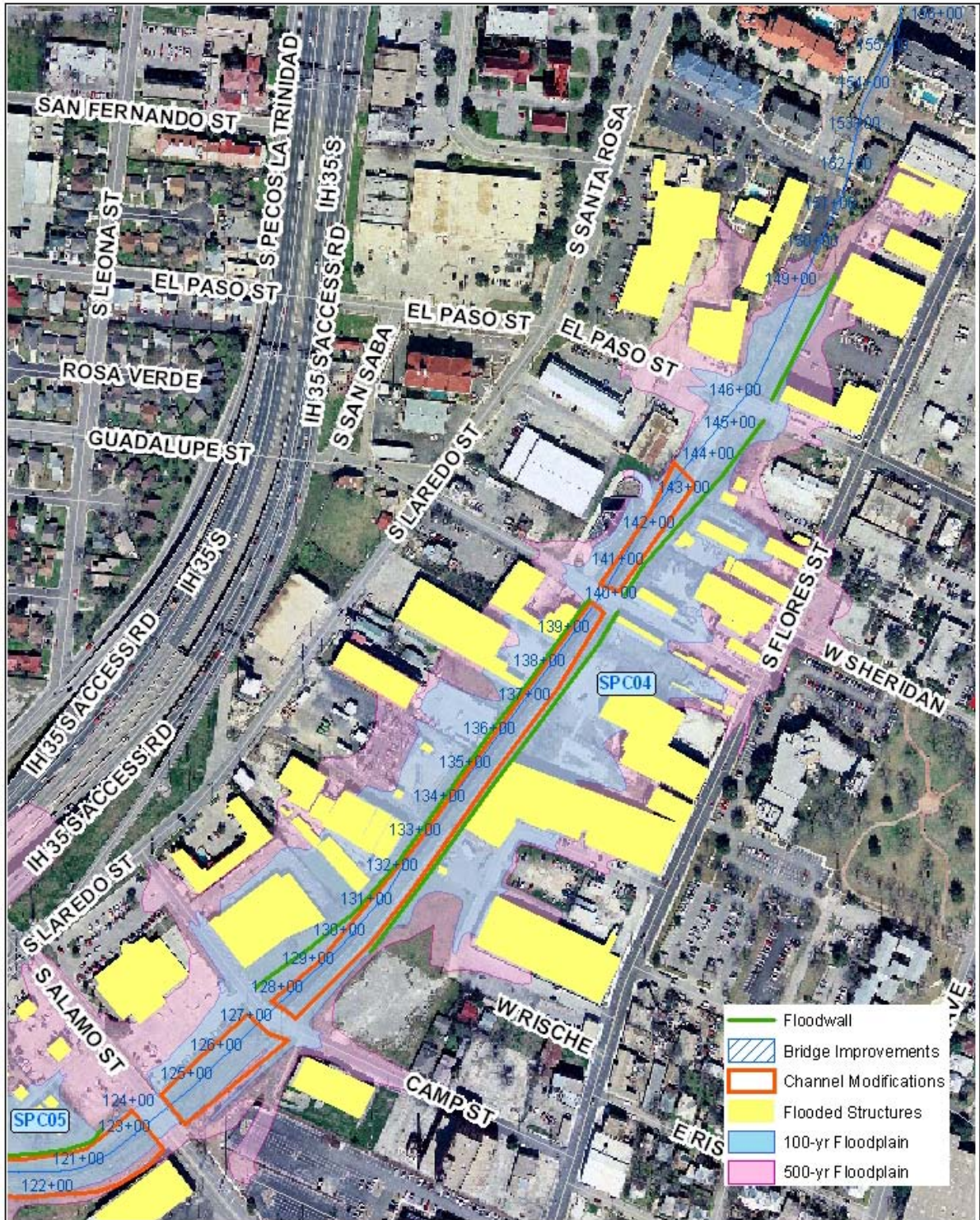


Figure 14 – SPC04 Location Map

**SPC03 – Dolorosa to W. Martin Street**

This commercial area is located between Dolorosa to W. Martin Street along both the right and left banks of San Pedro Creek (see Figure 15). The average flooding depth during the 100-year flood event in this area is 0.57'. During the 100-yr flood event, flood waters are contained in the channel from Dolorosa upstream to Camaron Street. South of W. Martin Street, the 100-yr floodplain spills out of the banks briefly but does not impact any structures. During the 500-yr flood event, 13 structures are flooded between Dolorosa and W. Commerce Street and between W. Houston and W. Salinas. The flooding of the structures in this area is due to an insufficient channel size and backwater from the bridges. Since there were not any structures impacted during the 100-yr flood, no physical channel modifications were evaluated. The recommended flood protection option in this situation is to close down Camaron Street between W. Salinas and W. Martin.

**SPC02 – W. Martin Street to Kingsbury (SPC Tunnel Inlet)**

This commercial area along Camaron Street at Kingsbury is located at the SPC Tunnel Inlet along the left bank of San Pedro Creek (see Figure 15). The average flooding depth during the 100-year flood event in this area is 0.29'. During the 100-yr flood event, street flooding occurs from the SPC Tunnel Inlet to the intersection of Kingsbury and Camaron Street but does not impact any structures. During the 500-yr flood event, the floodplain extends further east and north flooding five structures. The flooding in this area is caused by the low elevation of the area along the left bank. Since there were not any structures impacted during the 100-yr flood, no physical channel modifications were evaluated. The recommended flood protection option in this situation is to close down Camaron Street between N. Santa Rosa and IH35.

The draft floodplain mapping in the upper reaches of San Pedro Creek area may be revised and therefore the floodplain extents and flood protection measures should be re-evaluated if the floodplain extents decrease.



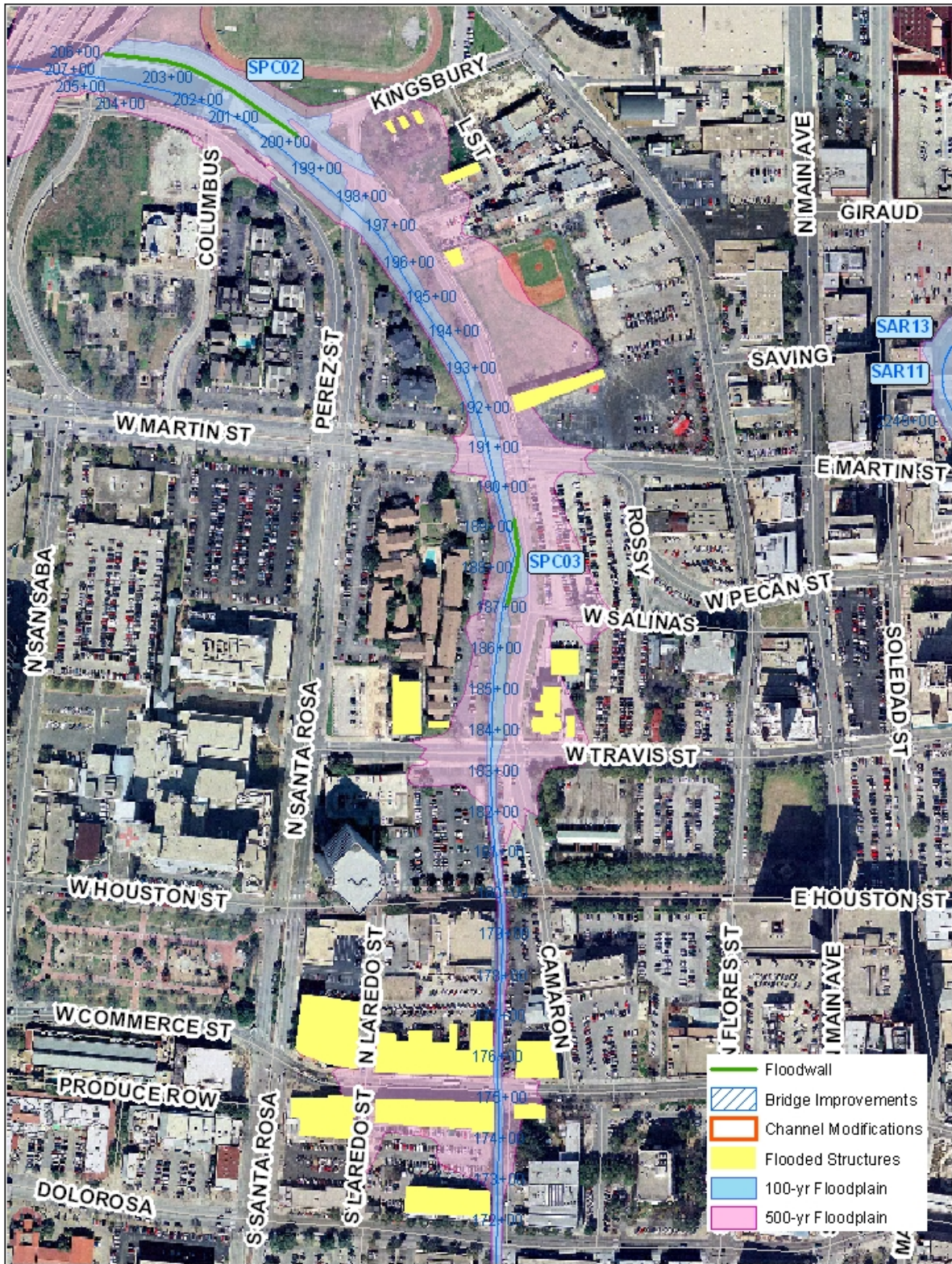


Figure 15 – SPC02 and SPC03 Location Map

**SPC01 – IH10 to West Laurel**

SPC01 consists of a residential and commercial area located at the headwaters of San Pedro Creek along the right and left banks of San Pedro Creek (see Figure 16). The 100-yr floodplain extends along the east side of IH35 from Poplar Street to Fredericksburg Road. The 500-yr floodplain is a wide floodplain that extends along the east and west side of IH35. There are 25 structures flooded during the 100-yr flood event and 47 structures flooded during the 500-yr flood event. The average flooding depths during the 100-year flood event in this area range from 0.04' to 2.42'. The flooding that occurs in this area is caused by a combination of backwater from the Cypress Street and Fredericksburg Road Bridges and the undersized improved channel upstream and downstream of Fredericksburg Road.

The flood mitigation measures evaluated for this area were floodwalls, channel modifications, and permanent relocations. The channel modification analysis included increasing the channel bottom width to 60' beginning upstream of the Cypress Street and ending downstream of Fredericksburg Road.

The draft floodplain mapping in this area may be revised. The flood mitigation measures for SPC01 should be re-evaluated if the floodplain extents decrease.



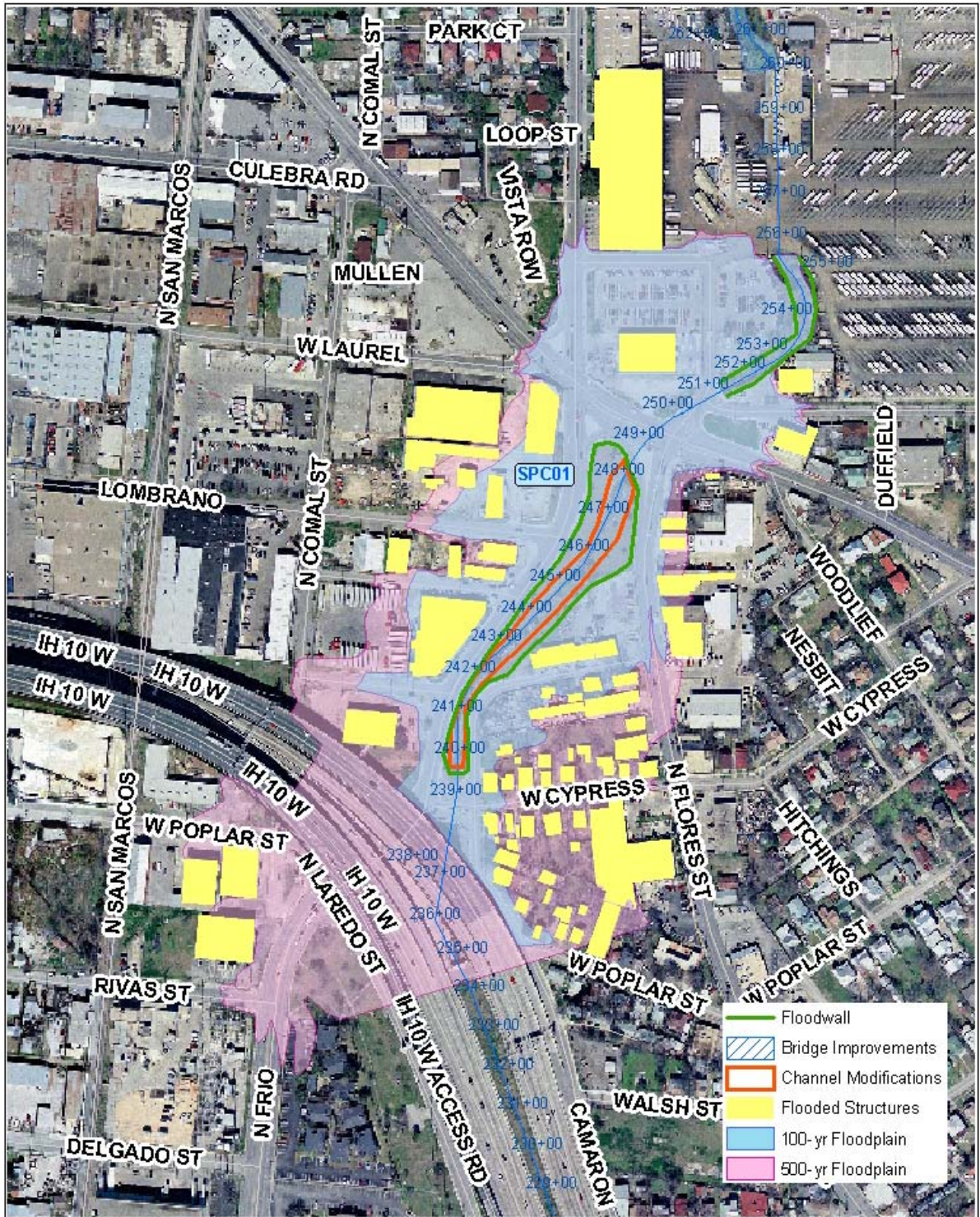


Figure 16 – SPC01 Location Map

### **San Antonio River**

The analysis for each of the San Antonio River mitigation areas was conducted in the same manner as the San Pedro Creek segment. The Eagleland Project encompasses the river segment from Guenther to Lone Star Street. This project includes restoration of the river channel and will affect the flood behavior. The elements of the Eagleland Project are not included in this analysis. The elements of the Museum and Park Segments of the Museum Reach - San Antonio River Improvements Project are included in this analysis. The following sections discuss the specific flood mitigation opportunities along the study reach of the San Antonio River.

During review meetings held with the San Antonio River Authority and the City of San Antonio as part of the project, several areas in the Upper San Antonio River study area were identified where the draft flood mapping was suspect or had mapping issues as yet unresolved by the Corps of Engineers, the River Authority, and the City. Due to these issues, the HDR study team was directed not to study the SAR02, SAR01, SAR21 to SAR24, and CPD areas. In other areas, the draft floodplain mapping error was noted and no mitigation options were identified for those areas.

**SAR20 – Constance Street Area**

This area is located along both the right and left banks of the San Antonio River near Constance Street and Barbe Street (see Figure 17). In this reach of the San Antonio River, the 100-yr storm floodwaters appear to spill out its left bank near cross-section 215261 but no structures are impacted. According to the contours and HEC-RAS cross section information, the nearby structure is located on the banks at least four feet above the water surface elevation. During the 500-yr flood event, the floodplain encroaches into two structures on the right bank near Barbe Street. The flooding in this area is caused by the low lying pockets of land near the banks.



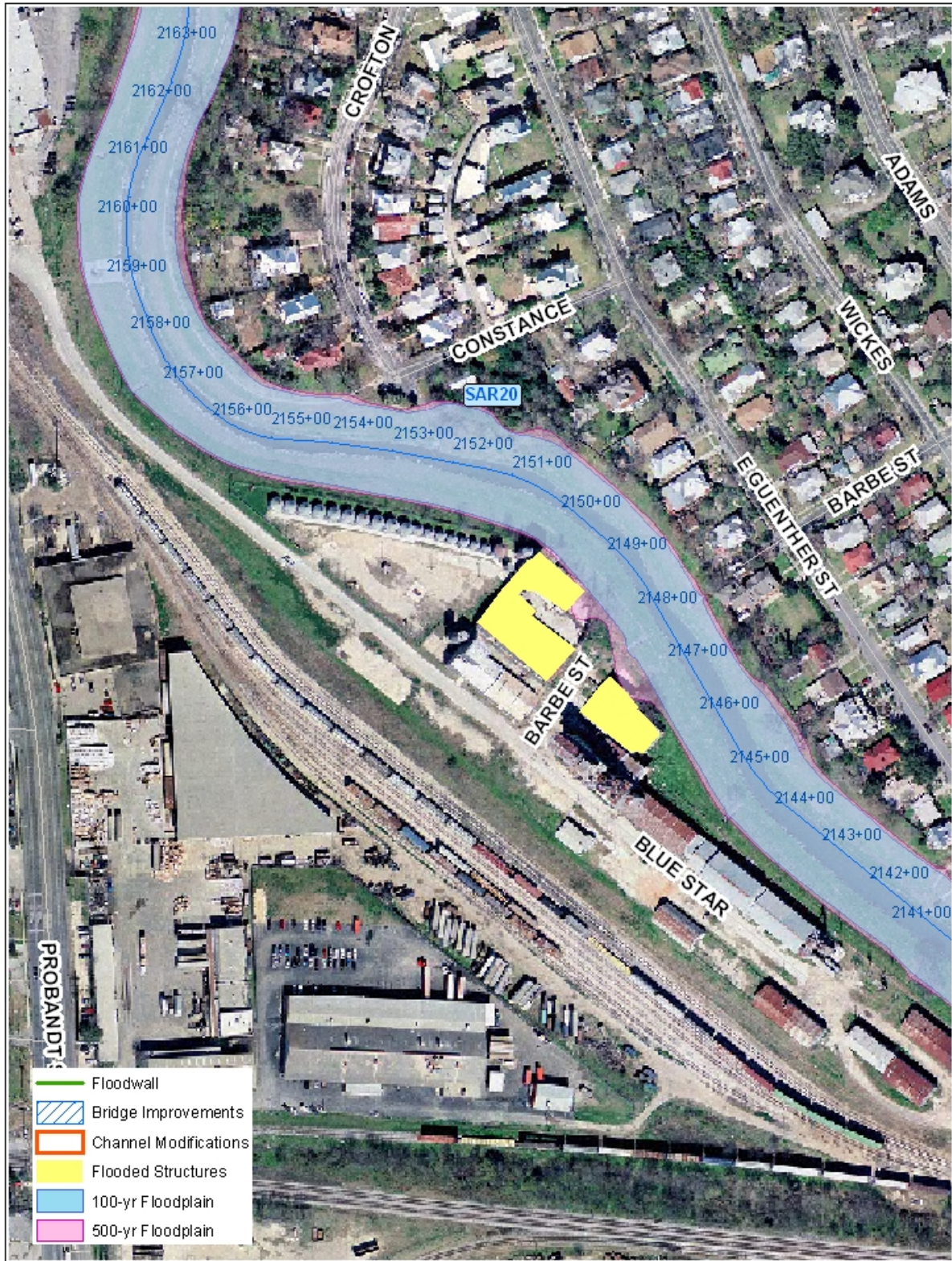


Figure 17 – SAR20 Location Map



**SAR19 – S. Alamo Street and Blue Star (Left Bank)**

This area is located in a commercial and residential area along the left bank of the San Antonio River downstream of S. Alamo Street Bridge (see Figure 18). The average flooding depths during the 100-year flood event in this area range from 2.81' to 4.82'. One structure is located in the 100-yr and 500-yr floodplain. The flooding is caused by the low elevation of the area.

The flood mitigation measure that was considered for this area was a floodwall and permanent relocation. A 400' floodwall would remove the structure from the floodplain.

SAR19 is located within the project limits of the current Eagleland project. The above mitigation element does not consider the effects that the Eagleland project may have in this segment of the river. The Eagleland project may already provide flood benefits that will reduce flooding in this area and, if so, would eliminate the need for any further improvements to provide flood protection.

**SAR18 – S. Alamo Street and Blue Star (Right Bank)**

This area is the Blue Star Art Complex parking lot located in a commercial area along the right bank of the San Antonio River downstream of S. Alamo Street Bridge (see Figure 18). The 100-yr and 500-yr floodplain extents are currently mapped to cover this parking lot. According to the contours and cross-sections in the area, the parking lot is approximately five feet above the 100-yr water surface elevation. Spot elevation data obtained from Geodetix confirms that the parking has an elevation ranging from 628.80' - 630.61' see Figure 19. The 100-year water surface elevation at cross-section 216946 is 624.60' and at cross-section 216700 is 624.48' see Figure 20 and Figure. It appears that the floodplain is not mapped correctly in this area.

**SAR17 – S. Alamo Street Bridge to E. Guenther Street Bridge**

This area is located in a residential and commercial area directly upstream of S. Alamo Street Bridge along both the right and left banks of the San Antonio River (see Figure 18). No structures are located in the 100-yr floodplain and two structures are impacted during the 500-yr flood event along the right bank, south of E. Guenther Street.

There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations. Spot elevations on the left bank, upstream of S. Alamo, indicate the elevations near the outer limits of the 100-yr floodplain are 629.85' (see Figure 22). The 100-year water surface elevation at cross-section 217151 is 624.85' (see Figure 23). The mapped floodplain near cross-section 217299 is not mapped to the extents of the improved channel in this area. It appears that the floodplain is not mapped correctly in this area.

**SAR16 – W. Johnson Street Bridge Area**

This area is located in a residential and commercial area upstream and downstream of the E. Johnson Street Bridge along both banks of the San Antonio River (see Figure 18). No structures are located in the 100-yr floodplain and one structure on the left bank is clipped by the 500-yr floodplain, south of W. Johnson Street Bridge.

There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations. The mapped floodplain near cross-section 218374 is not mapped to the extents of the improved channel in this area (see Figure 24). It was also noted that the top width of cross-section 218374 is 120.61' in the LMMP HEC-RAS model but measures 102.5' based on the

ArcView shapefile of the LMMP 100-yr floodplain. This is one area that is noted that the 2-ft contours that were provided to the study team in Phase I of this project are overlapping and jumbled (see Figure 25). It appears that the floodplain is not mapped correctly in this area.

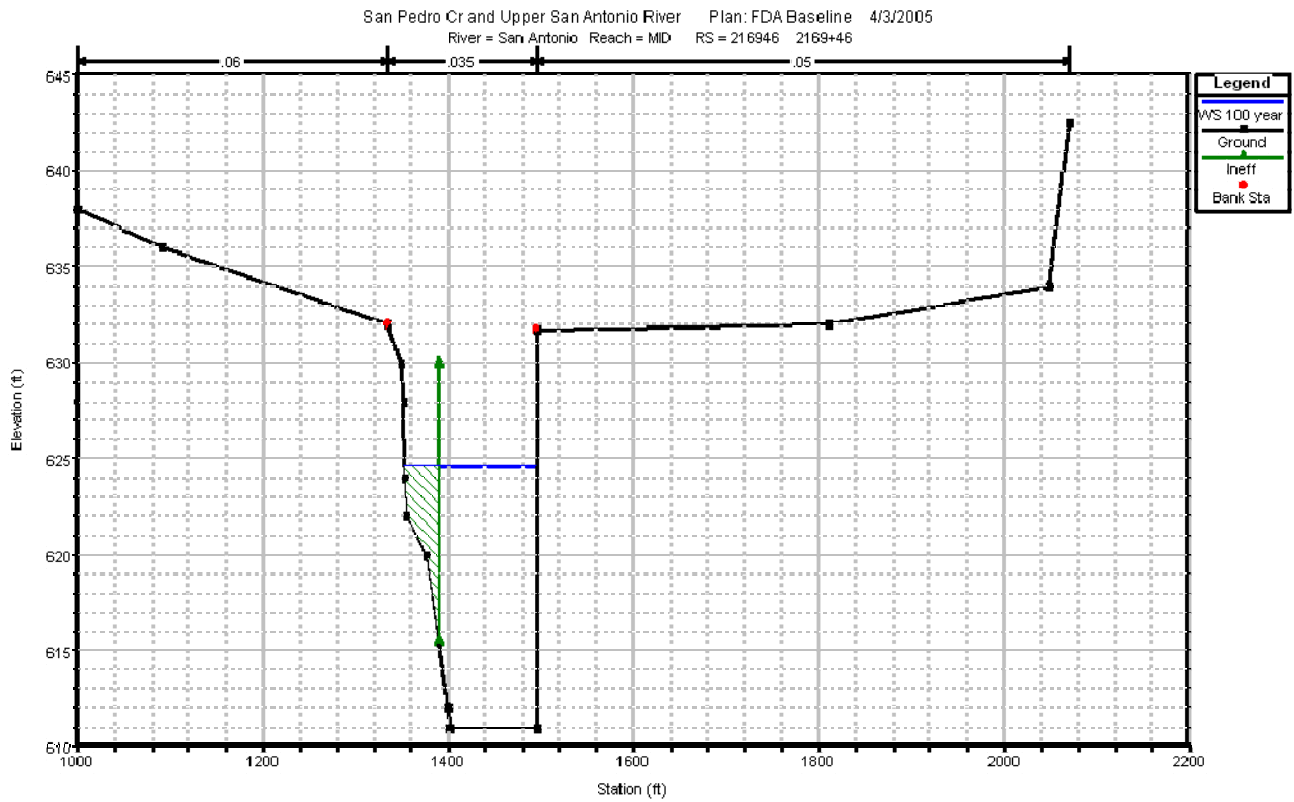


**Figure 18 – SAR19, SAR18, SAR17, and SAR16 Location Map**

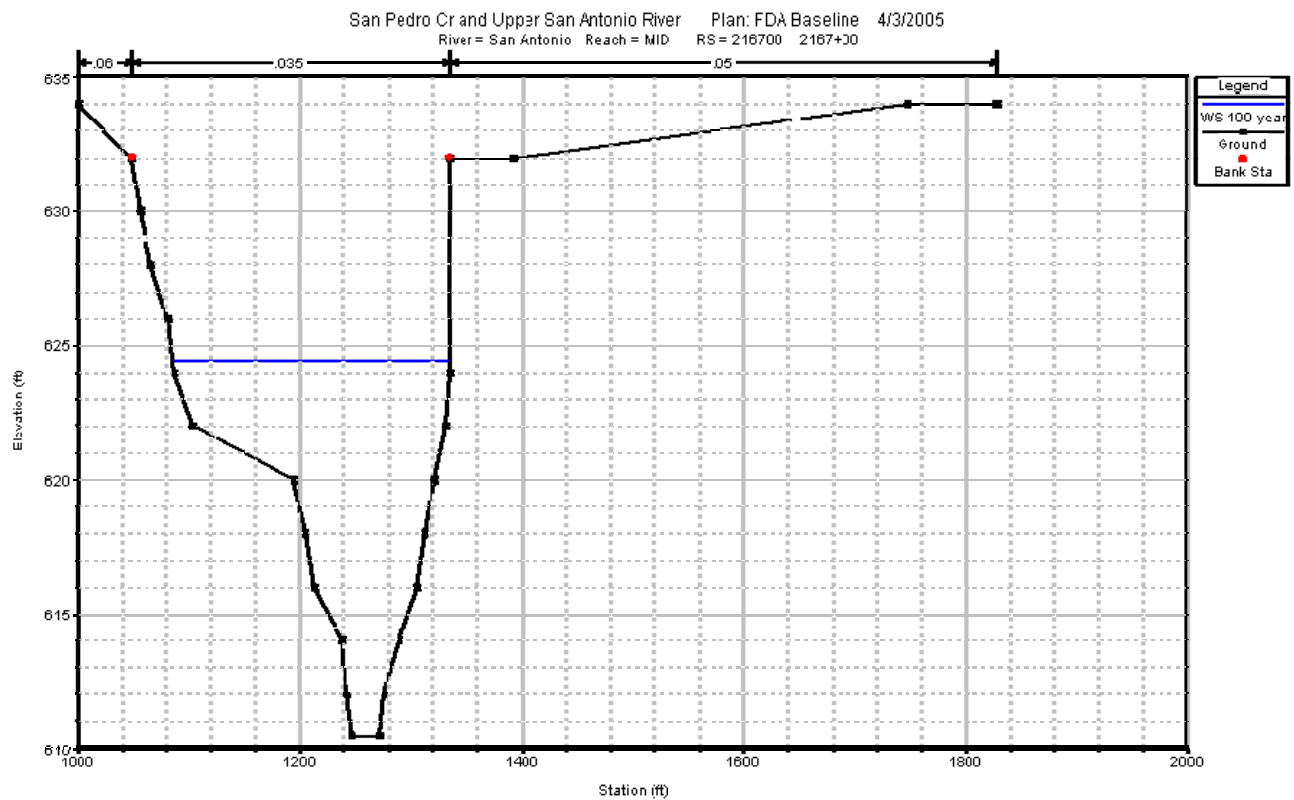




**Figure 19 – SAR18 Blue Star Parking Lot Spot Elevations**



**Figure 20 – SAR18 Cross Section 216946 100-yr WSE**

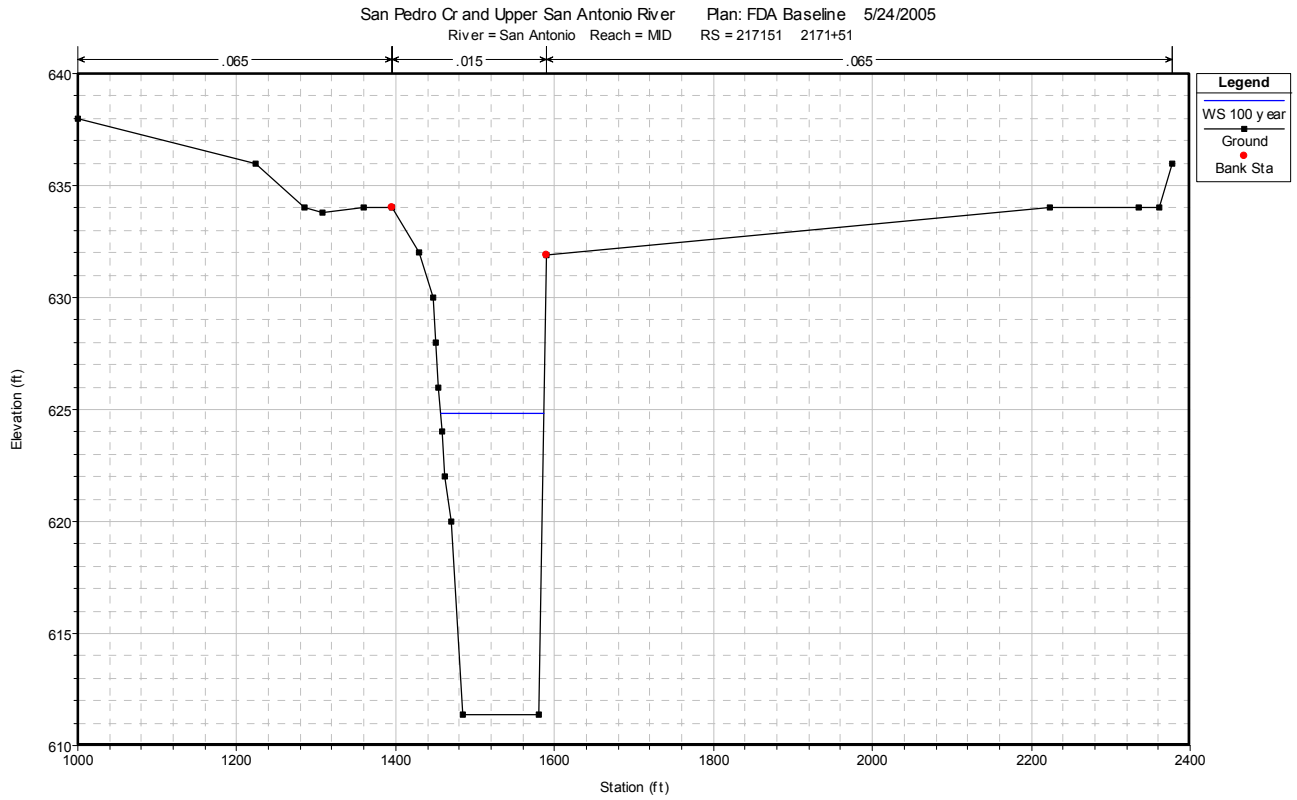


**Figure 21 – SAR18 Cross Section 216700 100-yr WSE**





**Figure 22 – SAR17 Ground Elevation Points**



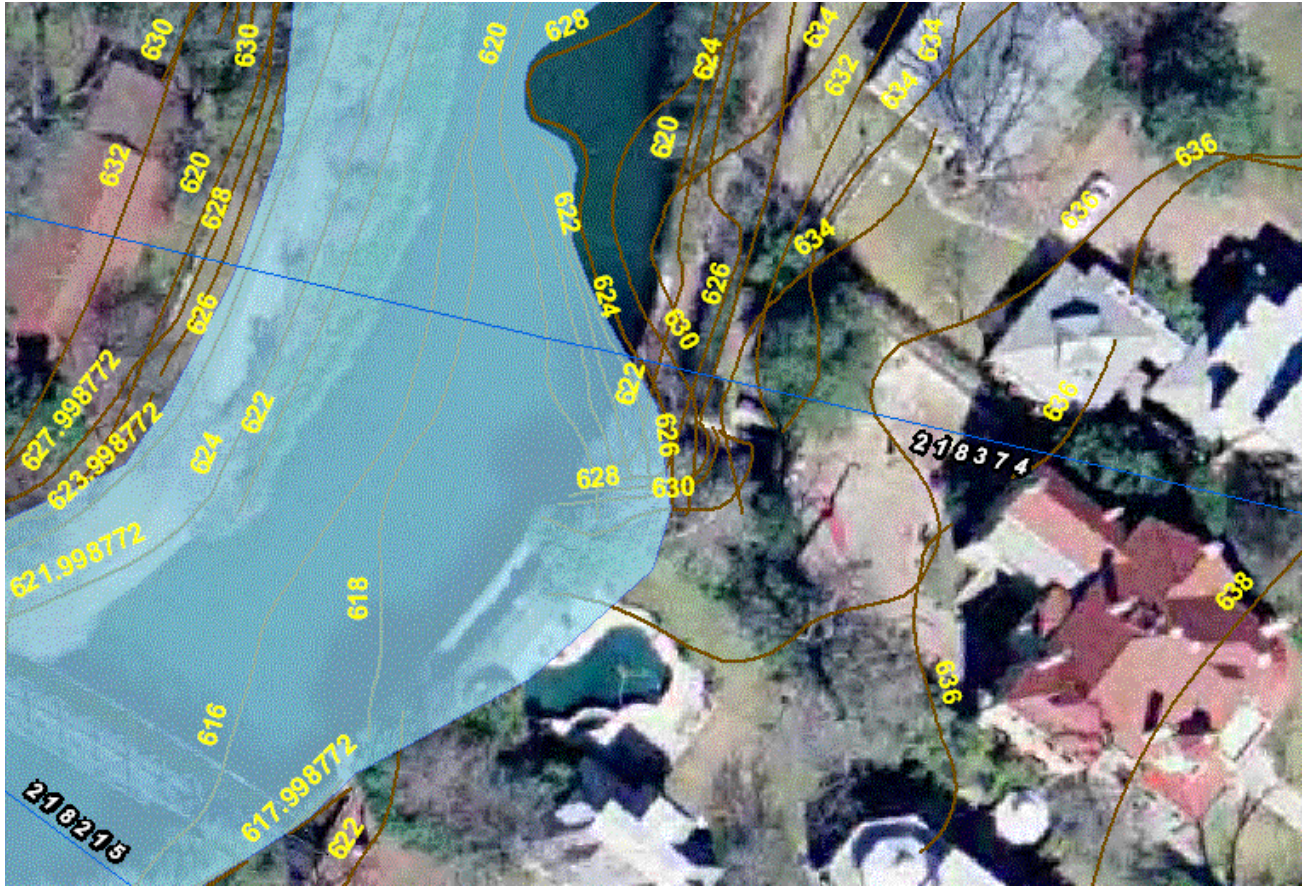
**Figure 23 – SAR17 Cross Section 217151 100 yr WSE**





Figure 24 – SAR16 Floodplain Mapping Issues





**Figure 25 – SAR16 Floodplain Mapping Issues**

**SAR15 – E. Commerce Street to E. Houston Street**

This commercial area is located between E. Commerce Street to E. Houston Street along the right bank of the San Antonio River (see Figure 26). Based on the aerial photograph, it appears that there are structures clipped by the 100-yr floodplain downstream of E. Houston Street and upstream of E. Commerce Street. The elevation points from Geodetix did not clarify whether or not the structures were located in the 100 yr floodplain. The 500-yr floodplain impacts seven structures. It is also noted that the 100-yr floodplain is not mapped to full extents of the improved channel upstream of E. Commerce (see Figure 27). There are instances where the measured floodplain top width does not correspond with the HEC-RAS cross-section top width. The 100-yr top widths of cross sections 222839 and 222850 from the HEC-RAS model are 78' and 42', respectively. The measured top widths from the ArcView 100-yr Floodplain polygon are 50' and 52', respectively. There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations.

**SAR14 – E. Houston Street to E. Travis Street**

This commercial area is located between E. Houston Street and E. Travis Street along the left bank of the San Antonio River (see Figure 26). Based on the aerial photograph, it appears that one structure is clipped by the 100-yr floodplain downstream of E. Travis Street. However, this is an area where the cross section top width does not correspond with the measure floodplain width. The 100-yr top width of cross sections 223638 from the HEC-RAS model is 72'. The measured top width from the ArcView 100-yr floodplain polygon is 81'. There appears to be a discrepancy in the floodplain mapping in this area.



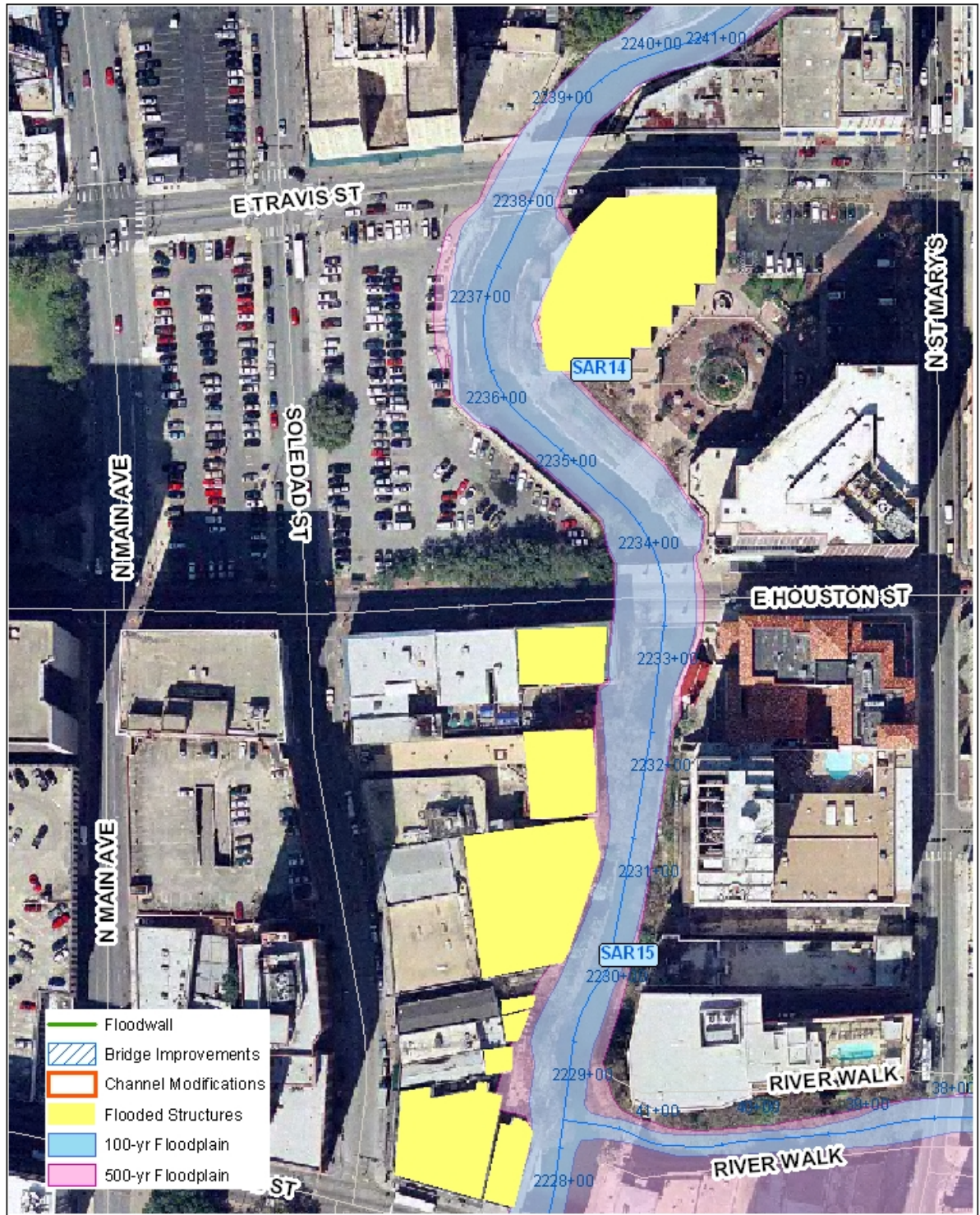


Figure 26 – SAR 15 and SAR14 Location Map



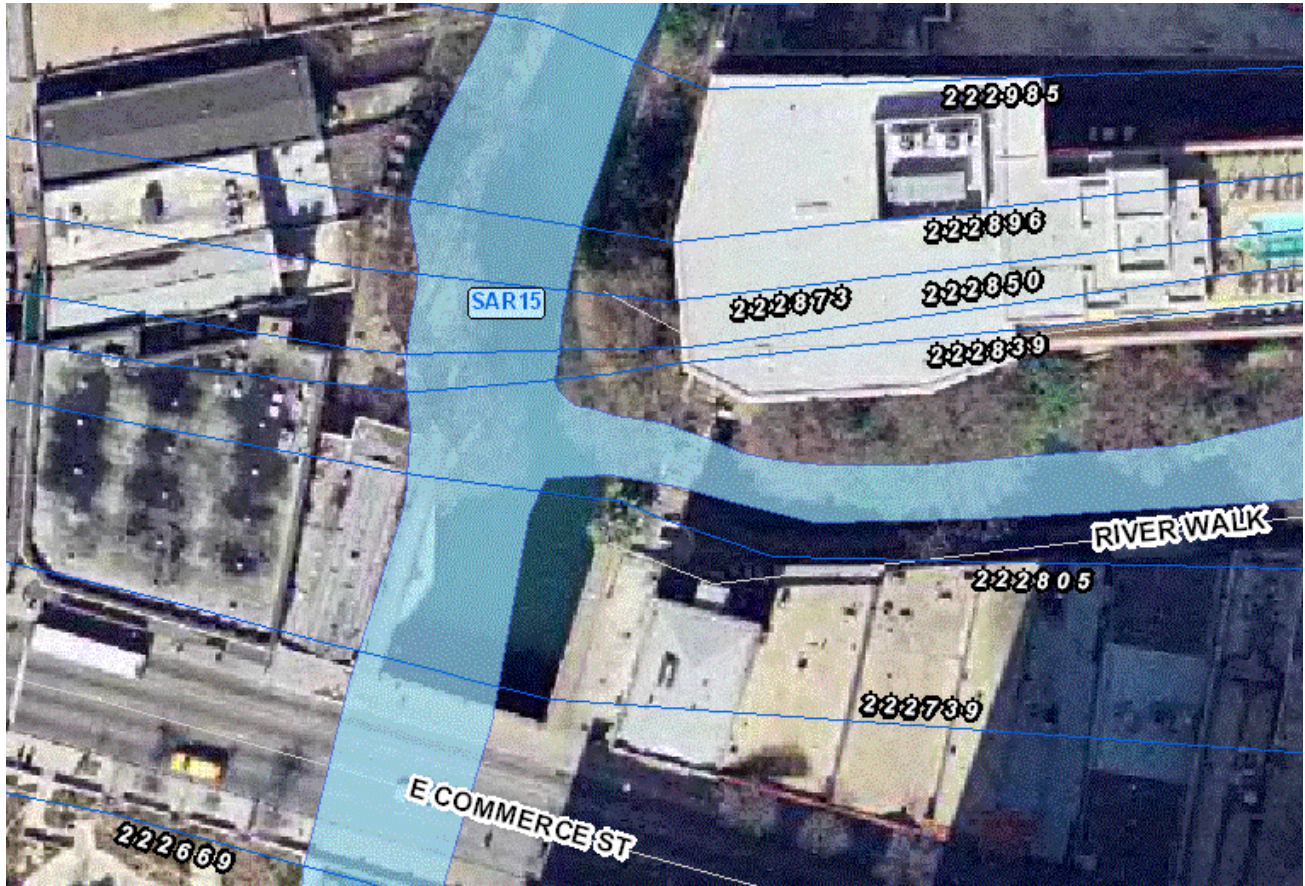


Figure 27 – SAR15 Floodplain Issues



**SAR13 – E. Martin Street to Augusta**

This commercial area is located between E. Martin Street and Augusta along the right bank of the San Antonio River (see Figure 28). Based on the aerial photograph, it appears that structures are in the 100-yr floodplain upstream of Convent. However, this is an area where the cross section top width does not correspond with the measure floodplain width. The 100-yr top width of cross sections 224971 from the HEC-RAS model is 109.21'. The measured top width from the ArcView 100-yr floodplain polygon is 89'. There appears to be a discrepancy in the floodplain mapping in this area.

**SAR12 – Navarro Street to N. St. Mary's**

This commercial area is located between Navarro and N. St. Mary's along the right bank of the San Antonio River (see Figure 28). The mapped 100-yr floodplain indicates impacted structures between Navarro and N. St. Mary's Street. However, this is an area where the cross section top width does not correspond with the measure floodplain width. The 100-yr top width of cross sections 225654 from the HEC-RAS model is 82.85'. The measured top width from the ArcView 100-yr floodplain polygon is 167.5'. There appears to be a discrepancy in the floodplain mapping in this area.

**SAR11 – Navarro Street to Convent**

This commercial area is located between Navarro and Convent along the left bank of the San Antonio River (see Figure 28). The mapped floodplain indicates impacted structures between Navarro and Convent. This area is located across the bank in the same area as SAR13 and SAR14 and therefore is located in area where there may be issues related to floodplain mapping.

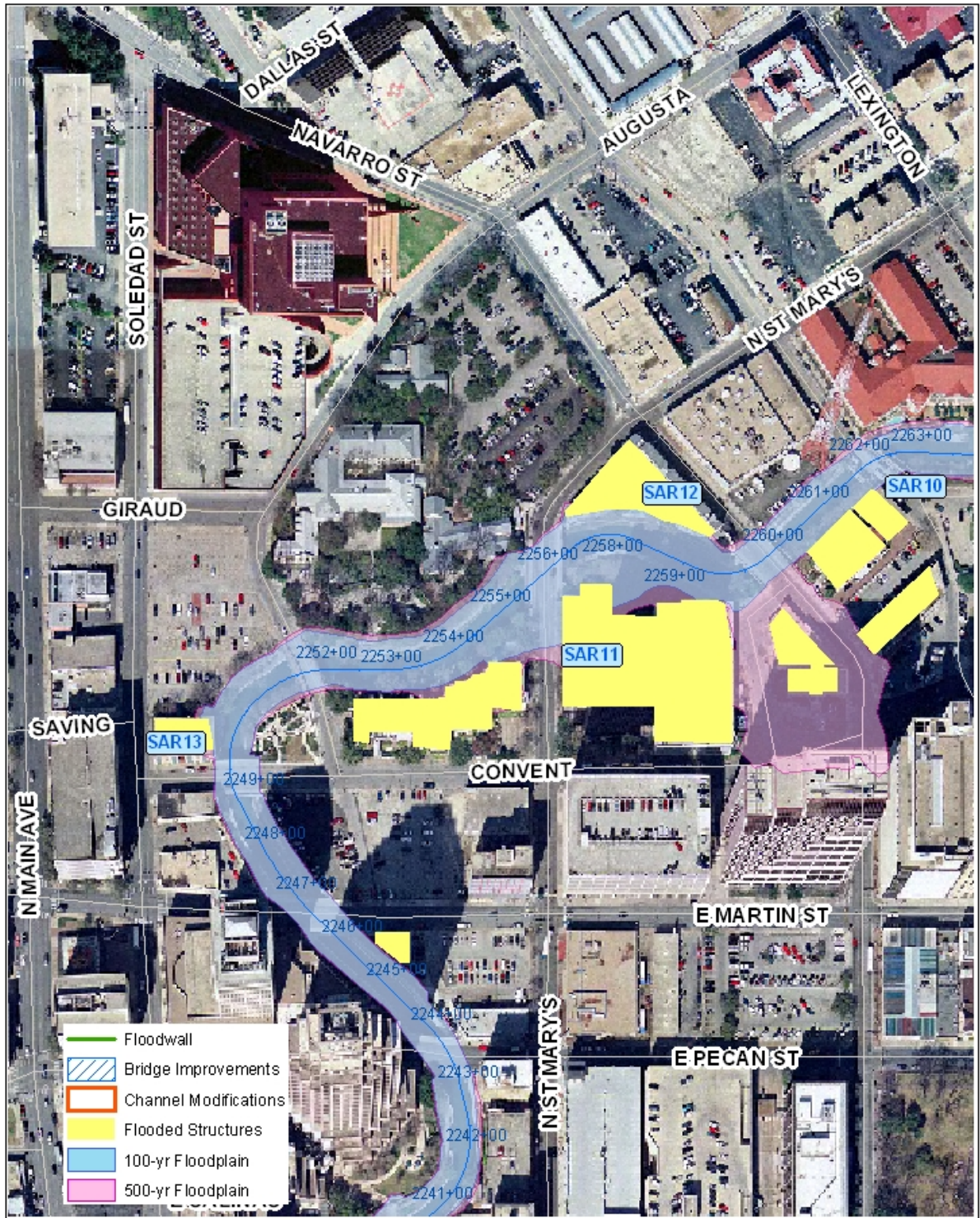
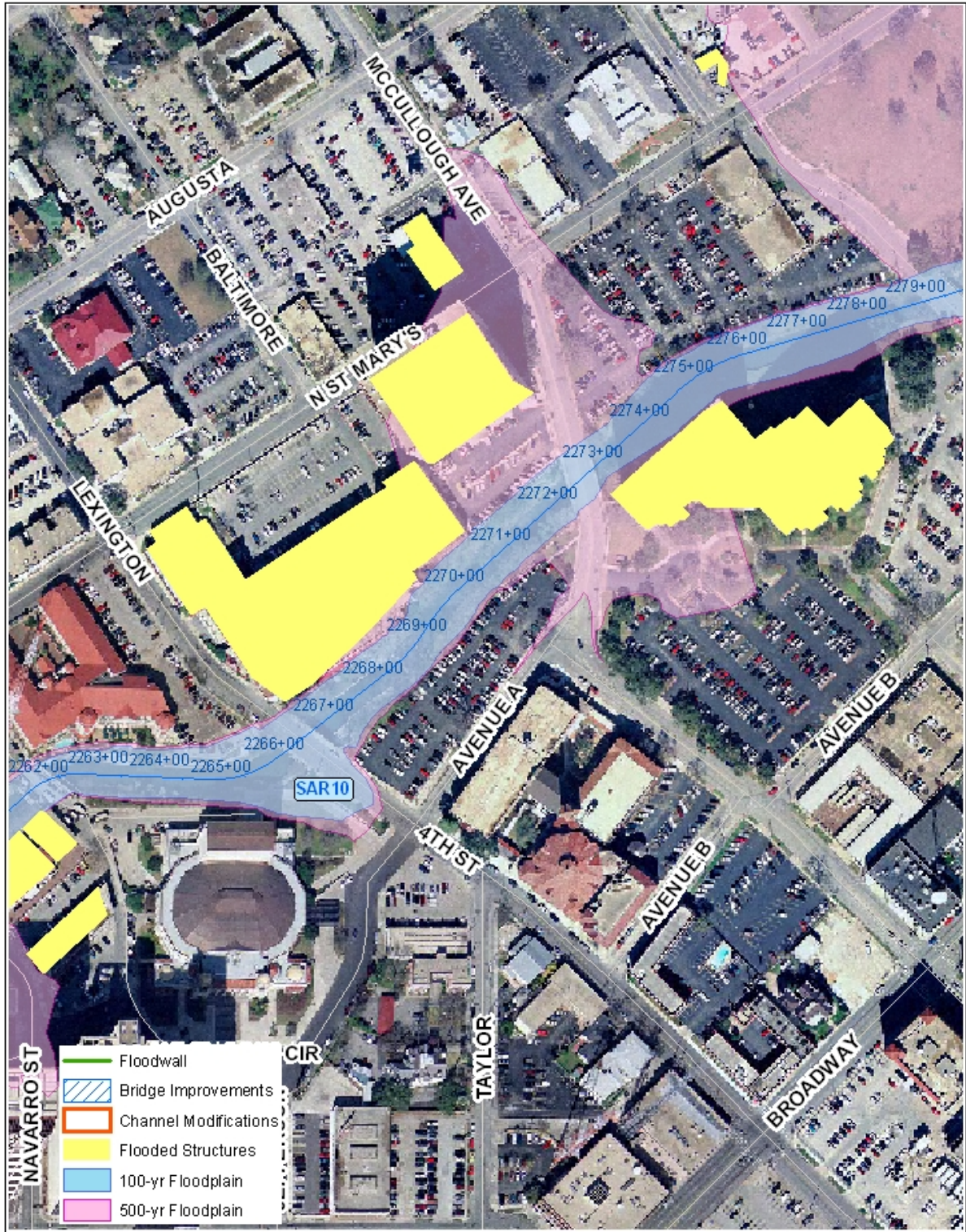


Figure 28 – SAR13, SAR12, and SAR11 Location Map

## **SAR10 – Richmond Avenue to Lexington Street**

This commercial area is located between Richmond Avenue and Lexington Street along the left bank of the San Antonio River (see Figure 29). The 100-yr floodplain comes out the defined channel banks and covers the downstream abutment of Lexington Avenue. There are no structures impacted in this area during the 100-yr storm event. However, this is an area where the cross section top width does not correspond with the measure floodplain width. The 100-yr top width of cross sections 226377 from the HEC-RAS model is 91'. The measured top width from the ArcView 100-yr floodplain polygon is 78'. There appears to be a discrepancy in the floodplain mapping in this area.





**Figure 29 – SAR10 Location Map**



## **SAR09 – 9th Street to W. Jones Avenue**

This commercial area is located between 9th Street at Arden Grove and W. Jones Avenue along the right bank of the San Antonio River (see Figure 30). The average flooding depths during the 100-yr storm range from 0.10' to 5.58'. There are 17 structures impacted by the 100-yr floodplain and 28 structures impacted by the 500-yr floodplain in this area. This is a low lying area and the floodplain is very wide in this area.

The SARIP will remove all of the 17 structures from the 100-yr floodplain. Based on the SARIP model 100-year water surface elevations, the floodplain will encroach on an undeveloped portion of a parcel at cross-section 229194. Currently, there are no structures on this part of the parcel. Adjustments to the SARIP could be made during the design phase of that project to address this area.

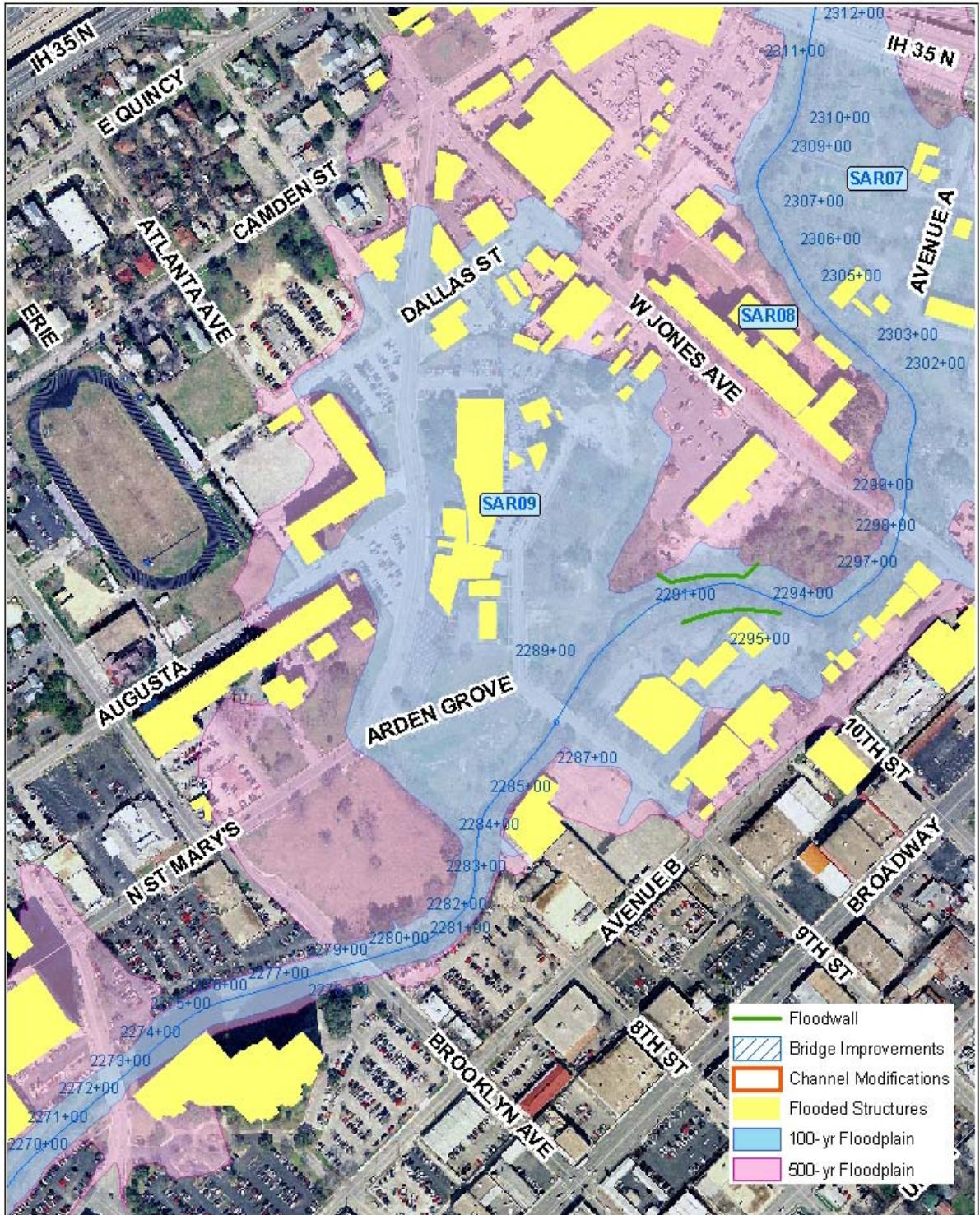


Figure 30 – SAR09 Location Map

**SAR08 – W. Jones Avenue to IH35**

This commercial area is located between W. Jones Avenue to IH35 along the right bank of the San Antonio River (see Figure 31). The average flooding depth during the 100-yr storm event in this area is 0.97'. There is one structure impacted by the 100-yr floodplain and six structures impacted by the 500-yr floodplain in this area. The SARIP will remove this structure from the floodplain.

**SAR07 – 9th Street to IH35**

This commercial area is located between 9th Street and IH35 along the left side of the San Antonio River (see Figure 31). The average flooding depths during the 100-yr storm event in this area range from 0.01'-3.11'. There 29 structures impacted by the 100-yr floodplain and 36 structures impacted by the 500-yr floodplain in this area. The low elevation and minimal topographic relief of the area make it susceptible to flooding. The SARIP will remove 28 structures. Adjustments could be made during the design phase of the SARIP to include construction of a low flood barrier to protect the structure at cross-section 229194.



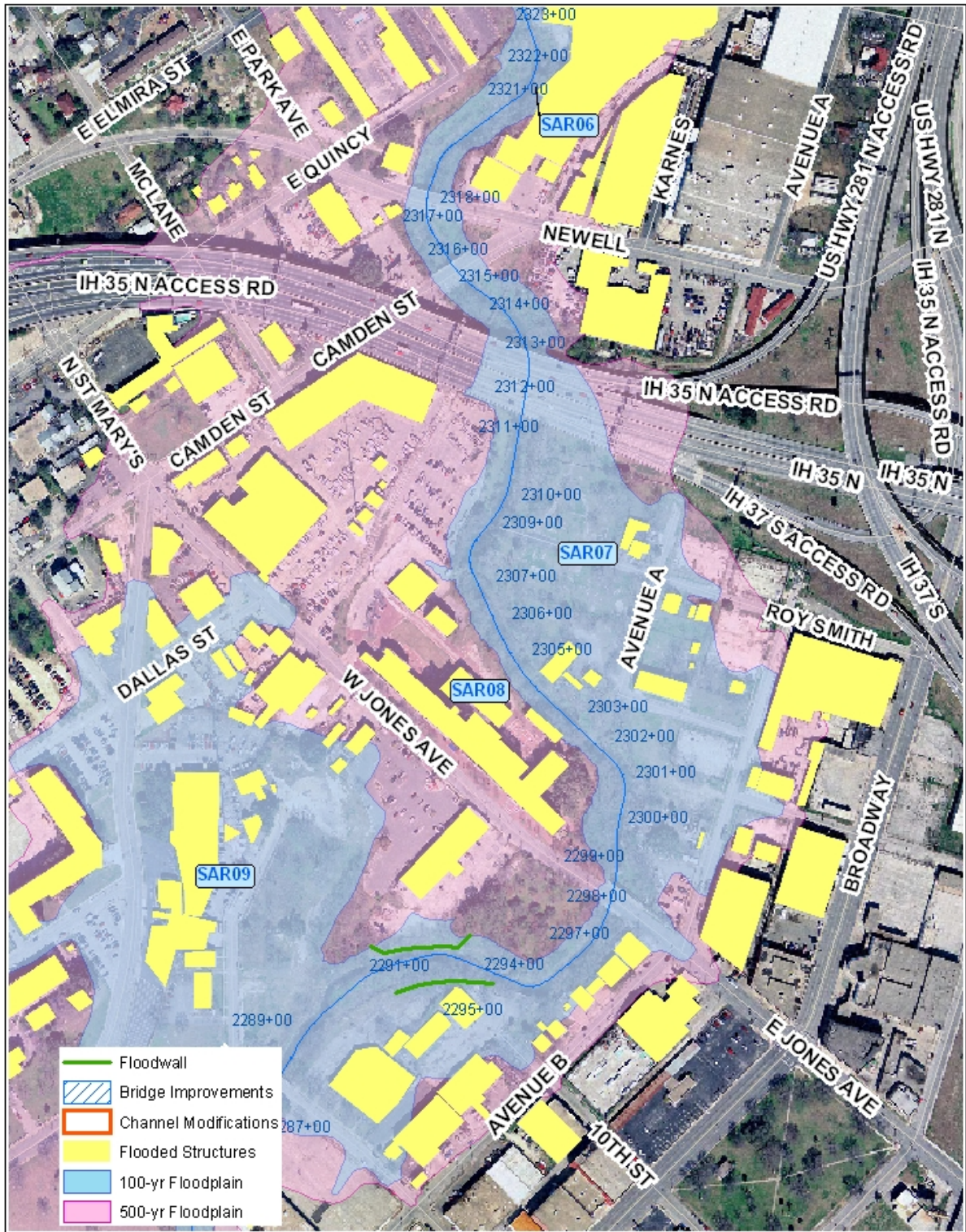


Figure 31 – SAR08 and SAR07 Location Map

**SAR06 – IH35 to Josephine Street**

This commercial area is located between Newell Street and E. Grayson Street on the left and right banks of the San Antonio River (see Figure 32). There are four structures impacted by the 100-yr floodplain and 79 structures impacted by the 500-yr floodplain in this area. The average flooding depths during the 100-year flood event range from 0.03'-4.21'. The 500-yr floodplain is very wide in this area due to lack of topographic relief in this area. The SARIP will remove the four structures from the 100-yr floodplain.



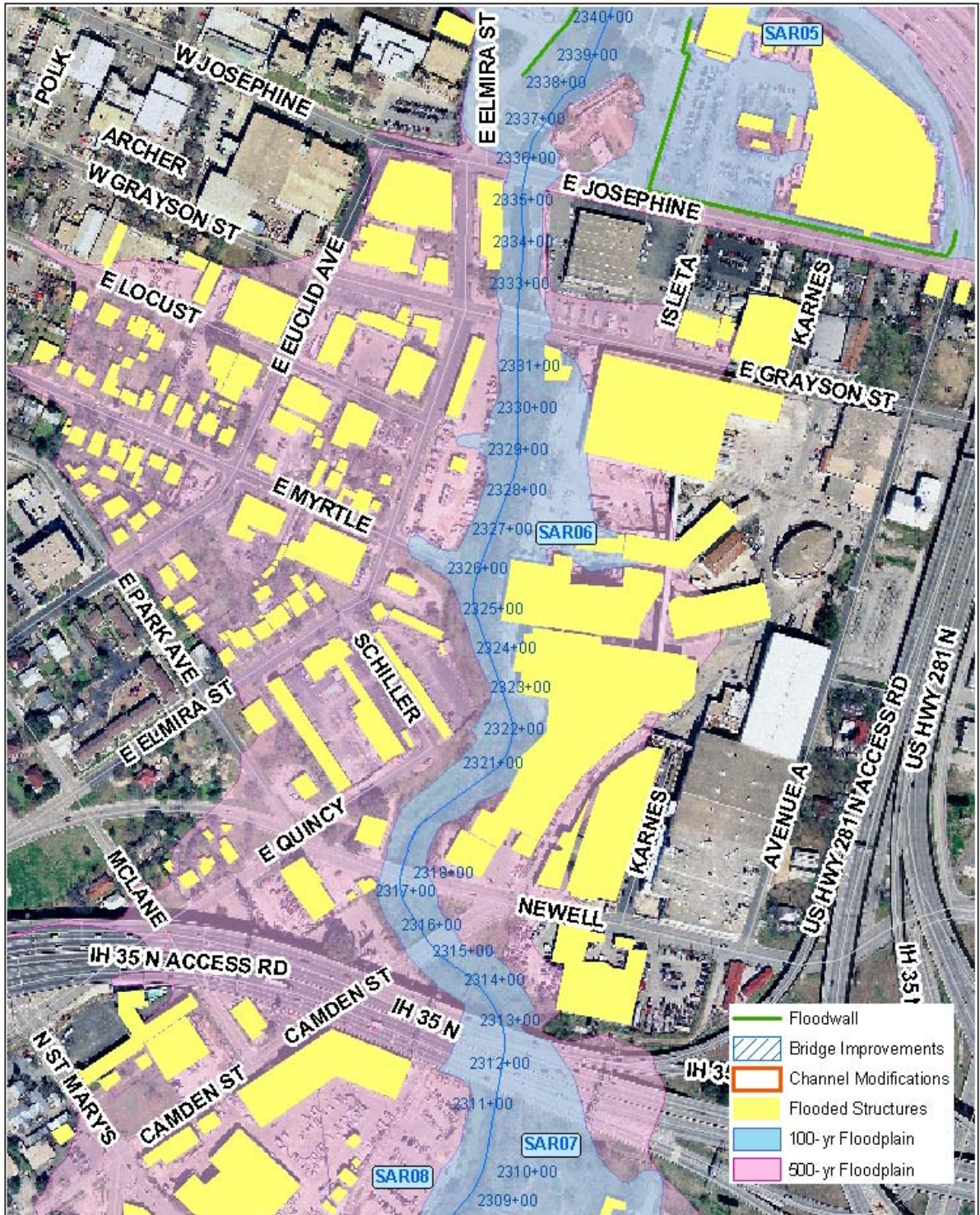


Figure 32 – SAR06 Location Map



**SAR05 – Josephine Street to US 281 (SAR Tunnel Inlet)**

This commercial area is located between Josephine Street and US 281 on the left and right banks of the San Antonio River (see Figure 33). The San Antonio River Tunnel Inlet, a storage/warehouse building, and the DPT Laboratory complex are located in this area. During the 100-year flood event, water surface elevations in the vicinity of the tunnel inlet structure are calculated to be approximately an elevation of 661'. The observed flood elevations during the 1998 event reached an elevation of 660.29' at the booster pump station and 660.35' at Borden Milk. Existing ground elevations range from approximately 660' near the northern portion of the DPT Labs complex to 657' near the northern right-of-way limits for Josephine Street. The flooding depths range from 0.40' to 3.45' depending on the elevation of the site and other structures located in the area.

The flooding mechanism for this area appears to result from two effects: the tunnel backwater elevation during the 100-year flood and surface flows from Broadway that travel under Hwy. 281 and are intercepted by Josephine Street. The intercepted flows then travel down Josephine Street before rejoining the San Antonio River channel downstream of the tunnel inlet. A drainage channel is also present between Hwy. 281 and the structures on the left and right bank. Backwater flows from the tunnel inlet may also be able to contribute to the flooding by traveling up this channel and into the commercial sites.

To protect the left bank structures in this area (DPT Labs and the Tunnel Inlet) the backwater flood flows must be constrained to the channel so that they do not inundate the site. This would require the modification of some of the tunnel inlet site grading and the installation of a low floodwall between certain elements of the inlet structure, park area, and the Hwy. 281 abutments on the left bank. The tunnel inlet facilities themselves are above the expected flood elevations while the parking lot and park area adjacent to them are at approximately an elevation of 660'. The parking lot elevations could be raised or a low floodwall (3' to 4') could be constructed running from the parking lot, north along the property line tying into the outer wall of the existing boat ramp. The existing boat ramp walls may have to be modified to provide sufficient freeboard. A floodwall and drainage return structure would then be constructed between the northern boat ramp wall and the Hwy. 281 abutments to prevent flood waters from entering the existing channel and the DPT site. The drainage return structure would have to include flap gates and provisions for positive closure should the flap gates malfunction.

Additionally, the structures on the left bank must also be isolated from the flood flows being captured by Josephine Street. The DPT driveway elevations along Josephine Street are at approximately an elevation of 657' with the site sloping up and northward to approximately an elevation of 660'. This area presents some of the deepest flood depths for the area and presents a challenge to providing flood protection as vehicular access must be maintained. In order to protect the DPT Labs area, a moderate height floodwall (approximately five feet) would have to be constructed from the Hwy. 281 overpass abutments at Josephine Street and follow the north side of Josephine to the tunnel inlet to tie into higher ground at the tunnel inlet facility. The floodwall would have to incorporate flood gates at the driveway entrances that would normally remain open but could be closed during a flood.

The flooding on the right bank of SAR05 affects the traffic triangle and roadway at River Road and the southeast portion of the warehouse facility. A floodwall in this area tied to the loading dock or facility parking lot would isolate the lower elevation portions of these structures from the flood waters. Consideration would have to be given vehicular or pedestrian access to the building at this location. If access is required, flood gates or doorways would have to be included in the floodwall design to allow access during non-flood conditions.

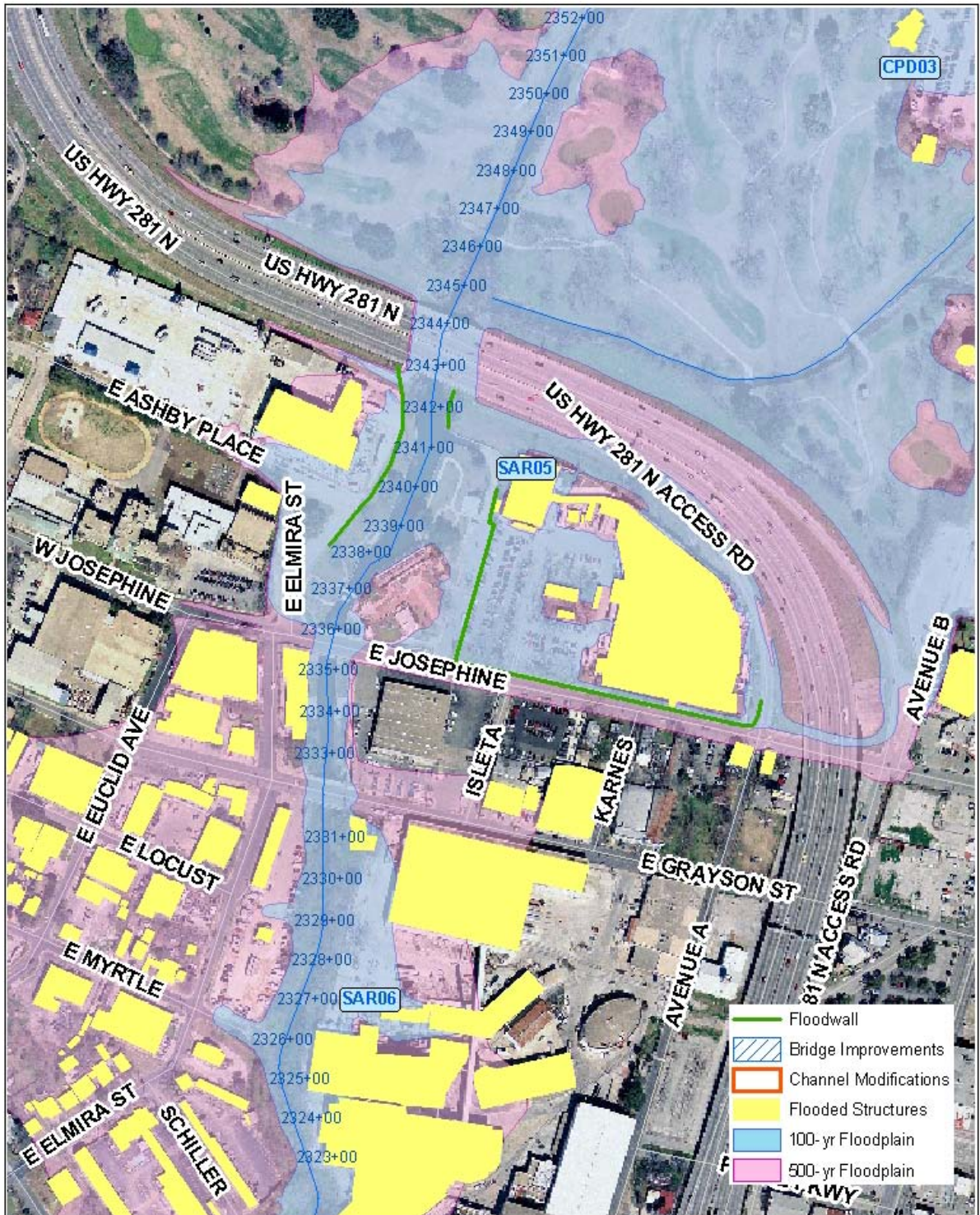


Figure 33 – SAR05 Location Map

**SAR04 – River Road Area (South)**

This residential area is located at E. Craig Place and River Road along the right bank of the San Antonio River (Figure 34). The average flooding depths in this area during the 100-year flood event range from 0.01' to 0.07'. Two structures are impacted in this area during the 100-yr and 500-yr storm event. The flooding in this area is due to the low elevation of the subdivision.

The flooding mitigation measures evaluated for this area were a floodwall and permanent relocations. A 450' long floodwall with a height of 3.5' would be required to protect the structures that are flooded by the 100-yr storm event.

**SAR03 – River Road Area (North)**

This residential area is located between Armour Street and Anastacia along River Road along the right bank of the San Antonio River (Figure 34 ). The average flooding depths during the 100-year flood event in this area range from 0.10' to 5.28'. There are 20 structures impacted in this area during the 100-yr flood event and 30 structures impacted during the 500-yr flood event. The flooding in this area is due to the low elevation of the subdivision.

The flooding mitigation measures evaluated for this area were a floodwall and permanent relocation. A 2000' long floodwall with a height of 8.3', in the deepest or lowest elevation areas, would be required to protect the structures that are flooded by the 100-yr storm event. The required height of the floodwall may have practical limitations due to viewshed obstructions and community acceptance.



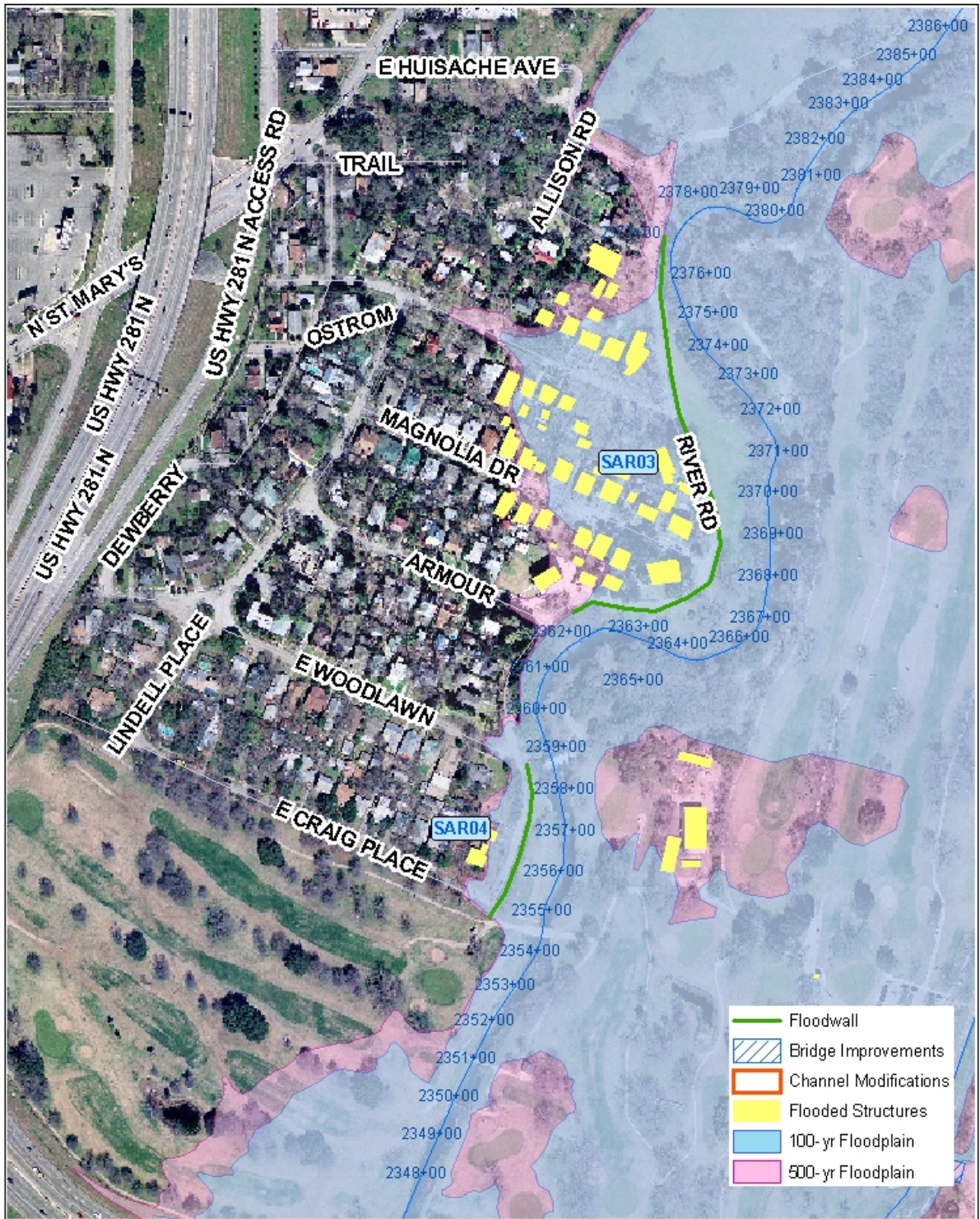


Figure 34 – SAR04 and SAR03 Location Map

## **PUBLIC OUTREACH**

SARA is required to keep the public informed and involved in this planning effort while meeting the public outreach requirements outlined in the TWDB Flood Protection Planning Grant Application. One of SARA's public outreach responsibilities is to provide a vehicle for public input via agenda items for meeting of the Watershed Improvement Advisory Committee, a citizen-based advisory committee supporting the Regional Flood Management Program, and the Committee of Six, the elected official steering committee supporting the Regional Flood Management Program. SARA is also tasked with integrating the identified solutions with the San Antonio River Improvements Project, by coordinating public presentations and comments through the San Antonio River Oversight Committee, a committee representing stakeholders along the San Antonio River.

Throughout the course of this project, HDR staff has meet with SARA, TWDB, County, and City staff for periodic project updates and to report preliminary findings. HDR presented the final findings of the report to the staff mentioned above and the Management Team. Information pertaining to these meetings is included in Section 8 of the Appendices.

**RESULTS**

**Flood Damage Analysis Results**

The FDA program calculates the equivalent annual damages (EAD) for the project study reaches based on the economic database and the hydraulic model compiled for the study reaches. Table 5 shows the calculated aggregate annual damages (for the study period and discount rate) for the 2 through 500-year events for the San Pedro Creek and San Antonio River study reaches.

**Table 5 – Equivalent Annual Damage Break Down**

<b>Damage Category</b>	<b>No. of Structures</b>	<b>EAD</b>
Commercial	106	\$554,710
Residential	281	\$31,220
Government	2	\$585,930
<b>San Pedro Creek Total</b>	389	\$1,171,860
<b>Damage Category</b>	<b>No. of Structures</b>	<b>EAD</b>
Commercial	129	\$2,566,860
Residential	76	\$258,850
Government	1	\$3,260
<b>San Antonio River Total</b>	206	\$2,828,970

As shown in the above table, the San Antonio River has fewer structures but more damages. The majority of the structures impacted in San Pedro Creek are residential while more commercial structures are impacted in the San Antonio River. The residential damages in San Antonio River are higher due to deeper flooding depths; mainly in the River Road neighborhood.

**Non-Structural Flood Mitigation Option Results**

As mentioned previously in the report, the flooded structures were identified using a GIS spatial database derived from BCAD data and field data that was overlaid on the floodplains. When the ground elevation and slab elevations for these structures were input into the economic database, there were instances in which a structure that was determined to be physically located within a floodplain boundary, did not sustain any damages in the HEC-FDA analysis because the slab elevation was above the flood water elevation. In these cases a permanent relocation B/C ratio was only calculated using the HEC-FDA damages, though the cost estimates for permanent relocation of all areas are included in Section 6 of the Appendices.

**San Pedro Creek Permanent Relocation Results**

Overall, the flood damage areas in the San Pedro Creek study reach are the result of shallow flooding. When coupled with low property and land values, this resulted in lower annual damage values. Benefit-cost ratios for the permanent relocation options were separated into 100-yr and 500-yr options. The total damages for the 100-yr and 500-yr events were extracted from a detailed structure HEC-FDA output table and then annualized. The B/C ratios for the San Pedro Creek permanent relocation cases are listed by damage assessment area from highest to lowest in Table 6.



**Table 6 – San Pedro Creek Permanent Relocation B/C Ratios**

Flood Mitigation Option	Annualized Benefit	Annualized Cost	B/C Ratio
SPC01 Permanent Relocation-100 yr	97,364	383,222	0.254
SPC12 Permanent Relocation-500 yr	34,924	157,280	0.222
SPC06 Permanent Relocation-500 yr	66,087	381,142	0.173
SPC11 Permanent Relocation-500 yr	19,394	118,393	0.164
SPC01 Permanent Relocation-500 yr	118,672	737,063	0.161
SPC13 Permanent Relocation-500 yr	15,221	117,845	0.129
SPC11 Permanent Relocation-100 yr	5,106	42,615	0.120
SPC13 Permanent Relocation-100 yr	1,488	12,930	0.115
SPC12 Permanent Relocation-100 yr	12,725	126,312	0.101
SPC08 Permanent Relocation-100 yr	1,925	24,987	0.077
SPC14 Permanent Relocation-500 yr	3,103	40,371	0.077
SPC07 Permanent Relocation-500 yr	12,779	173,450	0.074
SPC09 Permanent Relocation-500 yr	1,054	15,100	0.070
SPC10 Permanent Relocation-500 yr	67,486	1,161,682	0.058
SPC03 Permanent Relocation-500 yr	81,787	1,430,174	0.057
SPC08 Permanent Relocation-500 yr	10,131	187,018	0.054
SPC07 Permanent Relocation-100 yr	7,293	173,450	0.042
SPC02 Permanent Relocation-500 yr	2,646	77,195	0.034
SPC05 Permanent Relocation-500 yr	7,096	215,828	0.033
SPC14 Permanent Relocation-100 yr	405	14,875	0.027
SPC10 Permanent Relocation-100 yr	16,958	1,091,053	0.016
SPC04 Permanent Relocation-500 yr	25,270	1,716,619	0.015
SPC05 Permanent Relocation-100 yr	611	48,924	0.012
SPC04 Permanent Relocation-100 yr	184	464,106	0.000

As shown in Table 6, none of the permanent relocation options for the San Pedro Creek study reach had a calculated benefit-to-cost ratio above 1.0; meaning that the expected annualized damages are less than the annualized costs to perform the permanent relocations. It should be noted that this is a purely economic comparison and does not factor in other municipal considerations such as the effect on emergency responders etc. that the City, County, or SARA may wish to consider. However, these factors are considered in the priority ranking matrix discussed later in this report.

**San Antonio River Permanent Relocation Results**

The flooding in the San Antonio River Watershed in also shallow flooding but the property and land values are higher. There are also more commercial structures impacted. Benefit-cost ratios for the permanent relocation options were separated into 100-yr and 500-yr options. The total damages for the 100-yr and 500-yr events were extracted from a detailed structure HEC-FDA output table and then annualized. The B/C ratios for the San Antonio River are listed from highest to lowest in Table 7.

**Table 7 – San Antonio River Relocation B/C Ratios**

Flood Mitigation Option	Annualized Benefit, \$	Annualized Cost, \$	B/C Ratio
SAR19 Permanent Relocation-500 yr	11,450	33,492	0.342
SAR19 Permanent Relocation-100 yr	7,031	33,492	0.210
SAR13 Permanent Relocation-500 yr	16,799	80,733	0.208
SAR03 Permanent Relocation-100 yr	29,064	147,879	0.197
SAR07 Permanent Relocation-500 yr	231,525	1,360,586	0.170
SAR03 Permanent Relocation-500 yr	37,254	254,995	0.146
SAR11 Permanent Relocation-500 yr	18,278	129,670	0.141
SAR06 Permanent Relocation-500 yr	109,325	1,049,375	0.104
SAR10 Permanent Relocation-500 yr	200,354	2,048,824	0.098
SAR07 Permanent Relocation-100 yr	92,458	996,012	0.093
SAR09 Permanent Relocation-500 yr	248,378	4,834,424	0.051
SAR20 Permanent Relocation-500 yr	1,318	37,057	0.036
SAR06 Permanent Relocation-100 yr	12,710	404,874	0.031
SAR09 Permanent Relocation-100 yr	57,275	1,855,746	0.031
SAR08 Permanent Relocation-500 yr	23,083	1,266,046	0.018
SAR05 Permanent Relocation-500 yr	7,736	458,976	0.017
SAR08 Permanent Relocation-100 yr	245	388,068	0.000

Table 7 shows that none of the permanent relocation options for the San Antonio River study reach had a B/C ratio above 1.0.

**Structural Flood Mitigation Option Results**

The following sections provide the tabulated results for the structural alternatives for the San Pedro Creek and San Antonio River Study Areas. Again, it should be noted that this is a purely economic comparison and does not factor in other municipal considerations such as the effect on emergency responders etc. that the City, County, or SARA may wish to consider. However, these factors are considered in the priority ranking matrix discussed later in this report.

**San Pedro Creek Structural Option Results**

Table 8 provides a comparison of the calculated B/C ratios for the San Pedro Creek flood mitigation options. The options are sorted from highest to lowest B/C ratio.

**Table 8 – San Pedro Creek Structural Options B/C Ratios**

Flood Mitigation Option	Annualized Benefit, \$	Annualized Cost, \$	B/C Ratio
Floodwall SPC01	553510	67096	8.250
Floodwall SPC14, SPC13, SPC12	11100	94476	0.117
Floodwall SPC08	1810	15755	0.115
Flores Street Bridge Improvement	13560	119127	0.114
Mitchell Street Bridge Improvement	7260	112324	0.065
Probandt, Mitchell, Flores, and Nogalitos Street Bridges	24970	485637	0.051
Probandt, Mitchell, Flores, Nogalitos, and Furnish Street Bridges	27690	570842	0.049
Prob, Mitch, Flor, Nog, Furn, and Cevallos Street Bridges	28050	620163	0.045
Floodwall SPC14, SPC13	2350	58669	0.040
Mitchell to Flores Channel Modification	18590	501990	0.037

Floodwall SPC04	3730	101015	0.037
Detention Pond	6470	262475	0.025
RR to Alamo Channel Modification	3330	174046	0.019
Probandt to Mitchell Channel Modification	9370	513810	0.018
Cevallos Street Bridge Improvement	620	49321	0.013
Nogalitos to RR Channel Modification	7470	627273	0.012
Floodwall SPC05	280	34455	0.008
Flores to Nogalitos Channel Modification	5970	825409	0.007
Floodwall SPC09	110	21130	0.005
Nogalitos to Furnish Channel Modification	2140	443936	0.005
Alamo to El Paso Channel Modification	1620	513257	0.003

As shown in the above table, all the studied options, with the exception of a floodwall at SPC01, have a B/C ratio less than 1.0; indicating that the majority of these projects are not economically justifiable.

The floodwall option at SPC01 is the only mitigation option with a B/C over 1.0. Some of the structures in SPC01 include a VIA facility and a hotel. Figure 16 shows this study area. Four of the structures in this area have values ranging from \$880,000 to \$1,600,000 and contribute to a very large avoided value for the avoided damages. Given that the avoided damages are so much greater than the project costs, this area would be a good candidate for flood protection and further, detailed study and programming.

**San Antonio River Structural Option Results**

Table 9 provides a comparison of the calculated B/C ratios for the San Antonio River structural flood mitigation options. The options are sorted from highest to lowest B/C ratio.

**Table 9 – San Antonio River Structural Options B/C Ratios**

<b>Flood Mitigation Option</b>	<b>Annualized Benefit</b>	<b>Annualized Cost</b>	<b>B/C Ratio</b>
SARIP	175,410	156,386	<b>1.12</b>
Floodwall SAR05	458,976	61,000	<b>7.5</b>
Floodwall SAR04, SAR03	249,010	53,046	<b>4.69</b>

SAR05 primarily relates to the SART inlet area and the DPT Labs facility and is shown in Figure 33. Significant flooding in this area would produce, and has in the past, significant damages to the DPT facility. Consequently, the calculated annualized benefits for this option are above the conceptual annualized costs for constructing flood damage reduction improvements in this area. As noted in the description for this option, construction of floodwall along Josephine and solving some of the parking and/or related traffic problems will pose significant challenges.

Areas SAR03 and SAR04 are two areas of the River Road neighborhood that are inundated by the San Antonio River during extreme flood events and are shown in Figure 34. The FDA analysis shows that a floodwall facility in this area would be economically justifiable and would provide tangible flood protection benefits. However, as noted earlier, the maximum height of the floodwall would approach 8 feet and may make such a project not palatable to the residents in the area and the City due to aesthetic and maintenance reasons.



**Priority Ranking Matrix Results**

The San Antonio River Authority provided HDR with the BRWM standardized priority ranking matrix used by SARA, the City of San Antonio, and Bexar County, to rank storm water related capital improvement projects over a broad range of criteria; one of which includes the project B/C ration. This matrix ranks projects on key criteria with a total maximum possible score of 135 and a minimum possible score of zero.

Each of the mitigation options was entered into the ranking matrix for the San Pedro Creek and the San Antonio River study reaches. Permanent relocation and structural options were included and ranked for each study reach.

HDR has ranked the options for each study reach according to the ranking criteria; however, this information should be used for information purposes only since each agency must evaluate the 15 parameters based on the particular needs and goals of the agencies involved. The parameters used in the ranking matrix are described below. The complete tables and ranking matrix results are provided in Section 7 of the Appendices.

**Hydraulic/hydrologic significance or impact:** Reduces flood flows and/or flood depths. These reductions can also be measured or quantified with respect to the amount of floodplain area reclaimed and/or the number of structures (or square footage of structures) removed from flood zones. 1) mitigates flood damage in terms of reclaimed area, structures or infrastructure, 2) impact can be upstream or downstream of the project area, 3) reduces flood flows, water surface elevations and/or pollutant loadings and may increase values or encourage economic development

**Public safety:** Increases safety for emergency personnel and the general public. 1) Enhances mobility for emergency responders by providing un-flooded or safe access routes, especially where none presently exist. 2) Reduces and/or removes public roadways, facilities, etc. from flood zones.

**Benefit/Cost Ratio:** Provides a measure of a project's benefits versus its costs. There are guidelines developed by FEMA to aid estimating/assigning value to benefits including loss of life and disruption to the transportation system.

**Element of a comprehensive watershed plan:** A project that is an integral part of a regional comprehensive watershed master plan will be preferred to those projects that are not.

**Dependency on other projects:** Projects that can be completed independently of other projects or can provide their intended benefit without another project being completed are preferable. If a project is part of a master planned series of projects and it is correctly sequenced or phased, then it would not be scored negatively under this ranking factor.

**Mobility or effects on transportation system:** Projects that eliminate or reduce the time that roadways are inundated may reduce travel time and corresponding lost production during flood conditions by providing un-flooded access.

**Sustainability or low operations & maintenance cost:** Sustainability refers to the operation and maintenance cost of a project. It can be thought of in terms of the ability of a project to remain effective relative to its upkeep or operational cost. A nonstructural flood mitigation project such as buyouts or open space purchases would typically require less maintenance as compared to a channel improvement project that may require scheduled mowing and debris removal.

**Level of protection provided (i.e. 25 year, 50 year or 100 year flood):** Categorize the project into design return period as defined by the regional hydrologic standards. For example, a project designed to accommodate the 1% (100-year) flood event would rank higher than one designed for a 4% (25-year) event.

**Funding sources (leverage of participants' available funds):** If other funding sources are available for a particular type of project or due to its location, then the primary funding agency may be able to leverage its funds and stretch its resources.

**Promote orderly development or improve economic development/redevelopment potential:** If the project provides downstream capacity for upstream development and/or reduces downstream peak flows, it enhances economic development and provides for orderly development to occur. A project may also accommodate redevelopment of an otherwise undevelopable area due to past flood problems.

**Beneficial neighborhood impacts:** This factor should weigh in on the non-hydrologic/hydraulic significance of a project on adjoining neighborhoods and should include the construction phase of a project. A negative example of this might be the necessary removal of trees for a detention facility or channelization project adjacent to a residential neighborhood that might influence this ranking factor are aesthetics, security and objectionable construction activity.

**Water quality enhancement:** A measure of a project's effect on water quality either (and preferably) as designed or through planned or easily incorporated future upgrades. For example, a detention pond may provide settlement time for solids with no specific water quality upgrade or design component while a channelization project may have a small water quality benefit if grass filters can be effectively added in the future.

**Time to implement or construct:** Projects that need right-of-way and/or lengthy design or construction timeframes will not be scored as favorably as those with no land acquisition requirements and completed designs.

**Permitting resistance or difficulty:** Ease of permitting considering specific regulations, regulatory resistance, timing, etc. Include archaeological issues, water rights, endangered species, TXDOT, COE.

**Environmental or habitat enhancement:** A measure of a project's potential to enhance a desired habitat and/or have a positive impact on the environment.

**Potential for Recreation/Open Space/Connectivity for linear parks:** A measure of the acceptability/adaptability of a project site for recreational facilities or open space. Some projects may be located in floodplain areas and may provide links between other parks, open space and recreational areas.

**San Pedro Creek Ranking Results**

Table 10 lists the ranking matrix results for permanent relocations for the San Pedro Creek study reach. The options are sorted from highest score to lowest score. As noted, the complete ranking matrix and score calculations are included in Section 7 of the Appendices.

**Table 10 – San Pedro Creek Non Structural Ranking Table**

<b>Non-Structural Options</b>	<b>Ranking</b>
SPC09 500yr Perm. Relocation	61
SPC05 100yr Perm. Relocation	57
SPC14 500yr Perm. Relocation	50
SPC14 100yr Perm. Relocation	49
SPC13 100yr Perm. Relocation	49
SPC11 100yr Perm. Relocation	49
SPC09 100yr Perm. Relocation	49
SPC08 100yr Perm. Relocation	49
SPC06 100yr Perm. Relocation	49
SPC10 100yr Perm. Relocation	45
SPC04 100yr Perm. Relocation	39
SPC13 500yr Perm. Relocation	37
SPC12 500yr Perm. Relocation	37
SPC11 500yr Perm. Relocation	37
SPC10 500yr Perm. Relocation	37
SPC08 500yr Perm. Relocation	37
SPC07 500yr Perm. Relocation	37
SPC06 500yr Perm. Relocation	37
SPC05 500yr Perm. Relocation	37
SPC04 500yr Perm. Relocation	37
SPC03 500yr Perm. Relocation	37
SPC02 500yr Perm. Relocation	37
SPC01 500yr Perm. Relocation	37
SPC12 100yr Perm. Relocation	37
SPC07 100yr Perm. Relocation	37
SPC01 100yr Perm. Relocation	37

Table 11 lists the ranking matrix scores from highest to lowest for the San Pedro Creek study reach structural options.

**Table 11 – San Pedro Creek Structural Options Ranking Table**

<b>Structural Options</b>	<b>Ranking</b>
Probandt to Mitchell Channel Modification	49
Mitchell to Flores Channel Modification	49
Alamo to Guadalupe Channel Modification	49
Probandt to Nogalitos Channel Modification	49
Flores to Nogalitos Channel Modification	49
Nogalitos to Furnish Channel Modification	49
Nogalitos to RR Channel Modification	49
RR to Alamo Channel Modification	48
Cypress to Fredericksburg Channel Modification	48
Detention Pond	35
SPC14 & SPC13 Floodwall	28
SPC14, SPC13 & SPC12 Floodwall	28
SPC11 Floodwall	28



SPC14, SPC13 & SPC12 Floodwall	28
SPC11 Floodwall	28
SPC10 Floodwall	28
SPC09 Floodwall	28
SPC08 Floodwall	28
SPC07 Floodwall	28
SPC06 Floodwall	28
SPC05 Floodwall	28
SPC04 Floodwall	28
SPC01 Floodwall	28
Probandt Bridge Improvement	28
Mitchell Bridge Improvement	24
Probandt and Mitchell Bridge Improvements	24
Probandt, Mitchell & Flores Bridge Improvements	24
Flores Bridge Improvement	24
Nogalitos Bridge Improvement	24
Furnish Bridge Improvement	24
Probandt, Mitchell, Flores, & Nogalitos Bridge Improvement	24
Probandt, Mitchell, Flores, Nogalitos & Furnish Bridge Improvements	24
Cevallos Bridge Improvement	24
Probandt, Mitchell, Flores, Nogalitos, Furnish & Cevallos Bridge Improvements	24

**San Antonio River Ranking Results**

Table 12 lists the ranking matrix results for permanent relocations for the San Antonio River study reach. Table 13 lists the viable structural options studied for the San Antonio River study area. The options are sorted from highest score to lowest score. As noted, the complete ranking matrix and score calculations are included in Section 7 of the Appendices.

**Table 12 – San Antonio River Non Structural Ranking Table**

<b>Non-Structural Options</b>	<b>Ranking</b>
SAR20 500yr Perm. Relocation	42
SAR13 500yr Perm. Relocation	42
SAR10 500yr Perm. Relocation	42
SAR08 500yr Perm. Relocation	42
SAR06 500yr Perm. Relocation	42
SAR03 500yr Perm. Relocation	42
SAR13 100yr Perm. Relocation	42
SAR10 100yr Perm. Relocation	42
SAR08 100yr Perm. Relocation	42
SAR06 100yr Perm. Relocation	42
SAR19 500yr Perm. Relocation	30
SAR11 500yr Perm. Relocation	30
SAR09 500yr Perm. Relocation	30
SAR07 500yr Perm. Relocation	30
SAR05 500yr Perm. Relocation	30
SAR19 100yr Perm. Relocation	30

SAR11 100yr Perm. Relocation	30
SAR09 100yr Perm. Relocation	30
SAR07 100yr Perm. Relocation	30
SAR03 100yr Perm. Relocation	30

**Table 13 – San Antonio River Structural Ranking Table**

Structural Options	Ranking
SARIP	79
SAR05 Floodwall	42
SAR04, SAR03 Floodwall	42

The SARIP project is ranked according to the elements, including flood control aspects, environmental benefits, and recreational opportunities, that are included in the complete project vision for the Urban Reach, Museum Segment.

**RECOMMENDATIONS**

This study has examined several candidate flood mitigation projects using accepted FDA techniques and the BWRM ranking matrix. This methodology provides for a clear, unbiased evaluation of the economic practicality for each project. The use of the ranking matrix also provides for a ordered prioritization of each of the studied projects. This information will be useful for regional flood protection planning in terms of project identification, justification, and the need for further studies of candidate projects.

The results of this study show that there are several areas in San Pedro Creek and the San Antonio River that are experience flooding and are candidates for several types of mitigation options. However, the economic study (FDA study) of these options shows that very few of them are economically justifiable and provide B/C ratios above 1.0. Due to the fact that most of the study areas already have the benefit of previous flood mitigation projects (such as the existing San Pedro Creek channel and the San Antonio River tunnel), the existing flooding in the majority of the study areas is very shallow and does not generate annualized benefits (avoided damages) greater than the annualized costs to protect these areas.

It should be noted that this study was conducted using the LMMP models and the existing, available hydrology and hydraulics information. The ongoing DFIRM projects are in the process of updating the current hydrology and portions of the LMMP model. This study also used the draft floodplain maps as these were the best information available at the time and the final maps were still under review. It is anticipated that these maps will be finalized in the near future. If these updates, when completed, significantly change the input hydrology to this study or floodplain mapping than it may be beneficial to re-visit these study results in the future by incorporating new hydrologic, hydraulic, or floodplain mapping information.

In spite of these facts, some of the studied mitigation options do exhibit a B/C ratio greater than one. Additionally, this study also highlights some other opportunities for further investigation or regional flood planning. The recommendations and/or observations for each study reach are provided as follows:

**San Pedro Creek**

- The floodwall mitigation alternative for San Pedro Creek mitigation alternative SPC01 has a B/C ratio greater than 1.0 and appears economically justifiable. This conceptual alternative

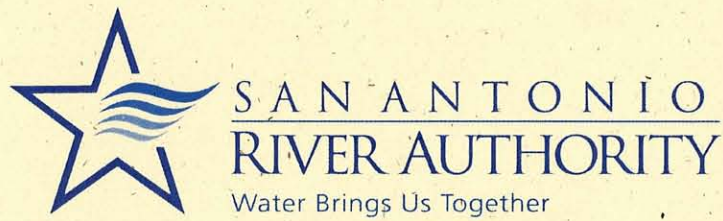
should be studied in more detail and potentially be included in regional flood mitigation efforts.

- The analysis of the San Pedro Creek Detention option showed that Alazan Creek has a significant impact on San Pedro Creek and areas downstream of its confluence with San Pedro Creek. A further study of potential mitigation options on Alazan Creek, including opportunities for regional detention, should be conducted to determine if there are any viable mitigations options available on Alazan Creek.
- The draft floodplain mapping in the upper reaches of San Pedro Creek area may be revised and therefore the floodplain extents and flood protection measures should be re-evaluated if the floodplain extents decrease. This may impact SPC01 and SPC02.
- The results shown in the ranking matrix should be evaluated in detail by SARA, the City of San Antonio, and Bexar County to update the criteria and ranking score with the benefit of their institutional knowledge to determine if some mitigation options might be acceptable candidates for inclusion in the regional flood mitigation plan.

#### San Antonio River

- The flood mitigation measure explored for area SAR05 (DPT Labs area) appears to provide justifiable flood protection benefits using the FDA criteria. A more detailed examination of the potential flood protection benefits in his area could be considered in light of flood insurance impacts, damages to a locally important business, public safety, and municipal concerns.
- The floodwall mitigation measure considered for areas SAR03 and SAR04 appear to provide a B/C ratio greater than 1.0. A detailed study of this option should be conducted and is suggested to include a presentation or dialog with the River Road Neighborhood and the City of San Antonio as to the practical acceptability of the proposed flood measure as it relates to aesthetics, traffic safety, maintenance, and public access to Brackenridge Park.
- The floodplain mapping of several areas of the San Antonio River showed some discrepancies between the hydraulic model output and the floodplain mapping extents. This is particularly evident in areas such as SAR16 through SAR20. It was difficult for the study team to evaluate mitigation options in these areas due to the mapping discrepancies.
- The results shown in the ranking matrix should be evaluated in detail by SARA, the City of San Antonio, and Bexar County to update the criteria and ranking score with the benefit of their institutional knowledge to determine if some mitigation options might be acceptable candidates for inclusion in the regional flood mitigation plan.





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## Technical Memorandum

**San Antonio River / San Pedro Creek  
Flood Damage Mitigation Assessment**  
San Antonio, Texas

*April 2004*

HDR Project No. 00000000011236

TECHNICAL MEMORANDUM

SAN ANTONIO RIVER / SAN PEDRO CREEK  
FLOOD DAMAGE MITIGATION ASSESSMENT

SAN ANTONIO RIVER AUTHORITY  
SAN ANTONIO, TX

**FORD  
POWELL  
& CARSON**  
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This document is released for the purpose of interim review under the authority of Michael W. Johnson, P.E. 86668 on April 26, 2004. It is not to be used for construction, planning, or bidding purposes.



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# SAN ANTONIO RIVER / SAN PEDRO CREEK FLOOD DAMAGE MITIGATION ASSESSMENT

Prepared For: San Antonio River Authority

4/26/04

Reviewed by: Mike Johnson, P.E.

Prepared by: Troy Dorman, P.E., Ph.D., LeeAnne Lutz, EIT

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## INTRODUCTION

This technical memorandum is a preliminary flood damage mitigation assessment of areas along San Pedro Creek and the San Antonio River that exhibit potential flooding problems during a 100-year event where property damage or hazardous conditions may occur. This document is intended to be a preliminary, planning level document that identifies areas within the study reaches that may be candidates for floodplain mitigation projects. The information presented is at a feasibility level only and does not constitute a full incremental flood damage assessment analysis.

The study reaches are approximately 5 miles of San Pedro Creek from the confluence with the San Antonio River upstream to West Laurel Street, approximately 7.5 miles of the San Antonio River from the confluence with San Pedro Creek upstream to Hildebrand Avenue, and the Catalpa-Pershing Channel from the confluence with the San Antonio River to Funston Avenue.

## REFERENCE DATA

The base hydrologic model for the San Antonio River watershed was created through the Limited Mapping Maintenance Project (LMMP) process undertaken for the San Antonio River and San Pedro Creek LMMP. The model incorporates the watershed for the San Antonio River and tributaries to the San Antonio River including San Pedro Creek, Zarzamora Creek, Alazan Creek, Olmos Creek, Apache Creek, Martinez Creek, Six Mile Creek, and the Catalpa-Pershing Channel (Unit 8-5-2). The San Antonio River hydrologic model was constructed using the HEC-HMS and GEO-HMS modeling package. This hydraulic model was modified in this study to characterize the impacts of various flood mitigation options.

The LMMP floodplain map used for this project was delineated by Freese and Nichols Engineering in Micro Station, converted to an ArcGIS shape file, and projected from NAD 27 to NAD 83. At the time of this report, the floodplain delineation was in draft form.

HEC-RAS models from the San Antonio River Improvement Project (SARIP) Museum Reach Project were used to determine the reduction in water surface elevation through out the Urban and Park segments of the SARIP project.

The improved property and land values for the flooded structures were determined using 2001 Bexar County Appraisal District (BCAD) parcel data. The ground elevation data was obtained from the topographic information used for the LMMP model. The City of San Antonio's 2003 color aerial photography was used as a background reference file.

## ANALYSIS METHODOLOGY

The draft LMMP floodplain mapping was reviewed and areas that indicated flooding conditions during a 100-year recurrence event where property damage or hazardous conditions appeared were identified and cataloged. Each cataloged area, or Flood Damage Assessment Area (FDAA), was assigned an alpha-numeric designation starting at the first upstream area of each reach. Flooding areas along San Pedro Creek are labeled SPC with a 2 digit number (e.g. SPC01), the areas along the San Antonio River are labeled SAR with a 2 digit number (e.g. SAR01), and the areas along the Catalpa Pershing Ditch are labeled CPD with a 2 digit number (e.g. CPD01).

The number of flooded parcels and structures in each FDAA were identified and a total Estimated Flooded Improved Property Value was calculated for each area using the 2001 BCAD parcel data. Only parcels that contained structures were included in the Estimated Flooded Improved Property Value summations. The BCAD parcel data does not include improved property and land values for parcels belonging to the City of San Antonio, San Antonio River Authority, and other governmental entities. In these instances, an average value per square foot of structure was determined from surrounding structures and applied to the government structures. This method of assessing the improved property values is an estimate by approximate methods and should only be used for comparison purposes for this particular study.

In each FDAA, the centroid of each flooded parcel was determined so that the average ground elevation per parcel and 100-year water surface elevation per parcel could be estimated. These elevations were used to calculate an estimated 100-year flooding depth per parcel.

The probable cause of flooding for each area was evaluated and flood mitigation measures that would potentially reduce or eliminate flooding were identified and modeled in HEC-RAS individually and in various combinations. The affects of each flood mitigation measure were evaluated for both beneficial and adverse flooding impacts. Any flood mitigation measure that resulted in an increased water surface elevation or other undesired affects upstream, downstream, or in the improvement area ceased to be considered as a viable option. Individual and combinations of flood mitigation options were modeled, starting at the most downstream FDAA of each reach until all structures were removed. This approach resulted in the creation and analysis of approximately 90 HEC-RAS runs. The Flood Mitigation Measures are described below and the specific measures that were considered for each area are discussed in the FDAA summaries later in the report. Comparison tables for some of the HEC-RAS model runs along San Pedro Creek are included in Appendix A.

## SAN PEDRO CREEK CHARACTERISTICS

San Pedro Creek is located in north central San Antonio and flows southeast to its confluence with the San Antonio River. San Pedro Creek flows in improved earthen channels, concrete-lined channels, and below grade in concrete culverts through out commercial and residential areas. Commercial and residential development crowd the banks except for an 18-acre plot of land located at the confluence with Alazan Creek.

Table 1 summarizes general location descriptions, left and right bank locations (looking downstream), and distance to the confluence of San Pedro Creek and San Antonio River for the San Pedro Creek FDAAs. Table 2 summarizes the land use, number of flooded parcels and structures, the estimated

flooded improved property value, and the estimated flooding depths per parcel for each San Pedro Creek FDAA.

**Table 1 – Flood Damage Assessment Areas for San Pedro Creek**

FDAA	Description	Left Bank	Right Bank	Distance from Confluence (miles)
SPC01	IH10 to W. Laurel	X	X	4.45
SPC02	Camaron Street, at Kingsbury (SPC Tunnel Inlet)	X		3.69
SPC03	Camaron Street, north of W. Salinas	X		3.50
SPC04	S. Alamo Street to El Paso	X	X	2.30
SPC05	Railroad to S Alamo Street		X	2.16
SPC06	IH35 and W. Cevallos Area		X	2.06
SPC07	S. San Marcos and Furnish Area		X	1.57
SPC08	IH35 and Furnish Area	X		1.57
SPC09	Nogalitos Street and Ralph Avenue Area	X		1.39
SPC10	Halstead Street Area		X	0.93
SPC11	Cass Street Area	X		0.93
SPC12	E. Baylor and E. Lubbock Street Area		X	0.49
SPC13	Probandt Street to W. Mitchell Street	X		0.14
SPC14	Probandt Street to S. Flores Street		X	0.14

**Table 2 – San Pedro Creek Flooded Property Values**

FDAA	Land Use	Flooded Parcels	Flooded Structures	Estimated Flooded Improved Property Value	Estimated Flooding Depths per parcel(ft)
SPC01	Residential/Commercial	45	32	\$ 1,499,500	0.05-2.42
SPC02	Street	0	0	-	0.29
SPC03	Street	0	0	-	0.57
SPC04	Commercial	38	28	\$ 9,211,000	0.04-4.29
SPC05	Commercial	14	9	\$ 69,900	0.16-2.93
SPC06	Commercial	2	2	\$ 86,300	0.17-0.44
SPC07	Commercial	2	1	\$ 970,500	0.87-1.52
SPC08	Residential	21	13	\$ 171,000	0.04-1.99
SPC09	Commercial	2	11	\$ 65,700	0.05-0.27
SPC10	Residential	42	57	\$ 674,500	0.21-6.22
SPC11	Residential	23	17	\$ 298,400	0.29-2.54
SPC12	Residential	45	45	\$ 778,500	0.07-6.25
SPC13	Residential	27	6	\$ 92,900	0.18-2.54
SPC14	Residential	14	6	\$ 115,000	0.10-2.35
Total		275	228	\$ 14,100,000	

**SAN ANTONIO RIVER CHARACTERISTICS**

The study reach for the San Antonio River runs from the confluence with San Pedro Creek upstream for approximately 7.5 miles to Hildebrand Avenue. This segment of the San Antonio River is heavily



urbanized and includes portions that have been totally contained within concrete lined channels (e.g. Nueva Street upstream to Lexington Street). Land uses along the river include commercial, institutional, and residential areas with some open areas at some locations. These open areas are anticipated to be developed in the near future.

Table 3 summarizes the general location descriptions, left and right bank locations (looking downstream), and distance to the confluence of San Pedro Creek and San Antonio River for the San Antonio River FDAAs. Table 4 summarizes the land use, number of flooded parcels and structures, the estimated flooded improved property value, and the estimated flooding depths per parcel for each San Antonio River FDA.

**Table 3 – Flood Damage Assessment Areas for San Antonio River**

FDA	Description	Left Bank	Right Bank	Distance from Confluence (miles)
SAR01	Broadway to Hildebrand Avenue	X		7.07
SAR02	Zoo Area	X	X	6.56
SAR03	River Road Area (North)		X	5.69
SAR04	River Road Area (South)		X	5.55
SAR05	Josephine Street to US 281 (SAR Tunnel Inlet)	X	X	5.20
SAR06	Newell Street to E. Grayson Street	X	X	4.86
SAR07	9 <sup>th</sup> Street to IH35	X		4.29
SAR08	W. Jones Avenue to IH35		X	4.53
SAR09	9 <sup>th</sup> Street to W. Jones Avenue		X	4.22
SAR10	Richmond Avenue to Lexington Street	X		3.81
SAR11	Navarro Street to Convent	X		3.58
SAR12	Navarro Street to N. St. Mary's		X	3.70
SAR13	E. Martin Street to Augusta		X	3.55
SAR14	E. Houston Street to E. Travis Street	X		3.29
SAR15	E. Commerce Street to E. Houston Street		X	3.17
SAR16	W. Johnson Street Bridge	X		2.32
SAR17	S. Alamo Street Bridge	X		2.08
SAR18	S. Alamo Street and Blue Star-Right Bank		X	2.02
SAR19	S. Alamo Street and Blue Star-Left Bank	X		2.00
SAR20	Constance Street Area	X		1.74
SAR21	Roosevelt Park (SAR Tunnel Outlet)	X		0.80
SAR22	Railroad upstream of Steves Avenue		X	0.74
SAR23	W. Mitchell Street to IH10		X	0.42
SAR24	E. Mitchell Street to IH10	X		0.35

**Table 4 – San Antonio River Flooded Property Values**

FDA	Land Use	Flooded Parcels	Flooded Structures	Estimated Flooded Improved Property Value	Estimated Flooding Depths per parcel(ft)
SAR01	Commercial/Recreational	11	17	\$ 14,000,000*	0.47-3.81
SAR02	Recreational	1	23	\$ 2,500,000	0.36
SAR03	Residential	28	24	\$ 1,300,000	0.10-5.28
SAR04	Residential	2	2	\$ 51,900	0.01-0.07

SAR05	Commercial	3	2	\$ 3,174,700	0.40-3.45
SAR06	Commercial	7	12	\$ 1,062,900	0.03-8.08
SAR07	Commercial	41	25	\$ 600,200	0.01-3.11
SAR08	Commercial	2	1	\$ 300,000	0.97
SAR09	Commercial	37	16	\$ 1,575,960	0.10-5.58
SAR10	ROW/Street/Commercial	1	0	-	1.57
SAR11	Commercial	5	0	-	0.87-6.88
SAR12	Commercial	3	0	-	2.67-5.87
SAR13	Commercial	4	0	-	1.80-4.35
SAR14	Commercial	1	0	-	5.28
SAR15	Commercial	5	0	-	0.38-3.12
SAR16	Residential	1	0	-	-
SAR17	Residential	2	0	-	3.07-6.84
SAR18	Commercial	1	0	-	-
SAR19	Residential	5	1	\$ 701,830	2.81-4.82
SAR20	Residential	1	0	-	5.25
SAR21	Commercial/Recreational	12	13	\$ 661,000*	0.21-8.86
SAR22	Commercial	1	1	\$ 20,800	2.35-4.10
SAR23	Commercial	28	14	\$ 177,700	0.10-3.61
SAR24	Commercial	1	0	-	1.26
		204	151	\$ 20,528,890	

\* Estimated values

Table 5 summarizes the general location descriptions, left and right bank locations (looking downstream), and the distance to the confluence of San Pedro Creek and the San Antonio River for the Catalpa-Pershing Ditch FDAAs. Table 6 summarized the land use, number of flooded parcels and structures, the estimated flooded improved property value, and estimated flooding depths per parcel for each Catalpa-Pershing FDAA.

**Table 5 – Flood Damage Assessment Areas for Catalpa-Pershing Ditch**

FDAA	Description	Left Bank	Right Bank	Distance from Confluence (miles)
CPD01	E. Mulberry Avenue and Broadway Area	X		0.80
CPD02	Millrace Bridge to Lions Park	X		0.31
CPD03	Golf Course		X	0.32

**Table 6 – Catalpa-Pershing Ditch Flooded Property Values**

FDAA	Land Use	Flooded Parcels	Flooded Structures	Estimated Flooded Improved Property Value	Estimated Flooding Depths per parcel(ft)
CPD01	Commercial/Residential	53	52	\$ 2,911,210	2.83'
CPD02	Commercial/Recreational	18	34	\$ 1,705,900	0.13'-1.51'
CPD03	Recreational	1	2	\$ 300,000*	4.11
		72	88	\$4,617,110.00	

\* Estimated Value

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## FLOOD MITIGATION MEASURES

Structural flood mitigation measures that can be applied to the San Antonio River or San Pedro Creek channels fall into two general categories: peak flow reduction measures and channel modification measures. The peak flow reduction measures include watershed land use and impervious cover management and/or flow diversion or detention to reduce the overall flow peak magnitude (and the corresponding water surface elevations) through the basin drainage areas. Channel modification measures are used to lower, or contain, the base flood elevations by increasing the flood conveyance efficiency of the significant drainage channels in a particular basin. Channel modification can include roughness modifications (debris and vegetation removal, "n" value reduction), modifications of the channel geometry (conveyance area, slope, cross section), obstruction removal (bridge and other structure modifications), and the construction of additional levees or floodwalls to contain the base flood elevations. Non-structural flood mitigation measures include flood-prone property acquisition, or "buy-outs", to reduce the number of private properties and structures that could be damaged by flooding.

The San Antonio River and San Pedro Creek watersheds and contributing areas for this project are urbanized. Changing the existing land use practices and impervious cover characteristics of an urbanized watershed is impractical because of the multitude of land owners and the extremely high costs associated with altering or limiting land use and impervious cover characteristics. Therefore, this flood mitigation measure was not considered a viable alternative for this study and was not included as an option in the analysis.

The San Antonio River, upstream and in the areas of the study reach, has both existing detention and diversion facilities in place. The San Antonio River Tunnel (SART) diverts flow "under" the downtown areas of San Antonio and provides increased flood protection between the tunnel inlet (downstream of Hwy. 281) and the tunnel outlet (downstream of the Blue Star area). Olmos Dam provides detention for over 32 square miles of contributing area and provides flood peak attenuation for areas downstream of the dam. The San Pedro Creek Tunnel (SPCT) diverts flood flows for a portion of the San Pedro Creek watershed from Kingsbury Street to Guadalupe Street. There are no significant, existing detention facilities on San Pedro Creek.

Because these areas are urbanized, a major constraint when considering the application of flood mitigation measures is the difficulty in acquiring additional right-of-way. The acquisition of additional right-of-way for the construction of flood detention or diversion measures can involve large costs and undesirable impacts to the existing property owners. Therefore, the placement of new detention or diversion facilities was not considered at this level of the study. However, the potential for new diversion or detention facilities may be considered in subsequent feasibility analyses.

Several options for channel modification measures are available for use the urban setting of these study reaches. These options were evaluated individually and in combination. The applicability of each of these measures is discussed in the following sections.

### **Roughness Reduction**

Roughness reduction includes modifying the channel and overbank surfaces to reduce their resistance to flow (reducing the composite Manning's "n" value used in the HEC-RAS model). These modifications can include a channel vegetation removal or thinning program, removal of existing flood debris within the channel or on bridges that impedes flood flows, or by modifying the channel surface

so that it includes smoother surfaces such as grass lined channels, concrete rip-rap, or other surface treatments that would reduce the roughness without adding undue maintenance requirements.

Within the study reach, the San Pedro Creek channel has been modified in the past and now presents a channel with grass lined overbanks and a pilot channel with broken rubble toe protection along the much of its length. Other portions of San Pedro creek are contained in concrete lined channels or fully enclosed in storm water culverts. Consequently, much of San Pedro Creek has already been optimized in terms of its roughness characteristics and this flood mitigation measure was generally not considered as a principal option.

The San Antonio River from Hildebrand downstream to Hwy. 281 retains much of its original plan form with some modifications to the channel bed in the Brackenridge Park area and through the Brackenridge Golf Course. The Catalpa-Pershing channel has been heavily modified and almost completely lined with concrete. Downstream of Hwy 281, the river is an earthen (vegetated) channel to Lexington Avenue. It should be noted that some portions of the river alignment in this area have been altered by past projects. From Lexington Avenue to Nueva Street, the San Antonio River is channelized and the majority of the channel lining is concrete (except in the River Loop area). From Nueva Street to the SART outlet, the channel has a rubble lined pilot channel with grass lined overbanks for the majority of its length with some portions fully concrete lined. As with San Pedro Creek, roughness reduction was not considered as a viable option due to the previous river improvements.

### **Channel Geometry Modifications**

Channel geometry modifications were considered in areas of San Pedro Creek where practical. In selected locations, improvements to the channel to increase the net conveyance area were included as an option. The channel improvements included steepening the overbank or channel side slopes to widen the overall channel without exceeding the limits of the current right-of-way. The effects of the geometry modifications were included in the modified HEC-RAS models by using the channel improvement tools with a consistent bottom width and 1:1 side slopes. This analysis provides an efficient, feasibility level sensitivity analysis of the channel modification effects. The channel gradient was not modified.

The SARIP Museum Reach – Urban Segment preliminary design plan includes modification of the channel geometry from Lexington Street upstream to Josephine Street. The effects of these improvements were considered in this analysis.

### **Bridge Modifications**

Bridge modifications consist of modification of a bridge so that it does not impede flood flows and raise the base flood elevations. The affects of bridge modifications in this analysis were included in the model runs by observing the affect of completely removing a bridge to determine the overall sensitivity of the flood elevations to this modification. Bridge modifications were analyzed both individually and in conjunction with downstream improvements, including modifications to downstream bridges.

### **Floodwalls**

Floodwalls provide a viable option in areas with shallow to moderate flooding. They have the significant advantage of requiring minimal right-of-way requirements. Low floodwalls are also cost competitive for low depth and limited right-of-way applications when compared to other improvement



alternatives such as levees. However, floodwalls must be designed to meet FEMA and COE standards and can impose significant costs on the project. Floodwalls were included in the analysis for areas with shallow to moderate flooding depths. Due to the limited right-of-way conditions for much of San Pedro Creek and limited areas of the San Antonio River, the small footprint of floodwalls make them a viable option in these areas.

**Levees**

Levees consist of earthen barriers to flood waters. They are typically constructed with a minimum 12 foot top width, 3:1 waterside slopes, and 2:1 landside slopes and must be designed according to FEMA and COE guidelines. Levee construction can require a large amount of right-of-way acquisition and materials and can be costly. Due to the constrained right-of-way of the study reaches, levee construction was not considered as a preferred alternative.

**OPINIONS OF PROBABLE COST ASSUMPTIONS**

In order to compare the relative cost impacts required to implement the flood mitigation measures, opinions of probable costs for each analyzed flood protection element are included in this report. The costs presented in this report are preliminary, feasibility or planning level costs. Actual implementation and construction costs are likely to differ from the costs presented in this report depending on the final design configuration, construction conditions, seasonal groundwater and stream flow variations, environmental factors, and other elements that may influence the cost of the improvements.

To compile the opinions of probable costs, planning level unit costs were developed for each flood improvement measure. These costs are listed in Table 7.

**Table 7 – Unit Costs**

Flood Improvement Item	Unit	Unit Cost
Bridge Replacement	SF of Deck Area, sf	\$75.00 / sf
Historic Bridge Replacement	SF of Deck Area, sf	\$120.00 / sf
Levees ( 0 - 8 ft)	LF of Levee( 0 – 8 ft), lf	\$190.00 / lf
Floodwalls	LF of Floodwall ( 0 – 6 ft), lf	\$400.00 / lf
Channel Improvements (including erosion protection and slope stabilization)	CY of Excavation, cy	\$25.00 / cy

The SARIP Museum Reach improvement costs are not included in these cost estimates as the mitigation measures presented in this report pertain to additional measures that would either be included in the SARIP project or constructed after the project.

A relative comparison of the cost effectiveness of each proposed Flood Mitigation Measure was determined by comparing the Flooded Improved Property Value to the cost of the recommended

Flood Mitigation Measure for each area. If the Flood Mitigation Measure cost was greater than the Flooded Improved Property Value, the mitigation project was not considered as a practical option.

Note that the cost comparison provides a relative measure of the practicality of the specific flood mitigation measure. To fully evaluate a particular flood mitigation measure, an incremental flood damage analysis must be performed. In addition, this analysis does not consider additional benefits that may be included in a flood protection project such as recreation or ecological restoration.

## **MITIGATION AREAS**

The following sections describe the analysis of each mitigation area for San Pedro Creek and the San Antonio River (from the confluence with San Pedro Creek to Hildebrand). The figures presented for each mitigation area show the areas outside the main channel only. These mitigation areas are shown with blue shading. The actual floodplain extents are not shown. The mitigation areas are not shown as part of the floodplain for clarity and should not be interpreted as the entire extent of the draft floodplain limits in that specific area. Additionally, schematic representations of the mitigation options, such as channel improvements, levees, bridge modifications, etc. are shown on the figures for each mitigation area.

### **SAN PEDRO CREEK**

A bridge sensitivity analysis was performed on San Pedro Creek to determine the backwater effects of the bridges on the 100-year water surface elevation. Various combinations of bridge improvements were modeled and the number of structures removed in each FDAA is summarized in Table 8. The bridge improvements, both in combinations and singularly, were then included in the analysis of each specific FDAA. Other mitigation measures, such as floodwalls or channel improvements, were also analyzed in terms of their affects for each area. The following sections describe the mitigation options identified for each FDAA.

Bridges Removed															
	Flooded Structures	Probandt Bridge	Mitchell Bridge	Probandt & Mitchell Bridges	Flores Bridge	Probandt, Mitchell, & Flores Bridges	Nogalitos Bridge	Probandt, Mitchell, Flores, & Nogalitos Bridges	Furnish Bridge	Probandt, Mitchell, Flores, & Nogalitos & Furnish Bridge	Cevallos Bridge	Probandt, Mitchell, Flores, Nogalitos, Furnish, & Cevallos Br	Alamo Bridge	Camp Bridge	Guadalupe Bridge
SPC14	6	6	-	6	-	6	-	6	-	6	-	6	-	-	-
SPC13	6	6	-	6	-	6	-	6	-	6	-	6	-	-	-
SPC12	45	18	18	29	-	29	-	29	-	29	-	29	-	-	-
SPC11	17	0	-	4	7	16	-	16	-	16	-	16	-	-	-
SPC10	57	0	-	8	20	24	-	24	-	24	-	24	-	-	-
SPC09	11	11	11	11	11	11	11	11	-	11	-	11	-	-	-
SPC08	13	-	-	-	-	2	2	2	5	13	-	13	-	-	-
SPC07	2	-	-	-	-	1	1	1	2	2	-	2	-	-	-
SPC06	2	-	-	-	-	-	1	1	1	2	1	2	-	-	-
SPC05	9	-	-	-	-	-	-	-	2	2	2	6	-	-	-
SPC04	28	-	-	-	-	-	-	-	1	1	1	1	1	1	-
SPC03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPC02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPC01	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	227	41	29	64	38	95	15	96	11	112	4	116	1	1	0

Table 8: Number of Structures Removed by Bridge Improvements

**SPC14 – Probandt Street to S. Flores Street**

This residential area is located in the southern most portion of the reach along the right bank of San Pedro Creek (see Figure 1). The average flooding depths in this area range from 0.05' to 2.35'. The floodplain spills out of the banks in 3 distinct areas and impacts 6 structures along E. Franciscan Street. The flooding depths around the flooded structures range from 0.05' to 0.84'. The flooding is caused by back water from the Probandt Street Bridge. The low chord of the bridge deck is at an elevation of 600.50' and the 100-year water surface elevation is 602.77'. This creates pressure flow through the bridge.

The options evaluated for this area were bridge improvements, floodwalls, channel modifications, and buyouts. Improving Probandt Street Bridge will remove all the structures from the floodplain. A 450' floodwall would be required to remove the 6 structures along E. Franciscan Street from floodplain. A floodwall will have negligible effects on the water surface in this portion of the reach. Channel modifications starting upstream of Probandt Street Bridge and ending downstream of W. Mitchell Bridge will remove all structures from the floodplain. The approximate 2001 improved property value of the 6 structures in this area is approximately \$114,980. Table 9 summarizes the flood mitigation measures considered and the associated costs.

**Table 9 – SPC14 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
Improve Probandt St. Bridge	6	\$ 1,121,400	\$ 114,980
450' Floodwall	6	\$ 180,000	\$ 114,980
Channel Modifications	6	\$ 8,410,125	\$ 114,980
Buyout	6	\$ 156,370	\$ 114,980



**SPC13 – Probandt Street to W. Mitchell Street**

This residential area is located in the southern most portion of the reach along the left bank of San Pedro Creek (see Figure 1). The average flooding depths in this area range from 0.07' to 2.54'. There are 6 structures impacted along Flato Street, in the upper portion of the FDAA. The floodplain is not contained within its banks from Probandt Street to just downstream of W. Mitchell Street. The flooding depths around the flooded structures range from 0.07' to 2.20'. The flooding in this area is caused by Probandt Street Bridge as discussed above.

The options evaluated for this area were bridge improvements, floodwalls, channel modifications, and buyouts. Improving Probandt Street Bridge will remove all the structures from the floodplain. A 600' floodwall would be required to remove the 6 structures along Flato Street from floodplain. Channel modifications starting upstream of Probandt Street Bridge and ending downstream of W. Mitchell Street Bridge would remove all structures from the floodplain. A floodwall will have negligible effects on the water surface in this portion of the reach. The approximate 2001 improved property value of the 6 structures in this area is approximately \$92,830. Table 10 summarizes the flood mitigation measures considered and the associated costs.

**Table 10 – SPC13 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
Probandt St Bridge Improvement	6	\$ 1,121,400	\$ 92,830
600' Floodwall	6	\$ 240,000	\$ 92,830
Channel Modifications	6	\$ 8,410,125	\$ 92,830
Buyout	6	\$ 134,520	\$ 92,830



# San Pedro Creek - SPC13 and SPC14

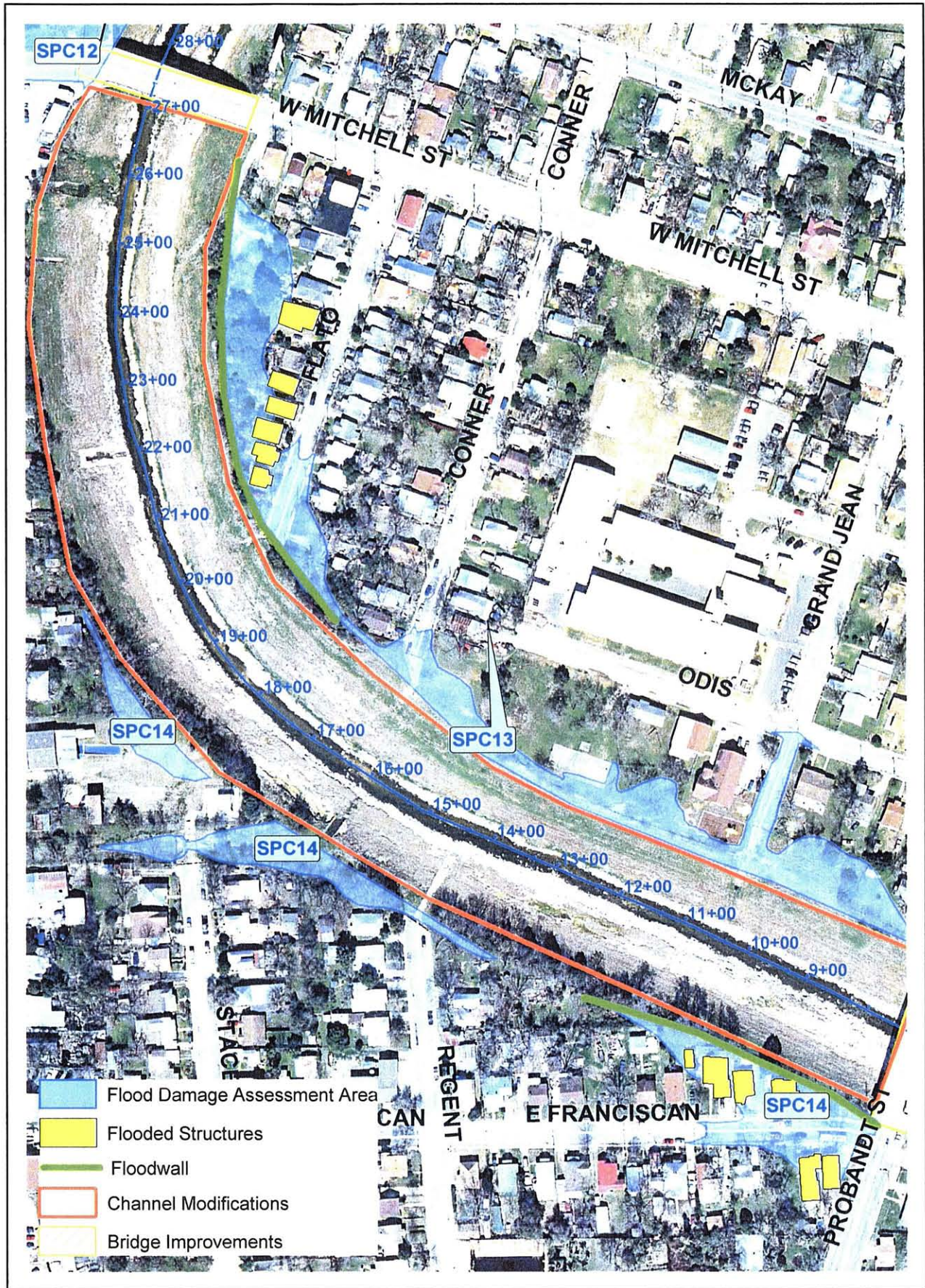


Figure 1

1 inch equals 200 feet





**SPC12 – E. Baylor and E. Lubbock Street Area**

This residential area is located between IH10 and S. Flores Street along the right bank of San Pedro Creek (see Figure 2). The average flooding depths in this area range from 0.07' to 6.25'. There are 45 flooded structures along E. Baylor and E. Lubbock Streets. The floodplain spreads out and becomes very wide in this area. The flooding is primarily caused by the low elevation of the residential area, though backwater from Probandt Street Bridge and W. Mitchell Street Bridge contributes to the flooding problems. The low chord of the W. Mitchell Street Bridge deck is at an elevation of 603' and the 100-year water surface elevation is 607.03'.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and buyouts. Table 11 summarizes the flood mitigation measures and costs.

**Table 11 – SPC12 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
<b>Option A:</b>			
Improve Probandt St Bridge	18	\$ 1,121,400	
Buyout	27	\$ 636,000	
Total	45	\$ 1,757,400	\$ 778,500
<b>Option B:</b>			
Improve W. Mitchell St Bridge	18	\$ 1,125,000	
Buyout	27	\$ 636,000	
Total	45	\$ 1,592,100	\$ 778,500
<b>Option C:</b>			
Improve Probandt St Bridge	29	\$ 1,121,400	
Improve W. Mitchell St Bridge		\$ 1,125,000	
Buyout	16	\$ 376,700	
Total	45	\$ 2,623,100	\$ 778,500
Option D: Channel Modifications	45	\$ 6,127,800	\$ 778,500
Option E: 1100' Floodwall	45	\$ 440,000	\$ 778,500
Option F: Buyout	45	\$ 1,059,470	\$ 778,500



# San Pedro Creek - SPC12

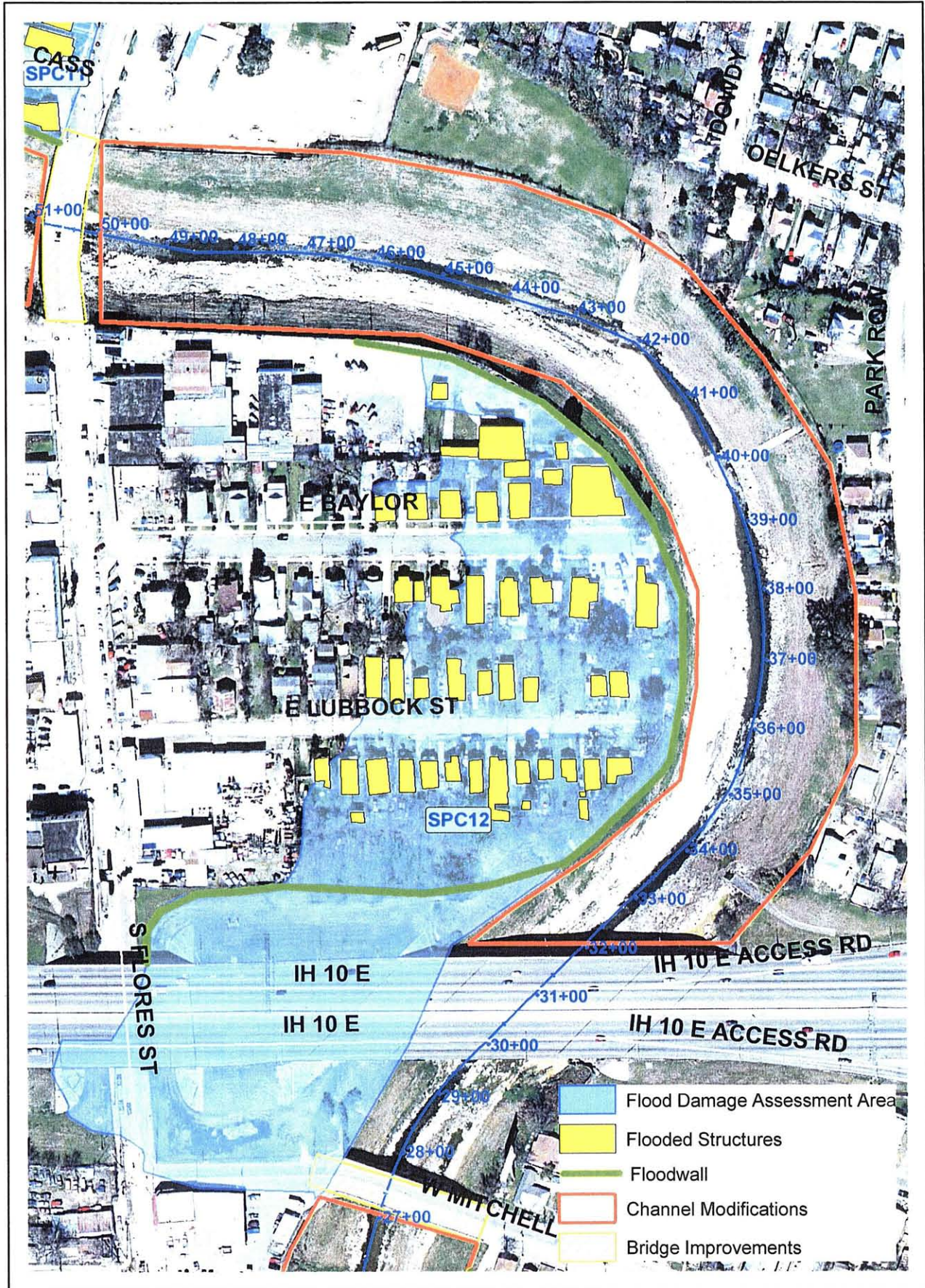


Figure 2

1 inch equals 200 feet





**SPC11 – Cass Street Area**

This residential area is located upstream of S. Flores Street Bridge along the left bank of San Pedro Creek (see Figure 3). The average flooding depths in this area range from 0.29' to 2.54'. There are 17 flooded structures along Cass Street. The flooding is caused by back water from downstream bridges. The low chord of the S. Flores Street Bridge deck is at an elevation of 610' and the 100-year water surface elevation is 613.54'.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and buyouts. Table 12 summarizes the flood mitigation measures considered and the project costs.

**Table 12 – SPC11 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
<b>Option A:</b>			
Improve Probandt St Bridge	4	\$ 1,121,400	
Improve W. Mitchell St Bridge		\$ 1,125,000	
Buyout	13	\$ 295,000	
Total	17	\$ 2,541,400	\$ 298,400
<b>Option B:</b>			
Improve S. Flores St Bridge	7	\$ 1,012,500	
Buyout	10	\$ 227,000	
Total	17	\$ 1,239,500	\$ 298,400
<b>Option C:</b>			
Improve Probandt St Bridge	16	\$ 1,121,400	
Improve W. Mitchell St Bridge		\$ 1,125,000	
Improve S. Flores St Bridge		\$ 1,012,500	
Buyout	1	\$ 22,700	
Total	17	\$ 2,246,400	\$ 298,400
Option D: Channel Modifications	17	\$ 5,210,825	\$ 298,400
Option E: Floodwall	17	\$ 330,000	\$ 298,400
Option F: Buyout	17	\$ 384,600	\$ 298,400



# San Pedro Creek - SPC11

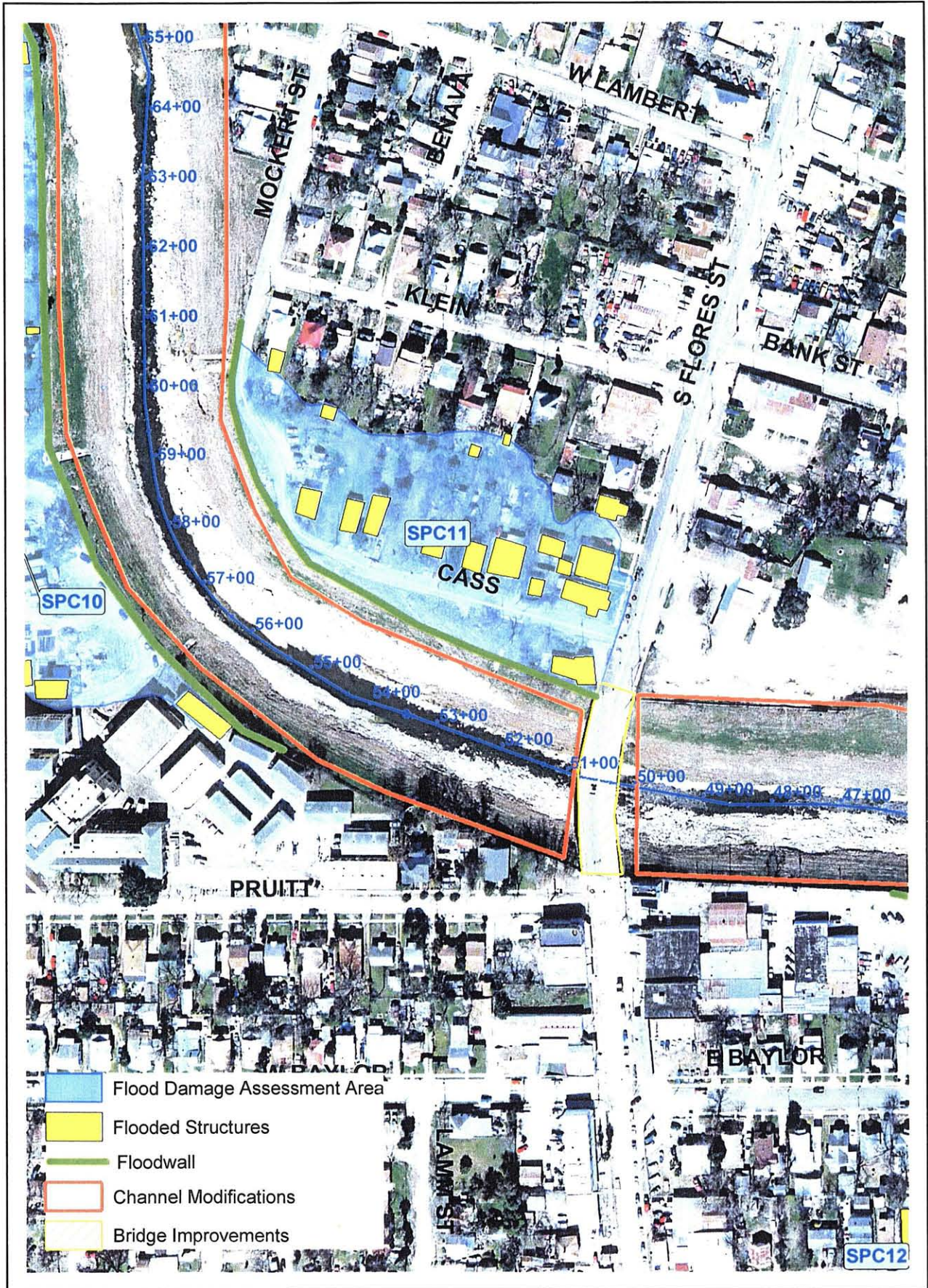


Figure 3

1 inch equals 200 feet





**SPC10 – Halstead Street Area**

This residential area is located between S. Flores Street and Nogalitos Street along the right bank of San Pedro Creek (see Figure 4). The average flooding depths in this area range from 0.21' to 6.22'. There are 57 flooded structures in this area. Four of the flooded structures are located on the Harris Middle School campus and the remaining residential structures are located on Glass Street, Alvarez Place, Cass Street, and Halstead Street. The flooding is caused by the low elevation of the residential area and backwater from the Probandt Street, W. Mitchell Street, and S. Flores Street Bridges.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and buyouts. Table 13 summarizes the flood mitigation measures considered and the project costs.

**Table 13 – SPC10 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
<b>Option A:</b>			
Improve Probandt St Bridge	24	\$ 1,121,400	
Improve W. Mitchell St Bridge		\$ 1,125,000	
Improve S. Flores St Bridge		\$ 1,012,500	
Buyout	33	\$ 509,000	
Total	57	\$ 3,767,900	\$ 674,500
<b>Option B:</b>			
Improve Probandt St Bridge	8	\$ 1,121,400	
Improve W. Mitchell St Bridge		\$ 1,125,000	
Buyout	49	\$ 755,000	
Total	57	\$ 3,001,400	\$ 674,500
<b>Option C:</b>			
Improve S. Flores St Bridge	20	\$ 1,012,500	
Buyout	37	\$ 570,000	
Total	57	\$ 1,582,500	\$ 674,500
Option D: Channel Modifications	57	\$ 5,210,825	\$ 674,500
Option D: 2000' Floodwall	57	\$ 800,000	\$ 674,500
Option E: Buyout	57	\$ 2,019,325	\$ 1,100,000



# San Pedro Creek - SPC10

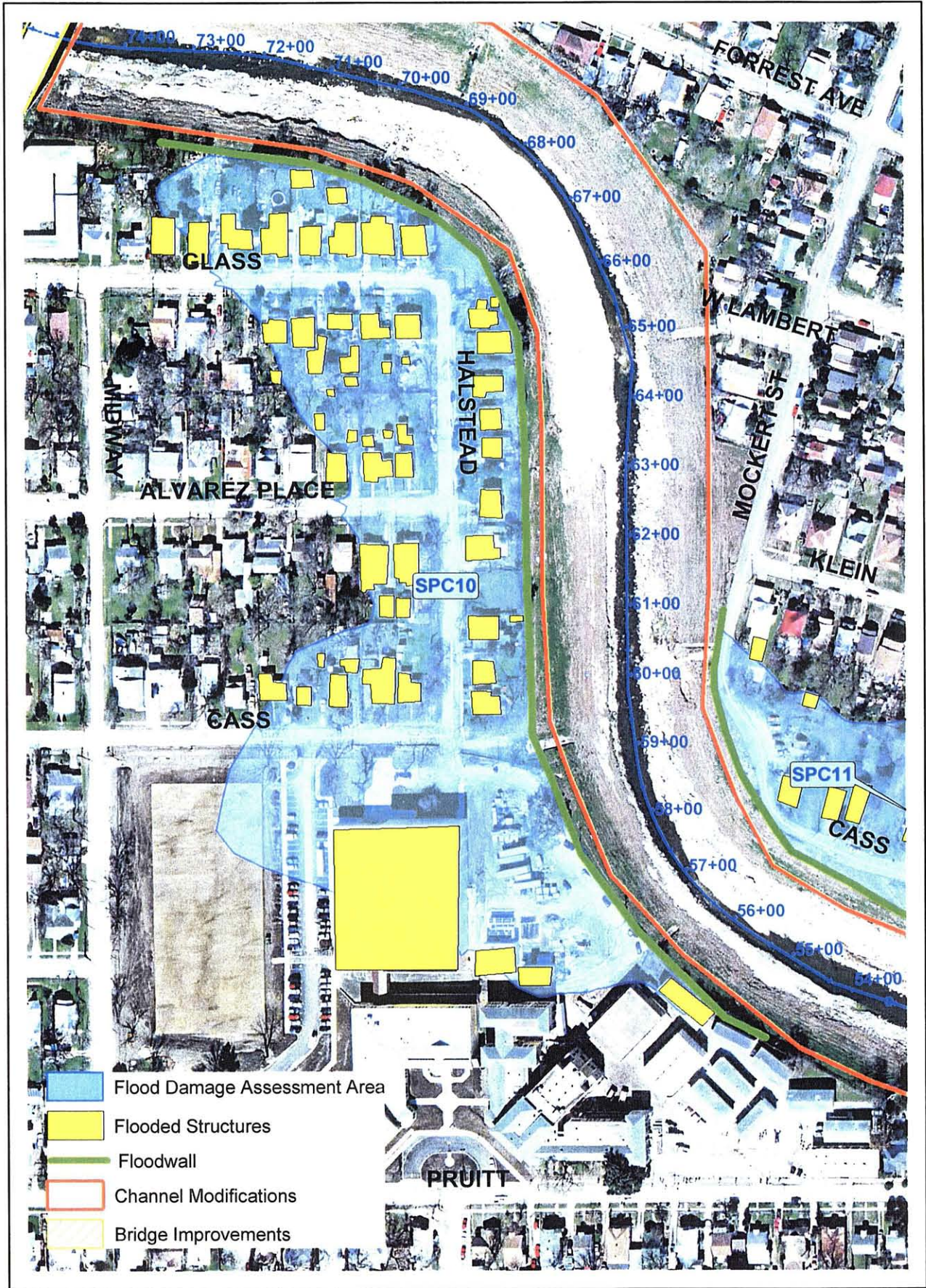


Figure 4

1 inch equals 200 feet





**SPC09 – Nogalitos Street and Ralph Avenue Area**

This commercial area is located directly upstream of Nogalitos Street Bridge and Ralph Avenue along the left bank of San Pedro Creek (see Figure 5). The average flooding depths in this area range from 0.05' to 0.27'. There are 11 flooded structures in this area. Backwater from downstream bridges causes shallow flooding in this area. The low chord of the Nogalitos Street bridge deck is at an elevation of 617' and the 100-year water surface elevation is 619.66'.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and buyouts. Due to the shallow flooding in this area, improving any of the downstream bridges individually will remove all 11 structures from the floodplain. The bridges downstream of this area are Probandt Street, W. Mitchell Street, S. Flores Street, and Nogalitos Street. A 640' floodwall would remove all structures from the floodplain. The approximate 2001 improved property value of the 11 structures in this area is approximately \$65,700. Table 14 summarizes the flood mitigation measures considered and the associated costs.

**Table 14 – SPC09 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
Option A:			
Probandt St Bridge Improvement	11	\$ 1,121,400	\$ 65,700
Option B:			
W. Mitchell St Bridge Improvement	11	\$ 1,125,000	\$ 65,700
Option C:			
S. Flores St Bridge Improvement	11	\$ 1,012,500	\$ 65,700
Option D:			
Nogalitos Bridge Improvement	11	\$ 1,125,000	\$ 65,700
Option E:			
640' Floodwall	11	\$ 256,000	\$ 65,700
Option F:			
Channel Modifications	11	\$ 2,565,950	\$ 65,700
Option G:			
Buyout	11	\$ 150,100	\$ 65,700

**SPC08 – IH35 and Furnish Area**

This residential area is located at IH35 and Furnish Street along the left bank of San Pedro Creek (see Figure 5). The average flooding depths in this area range from 0.04' to 1.99'. There are 13 flooded structures in this area. The flooding is caused by the low elevation of the residential area and backwater from downstream bridges. The low chord of the Furnish Street Bridge is 619.29' and the 100-year water surface elevation is 624.64'. The bridge is under approximately 3 feet of water during the 100-year flood event.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel improvements, and buyouts. Table 15 summarizes the flood mitigation measures considered and the associated costs.

**Table 15 – SPC08 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
<b>Option A:</b>			
Furnish St. Bridge Improvement	5	\$ 1,912,500	
Buyout 8 structures	8	\$ 143,000	
Total	13	\$ 2,055,500	\$ 171,000
<b>Option B:</b>			
Probandt St. Bridge Improvement	13	\$ 1,121,400	
W. Mitchell St. Bridge Improv.		\$ 1,125,000	
S. Flores St Bridge Improvement		\$ 1,012,500	
Nogalitos Bridge Improvement		\$ 1,125,000	
Total	13	\$ 4,383,900	\$ 171,000
Option C: 500' Floodwall	13	\$ 200,000	\$ 171,000
Option D: Channel Modifications	13	\$ 949,950	\$ 171,000
Option D: Buyout	13	\$ 231,000	\$ 171,000

**SPC07 – S. San Marcos and Furnish Street Area**

This commercial area is located at IH35 and S. San Marcos along the right bank of San Pedro Creek (see Figure 5). The average flooding depths in this area range from 0.87' to 1.52'. There are 2 structures impacted in this area. The flooding is caused by backwater from downstream bridges. The low chord of the Furnish Street Bridge is 619.29' and the 100-year water surface elevation is 624.64'. The bridge is under approximately 3 feet of water during the 100-year flood event.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and buyouts. Bridge improvements to Probandt Street, W. Mitchell Street, and Nogalitos Street Bridges removed 1 structure from the floodplain. Improving the Furnish Street Bridge removed both structures from the floodplain. A 550' floodwall would remove all structures from the floodplain. Channel modifications in this portion of the reach would remove both structures from the floodplain. The approximate 2001 improved property value of the 2 structures in this area is approximately \$970,500. Table 16 summarizes the flood mitigation measures considered and costs.

**Table 16 – SPC07 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
Furnish Street Bridge Improvement	2	\$ 1,912,500	\$ 970,500
550' Floodwall	2	\$ 220,000	\$ 970,500
Channel Modifications	2	\$ 949,950	\$ 970,500
Buyout	2	\$ 1,537,900	\$ 970,500



# San Pedro Creek - SPC07, SPC08, and SPC09

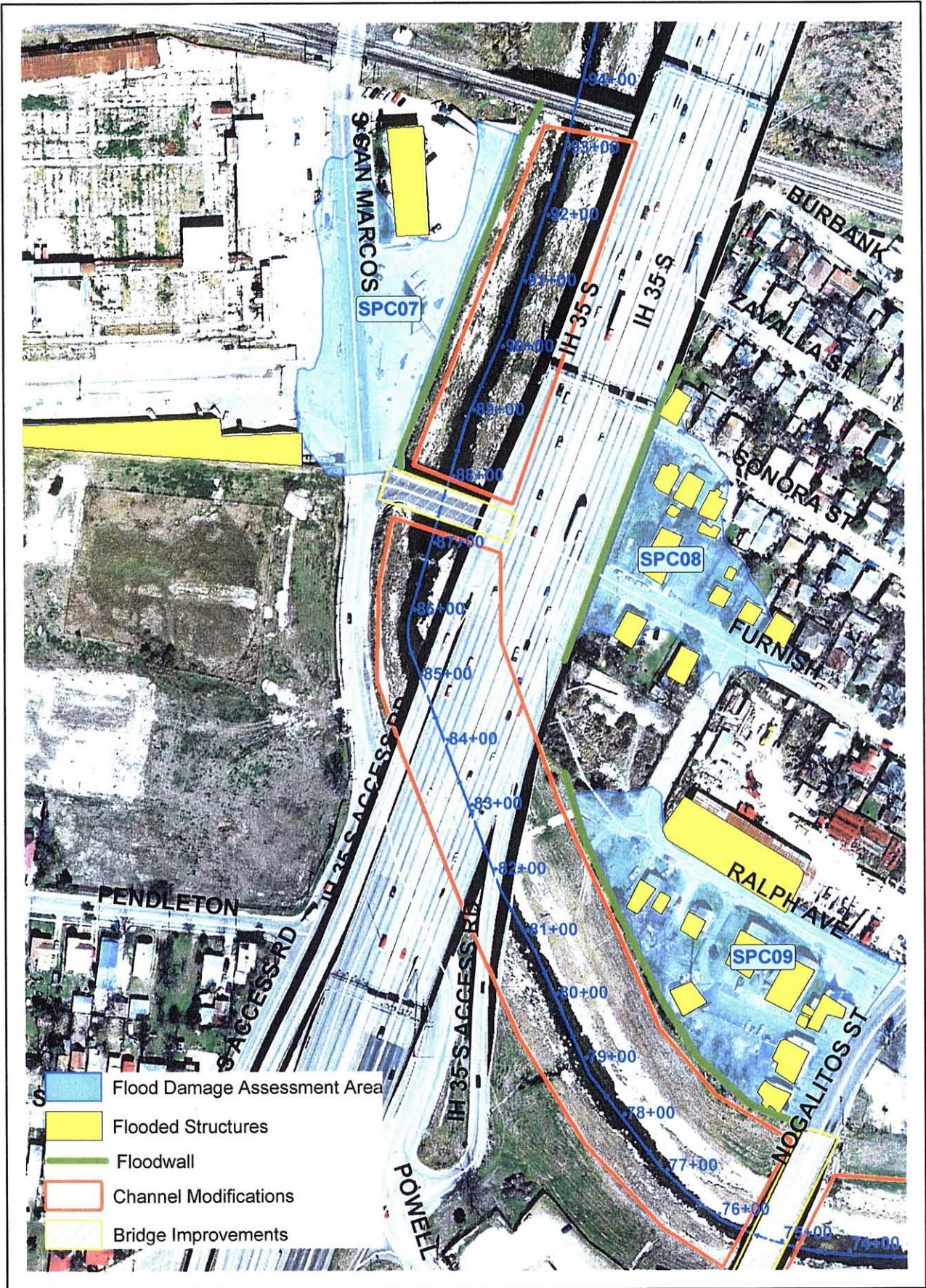


Figure 5

1 inch equals 200 feet





**SPC06 – IH35 and W. Cevallos Street Area**

This commercial area is located at IH35 and W. Cevallos Street along the right bank of San Pedro Creek (see Figure 6). The average flooding depths in this area range from 0.17' to 0.44'. There are 2 structures flooded in this area due to the elevation the commercial area and backwater from downstream bridges. The low chord of the W. Cevallos Street Bridge deck is at an elevation of 626.62' and the 100-year water surface elevation is 629.44'.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and buyouts. Improving Probandt Street, W. Mitchell Street, S. Flores Street, Nogalitos Street and Furnish Street Bridges removes both structures from the floodplain. Another bridge improvement option is to improve only the W. Cevallos Bridge which will remove both structures from the floodplain. A 240' floodwall would remove all structures from the floodplain. Channel modifications in this portion of the reach would remove all structures from the floodplain. The approximate 2001 improved property value of the 2 structures in this area is approximately \$86,300. Table 17 summarizes the flood mitigation measures considered and costs.

**Table 17 – SPC06 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
<b>Option A:</b>			
Probandt St. Bridge Improvement	2	\$ 1,121,400	
W. Mitchell St. Bridge Improvement		\$ 1,125,000	
S. Flores St Bridge Improvement		\$ 1,012,500	
Nogalitos Bridge Improvement		\$ 1,125,000	
Furnish St. Bridge Improvement		\$ 1,912,500	
Total	2	\$ 6,296,400	\$ 86,300
<b>Option B:</b>			
W. Cevallos St Bridge Improvement	2	\$ 712,500	\$ 86,300
<b>Option C: 240' Floodwall</b>			
	2	\$ 96,000	\$ 86,300
<b>Option D: Channel Modifications</b>			
	2	\$ 1,955,625	\$ 86,300
<b>Option E: Buyout</b>			
	2	\$ 305,500	\$ 86,300

**SPC05 – Railroad to S. Alamo Street**

This commercial area is located between railroad tracks and S. Alamo Street along the right bank of San Pedro Creek (see Figure 6). The average flooding depths in this area range from 0.16’ to 2.93’. There are 9 flooded structures in this area. The flooding is caused by the low elevation of the commercial area and backwater from downstream bridges.

The flood mitigation measures evaluated for this area were bridge improvements, floodwalls, channel modifications, and buyouts. Table 18 summarizes the flood mitigation measures considered and the associated costs.

**Table 18 – SPC05 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
Option A:			
Probandt St Bridge Improvement	6	\$ 1,121,400	
W. Mitchell St Bridge Improvement		\$ 1,125,000	
S Flores St Bridge Improvement		\$ 1,012,500	
Nogalitos St Bridge Improvement		\$ 1,125,000	
Furnish St Bridge Improvement		\$ 1,912,500	
W Cevallos St Bridge Improvement		\$ 712,500	
Buyout	3	\$ 65,100	
Total	9	\$ 7,074,000	\$ 69,900
Option B: 550' Floodwall	9	\$ 220,000	\$ 69,900
Option C: Channel Modifications	9	\$ 1,436,925	\$ 69,900
Option D: Buyout	9	\$ 195,300	\$ 69,900



# San Pedro Creek - SPC05 and SPC06

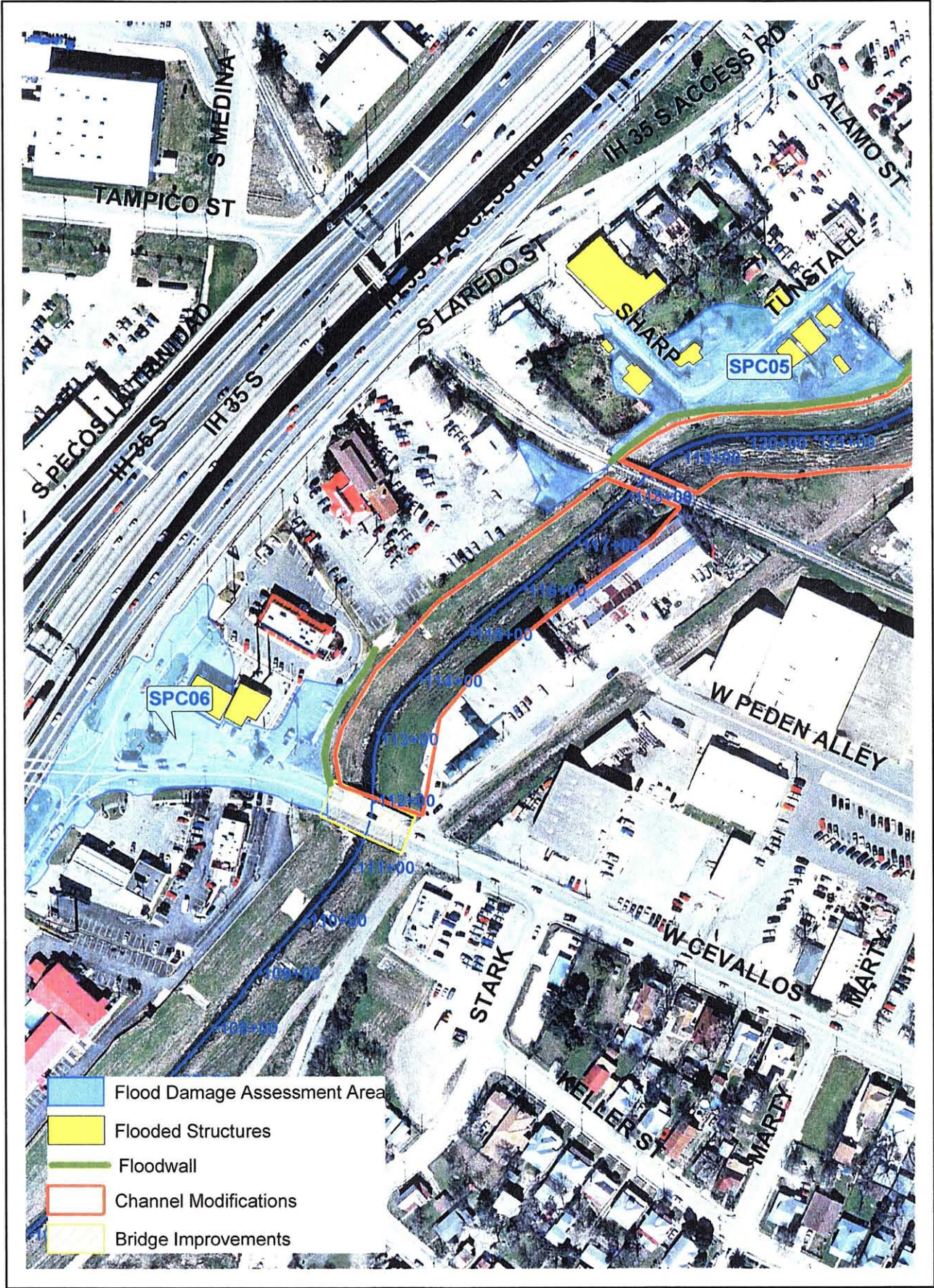


Figure 6

1 inch equals 200 feet





**SPC04 – S. Alamo Street to El Paso**

This commercial area is located between S. Alamo Street and El Paso Street along both the right and left banks of San Pedro Creek (see Figure 7). The average flooding depths in this area range from 0.04' to 4.29'. There are 28 flooded structures in this area. The flooding is caused by the low elevation of the commercial area, backwater from downstream bridges, size of the existing channel, and the presence of the long culvert between Camp Street and Guadalupe Street.

The flood mitigation measures evaluated for this area were bridge improvements, floodwall, channel modifications, and buyouts. At this point in the reach, any benefits from downstream bridge improvements are no longer noticed in SPC04. Improving bridges within the SPC04 reach does not provide any significant water surface elevation reduction. Table 19 summarizes the flood mitigation measures considered and estimated project costs.

**Table 19 – SPC04 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
4300' Floodwall	28	\$ 1,750,000	\$ 2,800,000
Channel Modifications	28	\$ 5,200,000	\$ 2,800,000
Buyout	28	\$ 4,114,600	\$ 2,800,000



# San Pedro Creek - SPC04



Figure 7

1 inch equals 200 feet





**SPC03 – Camaron Street, north of W. Salinas**

This commercial area along Camaron Street, north of W. Salinas is located along the left bank of San Pedro Creek (see Figure 8). The average flooding depth in this area is 0.57'. The flooding in this area occurs on Camaron Street and does not impact any structures. A 230' floodwall would contain the flood waters within its banks (see Table 20). The recommended option is to close the street during heavy rain events.

**Table 20 – SPC03 Flood Mitigation Measures and Costs**

Flood Mitigation Options	Estimated Project Cost
230' Floodwall	\$ 92,000

**SPC02 – Camaron Street, at Kingsbury (SPC Tunnel Inlet)**

This commercial area along Camaron Street at Kingsbury is located at the SPC Tunnel Inlet along the left bank of San Pedro Creek (see Figure 8). The average flooding depth in this area is 0.29'. The flooding in this area occurs on Camaron Street and does not impact any structures. A 500' floodwall would contain the flood waters within the banks (see Table 21). The recommended option is to close the street during heavy rain events.

**Table 21 – SPC02 Flood Mitigation Measures and Costs**

Flood Mitigation Options	Estimated Project Cost
Floodwall	\$ 200,000



# San Pedro Creek - SPC02 and SPC03

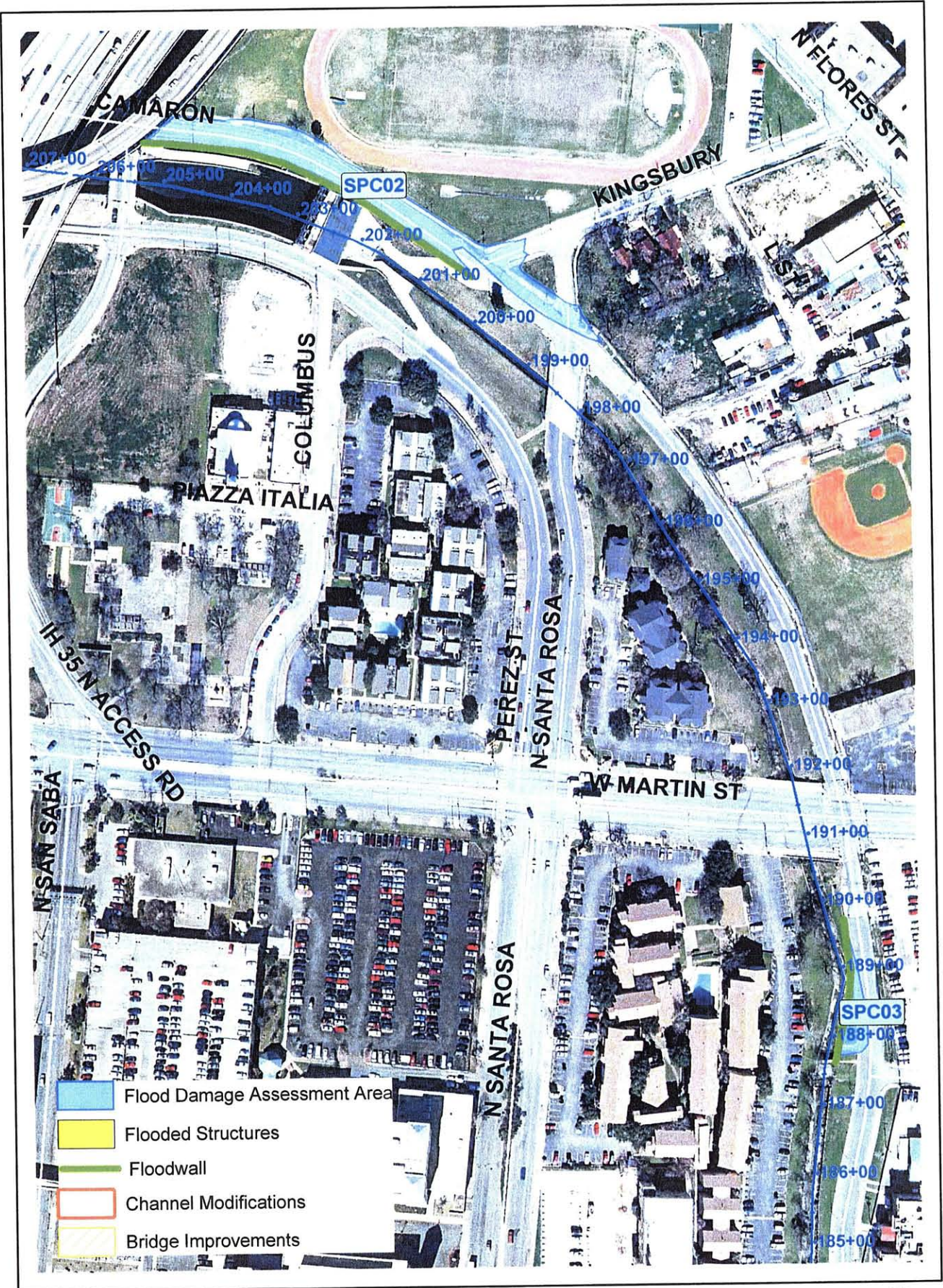


Figure 8

1 inch equals 200 feet





**SPC01 – IH10 to West Laurel**

SPC01 consists of a large, primarily commercial area located at the headwaters of San Pedro Creek between IH10 and West Laurel along the right and left banks of San Pedro Creek (see Figure 9). Approximately 7 of the 32 flooded structures are residential structures along Camaron Street near IH10. The average flooding depths in this area range from 0.04' to 2.42'. The flooding that occurs in this area is caused by a combination of backwater from the Cypress Street and Fredericksburg Road Bridges and the undersized improved channel upstream and downstream of Fredericksburg Road.

At this point in the reach, the benefits of any downstream bridge or channel improvements have dissipated and do not reduce the water surface elevation in this area. The flood mitigation measures evaluated for this area were floodwalls, channel modifications, and buyouts. Table 22 summarizes the flood mitigation measures considered and project costs.

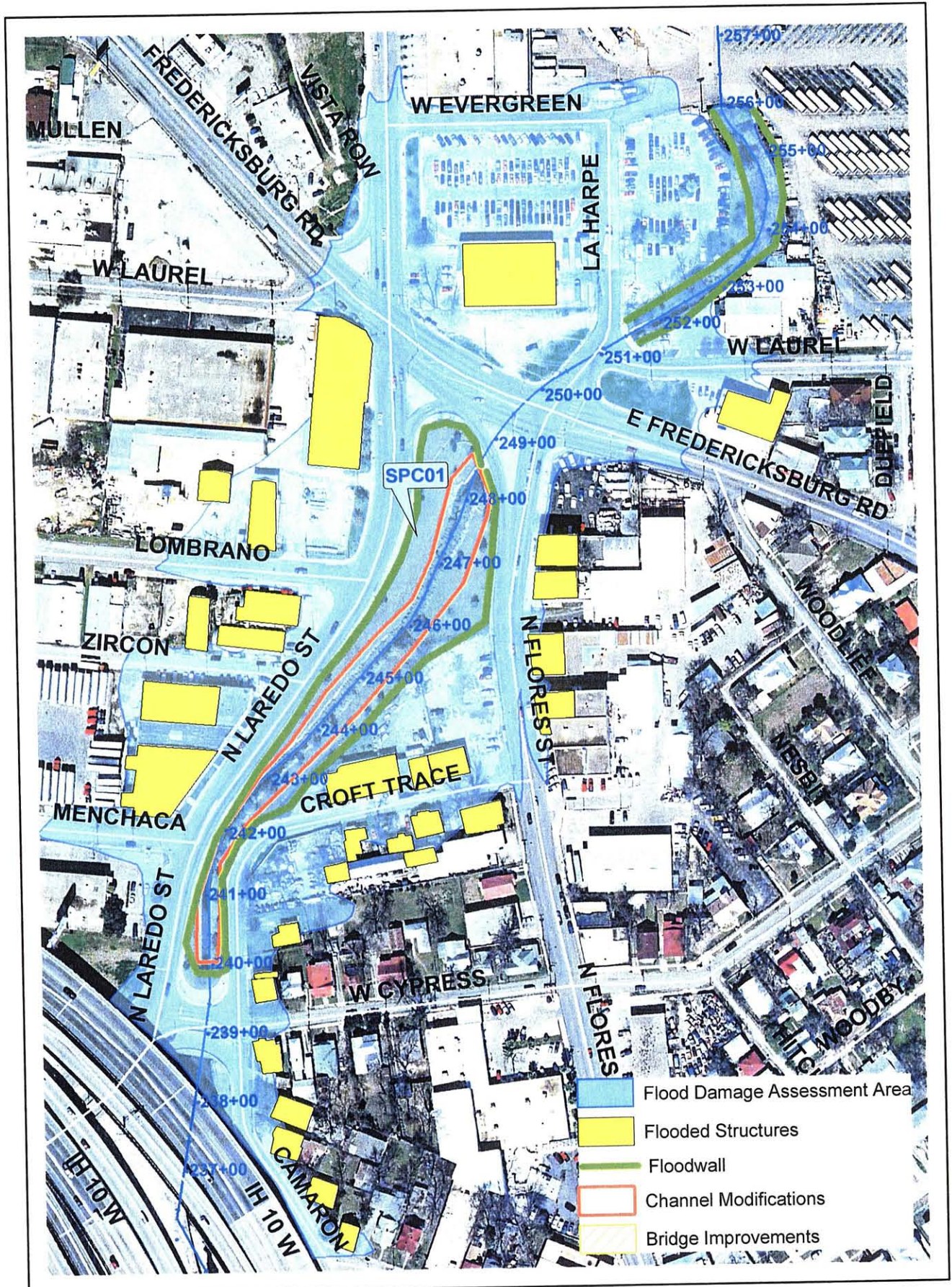
**Table 22 – SPC01 Flood Mitigation Measured and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
Option A: 2660' Floodwall	32	\$ 1,700,000	\$ 1,499,500
Option B: Channel Modifications	32	\$ 307,600	\$ 1,499,500
Option C: Buyout	32	\$ 2,287,700	\$ 1,499,500

The draft floodplain mapping in this area may be revised. The flood mitigation measures for SPC01 should be re-evaluated if the floodplain extents decrease.



# San Pedro Creek - SPC01



- Flood Damage Assessment Area
- Flooded Structures
- Floodwall
- Channel Modifications
- Bridge Improvements

1 inch equals 200 feet



Figure 9



**SAN ANTONIO RIVER**

The analysis for each of the San Antonio River mitigation areas was conducted in the same manner as the San Pedro Creek segment. The Eagleland Project encompasses the river segment from Guenther to Lone Star Street. This project includes restoration of the river channel and will affect the flood behavior. The elements of the Eagleland Project are not included in this analysis. The elements of the Museum and Park Segments of the Museum Reach - San Antonio River Improvements Project are included in this analysis. The following sections discuss the specific flood mitigation opportunities along the study reach of the San Antonio River.

**SAR24 – E. Mitchell Street to IH10**

This commercial area is located between E. Mitchell Street and IH10 along the left bank of the San Antonio River (see Figure 10). The average flooding depth in this area is 1.26'. The flooding in this area is caused by the low elevation of this portion of the parking lot and the backwater from Mitchell Street Bridge. There are no structures in this flooded area.

The flood mitigation measures evaluated for this area were bridge improvements and a floodwall. Improving the Mitchell Street Bridge will reduce the flooding depth to 0.68'. A 500' floodwall would remove the parcel from the floodplain. Improvements to the lower reach of the San Antonio River may also reduce the water surface elevation in this area. Table 23 summarizes the flood mitigation measures considered and estimated project costs.

**Table 23 – SAR24 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
Mitchell Street Bridge Improvement	-	\$ 716,250	\$ -
500' Floodwall	-	\$ 200,000	\$ -

The SARIP Mission Reach project may also contain some mitigation elements that will affect this area. At the time this report was written, the scope and impacts of the Mission Reach improvements were not available to the evaluation team. The impacts of any Mission Reach improvements, and associated costs, should be included in any refinements to this analysis.

**SAR23 – W. Mitchell Street to IH10**

This commercial area is located between E. Mitchell Street and IH10 along the right bank of the San Antonio River (see Figure 10). The average flooding depths in this area range from 0.10' to 3.61'. The floodplain is very wide and floods 14 structures in this area. The flooding is caused mainly by the low elevation of the commercial area.

The flood mitigation measures evaluated for this area were bridge improvements and a floodwall. Improving the Mitchell Street Bridge did not remove any structures from the floodplain. A 570' floodwall will remove all structures from the floodplain. The approximate 2001 improved property value of the 14 structures in this area is approximately \$177,700. Improvements to the lower reach of the San Antonio River may also reduce the water surface in this area. Table 24 summarizes the flood mitigation measures considered and the associated costs.

**Table 24 – SAR23 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
Mitchell Street Bridge Improvement	14	\$ 716,250	\$ 177,700
570' Floodwall	14	\$ 228,000	\$ 177,700
Buyout	14	\$ 251,100	\$ 177,700

The SARIP Mission Reach project may also contain some mitigation elements that will affect this area. At the time this report was written, the scope and impacts of the Mission Reach improvements were not available to the evaluation team. The impacts of any Mission Reach improvements, and associated costs, should be included in any refinements to this analysis.



# San Antonio River - SAR23 and SAR24

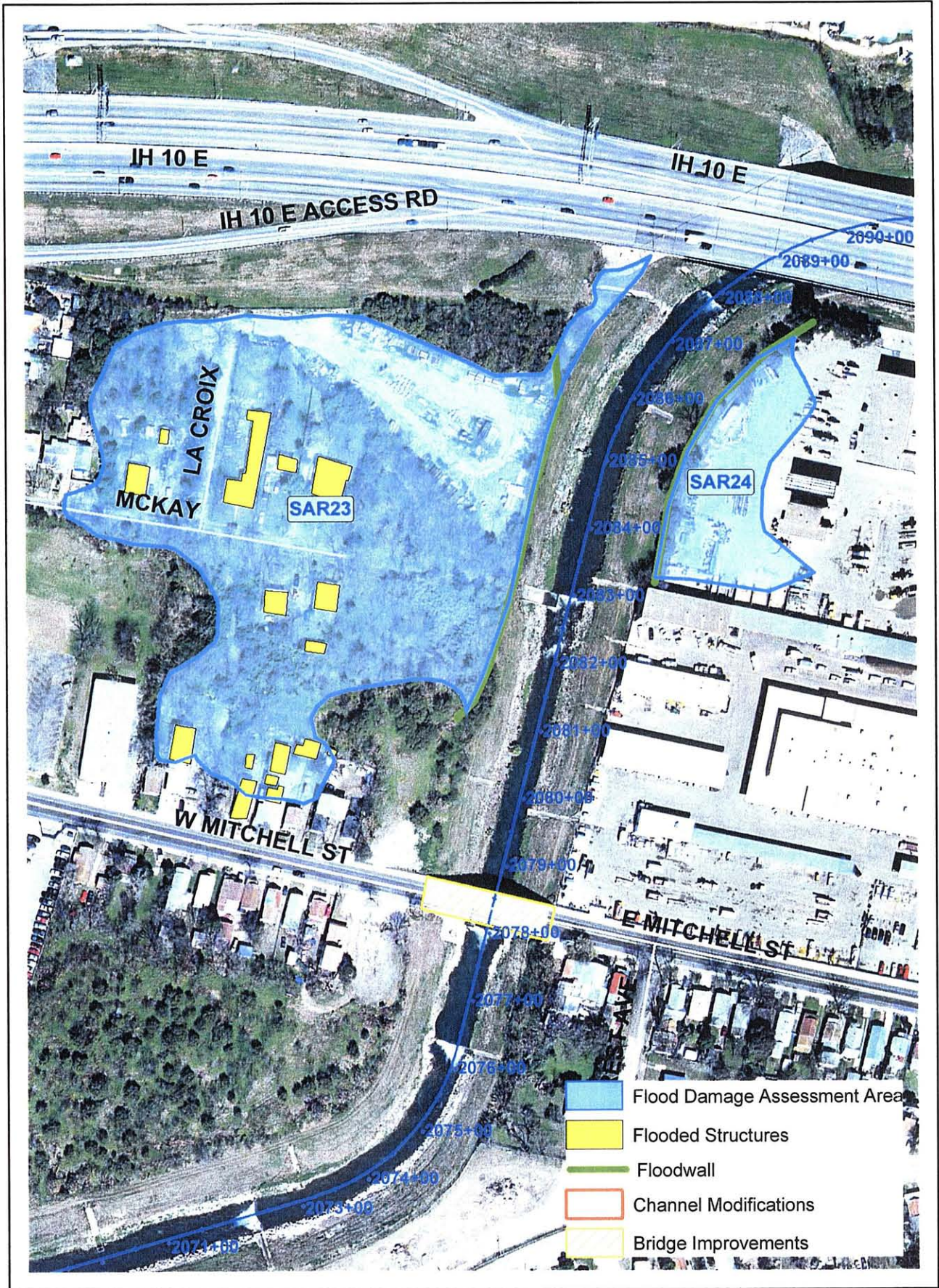


Figure 10

1 inch equals 200 feet





**SAR22 – Railroad Upstream of Steves Avenue**

This commercial area is located upstream of the railroad tracks near Steves Avenue along the right bank of the San Antonio River (see Figure 11). The average flooding depths in this area range from 2.35' to 4.10'. The flooded area is a portion of a parking lot and one structure is impacted.

Comparison of the HEC-RAS top width and the width of the floodplain at model section 210113 shows a discrepancy of approximately 10 feet. This should be verified by comparing the flood base elevations to detailed survey information. This parking lot area may be out of the actual floodplain.

If the floodplain mapping in this area is assumed to be correct, a floodwall was explored as a possible mitigation option for this area. A 200' floodwall will remove the structure from the floodplain. Table 25 summarizes the options considered and the associated costs. However, because the flooded area appears to be a parking lot with one storage building, no flood mitigation may also be a practical alternative.

**Table 25 – SAR22 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
200' Floodwall	1	\$ 80,000	\$ 20,800

**SAR21 – Roosevelt Park (SAR Tunnel Outlet)**

This recreational and commercial area is located at Roosevelt Avenue and Mission Road along the left bank of the San Antonio River (see Figure 11). The San Antonio River Outlet is located upstream of Lonestar Boulevard. The average flooding depths in this area range from 0.21-8.86'. There are 13 impacted structures in this area. The flooding in this area is caused by the low elevations of the terrain.

There is evidence of an existing berm along the left bank of the San Antonio River in the Roosevelt Park Area. Currently, the berm does not contain the floodplain. The height of the berm was increased and modeled. This resulted in increased water surface elevations on the right bank and upstream. Channel modifications within this reach had a minimal affect on reducing the water surface elevation. The approximate 2001 improved property value of the 13 structures in this area is \$661,000.

Several contour lines in the supplied design file had fractional elevation attributes, such as 623.57. Discrepancies were also found between the HEC-RAS model output and the floodplain mapping. For example, at cross-section 212124, the 100-year water surface elevation is 618.61', yet the floodplain is mapped across a 623.57' contour and does not extend to the 618' contour across Roosevelt Ave. Also in the ACAD contour file, there is one contour that is at an elevation of 485', which appears to be an error. At cross-section 211028, the bottom of channel cross-section appears to be 22 feet too high in the topographic file.

There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations. Survey information for this area should be reviewed against the proposed floodplain mapping.



# San Antonio River - SAR21 and SAR22

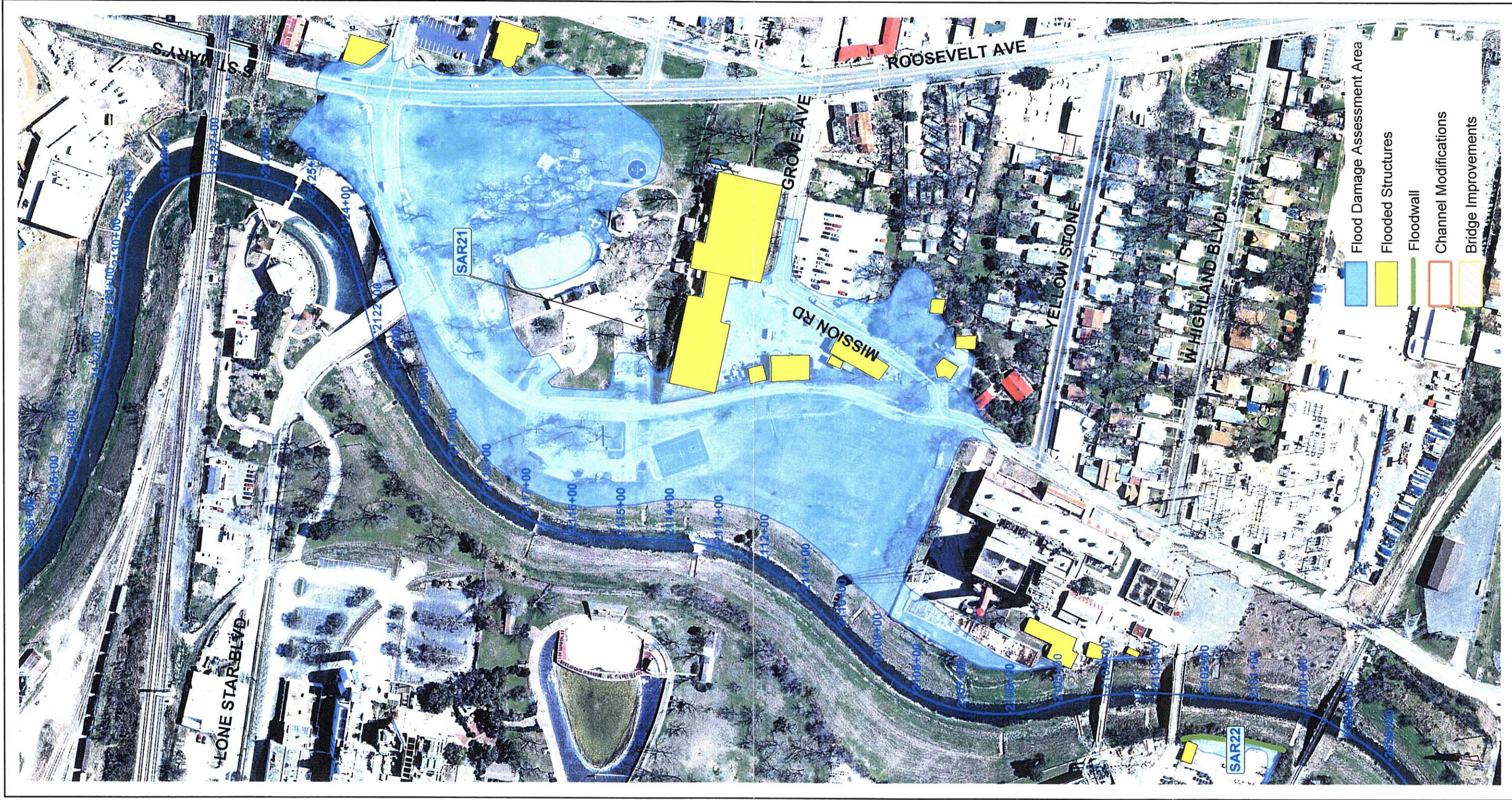


Figure 11



1 inch equals 200 feet



**SAR20 – Constance Street Area**

This small flooded area is located in a residential area along the left bank of the San Antonio River near Constance Street (see Figure 12). The floodwaters appear to encroach onto the property and according the contours and cross-section 215261, the structure is at least 4 feet above the water surface elevation. No flood mitigation measures are recommended for this area.

**SAR19 – S. Alamo Street and Blue Star (Left Bank)**

This area is located in a commercial and residential area along the left bank of the San Antonio River downstream of S. Alamo Street Bridge (see Figure 13). The average flooding depths in this area range from 2.81’ to 4.82’. One structure is impacted in this area. The flooding is caused by the low elevation of the area.

The flood mitigation measure that was considered for this area was a floodwall. A 400’ floodwall would remove the structure from the floodplain. Table 26 summarizes the flood mitigation measure considered and the estimated project cost.

**Table 26 – SAR19 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
400’ Floodwall	1	\$ 160,000	\$ 200,000

SAR19 also falls within the project limits of the current Eagleland project. The above mitigation element does not consider the effects that the Eagleland project may have in this segment of the river. The Eagleland project may already provide flood benefits that will reduce flooding in this area and, if so, would eliminate the need for any further improvements to provide flood protection.

**SAR18 – S. Alamo Street and Blue Star (Right Bank)**

This area is the Blue Star Art Complex parking lot located in a commercial area along the right bank of the San Antonio River downstream of S. Alamo Street Bridge (see Figure 13). According to the contours and cross-sections in the area, the parking lot is approximately 7 feet above the water surface elevation. Like SAR19, SAR18 falls within the limits of the Eagleland Project. This project may include features that will alleviate the flooding in this area. No flood mitigation measures are recommended for this area at this time.

It appears that the floodplain is not mapped correctly in this area. Survey information for this area should be reviewed against the proposed floodplain mapping.



# San Antonio River - SAR20

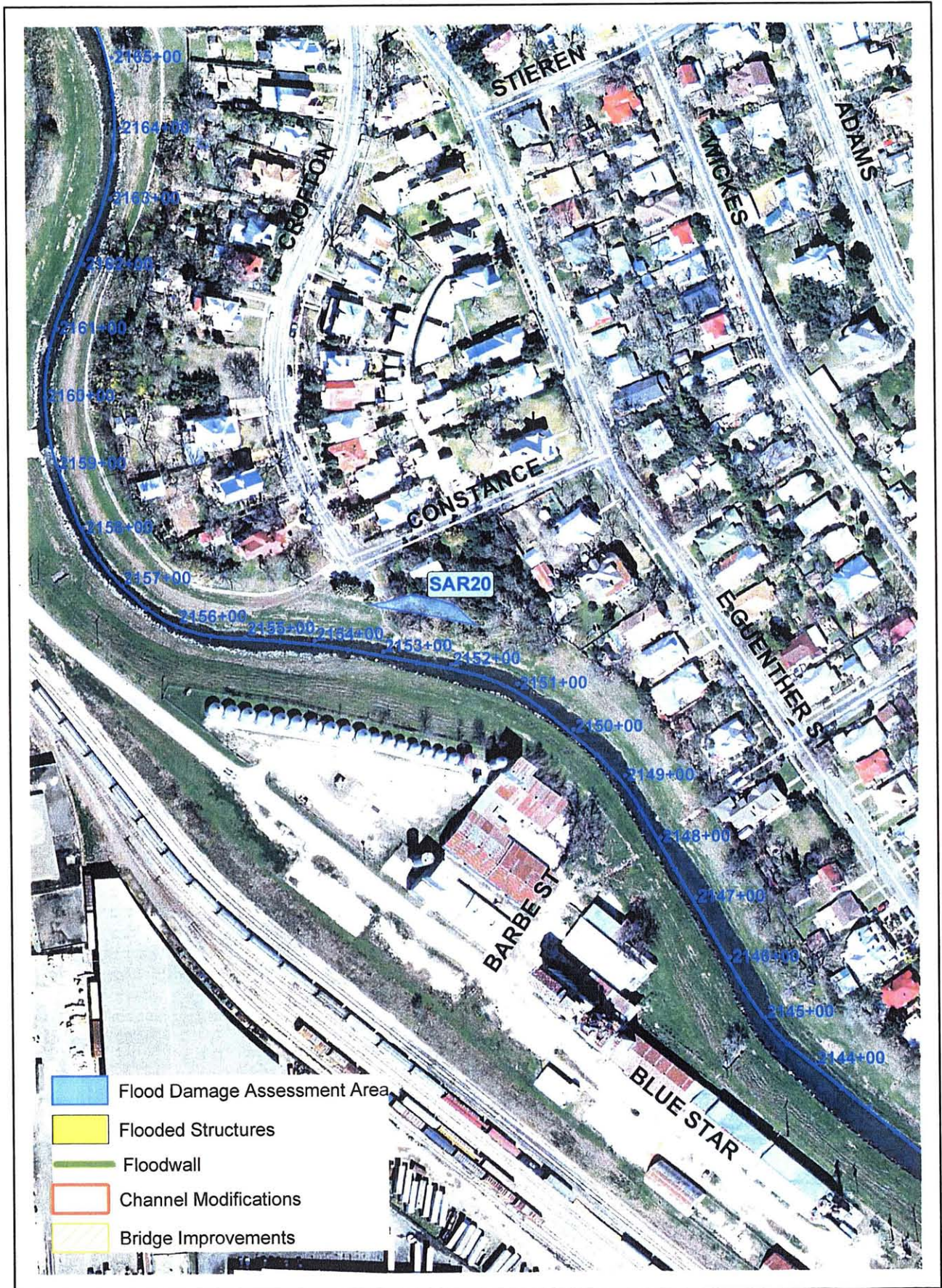


Figure 12

1 inch equals 200 feet





**SAR17 – S. Alamo Street Bridge**

This area is located in a residential area directly upstream of S. Alamo Street Bridge along the left bank of the San Antonio River (see Figure 13). According to the contours and cross-sections in the area, the lot is approximately 7 feet above the water surface elevation.

There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations. No flood mitigation measures are recommended for this area at this time. Survey information for this area should be reviewed against the proposed floodplain mapping.

**SAR16 – W. Johnson Street Bridge**

This area is located in a residential area upstream of E. Johnson Street Bridge along the left bank of the San Antonio River (see Figure 13). According to the contours and cross-sections in the area, the lot is approximately 7 feet above the water surface elevation. No flood mitigation measures are recommended for this area at this time.

There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations. Survey information for this area should be reviewed against the proposed floodplain mapping.

**SAR15 – E. Commerce Street to E. Houston Street**

This commercial area is located between E. Commerce Street to E. Houston Street along the right bank of the San Antonio River (see Figure 14). The mapped floodplain indicates impacted structures in this area. According to the contours and cross-sections in the area, it does not appear that property flooding is occurring in this area. No flood mitigation measures are recommended for this area at this time.

There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations. Survey information for this area should be reviewed against the proposed floodplain mapping.

**SAR14 – E. Houston Street to E. Travis Street**

This commercial area is located between E. Houston Street and E. Travis Street along the left bank of the San Antonio River (see Figure 14). The mapped floodplain indicates impacted structures in this area. However, a comparison of the HEC-RAS top width values of the cross sections in the area to the mapped floodplain width indicates a significant discrepancy in this area. No flood mitigation measures are recommended for this area at this time.

There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations. Survey information for this area should be reviewed against the proposed floodplain mapping.



# San Antonio River SAR16, SAR17, SAR18, and SAR19

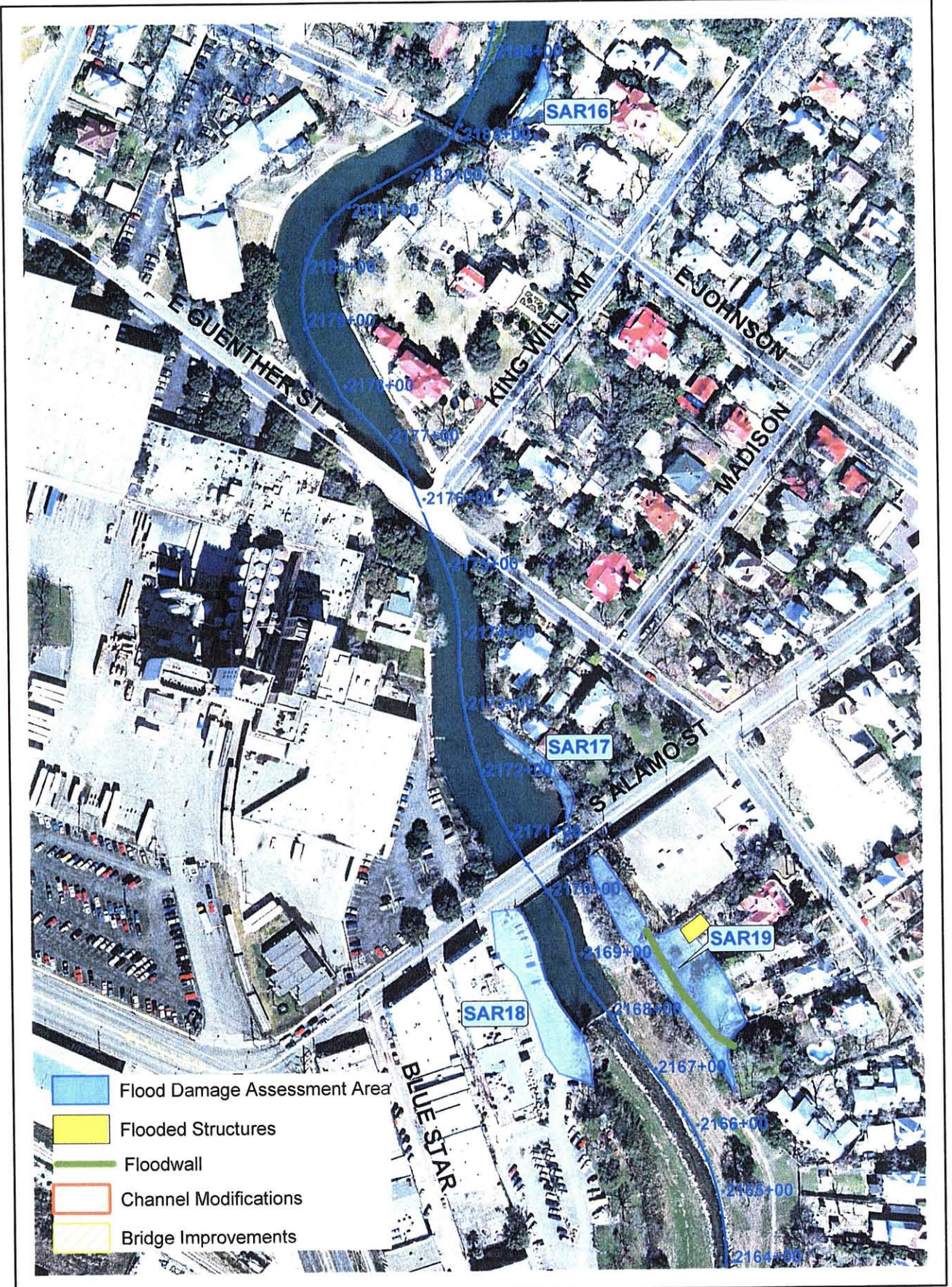


Figure 13

1 inch equals 200 feet





# San Antonio River - SAR14 and SAR15

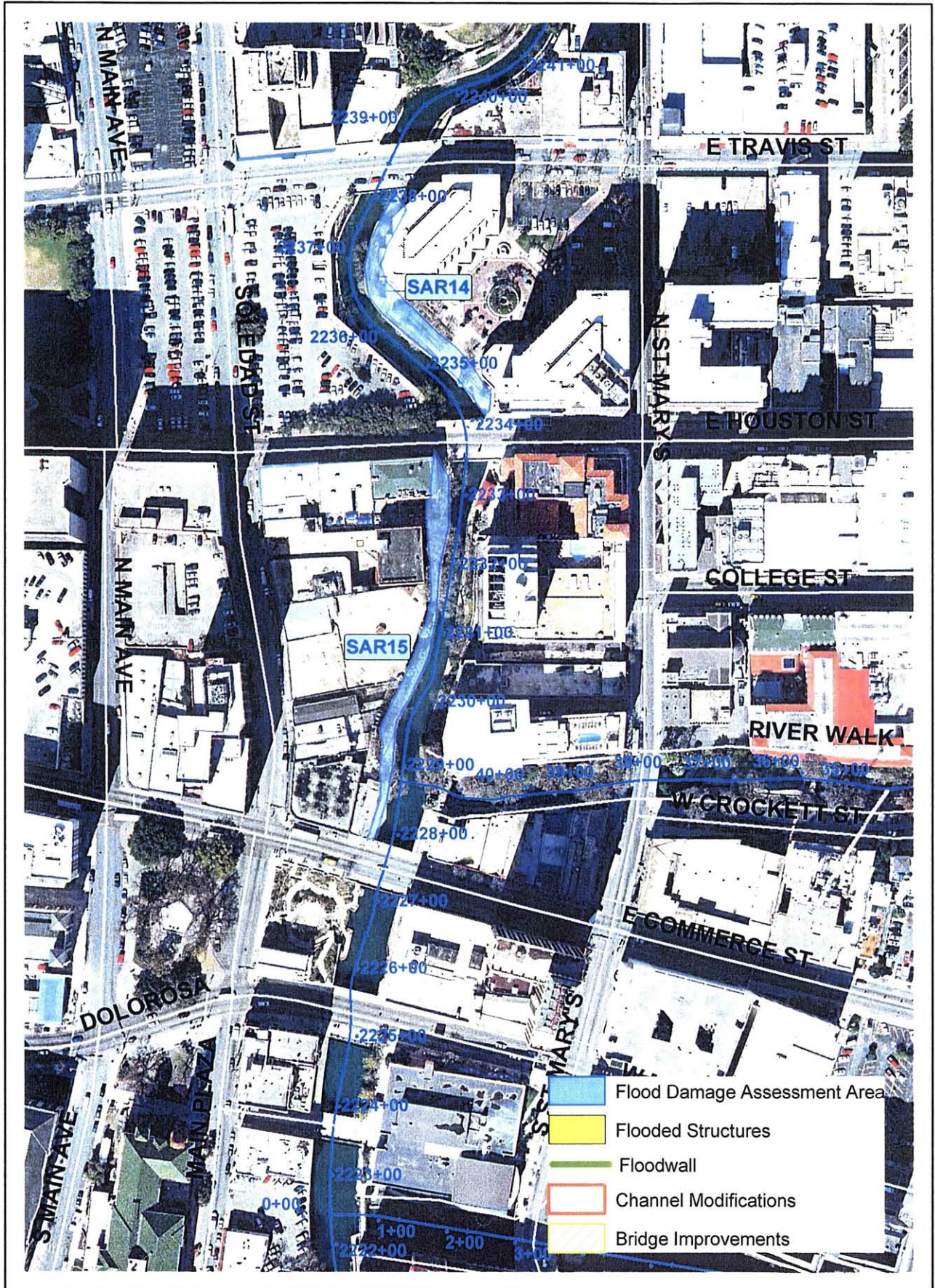


Figure 14

1 inch equals 200 feet





**SAR13 – E. Martin Street to Augusta**

This commercial area is located between E. Martin Street and Augusta along the right bank of the San Antonio River (see Figure 15). The mapped floodplain indicates impacted structures in upstream of Convent. However, a comparison of the HEC-RAS top width values of the cross sections in the area to the mapped floodplain width indicates a significant discrepancy in this area. No flood mitigation measures are recommended for this area at this time.

There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations. Survey information for this area should be reviewed against the proposed floodplain mapping.

**SAR12 – Navarro Street to N. St. Mary's**

This commercial area is located between Navarro and N. St. Mary's along the right bank of the San Antonio River (see Figure 15). The mapped floodplain indicates impacted structures between Navarro and N. St. Mary's Street. However, a comparison of the HEC-RAS top width values of the cross sections in the area to the mapped floodplain width indicates a significant discrepancy in this area. No flood mitigation measures are recommended for this area at this time.

There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations. Survey information for this area should be reviewed against the proposed floodplain mapping.

**SAR11 – Navarro Street to Convent**

This commercial area is located between Navarro and Convent along the left bank of the San Antonio River (see Figure 15). The mapped floodplain indicates impacted structures between Navarro and Convent. However, a comparison of the HEC-RAS top width values of the cross sections in the area to the mapped floodplain width indicates a significant discrepancy in this area. No flood mitigation measures are recommended for this area at this time.

There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations. Survey information for this area should be reviewed against the proposed floodplain mapping.



# San Antonio River - SAR11, SAR12, and SAR13

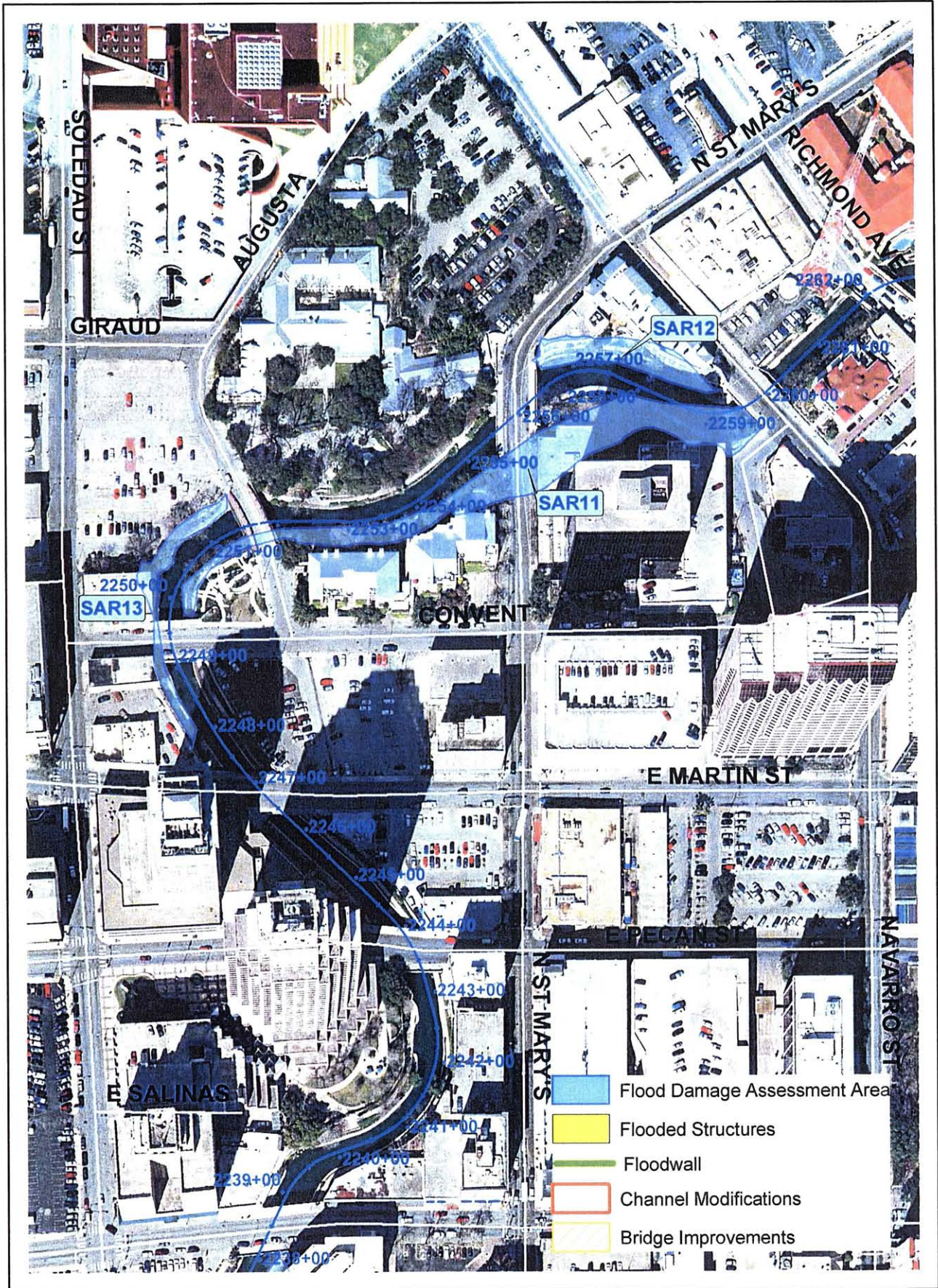


Figure 15

1 inch equals 200 feet





**SAR10 – Richmond Avenue to Lexington Street**

This commercial area is located between Richmond Avenue and Lexington Street along the left bank of the San Antonio River (see Figure 16). The floodplain comes out the defined channel banks and covers the downstream abutment of Lexington Avenue. There are no structures impacted in this area. A comparison of the HEC-RAS top width values of the cross sections in the area to the mapped floodplain width indicates a significant discrepancy in this area. No flood mitigation measures are recommended for this area at this time.

There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations. Survey information for this area should be reviewed against the proposed floodplain mapping.

**SAR09 – 9<sup>th</sup> Street to W. Jones Avenue**

This commercial area is located between 9<sup>th</sup> Street at Arden Grove and W. Jones Avenue along the right bank of the San Antonio River (see Figure 17). The average flooding depths in this area range from 0.10' to 5.58' (prior to construction of the SARIP). There are 19 structures impacted in this area. This is a low lying area and the floodplain is very wide in this area.

The SARIP will remove all structures from the floodplain. Based on the SARIP model 100-year water surface elevations, the floodplain will encroach on an undeveloped portion of a parcel at cross-section 229194. Currently, there are no structures on this part of the parcel. Adjustments to the SARIP could be made during the design phase of that project to address this area. The approximate 2001 improved property value of the 19 structures in this area is approximately \$1,575,960.

**Table 27 – SAR09 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
300' Floodwall	1	\$ 120,000	\$ 1,575,960

The costs for the SARIP project are not included in the above costs.



# San Antonio River - SAR10



Figure 16

1 inch equals 200 feet





# San Antonio River - SAR09

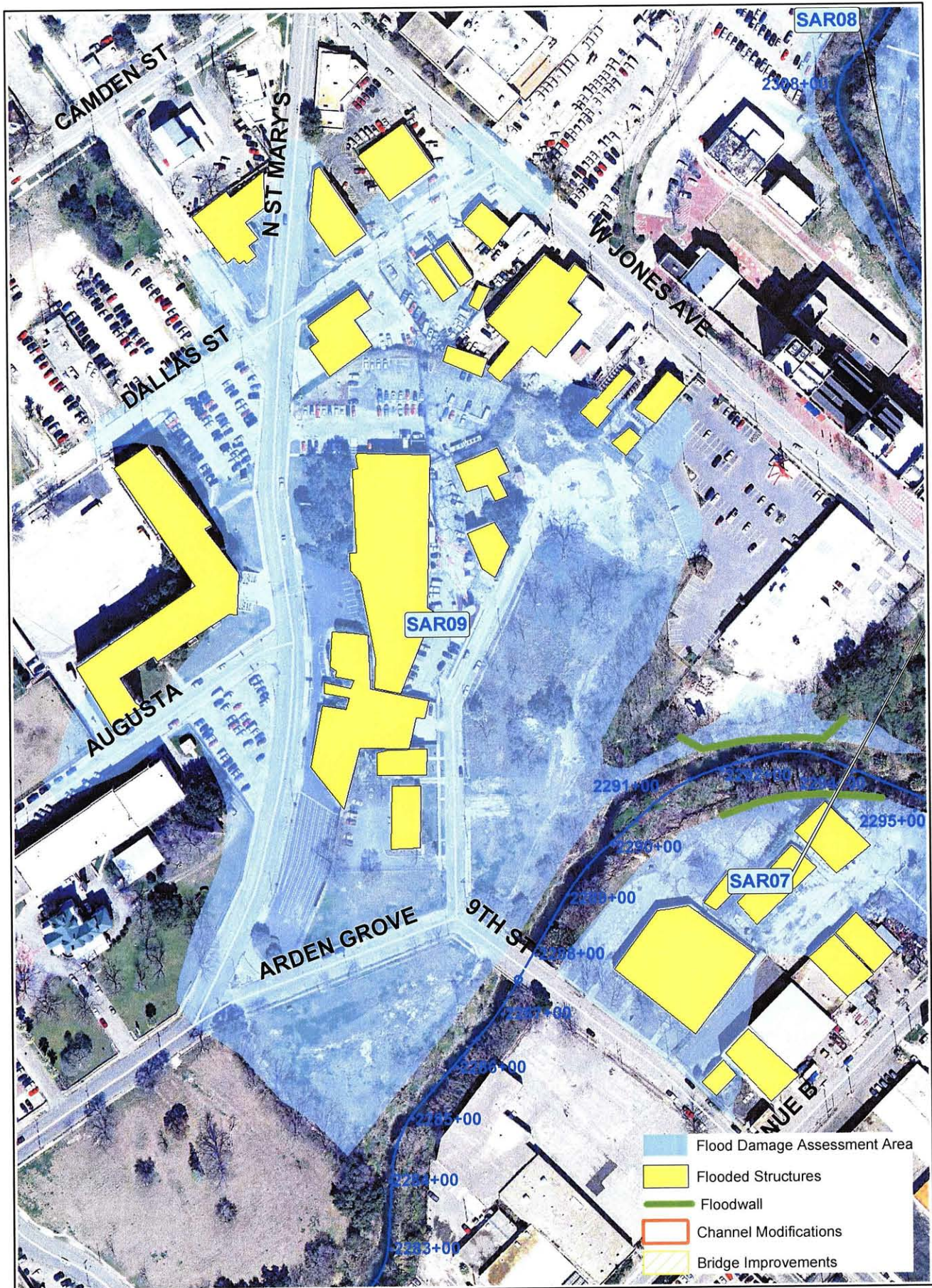


Figure 17

1 inch equals 200 feet





**SAR08 – W. Jones Avenue to IH35**

This commercial area is located between W. Jones Avenue to IH35 along the right bank of the San Antonio River (see Figure 18). The average flooding depth in this area is 0.97'. There is one impacted structure in this area located on the San Antonio Museum of Art property. The SARIP will remove this structure from the floodplain. The approximate 2001 improved property value of the structure is approximately \$300,000.

**SAR07 – 9<sup>th</sup> Street to IH35**

This commercial area is located between 9<sup>th</sup> Street and IH35 along the left side of the San Antonio River (see Figure 18). The average flooding depth in this area is 0.01'-3.11'. There are 29 impacted structures in this area. The low elevation and minimal topographic relief of the area make it susceptible to flooding. The SARIP will remove 28 structures. Adjustments could be made during the design phase of the SARIP to include construction of a low flood barrier to protect the structure at cross-section 229194. The approximate 2001 improved property value of the structure is approximately \$600,200.

**Table 28 – SAR07 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
200' Floodwall	1	\$ 80,000	\$ 61,000

**SAR06 – Newell Street to E. Grayson Street**

This commercial area is located between Newell Street and E. Grayson Street on the left and right banks of the San Antonio River (see Figure 19). There are 9 impacted structures in this area. The average flooding depths range from 0.03'-4.21'. The SARIP will remove all structures from the floodplain. The approximate 2001 improved property value of the structures is approximately \$1,062,900.



# San Antonio River - SAR07 and SAR08

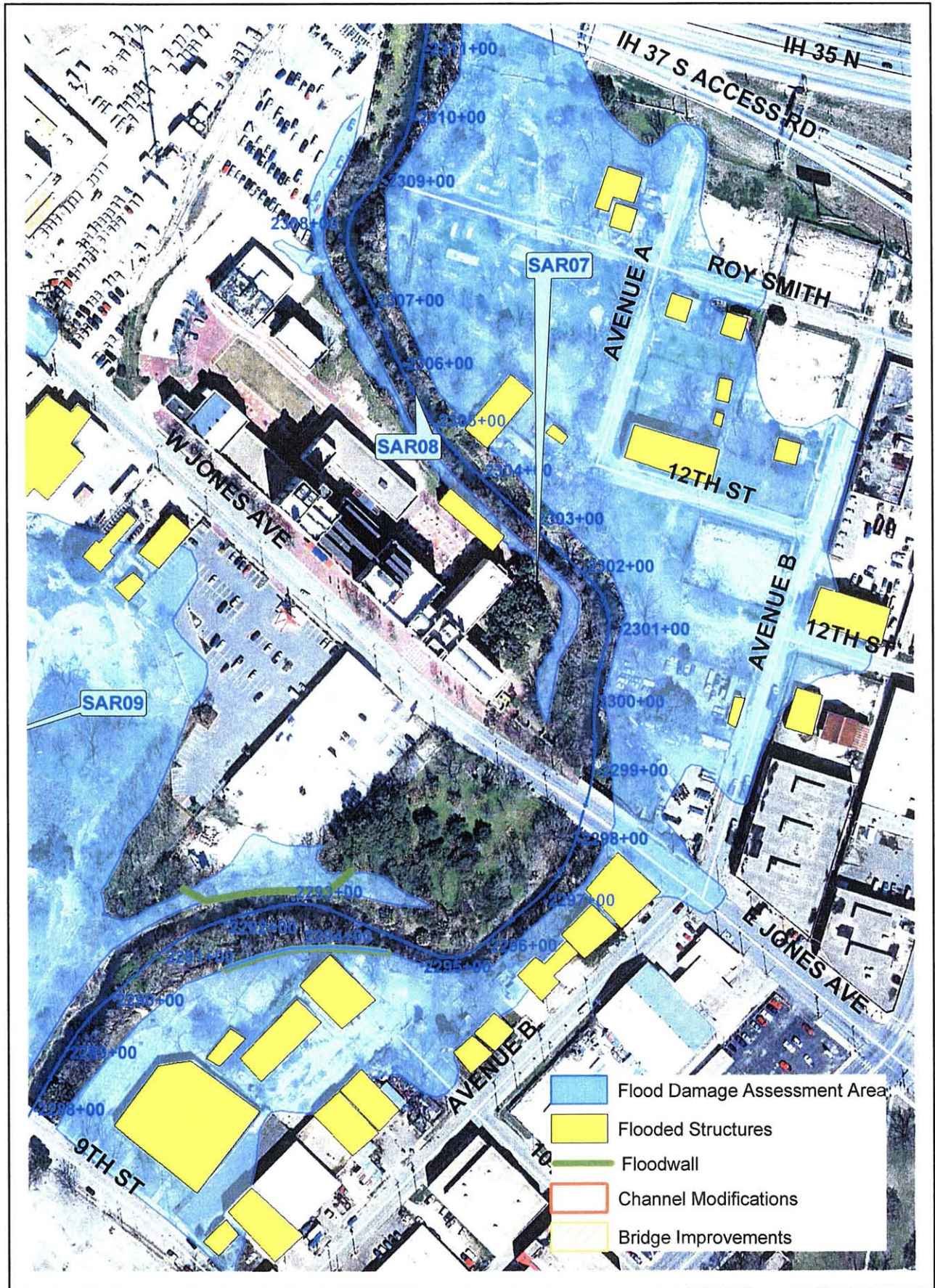


Figure 18

1 inch equals 200 feet





# San Antonio River - SAR06

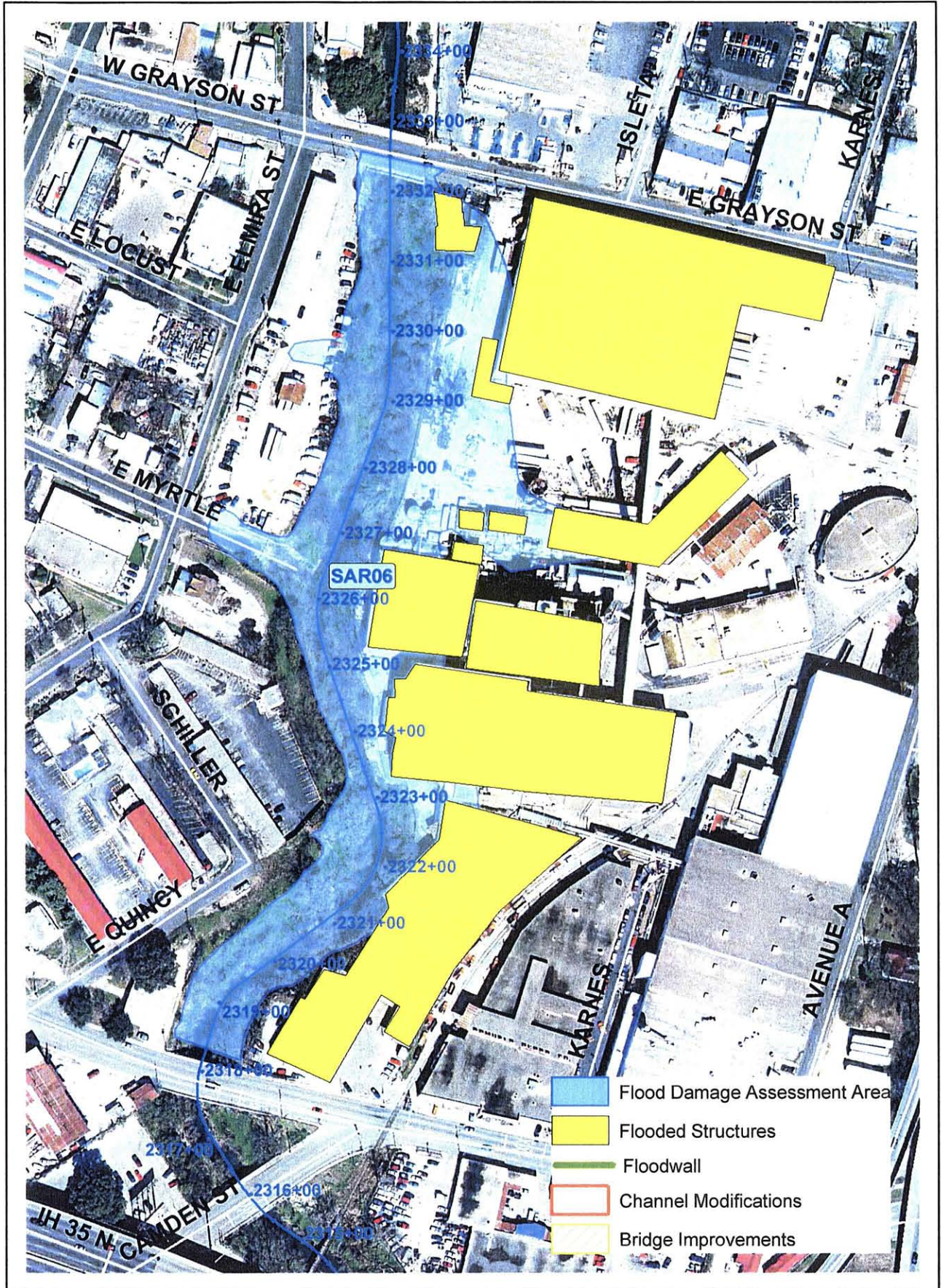


Figure 19

1 inch equals 200 feet





**SAR05 – Josephine Street to US 281 (SAR Tunnel Inlet)**

This commercial area is located between Josephine Street and US 281 on the left and right banks of the San Antonio River (see Figure 20). The San Antonio River Tunnel Inlet, a storage/warehouse building, and the DPT Laboratory complex are located in this area. During the 100-year flood event, water surface elevations in the vicinity of the tunnel inlet structure are calculated to be approximately an elevation of 661'. The observed flood elevations during the 1998 event reached an elevation of 660.29' at the booster pump station and 660.35' at Borden Milk. Existing ground elevations range from approximately 660' near the northern portion of the DPT Labs complex to 657' near the northern right-of-way limits for Josephine Street. The flooding depths range from 0.40' to 3.45' depending on the elevation of the site and other structures located in the area.

The flooding mechanism for this area appears to result from two effects: the tunnel backwater elevation during the 100-year flood and surface flows from Broadway that travel under Hwy. 281 and are intercepted by Josephine Street. The intercepted flows then travel down Josephine Street before rejoining the San Antonio River channel downstream of the tunnel inlet. A drainage channel is also present between Hwy. 281 and the structures on the left and right bank. Backwater flows from the tunnel inlet may also be able to contribute to the flooding by traveling up this channel and into the commercial sites.

To protect the left bank structures in this area (DPT Labs and the Tunnel Inlet) the backwater flood flows must be constrained to the channel so that they do not inundate the site. This would require the modification of some of the tunnel inlet site grading and the installation of a low floodwall between certain elements of the inlet structure, park area, and the Hwy. 281 abutments on the left bank. The tunnel inlet facilities themselves are above the expected flood elevations while the parking lot and park area adjacent to them are at approximately an elevation of 660'. The parking lot elevations could be raised or a low floodwall (3' to 4') could be constructed running from the parking lot, north along the property line tying into the outer wall of the existing boat ramp. The existing boat ramp walls may have to be modified to provide sufficient freeboard. A floodwall and drainage return structure would then be constructed between the northern boat ramp wall and the Hwy. 281 abutments to prevent flood waters from entering the existing channel and the DPT site. The drainage return structure would have to include flap gates and provisions for positive closure should the flap gates malfunction.

Additionally, the structures on the left bank must also be isolated from the flood flows being captured by Josephine Street. The DPT driveway elevations along Josephine Street are at approximately an elevation of 657' with the site sloping up and northward to approximately an elevation of 660'. This area presents some of the deepest flood depths for the area and presents a challenge to providing flood protection as vehicular access must be maintained. In order to protect the DPT Labs area, a moderate height floodwall (approximately 5 feet) would have to be constructed from the Hwy. 281 overpass abutments at Josephine Street and follow the north side of Josephine to the tunnel inlet to tie into higher ground at the tunnel inlet facility. The floodwall would have to incorporate flood gates at the driveway entrances that would normally remain open but could be closed during a flood.

The flooding on the right bank of SAR05 affects the traffic triangle and roadway at River Road and the southeast portion of the warehouse facility. A floodwall in this area tied to the loading dock or facility parking lot would isolate the lower elevation portions of these structures from the flood waters. Consideration would have to be given vehicular or pedestrian access to the building at this location. If access is required, flood gates or doorways would have to be included in the floodwall design to

allow access during non-flood conditions. Table 29 summarizes the flood mitigation measures considered and estimated project costs.

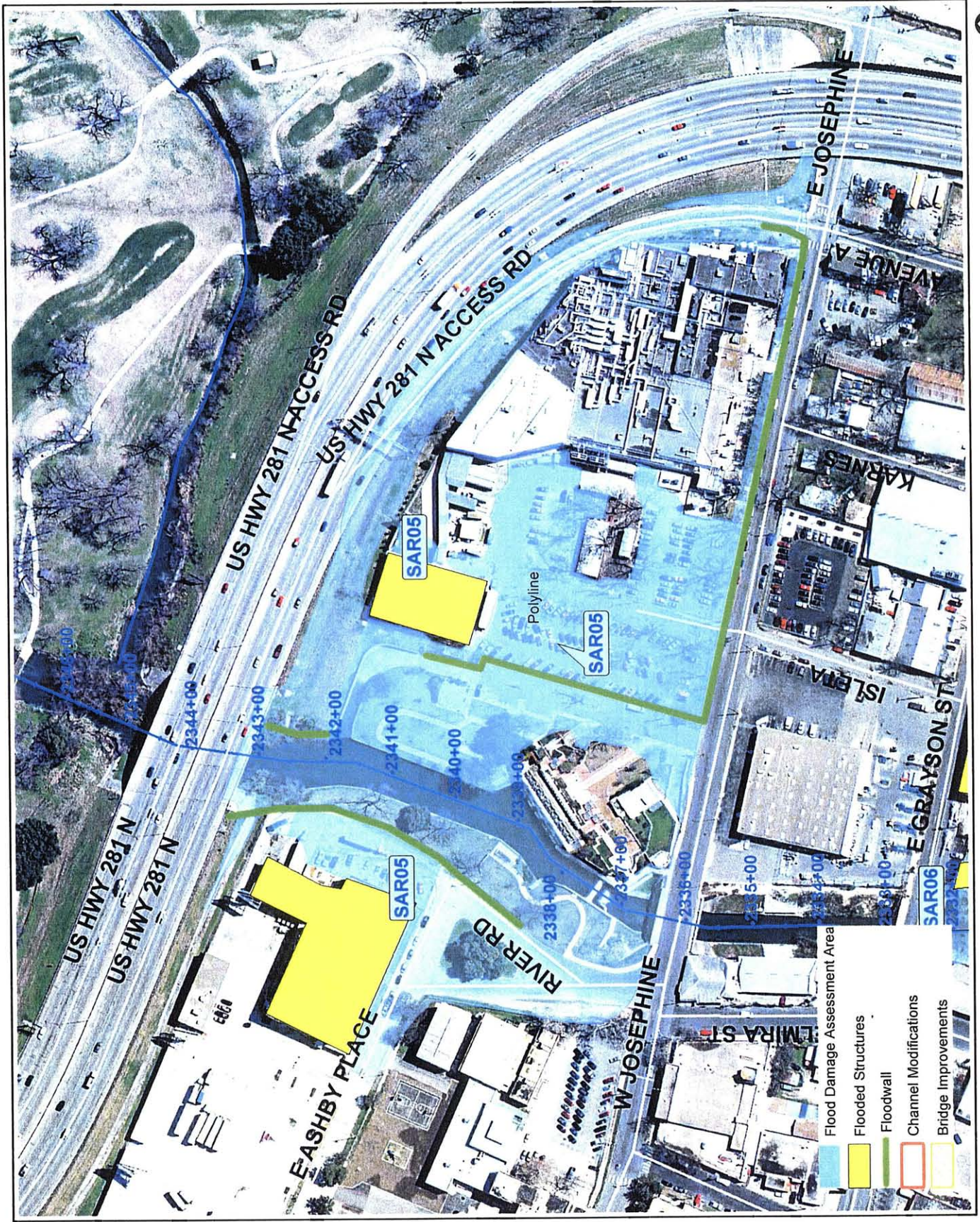
**Table 29 – SAR05 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
2100' Floodwall (Left Bank)	2	\$ 840,000	
Return Structures	-	\$ 200,000	
Driveway/Entryway Flood Gates	-	\$ 500,000	
Total	9	\$ 1,540,000	\$ 3,174,700

The above costs include the right bank and left bank mitigation costs.



# San Antonio River - SAR05



1 inch equals 200 feet

Figure 20





**SAR04 – River Road Area (South)**

This residential area is located at E. Craig Place and River Road along the right bank of the San Antonio River (see Figure 21). The average flooding depths in this area range from 0.01’ to 0.07’. Two structures are impacted in this area. The flooding in this area is due to the low elevation of the subdivision.

The flooding mitigation measures evaluated for this area were a floodwall and buyouts. A 350’ floodwall would remove all structures from the floodplain. The approximate 2001 improved property value of the 2 structures in this area is approximately \$51,900. Table 30 summarizes the flood mitigation measures considered and the associated costs.

**Table 30 – SAR04 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
350' Floodwall	2	\$ 140,000	\$ 51,900
Buyout	2	\$ 62,400	\$ 51,900

**SAR03 – River Road Area (North)**

This residential area is located between Armour Street and Anastacia along River Road along the right bank of the San Antonio River (see Figure 21). The average flooding depths in this area range from 0.10’ to 5.28’. There are 26 impacted structures in this area. The flooding in this area is due to the low elevation of the subdivision.

The flooding mitigation measures evaluated for this area were a floodwall and buyouts. A 1200’ floodwall would remove all parcels and structures from the floodplain. The approximate 2001 improved property value of the 26 structures in this area is approximately \$1,300,000. Table 31 summarizes the flood mitigation measures evaluated for this area and estimated project costs.

**Table 31 – SAR03 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
1200' Floodwall	26	\$ 480,000	\$ 1,300,000
Buyout	26	\$ 1,527,300	\$ 1,300,000



# San Antonio River - SAR03 and SAR04



Figure 21

1 inch equals 200 feet





**SAR02 – Zoo Area**

This recreational area is located near N. St. Mary’s and Tuleta along the left and right banks of the San Antonio River (see Figure 21). The average flooding depth in this area is 0.36’. There are 23 structures impacted in this area.

A sensitivity analysis was performed to determine the cause of flooding in this area. The inline structures and bridges are not contributing a significant amount backwater that would cause Zoo flooding. Diverting 1500 cfs from the Zoo reach of the San Antonio River to the Catalpa-Pershing Ditch would remove all the structures from the floodplain. Due to the nature of the recreational area, a floodwall was not considered a feasible option in this area. Channel modification throughout the Zoo reach will remove all structures from the floodplain. Table 32 summarizes the viable flood mitigation measures for this area and estimated project costs.

**Table 32 – SAR02 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
Channel Modifications	33	\$ 1,700,000	unknown



# San Antonio River - SAR02

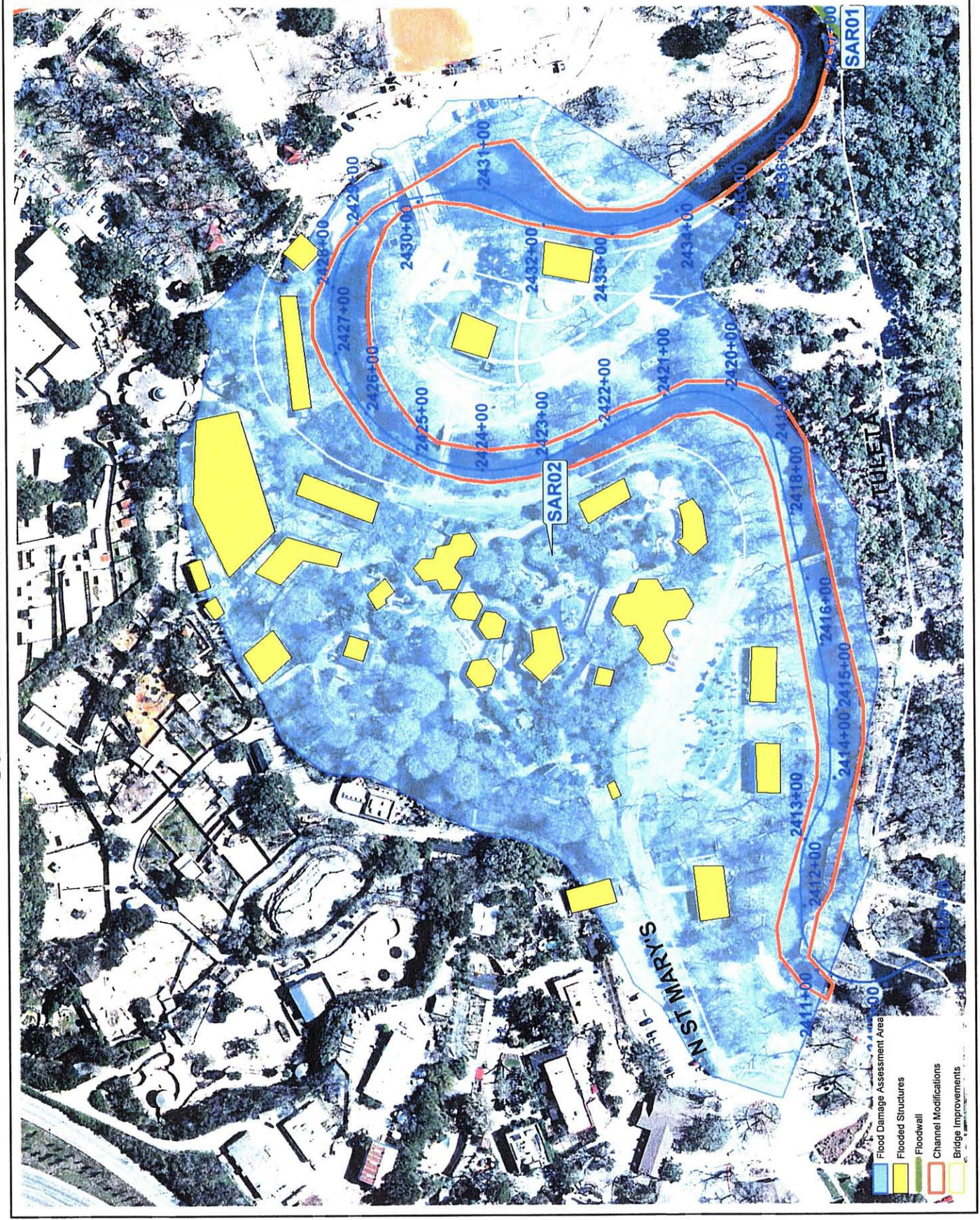


Figure 22

1 inch equals 200 feet





**SAR01 – Broadway to Hildebrand Avenue**

This commercial and recreational area is located along the left bank of the San Antonio River (see Figure 23). The average flooding depths in this area range from 0.47'-3.81'. There are 14 structures impacted in this area.

The flooding mitigation options evaluated for this area were a floodwall, flow diversion, channel modification, and buyouts. A 2200' floodwall along the left bank increases water surface elevations in the Zoo Area and upstream of Hildebrand Avenue. Diverting 1500 cfs from the San Antonio River to the Catalpa-Pershing Ditch does not remove any structures from the floodplain. Significant channel modifications from Hildebrand Avenue to Mulberry did lower the water surface elevation but did not remove all of the structures from the floodplain. A 2000' floodwall would still be required in addition to the channel modifications. Table 33 summarizes the flood mitigation measures considered and the estimated project costs.

**Table 33 – SAR01 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
Channel Modifications	9	\$ 6,403,300	-
2000' Floodwall	5	\$ 800,000	-
Total	14	\$ 7,203,300	\$ 14,000,000

The U.S. Corps of Engineers is currently completing a GRR that studies the flood benefits for the San Antonio River and the Catalpa-Pershing channel in this area. The results from this analysis were not available at the time this report was compiled and are not included in this analysis. The USCOE includes a detailed, incremental flood damage analysis that should be considered when evaluating mitigation options for this area.



# San Antonio River - SAR01

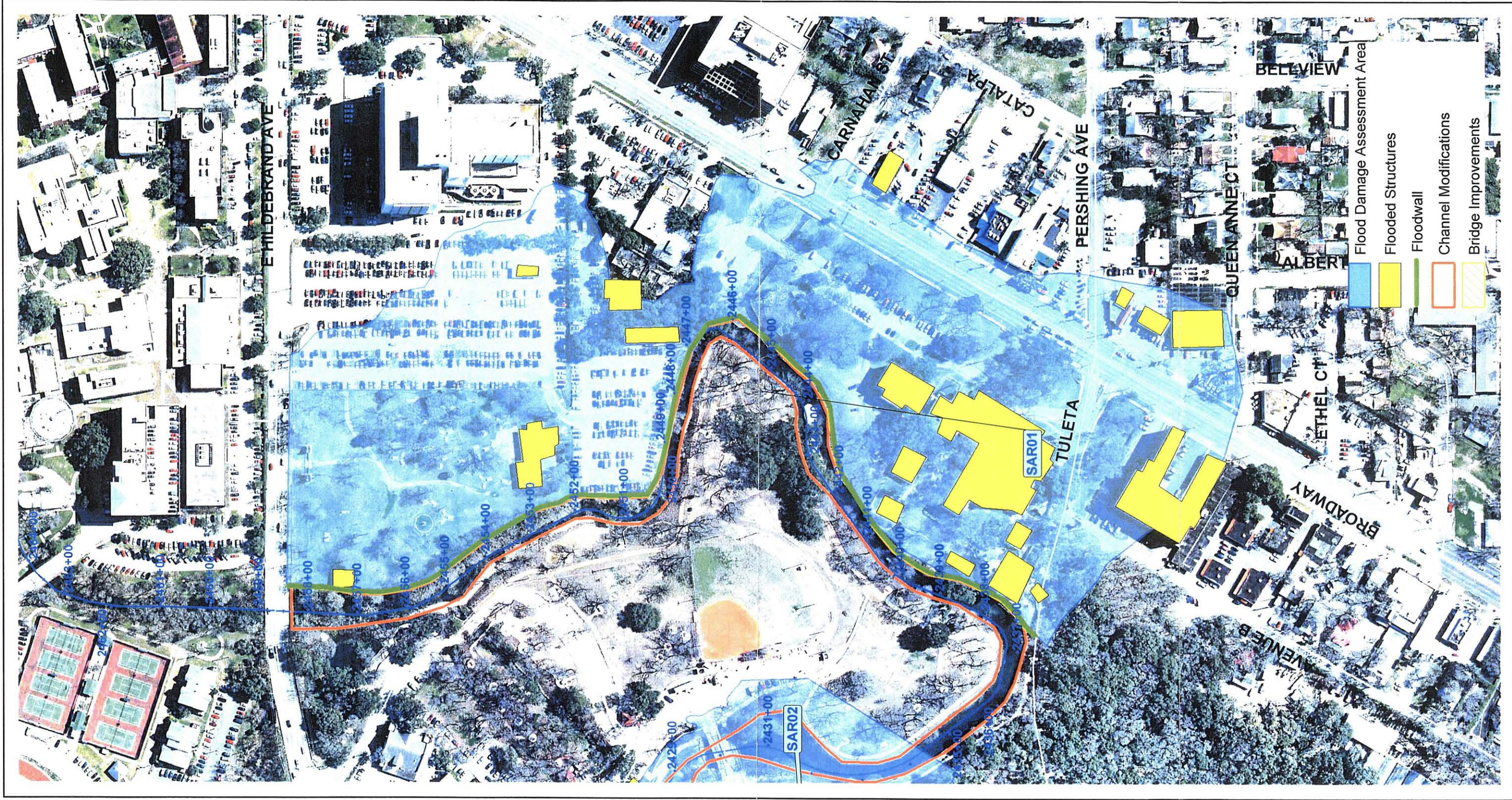


Figure 23

1 inch equals 200 feet





**CATALPA-PERSHING DITCH**

Portions of CPD03 and CPD02 are located outside the area where sufficient spatial data for ground elevation and water surface elevation was available. During the spatial analysis to determine the average water surface and ground elevations in these areas, reasonable values for these areas could not be developed. The estimated flooding depths noted in these areas are based on the values calculated in areas where sufficient topographical and water surface information was available. The U.S. Corps of Engineers is currently completing a GRR that studies the flood benefits for the San Antonio River and the Catalpa-Pershing channel in this area. The results from this analysis were not available at the time this report was compiled and are not included in this analysis. The USCOE includes a detailed, incremental flood damage analysis that should be considered when evaluating mitigation options for this area.

**CPD03 – Golf Course**

This recreational area is located along the right bank of the Catalpa-Pershing Ditch (see Figure 24). The average flooding in this area is 4.11'. There are 2 impacted structures that belong to the golf course. The flooding in this area is primarily associated with the backwater effects of the San Antonio River Tunnel during the 100-year event. The affects of interior, or local, drainage on this area are most likely negligible. Additionally, the draft floodplain mapping for this area may be revised and refined. Improvements to Mill Race Bridge will not remove these structures from the floodplain. Therefore, no mitigation measures are recommended for this area at this time.

**CPD02 – Mill Race Bridge to Lions Park**

This area is a primarily commercial and recreational area located along the left bank of the Catalpa-Pershing Ditch (see Figure 24). There are 33 commercial structures and 1 residential structure impacted in this area. The flooding depths in this area range from 0.13'- 1.51'. The flooding is primarily caused by backwater from Mill Race Bridge. Some of the flooding may also be attributed to interior drainage contributed from Broadway. However, for the scope of this analysis, Mill Race Bridge is assumed to be the primary cause for flooding in this area. The flood mitigation measures evaluated for this area were bridge improvements and buyouts. Improving Mill Race Bridge will remove all structures from the floodplain. The approximate 2001 improved property value of the 33 structures in this area is approximately \$1,705,900.

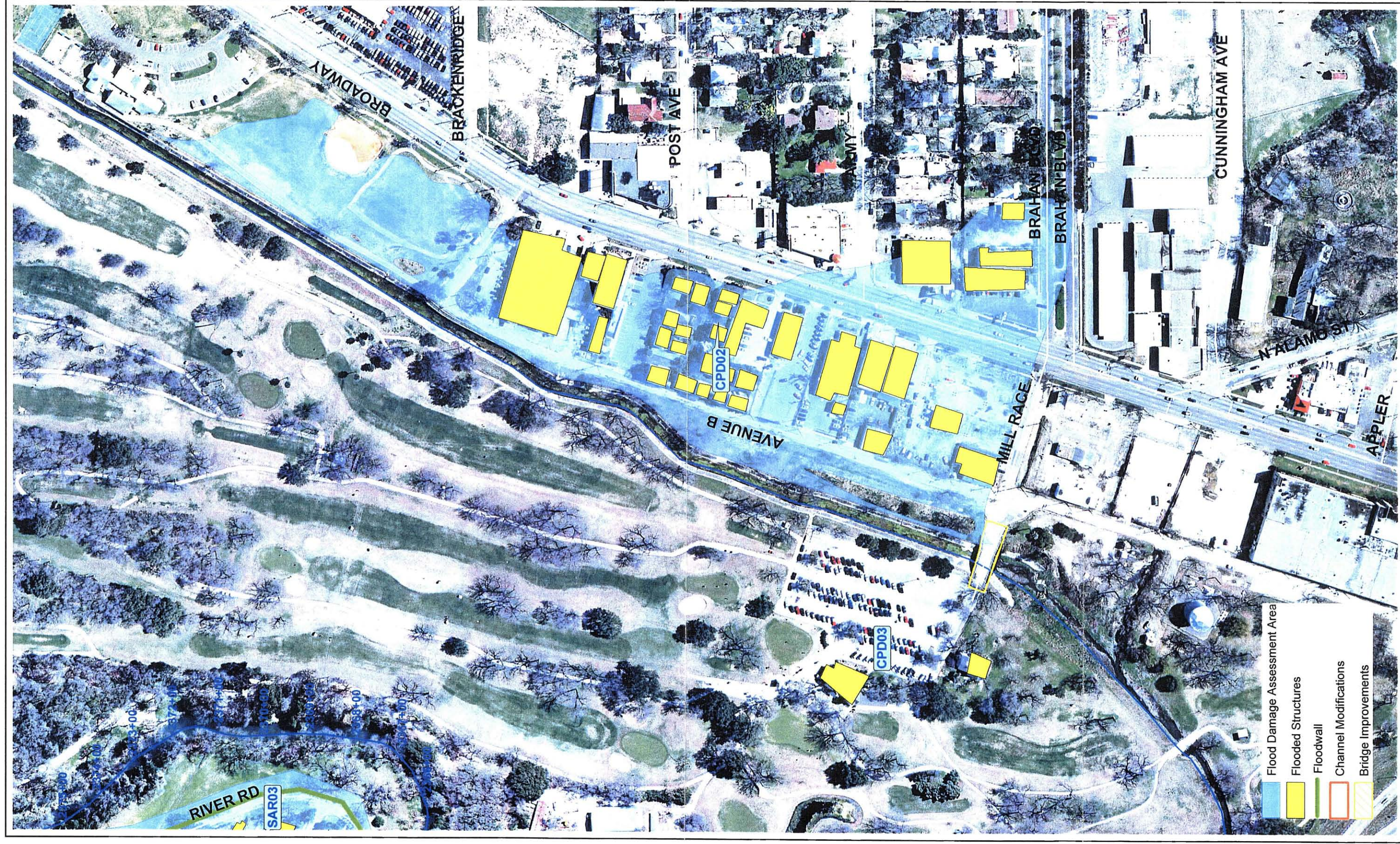
The water surface elevation upstream of Mill Race Bridge is 664.05'. The contours on Broadway in this area are at an elevation of 662' yet the floodplain does not extend onto Broadway, south of Mill Race Bridge. There appears to be an inconsistency between the floodplain mapping extents and the ground surface elevations. Survey information for this area should be reviewed against the proposed floodplain mapping. Table 34 summarizes the flood mitigation measures considered and the estimated project costs.

**Table 34 – CPD02 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
Mill Race Bridge Improvement	33	\$ 700,000	\$ 1,705,900
Buyout	33	\$ 3,676,900	\$ 1,705,900



# Catalpa-Pershing Ditch - CPD02 and CPD03



1 inch equals 200 feet

Figure 24



**CPD01 – E. Mulberry Avenue and Broadway Area**

This commercial and residential area is located along the left bank of the Catalpa-Pershing Ditch (see Figure 25). There are 52 impacted structures in this area. The average flooding depth in this area is 2.83'. The flooding in this area is caused by backwater from Mulberry Bridge. Some of the flooding may also be attributed to interior drainage contributed from Broadway and other upstream watershed areas. However, for the scope of this analysis, Mulberry Bridge is assumed to be the primary cause for flooding in this area and this is reflected in the draft floodplain mapping used for this report.

The flood mitigation measures evaluated for this area were bridge improvements and buyouts. Improving Mulberry Bridge will remove all structures from the floodplain. The approximate 2001 improved property value of the 52 structures in this area is approximately \$2,911,210. Table 35 summarizes the flood mitigation measures considered and the associated costs.

**Table 35 – CPD01 Flood Mitigation Measures and Costs**

Flood Mitigation Measure	Structures Removed	Estimated Project Cost	Estimated Damages Avoided (Improved Value)
Mulberry Bridge Improvement	52	\$ 1,000,000	\$ 2,911,210
Buyout Structures in the Floodplain	52	\$ 5,486,300	\$ 2,911,210



# Catalpa-Pershing Ditch - CPD01

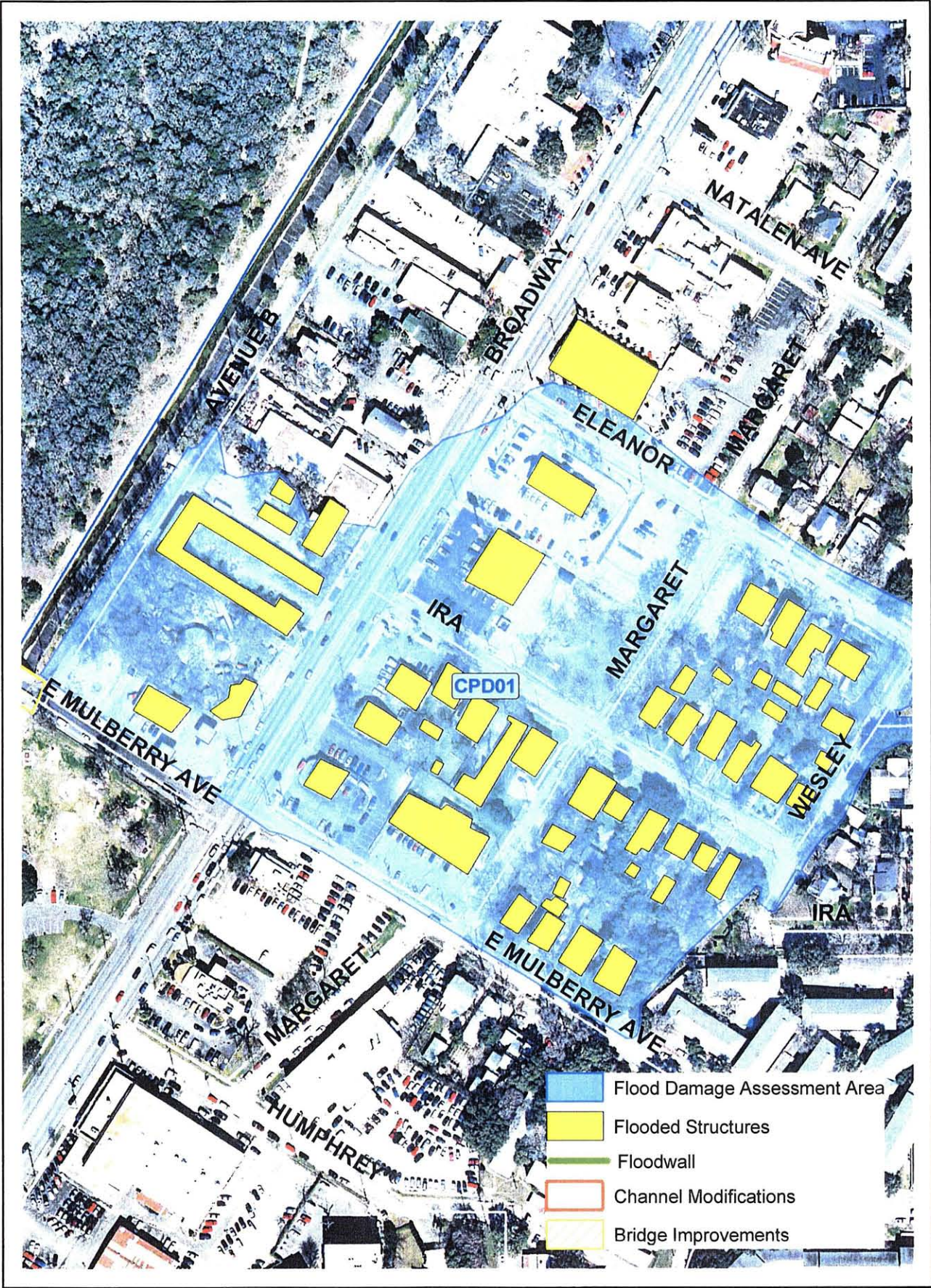


Figure 25

1 inch equals 200 feet





## SUMMARY

The analysis of the flood mitigation options for each area shows that some areas are good candidates for cost efficient flood mitigation projects while mitigation projects in other areas do not provide enough protection to justify the costs for the project, including buyouts. The most cost effective mitigation measures in the San Pedro Creek reach were generally flood walls or buy out programs.

The San Antonio River Improvement Project (SARIP) – Mission Reach will provide some flood protection measures from the confluence with San Pedro Creek upstream to Lonestar. Several flood mitigation areas were analyzed within this segment of the river. However, none of the mitigation alternatives had a cost lower than the avoided damages. Some discrepancies in the floodplain mapping or topographic information supplied for the study were noted in these areas.

The Eagleland project may also include project elements that provide flood protection up to S. Alamo Street. Very few flood mitigation areas were found in this segment. The draft floodplain mapping does show some candidate flood mitigation areas on the left and right bank of the Bluestar area. However, some discrepancies were noted in the floodplain mapping when compared to the topographic and HEC-RAS data. When considering these discrepancies, these areas may not require flood mitigation.

Very few flooding problems were catalogued on the San Antonio River from S. Alamo to Lexington Avenue. The existing flood control improvements appear to limit the floodplain extents in this area. For areas where the draft floodplain mapping does show impacts to existing structures, in this area, discrepancies were noted between the floodplain extents, the supplied topographic information, and the HEC-RAS model data. The floodplains in these areas may be revised after more thorough comparison of the base flood elevations and detailed survey data can be accomplished.

The San Antonio River Improvement Project – Museum Reach, Urban Segment, when implemented, will alleviate the majority of flooding problems from Lexington Street to Josephine Street. However, in the SAR07 and SAR09 areas, the Museum Reach project final design may need to be adjusted or additional minor measures will need to be added to protect some structures now included in the draft floodplain delineation.

The existing structures between Josephine Street and Hwy. 281 will require a significant project to alleviate the shallow flooding in this area, SAR05. Floodwalls, backwater intrusion protection (return) structures, and entrance flood gates will have to be constructed to protect this area. However, the preliminary cost comparisons between the avoided damages and the project costs shows that this may be a cost effective project or series of projects.

The SARIP Park Segment includes the San Antonio River from Hwy. 281 upstream to Hildebrand and the Catalpa-Pershing channel. This area presents a significant challenge when considering flood protection projects. This analysis indicates that there may be a cost effective option to protect a portion of the River Road neighborhood (SAR03) in the form of a floodwall. The remaining two mitigation areas, SAR02 and SAR01, will be expensive to protect and the avoided damages are difficult to quantify. The USCOE GRR for this area compiled and detailed analysis of these areas.

Finally, the modification of the Mill Race and Mulberry bridges on the Catalpa-Pershing channel will alleviate some significant flood problems along Broadway Avenue. The preliminary analysis of these options indicates that the costs to modify the bridges will be less than the avoided damages, making this a cost effective option. The preliminary design for the SARIP Museum Reach – Park Segment incorporates these modifications.



APPENDIX A

HEC-RAS results comparing the effects of removing individual bridges on San  
Pedro Creek



**River Sta      Plan      W.S. Elev      Diff      Vel Chnl**  
**15074 4 Box MBC from Durango to Arsenal**

14362	100 year	636.82		2.07
14362	Del Guadalupe	636.75	-0.07	2.09
14362	Del Camp	636.80	-0.02	2.07
14362	Del Alamo	636.81	-0.01	2.07
14362	Del Cevallos	636.81	-0.01	2.07
14362	Del Furnish	636.81	-0.01	2.07
14362	Del Nogalitos	636.82	0.00	2.07
14362	Del Flores	636.82	0.00	2.07
14362	Del Mitchell	636.82	0.00	2.07
14362	Del Probandt	636.82	0.00	2.07

14200	100 year	636.84		1.42
14200	Del Guadalupe	636.77	-0.07	1.43
14200	Del Camp	636.81	-0.03	1.42
14200	Del Alamo	636.82	-0.02	1.42
14200	Del Cevallos	636.82	-0.02	1.42
14200	Del Furnish	636.82	-0.02	1.42
14200	Del Nogalitos	636.83	-0.01	1.42
14200	Del Flores	636.83	-0.01	1.42
14200	Del Mitchell	636.84	0.00	1.42
14200	Del Probandt	636.84	0.00	1.42

14106	100 year	636.51		4.61
14106	Del Guadalupe	636.43	-0.08	4.65
14106	Del Camp	636.48	-0.03	4.62
14106	Del Alamo	636.49	-0.02	4.62
14106	Del Cevallos	636.49	-0.02	4.62
14106	Del Furnish	636.49	-0.02	4.62
14106	Del Nogalitos	636.50	-0.01	4.61
14106	Del Flores	636.51	0.00	4.61
14106	Del Mitchell	636.51	0.00	4.61
14106	Del Probandt	636.51	0.00	4.61

14052	100 year	635.99		7.25
14052	Del Guadalupe	635.88	-0.11	7.39
14052	Del Camp	635.96	-0.03	7.29
14052	Del Alamo	635.97	-0.02	7.28
14052	Del Cevallos	635.97	-0.02	7.27
14052	Del Furnish	635.97	-0.02	7.28
14052	Del Nogalitos	635.99	0.00	7.26
14052	Del Flores	635.99	0.00	7.25
14052	Del Mitchell	635.99	0.00	7.25
14052	Del Probandt	635.99	0.00	7.25

**14013 Guadalupe Street**

River Sta	Plan	W.S. Elev	Diff	Vel Chnl
13973	100 year	634.59		10.79
13973	Del Camp	634.52	-0.07	10.87
13973	Del Alamo	634.52	-0.07	10.87
13973	Del Cevallos	634.54	-0.05	10.85
13973	Del Furnish	634.53	-0.06	10.85
13973	Del Nogalitos	634.57	-0.02	10.81
13973	Del Flores	634.58	-0.01	10.80
13973	Del Mitchell	634.58	-0.01	10.79
13973	Del Probandt	634.58	-0.01	10.79
13915	100 year	635.21		5.62
13915	Del Camp	635.15	-0.06	5.68
13915	Del Alamo	635.16	-0.05	5.67
13915	Del Cevallos	635.17	-0.04	5.66
13915	Del Furnish	635.17	-0.04	5.67
13915	Del Nogalitos	635.20	-0.01	5.64
13915	Del Flores	635.20	-0.01	5.63
13915	Del Mitchell	635.21	0.00	5.62
13915	Del Probandt	635.21	0.00	5.62
13700	100 year	634.97		6.41
13700	Del Camp	634.90	-0.07	6.50
13700	Del Alamo	634.90	-0.07	6.49
13700	Del Cevallos	634.92	-0.05	6.47
13700	Del Furnish	634.91	-0.06	6.48
13700	Del Nogalitos	634.95	-0.02	6.43
13700	Del Flores	634.96	-0.01	6.42
13700	Del Mitchell	634.97	0.00	6.41
13700	Del Probandt	634.97	0.00	6.41
13525	100 year	635.03		5.32
13525	Del Camp	634.97	-0.06	5.39
13525	Del Alamo	634.97	-0.06	5.38
13525	Del Cevallos	634.99	-0.04	5.37
13525	Del Furnish	634.98	-0.05	5.37
13525	Del Nogalitos	635.01	-0.02	5.34
13525	Del Flores	635.02	-0.01	5.33
13525	Del Mitchell	635.03	0.00	5.32
13525	Del Probandt	635.03	0.00	5.32
13400	100 year	634.57		7.41
13400	Del Camp	634.49	-0.08	7.49
13400	Del Alamo	634.50	-0.07	7.48
13400	Del Cevallos	634.52	-0.05	7.46
13400	Del Furnish	634.51	-0.06	7.47
13400	Del Nogalitos	634.55	-0.02	7.43
13400	Del Flores	634.56	-0.01	7.42
13400	Del Mitchell	634.57	0.00	7.41
13400	Del Probandt	634.57	0.00	7.41



River Sta	Plan	W.S. Elev	Diff	Vel Chnl
13248	100 year	634.61		6.69
13248	Del Camp	634.54	-0.07	6.76
13248	Del Alamo	634.55	-0.06	6.74
13248	Del Cevallos	634.56	-0.05	6.74
13248	Del Furnish	634.56	-0.05	6.74
13248	Del Nogalitos	634.59	-0.02	6.71
13248	Del Flores	634.60	-0.01	6.70
13248	Del Mitchell	634.61	0.00	6.69
13248	Del Probandt	634.61	0.00	6.69

**13129 (Long Culvert) Between Camp and Guadalupe**

13010	100 year	633.68		9.20
13010	Del Camp	633.48	-0.20	9.43
13010	Del Alamo	633.50	-0.18	9.41
13010	Del Cevallos	633.54	-0.14	9.35
13010	Del Furnish	633.53	-0.15	9.37
13010	Del Nogalitos	633.62	-0.06	9.26
13010	Del Flores	633.65	-0.03	9.23
13010	Del Mitchell	633.68	0.00	9.20
13010	Del Probandt	633.68	0.00	9.20

12849	100 year	633.81		7.34
12849	Del Camp	633.61	-0.20	7.56
12849	Del Alamo	633.63	-0.18	7.53
12849	Del Cevallos	633.68	-0.13	7.48
12849	Del Furnish	633.67	-0.14	7.50
12849	Del Nogalitos	633.76	-0.05	7.40
12849	Del Flores	633.79	-0.02	7.37
12849	Del Mitchell	633.81	0.00	7.34
12849	Del Probandt	633.81	0.00	7.34

12791	100 year	633.37		8.97
12791	Del Camp	633.10	-0.27	9.34
12791	Del Alamo	633.13	-0.24	9.30
12791	Del Cevallos	633.19	-0.18	9.22
12791	Del Furnish	633.18	-0.19	9.24
12791	Del Nogalitos	633.30	-0.07	9.07
12791	Del Flores	633.33	-0.04	9.02
12791	Del Mitchell	633.37	0.00	8.97
12791	Del Probandt	633.37	0.00	8.97

**12733 Camp Street**

River Sta	Plan	W.S. Elev	Diff	Vel Chnl
12676	100 year	633.26		6.98
12676	Del Alamo	632.83	-0.43	7.35
12676	Del Cevallos	632.96	-0.30	7.24
12676	Del Furnish	632.93	-0.33	7.26
12676	Del Nogalitos	633.12	-0.14	7.09
12676	Del Flores	633.20	-0.06	7.02
12676	Del Mitchell	633.25	-0.01	6.98
12676	Del Probandt	633.25	-0.01	6.98
12600	100 year	633.00		7.43
12600	Del Alamo	632.51	-0.49	7.91
12600	Del Cevallos	632.66	-0.34	7.76
12600	Del Furnish	632.63	-0.37	7.79
12600	Del Nogalitos	632.85	-0.15	7.58
12600	Del Flores	632.94	-0.06	7.49
12600	Del Mitchell	632.99	-0.01	7.44
12600	Del Probandt	632.99	-0.01	7.44
12500	100 year	632.83		7.34
12500	Del Alamo	632.29	-0.54	7.87
12500	Del Cevallos	632.46	-0.37	7.70
12500	Del Furnish	632.42	-0.41	7.74
12500	Del Nogalitos	632.66	-0.17	7.50
12500	Del Flores	632.76	-0.07	7.40
12500	Del Mitchell	632.82	-0.01	7.35
12500	Del Probandt	632.82	-0.01	7.35
12414	100 year	632.81		6.56
12414	Del Alamo	632.28	-0.53	6.96
12414	Del Cevallos	632.44	-0.37	6.84
12414	Del Furnish	632.41	-0.40	6.86
12414	Del Nogalitos	632.64	-0.17	6.69
12414	Del Flores	632.74	-0.07	6.61
12414	Del Mitchell	632.80	-0.01	6.57
12414	Del Probandt	632.80	-0.01	6.57
<b>12369 S. Alamo</b>				
12325	100 year	632.14		6.92
12325	Del Cevallos	631.82	-0.32	7.19
12325	Del Furnish	631.79	-0.35	7.22
12325	Del Nogalitos	631.99	-0.15	7.04
12325	Del Flores	632.08	-0.06	6.96
12325	Del Mitchell	632.13	-0.01	6.92
12325	Del Probandt	632.13	-0.01	6.92



River Sta	Plan	W.S. Elev	Diff	Vel Chnl
12279	100 year	631.78		7.81
12279	Del Cevallos	631.37	-0.41	8.27
12279	Del Furnish	631.33	-0.45	8.32
12279	Del Nogalitos	631.60	-0.18	8.00
12279	Del Flores	631.71	-0.07	7.88
12279	Del Mitchell	631.77	-0.01	7.82
12279	Del Probandt	631.77	-0.01	7.82
12031	100 year	631.49		6.77
12031	Del Cevallos	630.98	-0.51	7.34
12031	Del Furnish	630.93	-0.56	7.40
12031	Del Nogalitos	631.27	-0.22	7.01
12031	Del Flores	631.41	-0.08	6.85
12031	Del Mitchell	631.48	-0.01	6.78
12031	Del Probandt	631.48	-0.01	6.78
11897	100 year	631.51		5.34
11897	Del Cevallos	631.01	-0.50	5.74
11897	Del Furnish	630.95	-0.56	5.78
11897	Del Nogalitos	631.29	-0.22	5.50
11897	Del Flores	631.43	-0.08	5.40
11897	Del Mitchell	631.50	-0.01	5.35
11897	Del Probandt	631.50	-0.01	5.35
11821	100 year	631.33		5.75
11821	Del Cevallos	630.82	-0.51	6.09
11821	Del Furnish	630.77	-0.56	6.13
11821	Del Nogalitos	631.11	-0.22	5.89
11821	Del Flores	631.25	-0.08	5.80
11821	Del Mitchell	631.32	-0.01	5.76
11821	Del Probandt	631.32	-0.01	5.76
<b>11794 R.R. U/S of W. Cevallos &amp; D/S of S. Alamo</b>				
11768	100 year	631.13		5.36
11768	Del Cevallos	630.59	-0.54	5.68
11768	Del Furnish	630.53	-0.60	5.72
11768	Del Nogalitos	630.90	-0.23	5.49
11768	Del Flores	631.04	-0.09	5.41
11768	Del Mitchell	631.11	-0.02	5.36
11768	Del Probandt	631.11	-0.02	5.36
11680	100 year	630.87		6.10
11680	Del Cevallos	630.28	-0.59	6.53
11680	Del Furnish	630.22	-0.65	6.58
11680	Del Nogalitos	630.62	-0.25	6.28
11680	Del Flores	630.78	-0.09	6.17
11680	Del Mitchell	630.86	-0.01	6.11

River Sta	Plan	W.S. Elev	Diff	Vel Chnl
11680	Del Probandt	630.85	-0.02	6.11



River Sta	Plan	W.S. Elev	Diff	Vel Chnl
11500	100 year	630.74		5.64
11500	Del Cevallos	630.13	-0.61	6.01
11500	Del Furnish	630.06	-0.68	6.06
11500	Del Nogalitos	630.48	-0.26	5.79
11500	Del Flores	630.65	-0.09	5.69
11500	Del Mitchell	630.73	-0.01	5.65
11500	Del Probandt	630.73	-0.01	5.65
11300	100 year	630.46		6.07
11300	Del Cevallos	629.77	-0.69	6.55
11300	Del Furnish	629.69	-0.77	6.61
11300	Del Nogalitos	630.17	-0.29	6.27
11300	Del Flores	630.35	-0.11	6.14
11300	Del Mitchell	630.44	-0.02	6.08
11300	Del Probandt	630.44	-0.02	6.08
11189	100 year	630.43		5.41
11189	Del Cevallos	629.73	-0.70	5.84
11189	Del Furnish	629.66	-0.77	5.89
11189	Del Nogalitos	630.14	-0.29	5.59
11189	Del Flores	630.32	-0.11	5.47
11189	Del Mitchell	630.42	-0.01	5.42
11189	Del Probandt	630.42	-0.01	5.42
11160	100 year	630.46		4.98
11160	Del Cevallos	629.77	-0.69	5.36
11160	Del Furnish	629.69	-0.77	5.41
11160	Del Nogalitos	630.17	-0.29	5.14
11160	Del Flores	630.35	-0.11	5.04
11160	Del Mitchell	630.44	-0.02	4.99
11160	Del Probandt	630.44	-0.02	4.99
11130	Cevallos			
11100	100 year	629.65		5.65
11100	Del Furnish	628.92	-0.73	6.11
11100	Del Nogalitos	629.37	-0.28	5.82
11100	Del Flores	629.55	-0.10	5.71
11100	Del Mitchell	629.63	-0.02	5.66
11100	Del Probandt	629.63	-0.02	5.66
11012	100 year	629.65		4.79
11012	Del Furnish	628.92	-0.73	5.16
11012	Del Nogalitos	629.38	-0.27	4.92
11012	Del Flores	629.55	-0.10	4.84
11012	Del Mitchell	629.63	-0.02	4.79
11012	Del Probandt	629.63	-0.02	4.79

River Sta	Plan	W.S. Elev	Diff	Vel Chnl
10800	100 year	629.58		4.29
10800	Del Furnish	628.84	-0.74	4.61
10800	Del Nogalitos	629.30	-0.28	4.41
10800	Del Flores	629.48	-0.10	4.33
10800	Del Mitchell	629.57	-0.01	4.30
10800	Del Probandt	629.57	-0.01	4.30
10500	100 year	629.52		3.73
10500	Del Furnish	628.76	-0.76	3.98
10500	Del Nogalitos	629.23	-0.29	3.82
10500	Del Flores	629.41	-0.11	3.76
10500	Del Mitchell	629.50	-0.02	3.73
10500	Del Probandt	629.50	-0.02	3.73
10200	100 year	629.50		3.02
10200	Del Furnish	628.74	-0.76	3.21
10200	Del Nogalitos	629.21	-0.29	3.09
10200	Del Flores	629.39	-0.11	3.04
10200	Del Mitchell	629.48	-0.02	3.02
10200	Del Probandt	629.48	-0.02	3.02
10022	100 year	629.51		2.39
10022	Del Furnish	628.75	-0.76	2.55
10022	Del Nogalitos	629.23	-0.28	2.45
10022	Del Flores	629.41	-0.10	2.41
10022	Del Mitchell	629.50	-0.01	2.40
10022	Del Probandt	629.50	-0.01	2.40
9900	100 year	629.53		1.84
9900	Del Furnish	628.77	-0.76	1.98
9900	Del Nogalitos	629.24	-0.29	1.89
9900	Del Flores	629.42	-0.11	1.86
9900	Del Mitchell	629.51	-0.02	1.84
9900	Del Probandt	629.51	-0.02	1.84
9500	100 year	627.37		10.56
9500	Del Furnish	626.34	-1.03	11.17
9500	Del Nogalitos	626.99	-0.38	10.78
9500	Del Flores	627.23	-0.14	10.64
9500	Del Mitchell	627.35	-0.02	10.57
9500	Del Probandt	627.35	-0.02	10.57
9395	100 year	627.21		10.43
9395	Del Furnish	626.16	-1.05	11.02
9395	Del Nogalitos	626.82	-0.39	10.64
9395	Del Flores	627.07	-0.14	10.50
9395	Del Mitchell	627.19	-0.02	10.44
9395	Del Probandt	627.19	-0.02	10.44



River Sta	Plan	W.S. Elev	Diff	Vel Chnl
9348	100 year	627.13		10.31
9348	Del Furnish	626.04	-1.09	10.94
9348	Del Nogalitos	626.73	-0.40	10.54
9348	Del Flores	626.98	-0.15	10.39
9348	Del Mitchell	627.11	-0.02	10.33
9348	Del Probandt	627.11	-0.02	10.33

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9290	100 year	626.26		10.42
9290	Del Furnish	625.00	-1.26	11.16
9290	Del Nogalitos	625.80	-0.46	10.68
9290	Del Flores	626.09	-0.17	10.51
9290	Del Mitchell	626.23	-0.03	10.43
9290	Del Probandt	626.23	-0.03	10.43

9233	100 year	625.99		10.78
9233	Del Furnish	624.68	-1.31	11.56
9233	Del Nogalitos	625.51	-0.48	11.05
9233	Del Flores	625.81	-0.18	10.88
9233	Del Mitchell	625.96	-0.03	10.79
9233	Del Probandt	625.96	-0.03	10.79

9100	100 year	625.23		11.78
9100	Del Furnish	623.68	-1.55	12.86
9100	Del Nogalitos	624.68	-0.55	12.15
9100	Del Flores	625.03	-0.20	11.91
9100	Del Mitchell	625.20	-0.03	11.80
9100	Del Probandt	625.20	-0.03	11.80

8900	100 year	625.52		8.69
8900	Del Furnish	623.93	-1.59	9.58
8900	Del Nogalitos	624.95	-0.57	9.00
8900	Del Flores	625.31	-0.21	8.80
8900	Del Mitchell	625.49	-0.03	8.71
8900	Del Probandt	625.48	-0.04	8.71

8754	100 year	624.64		10.78
8754	Del Furnish	622.55	-2.09	12.40
8754	Del Nogalitos	623.83	-0.81	11.49
8754	Del Flores	624.37	-0.27	11.00
8754	Del Mitchell	624.60	-0.04	10.81
8754	Del Probandt	624.60	-0.04	10.81

River Sta	Plan	W.S. Elev	Diff	Vel Chnl
<b>8720 Furnish</b>				
8686	100 year	622.08		12.81
8686	Del Nogalitos	620.85	-1.23	14.43
8686	Del Flores	621.63	-0.45	13.80
8686	Del Mitchell	622.02	-0.06	12.86
8686	Del Probandt	622.03	-0.05	12.85
8500	100 year	621.52		12.34
8500	Del Nogalitos	620.27	-1.25	13.48
8500	Del Flores	621.18	-0.34	12.63
8500	Del Mitchell	621.46	-0.06	12.39
8500	Del Probandt	621.46	-0.06	12.39
8137	100 year	620.72		11.87
8137	Del Nogalitos	619.10	-1.62	13.54
8137	Del Flores	620.26	-0.46	12.33
8137	Del Mitchell	620.63	-0.09	11.95
8137	Del Probandt	620.64	-0.08	11.95
7963	100 year	620.13		12.24
7963	Del Nogalitos	618.57	-1.56	13.52
7963	Del Flores	619.66	-0.47	12.61
7963	Del Mitchell	620.04	-0.09	12.31
7963	Del Probandt	620.04	-0.09	12.31
7735	100 year	619.80		11.77
7735	Del Nogalitos	618.13	-1.67	13.02
7735	Del Flores	619.30	-0.50	12.13
7735	Del Mitchell	619.71	-0.09	11.84
7735	Del Probandt	619.71	-0.09	11.84
7590	100 year	619.73		11.09
7590	Del Nogalitos	618.04	-1.69	12.20
7590	Del Flores	619.23	-0.50	11.40
7590	Del Mitchell	619.64	-0.09	11.15
7590	Del Probandt	619.64	-0.09	11.14
7522	100 year	619.66		10.98
7522	Del Nogalitos	617.93	-1.73	12.11
7522	Del Flores	619.15	-0.51	11.30
7522	Del Mitchell	619.56	-0.10	11.04
7522	Del Probandt	619.57	-0.09	11.04



River Sta	Plan	W.S. Elev	Diff	Vel Chnl
<b>7478 Nogalitos</b>				
7435	100 year	617.93		11.30
7435	Del Flores	617.35	-0.58	11.69
7435	Del Mitchell	617.82	-0.11	11.38
7435	Del Probandt	617.82	-0.11	11.38
7356	100 year	617.14		12.62
7356	Del Flores	616.43	-0.71	13.19
7356	Del Mitchell	617.00	-0.14	12.73
7356	Del Probandt	617.01	-0.13	12.73
7100	100 year	616.72		12.21
7100	Del Flores	615.92	-0.80	12.81
7100	Del Mitchell	616.57	-0.15	12.32
7100	Del Probandt	616.57	-0.15	12.32
6800	100 year	616.26		11.91
6800	Del Flores	615.28	-0.98	12.74
6800	Del Mitchell	616.07	-0.19	12.07
6800	Del Probandt	616.08	-0.18	12.06
6500	100 year	615.86		11.51
6500	Del Flores	614.75	-1.11	12.43
6500	Del Mitchell	615.66	-0.20	11.67
6500	Del Probandt	615.66	-0.20	11.66
6200	100 year	615.52		11.08
6200	Del Flores	614.33	-1.19	11.95
6200	Del Mitchell	615.30	-0.22	11.24
6200	Del Probandt	615.31	-0.21	11.23
5900	100 year	615.30		10.13
5900	Del Flores	613.93	-1.37	11.20
5900	Del Mitchell	615.05	-0.25	10.32
5900	Del Probandt	615.06	-0.24	10.31
5600	100 year	614.21		11.76
5600	Del Flores	612.31	-1.90	13.42
5600	Del Mitchell	613.89	-0.32	12.02
5600	Del Probandt	613.91	-0.30	12.01
5300	100 year	613.92		10.95
5300	Del Flores	611.80	-2.12	12.59
5300	Del Mitchell	613.57	-0.35	11.21
5300	Del Probandt	613.59	-0.33	11.20

River Sta	Plan	W.S. Elev	Diff	Vel Chnl
5110	100 year	613.48		11.28
5110	Del Flores	611.27	-2.21	12.84
5110	Del Mitchell	613.12	-0.36	11.53
5110	Del Probandt	613.13	-0.35	11.52
5048	100 year	613.54		10.64
5048	Del Flores	611.37	-2.17	12.02
5048	Del Mitchell	613.19	-0.35	10.85
5048	Del Probandt	613.20	-0.34	10.84
<b>5005 Flores</b>				
4962	100 year	611.24		11.84
4962	Del Mitchell	610.66	-0.58	12.24
4962	Del Probandt	610.70	-0.54	12.22
4876	100 year	610.71		12.59
4876	Del Mitchell	610.05	-0.66	13.09
4876	Del Probandt	610.09	-0.62	13.06
4683	100 year	610.20		12.87
4683	Del Mitchell	609.42	-0.78	13.47
4683	Del Probandt	609.47	-0.73	13.43
4402	100 year	609.07		13.93
4402	Del Mitchell	607.98	-1.09	14.87
4402	Del Probandt	608.05	-1.02	14.81
4100	100 year	609.08		11.75
4100	Del Mitchell	607.91	-1.17	12.61
4100	Del Probandt	607.99	-1.09	12.55
3800	100 year	608.56		11.96
3800	Del Mitchell	607.10	-1.46	13.13
3800	Del Probandt	607.20	-1.36	13.05
3501	100 year	608.35		10.98
3501	Del Mitchell	606.73	-1.62	12.24
3501	Del Probandt	606.85	-1.50	12.14
3260	100 year	608.42		9.34
3260	Del Mitchell	606.78	-1.64	10.41
3260	Del Probandt	606.90	-1.52	10.33
3193	100 year	608.77		6.90
3193	Del Mitchell	607.24	-1.53	7.59
3193	Del Probandt	607.35	-1.42	7.54



River Sta	Plan	W.S. Elev	Diff	Vel Chnl
2889	100 year	608.03		8.61
2889	Del Mitchell	606.22	-1.81	9.67
2889	Del Probandt	606.35	-1.68	9.59
2804	100 year	607.55		9.77
2804	Del Mitchell	605.66	-1.89	10.86
2804	Del Probandt	605.80	-1.75	10.78
2743	100 year	607.04		11.00
2743	Del Mitchell	605.12	-1.92	12.05
2743	Del Probandt	605.26	-1.78	11.98
<b>2707 Mitchell</b>				
2671	100 year	605.05		11.96
2671	Del Probandt	603.03	-2.02	13.34
2596	100 year	605.02		11.38
2596	Del Probandt	602.97	-2.05	12.76
2400	100 year	604.85		10.89
2400	Del Probandt	602.64	-2.21	12.41
2194	100 year	604.33		11.40
2194	Del Probandt	601.78	-2.55	13.27
2000	100 year	604.05		11.31
2000	Del Probandt	601.27	-2.78	13.31
1795	100 year	603.90		10.67
1795	Del Probandt	600.95	-2.95	12.68
1600	100 year	603.87		9.68
1600	Del Probandt	600.78	-3.09	11.70
1300	100 year	603.26		10.46
1300	Del Probandt	599.81	-3.45	12.56
1000	100 year	603.04		10.01
1000	Del Probandt	599.34	-3.70	12.14
776	100 year	602.77		10.16
776	Del Probandt	598.80	-3.97	12.43
722	100 year	602.77		9.90
722	Del Probandt	598.81	-3.96	12.02
<b>686 Probandt</b>				

HEC-RAS results comparing the effects of removing combinations of bridges on  
San Pedro Creek up to W. Cevallos



River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top	Width	Froude #
14200	100-year LMMP	636.84		636.87	0.000016	1.42	1118.18	294.22	0.09	
14200	Delete Probandt	636.84	0.00	636.87	0.000016	1.42	1118.15	294.2	0.09	
14200	Del. Probandt & Mitchell	636.84	0.00	636.87	0.000016	1.42	1117.82	294	0.09	
14200	Del. Probandt, Mitchell & Flores	636.83	-0.01	636.87	0.000016	1.42	1117.56	293.83	0.09	
14200	Del. Probandt, Mitchell, Flores, & Furnish	636.82	-0.02	636.85	0.000016	1.42	1114.21	291.76	0.09	
14200	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	636.82	-0.02	636.85	0.000016	1.42	1112.72	290.83	0.09	
14106	100-year LMMP	636.51		636.83	0.000095	4.61	1372.19	269.62	0.23	
14106	Delete Probandt	636.51	0.00	636.83	0.000095	4.61	1372.16	269.62	0.23	
14106	Del. Probandt & Mitchell	636.51	0.00	636.83	0.000095	4.61	1371.85	269.53	0.23	
14106	Del. Probandt, Mitchell & Flores	636.51	0.00	636.83	0.000095	4.61	1371.59	269.45	0.23	
14106	Del. Probandt, Mitchell, Flores, & Furnish	636.49	-0.02	636.82	0.000096	4.62	1368.3	268.54	0.23	
14106	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	636.49	-0.02	636.81	0.000096	4.62	1366.83	268.13	0.23	
14052	100-year LMMP	635.99		636.78	0.000498	7.25	997.24	351.73	0.48	
14052	Delete Probandt	635.99	0.00	636.78	0.000498	7.25	997.2	351.72	0.48	
14052	Del. Probandt & Mitchell	635.99	0.00	636.78	0.000499	7.25	996.6	351.56	0.48	
14052	Del. Probandt, Mitchell & Flores	635.99	0.00	636.78	0.000499	7.25	996.12	351.44	0.48	
14052	Del. Probandt, Mitchell, Flores, & Furnish	635.97	-0.02	636.76	0.000504	7.27	990.02	349.86	0.49	
14052	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	635.96	-0.03	636.76	0.000506	7.28	987.27	349.14	0.49	
14013	<b>Guadalupe Street</b>									
13973	100-year LMMP	634.59		636.36	0.00086	10.79	616.54	229.47	0.58	
13973	Delete Probandt	634.58	-0.01	636.36	0.00086	10.79	616.48	229.43	0.58	
13973	Del. Probandt & Mitchell	634.58	-0.01	636.36	0.000861	10.79	615.4	228.63	0.58	
13973	Del. Probandt, Mitchell & Flores	634.58	-0.01	636.36	0.000861	10.8	614.55	228	0.58	
13973	Del. Probandt, Mitchell, Flores, & Furnish	634.54	-0.05	636.34	0.000869	10.85	605.83	221.43	0.58	
13973	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	634.52	-0.07	636.33	0.000872	10.87	601.3	217.93	0.58	
13915	100-year LMMP	635.21		635.68	0.000316	5.62	1263.21	387.58	0.38	
13915	Delete Probandt	635.21	0.00	635.68	0.000316	5.62	1263.12	387.56	0.38	
13915	Del. Probandt & Mitchell	635.21	0.00	635.68	0.000317	5.62	1261.56	387.18	0.39	
13915	Del. Probandt, Mitchell & Flores	635.20	-0.01	635.68	0.000318	5.63	1260.35	386.89	0.39	
13915	Del. Probandt, Mitchell, Flores, & Furnish	635.17	-0.04	635.65	0.000324	5.66	1247.58	383.8	0.39	
13915	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	635.15	-0.06	635.63	0.000327	5.68	1240.8	382.15	0.39	

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
13700	100-year LMMP	634.97		635.58	0.000464	6.41	1063.49	372.93	0.46
13700	Delete Probandt	634.97	0.00	635.58	0.000464	6.41	1063.4	372.9	0.46
13700	Del. Probandt & Mitchell	634.96	0.00	635.58	0.000465	6.42	1061.63	372.4	0.46
13700	Del. Probandt, Mitchell & Flores	634.96	-0.01	635.58	0.000466	6.42	1060.24	372.01	0.46
13700	Del. Probandt, Mitchell, Flores, & Furnish	634.92	-0.05	635.55	0.000478	6.47	1045.66	367.84	0.46
13700	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	634.90	-0.07	635.53	0.000484	6.5	1037.89	365.6	0.47
13525	100-year LMMP	635.03		635.47	0.000286	5.32	1201.14	412.46	0.37
13525	Delete Probandt	635.03	0.00	635.47	0.000286	5.32	1201.04	412.42	0.37
13525	Del. Probandt & Mitchell	635.03	0.00	635.46	0.000287	5.33	1199.15	411.8	0.37
13525	Del. Probandt, Mitchell & Flores	635.02	-0.01	635.46	0.000288	5.33	1197.67	411.31	0.37
13525	Del. Probandt, Mitchell, Flores, & Furnish	634.99	-0.04	635.43	0.000294	5.37	1182.18	405.48	0.37
13525	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	634.97	-0.06	635.41	0.000297	5.39	1173.95	401.7	0.37
13400	100-year LMMP	634.57		635.39	0.000351	7.41	1039.27	330.08	0.4
13400	Delete Probandt	634.57	0.00	635.39	0.000351	7.41	1039.17	330.06	0.4
13400	Del. Probandt & Mitchell	634.57	0.00	635.38	0.000352	7.41	1037.4	329.76	0.4
13400	Del. Probandt, Mitchell & Flores	634.56	-0.01	635.38	0.000353	7.42	1036.01	329.52	0.4
13400	Del. Probandt, Mitchell, Flores, & Furnish	634.52	-0.05	635.35	0.000359	7.46	1021.44	327	0.4
13400	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	634.49	-0.08	635.33	0.000362	7.49	1013.62	325.64	0.41
13248	100-year LMMP	634.61		635.29	0.000352	6.69	983.49	421.59	0.4
13248	Delete Probandt	634.61	0.00	635.29	0.000352	6.69	983.41	421.55	0.4
13248	Del. Probandt & Mitchell	634.61	0.00	635.29	0.000353	6.69	982.03	420.9	0.4
13248	Del. Probandt, Mitchell & Flores	634.60	-0.01	635.29	0.000353	6.7	980.94	420.39	0.4
13248	Del. Probandt, Mitchell, Flores, & Furnish	634.56	-0.05	635.25	0.00036	6.74	969.63	415.04	0.41
13248	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	634.54	-0.07	635.23	0.000364	6.76	963.6	412.14	0.41
13129	(Long Culvert) Between Camp and Guadalupe								
13010	100-year LMMP	633.68		634.86	0.000525	9.2	1044.96	325.11	0.46
13010	Delete Probandt	633.68	0.00	634.86	0.000525	9.2	1044.74	325.02	0.46
13010	Del. Probandt & Mitchell	633.66	0.00	634.86	0.000528	9.22	1040.31	323.24	0.46
13010	Del. Probandt, Mitchell & Flores	633.65	-0.03	634.85	0.00053	9.23	1036.8	321.83	0.46
13010	Del. Probandt, Mitchell, Flores, & Furnish	633.54	-0.14	634.78	0.000551	9.35	1002.89	307.82	0.47
13010	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	633.48	-0.20	634.73	0.000564	9.43	982.41	299.05	0.48

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #
12849	100-year LMMP	633.81		634.59	0.000381	7.34	1233.97	331.71	0.43
12849	Delete Probandt	633.81	0.00	634.59	0.000381	7.34	1233.75	331.67	0.43
12849	Del. Probandt & Mitchell	633.80	0.00	634.58	0.000384	7.35	1229.28	330.89	0.43
12849	Del. Probandt, Mitchell & Flores	633.79	-0.02	634.57	0.000385	7.37	1225.73	330.27	0.43
12849	Del. Probandt, Mitchell, Flores, & Furnish	633.68	-0.13	634.49	0.000404	7.48	1191.04	324.15	0.44
12849	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	633.61	-0.20	634.45	0.000416	7.56	1169.51	320.3	0.45
12791	100-year LMMP	633.37		634.53	0.000544	8.97	1068.55	323.19	0.5
12791	Delete Probandt	633.37	0.00	634.52	0.000544	8.97	1068.27	323.15	0.5
12791	Del. Probandt & Mitchell	633.35	0.00	634.51	0.000549	9	1062.52	322.37	0.5
12791	Del. Probandt, Mitchell & Flores	633.34	-0.03	634.51	0.000552	9.02	1057.94	321.74	0.5
12791	Del. Probandt, Mitchell, Flores, & Furnish	633.19	-0.18	634.42	0.000587	9.21	1012.52	315.47	0.52
12791	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	633.10	-0.27	634.37	0.000612	9.34	983.65	311.42	0.53
Camp									
12733									
12676	100-year LMMP	633.26		634.01	0.001468	6.98	942.73	213.5	0.39
12676	Delete Probandt	633.25	-0.01	634	0.001473	6.98	940.88	213.11	0.39
12676	Del. Probandt & Mitchell	633.22	-0.01	633.98	0.001487	7	935.38	211.95	0.39
12676	Del. Probandt, Mitchell & Flores	633.20	-0.06	633.96	0.001504	7.03	929.35	210.67	0.4
12676	Del. Probandt, Mitchell, Flores, & Furnish	632.94	-0.32	633.75	0.00166	7.25	876.48	194.6	0.41
12676	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	632.79	-0.47	633.63	0.001756	7.38	848.66	177.36	0.42
12600	100-year LMMP	633.00		633.85	0.001834	7.43	854.11	148.67	0.44
12600	Delete Probandt	632.99	-0.01	633.84	0.00184	7.44	852.68	148.32	0.45
12600	Del. Probandt & Mitchell	632.96	-0.01	633.82	0.00186	7.47	848.43	147.28	0.45
12600	Del. Probandt, Mitchell & Flores	632.93	-0.07	633.8	0.001881	7.5	843.75	146.13	0.45
12600	Del. Probandt, Mitchell, Flores, & Furnish	632.64	-0.36	633.57	0.002097	7.78	802.4	135.54	0.47
12600	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	632.46	-0.54	633.44	0.002239	7.96	779.14	129.2	0.49
12500	100-year LMMP	632.83		633.66	0.001882	7.34	860.63	147.12	0.45
12500	Delete Probandt	632.82	-0.01	633.65	0.001888	7.35	859.11	146.81	0.45
12500	Del. Probandt & Mitchell	632.79	-0.01	633.63	0.001909	7.38	854.54	145.88	0.45
12500	Del. Probandt, Mitchell & Flores	632.75	-0.08	633.6	0.001933	7.41	849.52	144.86	0.45
12500	Del. Probandt, Mitchell, Flores, & Furnish	632.43	-0.40	633.36	0.002166	7.73	804.6	135.33	0.48
12500	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	632.24	-0.59	633.21	0.002323	7.93	778.6	129.49	0.5

5/20/04



River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #
12414	100-year LMMP	632.81		633.47	0.001354	6.56	934.93	146.27	0.38
12414	Delete Probandt	632.80	-0.01	633.47	0.001357	6.57	933.43	145.59	0.38
12414	Del. Probandt & Mitchell	632.77	-0.01	633.44	0.001368	6.59	928.96	143.52	0.38
12414	Del. Probandt, Mitchell & Flores	632.73	-0.08	633.41	0.00138	6.62	924.09	141.23	0.39
12414	Del. Probandt, Mitchell, Flores, & Furnish	632.41	-0.40	633.14	0.001492	6.86	882.75	120.09	0.4
12414	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	632.22	-0.59	632.98	0.001564	7.01	860.86	107.21	0.41
<b>S. Alamo</b>									
12325	100-year LMMP	632.14		632.88	0.001706	6.92	870.85	106.2	0.43
12325	Delete Probandt	632.13	-0.01	632.87	0.00171	6.92	869.94	106.15	0.43
12325	Del. Probandt & Mitchell	632.10	-0.01	632.85	0.001725	6.94	867.19	105.97	0.43
12325	Del. Probandt, Mitchell & Flores	632.07	-0.07	632.83	0.001741	6.97	864.05	105.78	0.43
12325	Del. Probandt, Mitchell, Flores, & Furnish	631.79	-0.35	632.6	0.001919	7.21	834.73	104.39	0.45
12325	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	631.57	-0.57	632.43	0.002078	7.42	811.87	103.44	0.47
12279	100-year LMMP	631.78		632.72	0.002595	7.81	771.42	108	0.51
12279	Delete Probandt	631.77	-0.01	632.72	0.002605	7.82	770.31	107.93	0.52
12279	Del. Probandt & Mitchell	631.73	-0.01	632.69	0.002637	7.85	766.86	107.7	0.52
12279	Del. Probandt, Mitchell & Flores	631.70	-0.08	632.67	0.002673	7.89	762.93	107.43	0.52
12279	Del. Probandt, Mitchell, Flores, & Furnish	631.34	-0.44	632.41	0.003066	8.3	725.17	104.86	0.56
12279	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	631.04	-0.74	632.21	0.003449	8.67	694.19	102.69	0.59
12031	100-year LMMP	631.49		632.16	0.001506	6.77	1097.87	243.39	0.4
12031	Delete Probandt	631.48	-0.01	632.15	0.001513	6.78	1094.81	243.06	0.41
12031	Del. Probandt & Mitchell	631.44	-0.01	632.12	0.001537	6.82	1085.34	242.04	0.41
12031	Del. Probandt, Mitchell & Flores	631.40	-0.09	632.09	0.001564	6.87	1074.49	240.86	0.41
12031	Del. Probandt, Mitchell, Flores, & Furnish	630.94	-0.55	631.75	0.001876	7.39	967.05	229.51	0.45
12031	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	630.52	-0.97	631.46	0.002244	7.9	872.46	222.67	0.49
11897	100-year LMMP	631.51		631.93	0.000927	5.34	1307.66	228.69	0.32
11897	Delete Probandt	631.50	-0.01	631.92	0.000931	5.35	1304.83	228.51	0.32
11897	Del. Probandt & Mitchell	631.46	-0.01	631.89	0.000945	5.38	1296.28	227.99	0.32
11897	Del. Probandt, Mitchell & Flores	631.41	-0.10	631.85	0.000961	5.41	1286.23	227.36	0.33
11897	Del. Probandt, Mitchell, Flores, & Furnish	630.97	-0.54	631.46	0.001146	5.77	1185.42	220.81	0.35
11897	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	630.55	-0.96	631.12	0.001352	6.13	1096.18	212.69	0.38

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
11821	100-year LMMP	631.33		631.84	0.00102	5.75	1047.42	134.86	0.34
11821	Delete Probandt	631.32	-0.01	631.83	0.001024	5.76	1045.97	134.67	0.34
11821	Del. Probandt & Mitchell	631.28	-0.01	631.8	0.001039	5.78	1041.56	134.12	0.34
11821	Del. Probandt, Mitchell & Flores	631.24	-0.09	631.76	0.001056	5.81	1036.38	133.48	0.34
11821	Del. Probandt, Mitchell, Flores, & Furnish	630.78	-0.55	631.36	0.001258	6.12	983.48	125.5	0.37
11821	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	630.36	-0.97	631	0.001471	6.44	934.85	116.82	0.4
<b>R.R. U/S of W. Cevallos &amp; D/S of S. Alamo</b>									
11794									
11768	100-year LMMP	631.13		631.57	0.000853	5.36	1124.38	132.33	0.31
11768	Delete Probandt	631.11	-0.02	631.56	0.000856	5.36	1122.77	132.24	0.31
11768	Del. Probandt & Mitchell	631.07	-0.02	631.52	0.000868	5.39	1117.95	131.99	0.31
11768	Del. Probandt, Mitchell & Flores	631.03	-0.10	631.48	0.000882	5.41	1112.28	131.7	0.31
11768	Del. Probandt, Mitchell, Flores, & Furnish	630.55	-0.58	631.05	0.001004	5.71	1055.2	124.25	0.33
11768	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	630.10	-1.03	630.66	0.001131	6	1004.18	117.1	0.35
11680	100-year LMMP	630.87		631.45	0.001153	6.1	1011.48	168.98	0.36
11680	Delete Probandt	630.85	-0.02	631.43	0.001159	6.11	1009.03	167.9	0.36
11680	Del. Probandt & Mitchell	630.81	-0.02	631.4	0.001175	6.14	1001.73	164.64	0.36
11680	Del. Probandt, Mitchell & Flores	630.76	-0.11	631.35	0.001195	6.18	993.34	160.81	0.36
11680	Del. Probandt, Mitchell, Flores, & Furnish	630.23	-0.64	630.9	0.001416	6.57	918.67	121.56	0.39
11680	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	629.73	-1.14	630.49	0.001665	6.96	864.91	103.13	0.42
11500	100-year LMMP	630.74		631.24	0.000919	5.64	1068.37	110.93	0.32
11500	Delete Probandt	630.73	-0.01	631.22	0.000923	5.65	1066.7	110.84	0.32
11500	Del. Probandt & Mitchell	630.68	-0.01	631.18	0.000934	5.67	1061.68	110.55	0.32
11500	Del. Probandt, Mitchell & Flores	630.63	-0.11	631.13	0.000948	5.7	1055.79	110.22	0.32
11500	Del. Probandt, Mitchell, Flores, & Furnish	630.08	-0.66	630.65	0.001103	6.05	995.96	106.77	0.35
11500	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	629.55	-1.19	630.19	0.001291	6.4	940.45	104.15	0.38
11300	100-year LMMP	630.46		631.03	0.001092	6.07	1008.75	130.04	0.35
11300	Delete Probandt	630.44	-0.02	631.01	0.001097	6.08	1006.59	129.73	0.35
11300	Del. Probandt & Mitchell	630.39	-0.02	630.97	0.001115	6.12	1000.11	128.77	0.35
11300	Del. Probandt, Mitchell & Flores	630.33	-0.13	630.92	0.001137	6.16	992.53	127.65	0.35
11300	Del. Probandt, Mitchell, Flores, & Furnish	629.71	-0.75	630.39	0.001392	6.6	917.19	115.19	0.39
11300	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	629.10	-1.36	629.88	0.001715	7.08	850.6	102.05	0.43

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
11189	100-year LMMP	630.43		630.89	0.000869	5.41	1149	234.01	0.31
11189	Delete Probandt	630.42	-0.01	630.87	0.000873	5.42	1145.05	231.51	0.31
11189	Del. Probandt & Mitchell	630.36	-0.01	630.82	0.000885	5.45	1133.41	223.98	0.31
11189	Del. Probandt, Mitchell & Flores	630.30	-0.13	630.77	0.000899	5.48	1120.19	215.12	0.32
11189	Del. Probandt, Mitchell, Flores, & Furnish	629.67	-0.76	630.21	0.001066	5.88	1024.86	111.86	0.34
11189	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	629.05	-1.38	629.66	0.00128	6.3	956.11	107.87	0.37
11160	100-year LMMP	630.46		630.84	0.000693	4.98	1261.8	280.81	0.28
11160	Delete Probandt	630.44	-0.02	630.83	0.000696	4.99	1257.09	278.01	0.28
11160	Del. Probandt & Mitchell	630.39	-0.02	630.78	0.000706	5.02	1243.19	269.57	0.28
11160	Del. Probandt, Mitchell & Flores	630.33	-0.13	630.73	0.000717	5.05	1227.36	259.63	0.28
11160	Del. Probandt, Mitchell, Flores, & Furnish	629.71	-0.75	630.16	0.00085	5.4	1116.19	116.33	0.31
11160	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	629.09	-1.37	629.6	0.001018	5.76	1045.12	113	0.33
11130									
W. Cevallos									
11100	100-year LMMP	629.65		630.14	0.000949	5.65	1065.26	112.86	0.32
11100	Delete Probandt	629.63	-0.02	630.13	0.000953	5.66	1063.48	112.75	0.32
11100	Del. Probandt & Mitchell	629.58	-0.02	630.09	0.000965	5.69	1058.14	112.4	0.33
11100	Del. Probandt, Mitchell & Flores	629.53	-0.12	630.04	0.00098	5.73	1051.86	112	0.33
11100	Del. Probandt, Mitchell, Flores, & Furnish	628.94	-0.71	629.52	0.001151	6.1	987.24	107.86	0.36
11100	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.94	-0.71	629.52	0.001151	6.1	987.24	107.86	0.36
11012	100-year LMMP	629.65		630.01	0.000637	4.79	1257.94	127.79	0.27
11012	Delete Probandt	629.63	-0.02	629.99	0.000639	4.79	1255.93	127.69	0.27
11012	Del. Probandt & Mitchell	629.59	-0.02	629.95	0.000648	4.82	1249.86	127.39	0.27
11012	Del. Probandt, Mitchell & Flores	629.53	-0.12	629.9	0.000658	4.85	1242.72	127.04	0.27
11012	Del. Probandt, Mitchell, Flores, & Furnish	628.94	-0.71	629.35	0.000775	5.15	1168.87	123.35	0.29
11012	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.94	-0.71	629.35	0.000775	5.15	1168.87	123.35	0.29
10800	100-year LMMP	629.58		629.87	0.000475	4.29	1403.9	188.47	0.23
10800	Delete Probandt	629.57	-0.01	629.85	0.000477	4.3	1401.74	188.11	0.23
10800	Del. Probandt & Mitchell	629.52	-0.01	629.81	0.000483	4.32	1395.19	187.01	0.24
10800	Del. Probandt, Mitchell & Flores	629.46	-0.12	629.75	0.00049	4.34	1387.48	185.73	0.24
10800	Del. Probandt, Mitchell, Flores, & Furnish	628.86	-0.72	629.19	0.000577	4.61	1307.36	172.29	0.26
10800	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.86	-0.72	629.19	0.000577	4.61	1307.36	172.29	0.26



River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #
10500	100-year LMMP	629.52		629.73	0.000314	3.73	1616.2	140.09	0.19
10500	Delete Probandt	629.50	-0.02	629.72	0.000315	3.73	1613.92	139.99	0.19
10500	Del. Probandt & Mitchell	629.45	-0.02	629.67	0.000319	3.75	1607.01	139.69	0.19
10500	Del. Probandt, Mitchell & Flores	629.39	-0.13	629.61	0.000323	3.77	1598.88	139.33	0.2
10500	Del. Probandt, Mitchell, Flores, & Furnish	628.78	-0.74	629.02	0.000373	3.98	1514.36	135.55	0.21
10500	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.78	-0.74	629.02	0.000373	3.98	1514.36	135.55	0.21
10200	100-year LMMP	629.50		629.64	0.000186	3.02	1997.24	160.91	0.15
10200	Delete Probandt	629.48	-0.02	629.62	0.000186	3.02	1994.6	160.77	0.15
10200	Del. Probandt & Mitchell	629.43	-0.02	629.58	0.000188	3.03	1986.62	160.33	0.15
10200	Del. Probandt, Mitchell & Flores	629.37	-0.13	629.52	0.00019	3.05	1977.25	159.81	0.15
10200	Del. Probandt, Mitchell, Flores, & Furnish	628.76	-0.74	628.92	0.000215	3.2	1880.15	154.36	0.16
10200	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.76	-0.74	628.92	0.000215	3.2	1880.15	154.36	0.16
10022	100-year LMMP	629.51		629.6	0.000098	2.39	2759.73	337.44	0.11
10022	Delete Probandt	629.50	-0.01	629.58	0.000098	2.4	2754.2	336.63	0.11
10022	Del. Probandt & Mitchell	629.45	-0.01	629.54	0.000099	2.41	2737.53	334.18	0.11
10022	Del. Probandt, Mitchell & Flores	629.39	-0.12	629.48	0.0001	2.42	2718.06	331.29	0.11
10022	Del. Probandt, Mitchell, Flores, & Furnish	628.77	-0.74	628.87	0.000116	2.54	2522.69	300.79	0.12
10022	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.77	-0.74	628.87	0.000116	2.54	2522.69	300.79	0.12
9900	100-year LMMP	629.53		629.58	0.000079	1.84	3269.72	296.09	0.1
9900	Delete Probandt	629.51	-0.02	629.56	0.00008	1.84	3264.88	295.91	0.1
9900	Del. Probandt & Mitchell	629.46	-0.02	629.51	0.000081	1.85	3250.21	295.33	0.1
9900	Del. Probandt, Mitchell & Flores	629.40	-0.13	629.46	0.000082	1.86	3232.96	294.65	0.1
9900	Del. Probandt, Mitchell, Flores, & Furnish	628.78	-0.75	628.85	0.000096	1.97	3053.23	287.49	0.11
9900	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.78	-0.75	628.85	0.000096	1.97	3053.23	287.49	0.11
9500	100-year LMMP	627.37		629.1	0.00132	10.56	5154.65	300.52	0.43
9500	Delete Probandt	627.35	-0.02	629.08	0.001324	10.57	5148.66	298.94	0.43
9500	Del. Probandt & Mitchell	627.28	-0.02	629.03	0.001336	10.61	5130.51	294.14	0.43
9500	Del. Probandt, Mitchell & Flores	627.21	-0.16	628.97	0.001351	10.65	5109.07	288.46	0.44
9500	Del. Probandt, Mitchell, Flores, & Furnish	626.37	-1.00	628.3	0.001523	11.15	4880.53	268.64	0.46
9500	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	626.37	-1.00	628.3	0.001523	11.15	4880.53	268.64	0.46

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #
9395	100-year LMMP	627.21		628.9	0.002605	10.43	5230.75	276.29	0.41
9395	Delete Probandt	627.19	-0.02	628.88	0.002613	10.44	5224.65	276.04	0.41
9395	Del. Probandt & Mitchell	627.12	-0.02	628.83	0.00264	10.47	5206.14	275.27	0.42
9395	Del. Probandt, Mitchell & Flores	627.04	-0.17	628.76	0.002673	10.52	5184.28	274.36	0.42
9395	Del. Probandt, Mitchell, Flores, & Furnish	626.18	-1.03	628.06	0.003089	11	4950.1	268.39	0.45
9395	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	626.18	-1.03	628.06	0.003089	11	4950.1	268.39	0.45
9348	100-year LMMP	627.13		628.78	0.002093	10.31	5276.71	284.34	0.42
9348	Delete Probandt	627.11	-0.02	628.76	0.0021	10.33	5270.29	284.18	0.42
9348	Del. Probandt & Mitchell	627.04	-0.02	628.71	0.002121	10.36	5250.78	283.67	0.42
9348	Del. Probandt, Mitchell & Flores	626.96	-0.17	628.64	0.002146	10.41	5227.72	282.97	0.43
9348	Del. Probandt, Mitchell, Flores, & Furnish	626.07	-1.06	627.92	0.002419	10.92	4981.11	274.37	0.45
9348	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	626.07	-1.06	627.92	0.002419	10.92	4981.11	274.37	0.45
<b>So. Pacific Railroad</b>									
9319									
9290	100-year LMMP	626.26		627.94	0.002108	10.42	5224.95	286.66	0.43
9290	Delete Probandt	626.23	-0.03	627.92	0.002116	10.43	5217.54	286.29	0.43
9290	Del. Probandt & Mitchell	626.15	-0.03	627.86	0.00214	10.48	5195.02	285.16	0.43
9290	Del. Probandt, Mitchell & Flores	626.06	-0.20	627.78	0.002169	10.53	5168.44	283.82	0.43
9290	Del. Probandt, Mitchell, Flores, & Furnish	625.04	-1.22	626.96	0.002415	11.14	4885.05	269	0.46
9290	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	625.04	-1.22	626.96	0.002415	11.14	4885.05	269	0.46
9233	100-year LMMP	625.99		627.79	0.002045	10.78	5056.78	278.9	0.43
9233	Delete Probandt	625.96	-0.03	627.77	0.002054	10.79	5049.3	278.45	0.44
9233	Del. Probandt & Mitchell	625.88	-0.03	627.7	0.00208	10.84	5026.65	277.06	0.44
9233	Del. Probandt, Mitchell & Flores	625.78	-0.21	627.62	0.002112	10.89	4999.9	275.4	0.44
9233	Del. Probandt, Mitchell, Flores, & Furnish	624.71	-1.28	626.78	0.002502	11.54	4714.28	260.69	0.48
9233	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	624.71	-1.28	626.78	0.002502	11.54	4714.28	260.69	0.48
9100	100-year LMMP	625.23		627.39	0.003878	11.78	4621.91	274.32	0.49
9100	Delete Probandt	625.20	-0.03	627.36	0.0039	11.8	4613.38	271.6	0.49
9100	Del. Probandt & Mitchell	625.11	-0.03	627.29	0.003969	11.86	4587.98	263.34	0.49
9100	Del. Probandt, Mitchell & Flores	624.99	-0.24	627.21	0.004052	11.94	4558.73	253.93	0.5
9100	Del. Probandt, Mitchell, Flores, & Furnish	623.72	-1.51	626.28	0.004876	12.83	4240.71	245.47	0.54
9100	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	623.72	-1.51	626.28	0.004876	12.83	4240.71	245.47	0.54

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
8900	100-year LMMP	625.52		626.68	0.001276	8.69	6703.35	700.96	0.36
8900	Delete Probandt	625.48	-0.04	626.65	0.001284	8.71	6680.96	696.28	0.36
8900	Del. Probandt & Mitchell	625.39	-0.04	626.57	0.001309	8.76	6613.78	682.06	0.37
8900	Del. Probandt, Mitchell & Flores	625.27	-0.25	626.47	0.00134	8.82	6535.54	665.12	0.37
8900	Del. Probandt, Mitchell, Flores, & Furnish	623.97	-1.55	625.39	0.001743	9.56	5843.73	399.74	0.42
8900	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	623.97	-1.55	625.39	0.001743	9.56	5843.73	399.74	0.42
8754	100-year LMMP	624.64		626.4	0.001934	10.78	5990.71	787.6	0.43
8754	Delete Probandt	624.60	-0.04	626.37	0.001952	10.81	5957.71	786.6	0.43
8754	Del. Probandt & Mitchell	624.47	-0.04	626.28	0.002006	10.91	5857.28	783.55	0.44
8754	Del. Probandt, Mitchell & Flores	624.32	-0.32	626.17	0.002073	11.04	5737.18	779.89	0.44
8754	Del. Probandt, Mitchell, Flores, & Furnish	621.82	-2.82	624.87	0.003719	14.02	3985.06	280.72	0.57
8754	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	621.82	-2.82	624.87	0.003719	14.02	3985.06	280.72	0.57
Furnish Street									
8720									
8686	100-year LMMP	622.08		624.63	0.005097	12.81	4364.32	332.74	0.54
8686	Delete Probandt	622.03	-0.05	624.59	0.005152	12.85	4346.53	328.09	0.55
8686	Del. Probandt & Mitchell	621.81	-0.05	624.71	0.005136	13.66	4081.88	295.81	0.56
8686	Del. Probandt, Mitchell & Flores	621.55	-0.53	624.54	0.005387	13.86	4015.22	281.11	0.58
8686	Del. Probandt, Mitchell, Flores, & Furnish	621.55	-0.53	624.54	0.005387	13.86	4015.22	281.11	0.58
8686	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	621.55	-0.53	624.54	0.005387	13.86	4015.22	281.11	0.58
8500	100-year LMMP	621.52		623.88	0.002548	12.34	4502.95	317.78	0.58
8500	Delete Probandt	621.46	-0.06	623.84	0.002572	12.39	4483.23	316.53	0.58
8500	Del. Probandt & Mitchell	621.39	-0.06	623.8	0.002597	12.45	4462.92	315.24	0.58
8500	Del. Probandt, Mitchell & Flores	621.10	-0.42	623.61	0.002715	12.71	4370.88	309.32	0.6
8500	Del. Probandt, Mitchell, Flores, & Furnish	621.10	-0.42	623.61	0.002715	12.71	4370.88	309.32	0.6
8500	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	621.10	-0.42	623.61	0.002715	12.71	4370.88	309.32	0.6
8137	100-year LMMP	620.72		622.88	0.002661	11.87	4927.46	479.81	0.57
8137	Delete Probandt	620.64	-0.08	622.83	0.00272	11.95	4887.37	477.03	0.58
8137	Del. Probandt & Mitchell	620.55	-0.08	622.77	0.002783	12.03	4845.77	474.13	0.58
8137	Del. Probandt, Mitchell & Flores	620.13	-0.59	622.52	0.003108	12.45	4652.1	460.39	0.61
8137	Del. Probandt, Mitchell, Flores, & Furnish	620.13	-0.59	622.52	0.003108	12.45	4652.1	460.39	0.61
8137	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	620.13	-0.59	622.52	0.003108	12.45	4652.1	460.39	0.61



River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
7963	100-year LMMP	620.13		622.45	0.002107	12.24	4556.3	401.98	0.54
7963	Delete Probandt	620.04	-0.09	622.39	0.002139	12.31	4521.76	401.3	0.54
7963	Del. Probandt & Mitchell	619.95	-0.09	622.33	0.002171	12.38	4491.66	289.99	0.55
7963	Del. Probandt, Mitchell & Flores	619.53	-0.60	622.04	0.002334	12.71	4371.9	282.41	0.56
7963	Del. Probandt, Mitchell, Flores, & Furnish	619.53	-0.60	622.04	0.002334	12.71	4371.9	282.41	0.56
7963	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	619.53	-0.60	622.04	0.002334	12.71	4371.9	282.41	0.56
7735	100-year LMMP	619.80		621.95	0.001839	11.77	4717.53	279.36	0.5
7735	Delete Probandt	619.71	-0.09	621.89	0.001861	11.84	4692.37	278.12	0.51
7735	Del. Probandt & Mitchell	619.62	-0.09	621.82	0.001884	11.9	4666.47	276.84	0.51
7735	Del. Probandt, Mitchell & Flores	619.17	-0.63	621.49	0.001997	12.22	4545.26	270.76	0.53
7735	Del. Probandt, Mitchell, Flores, & Furnish	619.17	-0.63	621.49	0.001997	12.22	4545.26	270.76	0.53
7735	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	619.17	-0.63	621.49	0.001997	12.22	4545.26	270.76	0.53
7590	100-year LMMP	619.73		621.64	0.001465	11.09	5016.28	294.12	0.46
7590	Delete Probandt	619.64	-0.09	621.57	0.001488	11.14	4989.71	291.25	0.46
7590	Del. Probandt & Mitchell	619.55	-0.09	621.5	0.001512	11.2	4962.51	288.29	0.46
7590	Del. Probandt, Mitchell & Flores	619.10	-0.63	621.15	0.001633	11.48	4837.06	274.2	0.48
7590	Del. Probandt, Mitchell, Flores, & Furnish	619.10	-0.63	621.15	0.001633	11.48	4837.06	274.2	0.48
7590	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	619.10	-0.63	621.15	0.001633	11.48	4837.06	274.2	0.48
7522	100-year LMMP	619.66		621.53	0.001447	10.98	5067.38	306.38	0.45
7522	Delete Probandt	619.57	-0.09	621.46	0.00147	11.04	5039.27	302.01	0.46
7522	Del. Probandt & Mitchell	619.47	-0.09	621.38	0.001494	11.1	5010.62	297.49	0.46
7522	Del. Probandt, Mitchell & Flores	619.02	-0.64	621.03	0.001616	11.38	4880.21	275.99	0.48
7522	Del. Probandt, Mitchell, Flores, & Furnish	619.02	-0.64	621.03	0.001616	11.38	4880.21	275.99	0.48
7522	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	619.02	-0.64	621.03	0.001616	11.38	4880.21	275.99	0.48
7478									
<b>Nogalitos</b>									
7435	100-year LMMP	617.93		619.91	0.001635	11.3	4913.91	282.26	0.48
7435	Delete Probandt	617.82	-0.11	619.83	0.001665	11.38	4882.98	281.69	0.48
7435	Del. Probandt & Mitchell	617.71	-0.11	619.74	0.001696	11.45	4851.79	281.12	0.49
7435	Del. Probandt, Mitchell & Flores	617.18	-0.75	619.35	0.001854	11.81	4704.58	278.4	0.51
7435	Del. Probandt, Mitchell, Flores, & Furnish	617.18	-0.75	619.35	0.001854	11.81	4704.58	278.4	0.51
7435	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	617.18	-0.75	619.35	0.001854	11.81	4704.58	278.4	0.51

River Sta	Plan	W.S. Elev	W.S. Diff	E.G. Elev	E.G. Slope	Vel	Chnl	Flow Area	Top	Width	Froude #
7356	100-year LMMP	617.14		619.62	0.002195	12.62		4400.02	267.22		0.55
7356	Delete Probandt	617.01	-0.13	619.52	0.002246	12.73		4364.69	266.49		0.55
7356	Del. Probandt & Mitchell	616.87	-0.13	619.43	0.0023	12.83		4328.76	265.75		0.56
7356	Del. Probandt, Mitchell & Flores	616.21	-0.93	618.99	0.002588	13.37		4154.28	262.12		0.59
7356	Del. Probandt, Mitchell, Flores, & Furnish	616.21	-0.93	618.99	0.002588	13.37		4154.28	262.12		0.59
7356	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	616.21	-0.93	618.99	0.002588	13.37		4154.28	262.12		0.59
7100	100-year LMMP	616.72		619.03	0.001979	12.21		4561.14	285.66		0.52
7100	Delete Probandt	616.57	-0.15	618.93	0.002033	12.32		4519.34	285.26		0.53
7100	Del. Probandt & Mitchell	616.42	-0.15	618.82	0.00209	12.43		4476.56	284.85		0.54
7100	Del. Probandt, Mitchell & Flores	615.68	-1.04	618.31	0.002374	13		4272.31	263.43		0.57
7100	Del. Probandt, Mitchell, Flores, & Furnish	615.68	-1.04	618.31	0.002374	13		4272.31	263.43		0.57
7100	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	615.68	-1.04	618.31	0.002374	13		4272.31	263.43		0.57
6800	100-year LMMP	616.26		618.43	0.001808	11.91		5164.34	578.74		0.5
6800	Delete Probandt	616.08	-0.18	618.31	0.001873	12.06		5062.53	572.04		0.51
6800	Del. Probandt & Mitchell	615.90	-0.18	618.19	0.001942	12.21		4958.96	563.33		0.52
6800	Del. Probandt, Mitchell & Flores	614.99	-1.27	617.6	0.002326	13		4469.8	512.62		0.56
6800	Del. Probandt, Mitchell, Flores, & Furnish	614.99	-1.27	617.6	0.002326	13		4469.8	512.62		0.56
6800	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	614.99	-1.27	617.6	0.002326	13		4469.8	512.62		0.56
6500	100-year LMMP	615.86		617.87	0.001622	11.51		5507.38	600.91		0.48
6500	Delete Probandt	615.66	-0.20	617.73	0.001686	11.66		5389.3	590.37		0.49
6500	Del. Probandt & Mitchell	615.46	-0.20	617.59	0.001756	11.83		5268.74	579.41		0.5
6500	Del. Probandt, Mitchell & Flores	614.40	-1.46	616.89	0.002172	12.73		4687.74	514.59		0.55
6500	Del. Probandt, Mitchell, Flores, & Furnish	614.40	-1.46	616.89	0.002172	12.73		4687.74	514.59		0.55
6500	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	614.40	-1.46	616.89	0.002172	12.73		4687.74	514.59		0.55
6200	100-year LMMP	615.52		617.37	0.001415	11.08		5759.79	541.8		0.45
6200	Delete Probandt	615.31	-0.21	617.21	0.001472	11.23		5647.4	526.65		0.46
6200	Del. Probandt & Mitchell	615.09	-0.21	617.05	0.001533	11.39		5533.6	510.85		0.47
6200	Del. Probandt, Mitchell & Flores	613.94	-1.58	616.22	0.001899	12.24		4989.82	438.27		0.52
6200	Del. Probandt, Mitchell, Flores, & Furnish	613.94	-1.58	616.22	0.001899	12.24		4989.82	438.27		0.52
6200	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	613.94	-1.58	616.22	0.001899	12.24		4989.82	438.27		0.52

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
5900	100-year LMMP	615.30		616.86	0.001379	10.13	6055.5	728.46	0.44
5900	Delete Probandt	615.06	-0.24	616.69	0.001455	10.31	5886.76	703.57	0.45
5900	Del. Probandt & Mitchell	614.81	-0.24	616.51	0.00154	10.5	5715.66	677.35	0.46
5900	Del. Probandt, Mitchell & Flores	613.49	-1.81	615.56	0.002075	11.56	4920.47	507.27	0.53
5900	Del. Probandt, Mitchell, Flores, & Furnish	613.49	-1.81	615.56	0.002075	11.56	4920.47	507.27	0.53
5900	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	613.49	-1.81	615.56	0.002075	11.56	4920.47	507.27	0.53
5600	100-year LMMP	614.21		616.33	0.001844	11.76	5070.91	514.29	0.51
5600	Delete Probandt	613.91	-0.30	616.12	0.001972	12.01	4916.17	498.98	0.52
5600	Del. Probandt & Mitchell	613.57	-0.30	615.9	0.002124	12.29	4750.91	490.11	0.54
5600	Del. Probandt, Mitchell & Flores	611.62	-2.59	614.69	0.00323	14.08	3954.35	305.23	0.65
5600	Del. Probandt, Mitchell, Flores, & Furnish	611.62	-2.59	614.69	0.00323	14.08	3954.35	305.23	0.65
5600	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	611.62	-2.59	614.69	0.00323	14.08	3954.35	305.23	0.65
5300	100-year LMMP	613.92		615.76	0.001475	10.95	5500.21	545.7	0.46
5300	Delete Probandt	613.59	-0.33	615.51	0.001573	11.2	5320.63	530.28	0.47
5300	Del. Probandt & Mitchell	613.22	-0.33	615.25	0.00169	11.47	5129.5	513.36	0.49
5300	Del. Probandt, Mitchell & Flores	611.00	-2.92	613.72	0.002584	13.24	4194.59	269.38	0.59
5300	Del. Probandt, Mitchell, Flores, & Furnish	611.00	-2.92	613.72	0.002584	13.24	4194.59	269.38	0.59
5300	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	611.00	-2.92	613.72	0.002584	13.24	4194.59	269.38	0.59
5110	100-year LMMP	613.48		615.46	0.001538	11.28	5058.06	494.11	0.47
5110	Delete Probandt	613.13	-0.35	615.19	0.001642	11.52	4884.91	488.86	0.48
5110	Del. Probandt & Mitchell	612.76	-0.35	614.91	0.001745	11.77	4740.93	318.22	0.49
5110	Del. Probandt, Mitchell & Flores	610.34	-3.14	613.21	0.002645	13.59	4088.56	256.51	0.6
5110	Del. Probandt, Mitchell, Flores, & Furnish	610.34	-3.14	613.21	0.002645	13.59	4088.56	256.51	0.6
5110	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	610.34	-3.14	613.21	0.002645	13.59	4088.56	256.51	0.6
5048	100-year LMMP	613.54		615.3	0.001384	10.64	5220.12	288.63	0.44
5048	Delete Probandt	613.20	-0.34	615.03	0.001429	10.84	5122.33	281.85	0.45
5048	Del. Probandt & Mitchell	612.83	-0.34	614.73	0.001493	11.07	5019.06	276.63	0.46
5048	Del. Probandt, Mitchell & Flores	610.46	-3.08	612.95	0.002145	12.67	4382.91	259.34	0.54
5048	Del. Probandt, Mitchell, Flores, & Furnish	610.46	-3.08	612.95	0.002145	12.67	4382.91	259.34	0.54
5048	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	610.46	-3.08	612.95	0.002145	12.67	4382.91	259.34	0.54



River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl	Flow Area	Top	Width	Froude #
<b>S. Flores</b>											
5005											
4962	100-year LMMP	611.24		613.42	0.001753	11.84		4693.3	270.51		0.5
4962	Delete Probandt	610.70	-0.54	613.02	0.001902	12.22		4548.14	263.54		0.51
4962	Del. Probandt & Mitchell	610.31	-0.54	612.74	0.002016	12.49		4447.46	258.58		0.53
4962	Del. Probandt, Mitchell & Flores	610.31	-0.93	612.74	0.002016	12.49		4447.46	258.58		0.53
4962	Del. Probandt, Mitchell, Flores, & Furnish	610.31	-0.93	612.74	0.002016	12.49		4447.46	258.58		0.53
4962	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	610.31	-0.93	612.74	0.002016	12.49		4447.46	258.58		0.53
4876	100-year LMMP	610.71		613.17	0.002039	12.59		4414.3	262.91		0.53
4876	Delete Probandt	610.09	-0.62	612.74	0.002282	13.06		4254.05	253.63		0.56
4876	Del. Probandt & Mitchell	609.64	-0.62	612.43	0.002475	13.42		4139.49	250.81		0.58
4876	Del. Probandt, Mitchell & Flores	609.64	-1.07	612.43	0.002475	13.42		4139.49	250.81		0.58
4876	Del. Probandt, Mitchell, Flores, & Furnish	609.64	-1.07	612.43	0.002475	13.42		4139.49	250.81		0.58
4876	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	609.64	-1.07	612.43	0.002475	13.42		4139.49	250.81		0.58
4683	100-year LMMP	610.20		612.76	0.00211	12.87		4356.49	266.11		0.54
4683	Delete Probandt	609.47	-0.73	612.27	0.002416	13.43		4165.04	262.41		0.58
4683	Del. Probandt & Mitchell	608.92	-0.73	611.91	0.002687	13.89		4020.83	259.48		0.61
4683	Del. Probandt, Mitchell & Flores	608.92	-1.28	611.91	0.002687	13.89		4020.83	259.48		0.61
4683	Del. Probandt, Mitchell, Flores, & Furnish	608.92	-1.28	611.91	0.002687	13.89		4020.83	259.48		0.61
4683	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	608.92	-1.28	611.91	0.002687	13.89		4020.83	259.48		0.61
4402	100-year LMMP	609.07		612.07	0.002518	13.93		4070.23	297.15		0.59
4402	Delete Probandt	608.05	-1.02	611.45	0.003032	14.81		3789.64	252.11		0.64
4402	Del. Probandt & Mitchell	607.16	-1.02	610.96	0.003601	15.67		3568.9	242.56		0.7
4402	Del. Probandt, Mitchell & Flores	607.16	-1.91	610.96	0.003601	15.67		3568.9	242.56		0.7
4402	Del. Probandt, Mitchell, Flores, & Furnish	607.16	-1.91	610.96	0.003601	15.67		3568.9	242.56		0.7
4402	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	607.16	-1.91	610.96	0.003601	15.67		3568.9	242.56		0.7
4100	100-year LMMP	609.08		611.21	0.001621	11.75		5108.89	473.35		0.48
4100	Delete Probandt	607.99	-1.09	610.43	0.001992	12.55		4632.18	405.9		0.53
4100	Del. Probandt & Mitchell	607.01	-1.09	609.77	0.002404	13.33		4269.85	333.99		0.58
4100	Del. Probandt, Mitchell & Flores	607.01	-2.07	609.77	0.002404	13.33		4269.85	333.99		0.58
4100	Del. Probandt, Mitchell, Flores, & Furnish	607.01	-2.07	609.77	0.002404	13.33		4269.85	333.99		0.58
4100	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	607.01	-2.07	609.77	0.002404	13.33		4269.85	333.99		0.58

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
3800	100-year LMMP	608.56		610.72	0.001616	11.96	5363.43	533.18	0.48
3800	Delete Probandt	607.20	-1.36	609.81	0.00208	13.05	4691.38	440.17	0.54
3800	Del. Probandt & Mitchell	605.84	-1.36	608.97	0.002695	14.24	4141.1	368.66	0.61
3800	Del. Probandt, Mitchell & Flores	605.84	-2.72	608.97	0.002695	14.24	4141.1	368.66	0.61
3800	Del. Probandt, Mitchell, Flores, & Furnish	605.84	-2.72	608.97	0.002695	14.24	4141.1	368.66	0.61
3800	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	605.84	-2.72	608.97	0.002695	14.24	4141.1	368.66	0.61
3501	100-year LMMP	608.35		610.17	0.001459	10.98	5877.34	640.83	0.45
3501	Delete Probandt	606.85	-1.50	609.1	0.001957	12.14	5023.87	502.97	0.52
3501	Del. Probandt & Mitchell	605.24	-1.50	608.08	0.002717	13.55	4290.22	397.36	0.6
3501	Del. Probandt, Mitchell & Flores	605.24	-3.11	608.08	0.002717	13.55	4290.22	397.36	0.6
3501	Del. Probandt, Mitchell, Flores, & Furnish	605.24	-3.11	608.08	0.002717	13.55	4290.22	397.36	0.6
3501	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	605.24	-3.11	608.08	0.002717	13.55	4290.22	397.36	0.6
3260	100-year LMMP	608.42		609.73	0.000957	9.34	6966.55	793.29	0.38
3260	Delete Probandt	606.90	-1.52	608.54	0.001306	10.33	5849.39	656.53	0.43
3260	Del. Probandt & Mitchell	605.27	-1.52	607.3	0.001829	11.47	4993.95	402.35	0.5
3260	Del. Probandt, Mitchell & Flores	605.27	-3.15	607.3	0.001829	11.47	4993.95	402.35	0.5
3260	Del. Probandt, Mitchell, Flores, & Furnish	605.27	-3.15	607.3	0.001829	11.47	4993.95	402.35	0.5
3260	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	605.27	-3.15	607.3	0.001829	11.47	4993.95	402.35	0.5
3193	100-year LMMP	608.77		609.5	0.000835	6.9	8827.79	725.07	0.27
3193	Delete Probandt	607.35	-1.42	608.23	0.001075	7.54	7658.03	499.33	0.31
3193	Del. Probandt & Mitchell	605.85	-1.42	606.9	0.001396	8.23	6939.2	458.08	0.35
3193	Del. Probandt, Mitchell & Flores	605.85	-2.92	606.9	0.001396	8.23	6939.2	458.08	0.35
3193	Del. Probandt, Mitchell, Flores, & Furnish	605.85	-2.92	606.9	0.001396	8.23	6939.2	458.08	0.35
3193	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	605.85	-2.92	606.9	0.001396	8.23	6939.2	458.08	0.35
2889	100-year LMMP	608.03		609.14	0.001369	8.61	7397.38	705.33	0.34
2889	Delete Probandt	606.35	-1.68	607.76	0.001791	9.59	6301.9	576.11	0.39
2889	Del. Probandt & Mitchell	604.50	-1.68	606.28	0.002402	10.73	5370.93	398.17	0.45
2889	Del. Probandt, Mitchell & Flores	604.50	-3.53	606.28	0.002402	10.73	5370.93	398.17	0.45
2889	Del. Probandt, Mitchell, Flores, & Furnish	604.50	-3.53	606.28	0.002402	10.73	5370.93	398.17	0.45
2889	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	604.50	-3.53	606.28	0.002402	10.73	5370.93	398.17	0.45

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #
2804	100-year LMMP	607.55		609.01	0.000952	9.77	6367.53	610.18	0.38
2804	Delete Probandt	605.80	-1.75	607.6	0.001253	10.78	5432.82	454.29	0.43
2804	Del. Probandt & Mitchell	603.85	-1.75	606.07	0.001705	11.97	4754.28	278.39	0.49
2804	Del. Probandt, Mitchell & Flores	603.85	-3.70	606.07	0.001705	11.97	4754.28	278.39	0.49
2804	Del. Probandt, Mitchell, Flores, & Furnish	603.85	-3.70	606.07	0.001705	11.97	4754.28	278.39	0.49
2804	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	603.85	-3.70	606.07	0.001705	11.97	4754.28	278.39	0.49
2743	100-year LMMP	607.04		608.9	0.001124	11	5535.62	520.01	0.41
2743	Delete Probandt	605.26	-1.78	607.47	0.001472	11.98	4856.6	280.79	0.47
2743	Del. Probandt & Mitchell	603.17	-1.78	605.9	0.002037	13.31	4330.06	244.76	0.54
2743	Del. Probandt, Mitchell & Flores	603.17	-3.87	605.9	0.002037	13.31	4330.06	244.76	0.54
2743	Del. Probandt, Mitchell, Flores, & Furnish	603.17	-3.87	605.9	0.002037	13.31	4330.06	244.76	0.54
2743	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	603.17	-3.87	605.9	0.002037	13.31	4330.06	244.76	0.54
2707									
W. Mitchell									
2671	100-year LMMP	605.05		607.22	0.001483	11.96	4965.08	276.51	0.47
2671	Delete Probandt	603.03	-2.02	605.74	0.002087	13.34	4416.07	267.85	0.55
2671	Del. Probandt & Mitchell	603.03	-2.02	605.74	0.002087	13.34	4416.07	267.85	0.55
2671	Del. Probandt, Mitchell & Flores	603.03	-2.02	605.74	0.002087	13.34	4416.07	267.85	0.55
2671	Del. Probandt, Mitchell, Flores, & Furnish	603.03	-2.02	605.74	0.002087	13.34	4416.07	267.85	0.55
2671	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	603.03	-2.02	605.74	0.002087	13.34	4416.07	267.85	0.55
2596	100-year LMMP	605.02		607.03	0.001484	11.38	4976.11	271.5	0.46
2596	Delete Probandt	602.97	-2.05	605.49	0.002116	12.76	4428.24	262.87	0.54
2596	Del. Probandt & Mitchell	602.97	-2.05	605.49	0.002116	12.76	4428.24	262.87	0.54
2596	Del. Probandt, Mitchell & Flores	602.97	-2.05	605.49	0.002116	12.76	4428.24	262.87	0.54
2596	Del. Probandt, Mitchell, Flores, & Furnish	602.97	-2.05	605.49	0.002116	12.76	4428.24	262.87	0.54
2596	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	602.97	-2.05	605.49	0.002116	12.76	4428.24	262.87	0.54
2400	100-year LMMP	604.85		606.69	0.001485	10.89	5179.74	291.57	0.46
2400	Delete Probandt	602.64	-2.21	605.03	0.002197	12.41	4544.8	284.27	0.55
2400	Del. Probandt & Mitchell	602.64	-2.21	605.03	0.002197	12.41	4544.8	284.27	0.55
2400	Del. Probandt, Mitchell & Flores	602.64	-2.21	605.03	0.002197	12.41	4544.8	284.27	0.55
2400	Del. Probandt, Mitchell, Flores, & Furnish	602.64	-2.21	605.03	0.002197	12.41	4544.8	284.27	0.55
2400	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	602.64	-2.21	605.03	0.002197	12.41	4544.8	284.27	0.55



River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
14200	100-year LMMP	636.84		636.87	0.000016	1.42	1118.18	294.22	0.09
14200	Delete Probandt	636.84	0.00	636.87	0.000016	1.42	1118.15	294.2	0.09
14200	Del. Probandt & Mitchell	636.84	0.00	636.87	0.000016	1.42	1117.82	294	0.09
14200	Del. Probandt, Mitchell & Flores	636.83	-0.01	636.87	0.000016	1.42	1117.56	293.83	0.09
14200	Del. Probandt, Mitchell, Flores, & Furnish	636.82	-0.02	636.85	0.000016	1.42	1114.21	291.76	0.09
14200	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	636.82	-0.02	636.85	0.000016	1.42	1112.72	290.83	0.09
14106	100-year LMMP	636.51		636.83	0.000095	4.61	1372.19	269.62	0.23
14106	Delete Probandt	636.51	0.00	636.83	0.000095	4.61	1372.16	269.62	0.23
14106	Del. Probandt & Mitchell	636.51	0.00	636.83	0.000095	4.61	1371.85	269.53	0.23
14106	Del. Probandt, Mitchell & Flores	636.51	0.00	636.83	0.000095	4.61	1371.59	269.45	0.23
14106	Del. Probandt, Mitchell, Flores, & Furnish	636.49	-0.02	636.82	0.000096	4.62	1368.3	268.54	0.23
14106	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	636.49	-0.02	636.81	0.000096	4.62	1366.83	268.13	0.23
14052	100-year LMMP	635.99		636.78	0.000498	7.25	997.24	351.73	0.48
14052	Delete Probandt	635.99	0.00	636.78	0.000498	7.25	997.2	351.72	0.48
14052	Del. Probandt & Mitchell	635.99	0.00	636.78	0.000499	7.25	996.6	351.56	0.48
14052	Del. Probandt, Mitchell & Flores	635.99	0.00	636.78	0.000499	7.25	996.12	351.44	0.48
14052	Del. Probandt, Mitchell, Flores, & Furnish	635.97	-0.02	636.76	0.000504	7.27	990.02	349.86	0.49
14052	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	635.96	-0.03	636.76	0.000506	7.28	987.27	349.14	0.49
14013	Guadalupe Street								
13973	100-year LMMP	634.59		636.36	0.00086	10.79	616.54	229.47	0.58
13973	Delete Probandt	634.58	-0.01	636.36	0.00086	10.79	616.48	229.43	0.58
13973	Del. Probandt & Mitchell	634.58	-0.01	636.36	0.000861	10.79	615.4	228.63	0.58
13973	Del. Probandt, Mitchell & Flores	634.58	-0.01	636.36	0.000861	10.8	614.55	228	0.58
13973	Del. Probandt, Mitchell, Flores, & Furnish	634.54	-0.05	636.34	0.000869	10.85	605.83	221.43	0.58
13973	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	634.52	-0.07	636.33	0.000872	10.87	601.3	217.93	0.58
13915	100-year LMMP	635.21		635.68	0.000316	5.62	1263.21	387.58	0.38
13915	Delete Probandt	635.21	0.00	635.68	0.000316	5.62	1263.12	387.56	0.38
13915	Del. Probandt & Mitchell	635.21	0.00	635.68	0.000317	5.62	1261.56	387.18	0.39
13915	Del. Probandt, Mitchell & Flores	635.20	-0.01	635.68	0.000318	5.63	1260.35	386.89	0.39
13915	Del. Probandt, Mitchell, Flores, & Furnish	635.17	-0.04	635.65	0.000324	5.66	1247.58	383.8	0.39
13915	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	635.15	-0.06	635.63	0.000327	5.68	1240.8	382.15	0.39

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
13700	100-year LMMP	634.97		635.58	0.000464	6.41	1063.49	372.93	0.46
13700	Delete Probandt	634.97	0.00	635.58	0.000464	6.41	1063.4	372.9	0.46
13700	Del. Probandt & Mitchell	634.96	-0.01	635.58	0.000465	6.42	1061.63	372.4	0.46
13700	Del. Probandt, Mitchell & Flores	634.96	-0.01	635.58	0.000466	6.42	1060.24	372.01	0.46
13700	Del. Probandt, Mitchell, Flores, & Furnish	634.92	-0.05	635.55	0.000478	6.47	1045.66	367.84	0.46
13700	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	634.90	-0.07	635.53	0.000484	6.5	1037.89	365.6	0.47
13525	100-year LMMP	635.03		635.47	0.000286	5.32	1201.14	412.46	0.37
13525	Delete Probandt	635.03	0.00	635.47	0.000286	5.32	1201.04	412.42	0.37
13525	Del. Probandt & Mitchell	635.03	0.00	635.46	0.000287	5.33	1199.15	411.8	0.37
13525	Del. Probandt, Mitchell & Flores	635.02	-0.01	635.46	0.000288	5.33	1197.67	411.31	0.37
13525	Del. Probandt, Mitchell, Flores, & Furnish	634.99	-0.04	635.43	0.000294	5.37	1182.18	405.48	0.37
13525	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	634.97	-0.06	635.41	0.000297	5.39	1173.95	401.7	0.37
13400	100-year LMMP	634.57		635.39	0.000351	7.41	1039.27	330.08	0.4
13400	Delete Probandt	634.57	0.00	635.39	0.000351	7.41	1039.17	330.06	0.4
13400	Del. Probandt & Mitchell	634.57	0.00	635.38	0.000352	7.41	1037.4	329.76	0.4
13400	Del. Probandt, Mitchell & Flores	634.56	-0.01	635.38	0.000353	7.42	1036.01	329.52	0.4
13400	Del. Probandt, Mitchell, Flores, & Furnish	634.52	-0.05	635.35	0.000359	7.46	1021.44	327	0.4
13400	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	634.49	-0.08	635.33	0.000362	7.49	1013.62	325.64	0.41
13248	100-year LMMP	634.61		635.29	0.000352	6.69	983.49	421.59	0.4
13248	Delete Probandt	634.61	0.00	635.29	0.000352	6.69	983.41	421.55	0.4
13248	Del. Probandt & Mitchell	634.61	0.00	635.29	0.000353	6.69	982.03	420.9	0.4
13248	Del. Probandt, Mitchell & Flores	634.60	-0.01	635.29	0.000353	6.7	980.94	420.39	0.4
13248	Del. Probandt, Mitchell, Flores, & Furnish	634.56	-0.05	635.25	0.00036	6.74	969.63	415.04	0.41
13248	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	634.54	-0.07	635.23	0.000364	6.76	963.6	412.14	0.41
13129	(Long Culvert) Between Camp and Guadalupe								
13010	100-year LMMP	633.68		634.86	0.000525	9.2	1044.96	325.11	0.46
13010	Delete Probandt	633.68	0.00	634.86	0.000525	9.2	1044.74	325.02	0.46
13010	Del. Probandt & Mitchell	633.66	-0.02	634.86	0.000528	9.22	1040.31	323.24	0.46
13010	Del. Probandt, Mitchell & Flores	633.65	-0.03	634.85	0.00053	9.23	1036.8	321.83	0.46
13010	Del. Probandt, Mitchell, Flores, & Furnish	633.54	-0.14	634.78	0.000551	9.35	1002.89	307.82	0.47
13010	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	633.48	-0.20	634.73	0.000564	9.43	982.41	299.05	0.48

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #
12849	100-year LMMP	633.81		634.59	0.000381	7.34	1233.97	331.71	0.43
12849	Delete Probandt	633.81	0.00	634.59	0.000381	7.34	1233.75	331.67	0.43
12849	Del. Probandt & Mitchell	633.80	-0.01	634.58	0.000384	7.35	1229.28	330.89	0.43
12849	Del. Probandt, Mitchell & Flores	633.79	-0.02	634.57	0.000385	7.37	1225.73	330.27	0.43
12849	Del. Probandt, Mitchell, Flores, & Furnish	633.68	-0.13	634.49	0.000404	7.48	1191.04	324.15	0.44
12849	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	633.61	-0.20	634.45	0.000416	7.56	1169.51	320.3	0.45
12791	100-year LMMP	633.37		634.53	0.000544	8.97	1068.55	323.19	0.5
12791	Delete Probandt	633.37	0.00	634.52	0.000544	8.97	1068.27	323.15	0.5
12791	Del. Probandt & Mitchell	633.35	-0.02	634.51	0.000549	9	1062.52	322.37	0.5
12791	Del. Probandt, Mitchell & Flores	633.34	-0.03	634.51	0.000552	9.02	1057.94	321.74	0.5
12791	Del. Probandt, Mitchell, Flores, & Furnish	633.19	-0.18	634.42	0.000587	9.21	1012.52	315.47	0.52
12791	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	633.10	-0.27	634.37	0.000612	9.34	983.65	311.42	0.53
Camp									
12733									
12676	100-year LMMP	633.26		634.01	0.001468	6.98	942.73	213.5	0.39
12676	Delete Probandt	633.25	-0.01	634	0.001473	6.98	940.88	213.11	0.39
12676	Del. Probandt & Mitchell	633.22	-0.04	633.98	0.001487	7	935.38	211.95	0.39
12676	Del. Probandt, Mitchell & Flores	633.20	-0.06	633.96	0.001504	7.03	929.35	210.67	0.4
12676	Del. Probandt, Mitchell, Flores, & Furnish	632.94	-0.32	633.75	0.00166	7.25	876.48	194.6	0.41
12676	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	632.79	-0.47	633.63	0.001756	7.38	848.66	177.36	0.42
12600	100-year LMMP	633.00		633.85	0.001834	7.43	854.11	148.67	0.44
12600	Delete Probandt	632.99	-0.01	633.84	0.00184	7.44	852.68	148.32	0.45
12600	Del. Probandt & Mitchell	632.96	-0.04	633.82	0.00186	7.47	848.43	147.28	0.45
12600	Del. Probandt, Mitchell & Flores	632.93	-0.07	633.8	0.001881	7.5	843.75	146.13	0.45
12600	Del. Probandt, Mitchell, Flores, & Furnish	632.64	-0.36	633.57	0.002097	7.78	802.4	135.54	0.47
12600	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	632.46	-0.54	633.44	0.002239	7.96	779.14	129.2	0.49
12500	100-year LMMP	632.83		633.66	0.001882	7.34	860.63	147.12	0.45
12500	Delete Probandt	632.82	-0.01	633.65	0.001888	7.35	859.11	146.81	0.45
12500	Del. Probandt & Mitchell	632.79	-0.04	633.63	0.001909	7.38	854.54	145.88	0.45
12500	Del. Probandt, Mitchell & Flores	632.75	-0.08	633.6	0.001933	7.41	849.52	144.86	0.45
12500	Del. Probandt, Mitchell, Flores, & Furnish	632.43	-0.40	633.36	0.002166	7.73	804.6	135.33	0.48
12500	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	632.24	-0.59	633.21	0.002323	7.93	778.6	129.49	0.5



River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top	Width	Froude #
12414	100-year LMMP	632.81		633.47	0.001354	6.56	934.93	146.27	0.38	
12414	Delete Probandt	632.80	-0.01	633.47	0.001357	6.57	933.43	145.59	0.38	
12414	Del. Probandt & Mitchell	632.77	-0.04	633.44	0.001368	6.59	928.96	143.52	0.38	
12414	Del. Probandt, Mitchell & Flores	632.73	-0.08	633.41	0.00138	6.62	924.09	141.23	0.39	
12414	Del. Probandt, Mitchell, Flores, & Furnish	632.41	-0.40	633.14	0.001492	6.86	882.75	120.09	0.4	
12414	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	632.22	-0.59	632.98	0.001564	7.01	860.86	107.21	0.41	
<b>S. Alamo</b>										
12325	100-year LMMP	632.14		632.88	0.001706	6.92	870.85	106.2	0.43	
12325	Delete Probandt	632.13	-0.01	632.87	0.00171	6.92	869.94	106.15	0.43	
12325	Del. Probandt & Mitchell	632.10	-0.04	632.85	0.001725	6.94	867.19	105.97	0.43	
12325	Del. Probandt, Mitchell & Flores	632.07	-0.07	632.83	0.001741	6.97	864.05	105.78	0.43	
12325	Del. Probandt, Mitchell, Flores, & Furnish	631.79	-0.35	632.6	0.001919	7.21	834.73	104.39	0.45	
12325	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	631.57	-0.57	632.43	0.002078	7.42	811.87	103.44	0.47	
12279	100-year LMMP	631.78		632.72	0.002595	7.81	771.42	108	0.51	
12279	Delete Probandt	631.77	-0.01	632.72	0.002605	7.82	770.31	107.93	0.52	
12279	Del. Probandt & Mitchell	631.73	-0.05	632.69	0.002637	7.85	766.86	107.7	0.52	
12279	Del. Probandt, Mitchell & Flores	631.70	-0.08	632.67	0.002673	7.89	762.93	107.43	0.52	
12279	Del. Probandt, Mitchell, Flores, & Furnish	631.34	-0.44	632.41	0.003066	8.3	725.17	104.86	0.56	
12279	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	631.04	-0.74	632.21	0.003449	8.67	694.19	102.69	0.59	
12031	100-year LMMP	631.49		632.16	0.001506	6.77	1097.87	243.39	0.4	
12031	Delete Probandt	631.48	-0.01	632.15	0.001513	6.78	1094.81	243.06	0.41	
12031	Del. Probandt & Mitchell	631.44	-0.05	632.12	0.001537	6.82	1085.34	242.04	0.41	
12031	Del. Probandt, Mitchell & Flores	631.40	-0.09	632.09	0.001564	6.87	1074.49	240.86	0.41	
12031	Del. Probandt, Mitchell, Flores, & Furnish	630.94	-0.55	631.75	0.001876	7.39	967.05	229.51	0.45	
12031	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	630.52	-0.97	631.46	0.002244	7.9	872.46	222.67	0.49	
11897	100-year LMMP	631.51		631.93	0.000927	5.34	1307.66	228.69	0.32	
11897	Delete Probandt	631.50	-0.01	631.92	0.000931	5.35	1304.83	228.51	0.32	
11897	Del. Probandt & Mitchell	631.46	-0.05	631.89	0.000945	5.38	1296.28	227.99	0.32	
11897	Del. Probandt, Mitchell & Flores	631.41	-0.10	631.85	0.000961	5.41	1286.23	227.36	0.33	
11897	Del. Probandt, Mitchell, Flores, & Furnish	630.97	-0.54	631.46	0.001146	5.77	1185.42	220.81	0.35	
11897	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	630.55	-0.96	631.12	0.001352	6.13	1096.18	212.69	0.38	

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top	Width	Froude #
11821	100-year LMMP	631.33		631.84	0.00102	5.75	1047.42	134.86	0.34	
11821	Delete Probandt	631.32	-0.01	631.83	0.001024	5.76	1045.97	134.67	0.34	
11821	Del. Probandt & Mitchell	631.28	-0.05	631.8	0.001039	5.78	1041.56	134.12	0.34	
11821	Del. Probandt, Mitchell & Flores	631.24	-0.09	631.76	0.001056	5.81	1036.38	133.48	0.34	
11821	Del. Probandt, Mitchell, Flores, & Furnish	630.78	-0.55	631.36	0.001258	6.12	983.48	125.5	0.37	
11821	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	630.36	-0.97	631	0.001471	6.44	934.85	116.82	0.4	
11794										
<b>R.R. U/S of W. Cevallos &amp; D/S of S. Alamo</b>										
11768	100-year LMMP	631.13		631.57	0.000853	5.36	1124.38	132.33	0.31	
11768	Delete Probandt	631.11	-0.02	631.56	0.000856	5.36	1122.77	132.24	0.31	
11768	Del. Probandt & Mitchell	631.07	-0.06	631.52	0.000868	5.39	1117.95	131.99	0.31	
11768	Del. Probandt, Mitchell & Flores	631.03	-0.10	631.48	0.000882	5.41	1112.28	131.7	0.31	
11768	Del. Probandt, Mitchell, Flores, & Furnish	630.55	-0.58	631.05	0.001004	5.71	1055.2	124.25	0.33	
11768	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	630.10	-1.03	630.66	0.001131	6	1004.18	117.1	0.35	
11680	100-year LMMP	630.87		631.45	0.001153	6.1	1011.48	168.98	0.36	
11680	Delete Probandt	630.85	-0.02	631.43	0.001159	6.11	1009.03	167.9	0.36	
11680	Del. Probandt & Mitchell	630.81	-0.06	631.4	0.001175	6.14	1001.73	164.64	0.36	
11680	Del. Probandt, Mitchell & Flores	630.76	-0.11	631.35	0.001195	6.18	993.34	160.81	0.36	
11680	Del. Probandt, Mitchell, Flores, & Furnish	630.23	-0.64	630.9	0.001416	6.57	918.67	121.56	0.39	
11680	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	629.73	-1.14	630.49	0.001665	6.96	864.91	103.13	0.42	
11500	100-year LMMP	630.74		631.24	0.000919	5.64	1068.37	110.93	0.32	
11500	Delete Probandt	630.73	-0.01	631.22	0.000923	5.65	1066.7	110.84	0.32	
11500	Del. Probandt & Mitchell	630.68	-0.06	631.18	0.000934	5.67	1061.68	110.55	0.32	
11500	Del. Probandt, Mitchell & Flores	630.63	-0.11	631.13	0.000948	5.7	1055.79	110.22	0.32	
11500	Del. Probandt, Mitchell, Flores, & Furnish	630.08	-0.66	630.65	0.001103	6.05	995.96	106.77	0.35	
11500	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	629.55	-1.19	630.19	0.001291	6.4	940.45	104.15	0.38	
11300	100-year LMMP	630.46		631.03	0.001092	6.07	1008.75	130.04	0.35	
11300	Delete Probandt	630.44	-0.02	631.01	0.001097	6.08	1006.59	129.73	0.35	
11300	Del. Probandt & Mitchell	630.39	-0.07	630.97	0.001115	6.12	1000.11	128.77	0.35	
11300	Del. Probandt, Mitchell & Flores	630.33	-0.13	630.92	0.001137	6.16	992.53	127.65	0.35	
11300	Del. Probandt, Mitchell, Flores, & Furnish	629.71	-0.75	630.39	0.001392	6.6	917.19	115.19	0.39	
11300	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	629.10	-1.36	629.88	0.001715	7.08	850.6	102.05	0.43	

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
11189	100-year LMMP	630.43		630.89	0.000869	5.41	1149	234.01	0.31
11189	Delete Probandt	630.42	-0.01	630.87	0.000873	5.42	1145.05	231.51	0.31
11189	Del. Probandt & Mitchell	630.36	-0.07	630.82	0.000885	5.45	1133.41	223.98	0.31
11189	Del. Probandt, Mitchell & Flores	630.30	-0.13	630.77	0.000899	5.48	1120.19	215.12	0.32
11189	Del. Probandt, Mitchell, Flores, & Furnish	629.67	-0.76	630.21	0.001066	5.88	1024.86	111.86	0.34
11189	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	629.05	-1.38	629.66	0.00128	6.3	956.11	107.87	0.37
11160	100-year LMMP	630.46		630.84	0.000693	4.98	1261.8	280.81	0.28
11160	Delete Probandt	630.44	-0.02	630.83	0.000696	4.99	1257.09	278.01	0.28
11160	Del. Probandt & Mitchell	630.39	-0.07	630.78	0.000706	5.02	1243.19	269.57	0.28
11160	Del. Probandt, Mitchell & Flores	630.33	-0.13	630.73	0.000717	5.05	1227.36	259.63	0.28
11160	Del. Probandt, Mitchell, Flores, & Furnish	629.71	-0.75	630.16	0.00085	5.4	1116.19	116.33	0.31
11160	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	629.09	-1.37	629.6	0.001018	5.76	1045.12	113	0.33
11130									
W. Cevallos									
11100	100-year LMMP	629.65		630.14	0.000949	5.65	1065.26	112.86	0.32
11100	Delete Probandt	629.63	-0.02	630.13	0.000953	5.66	1063.48	112.75	0.32
11100	Del. Probandt & Mitchell	629.58	-0.07	630.09	0.000965	5.69	1058.14	112.4	0.33
11100	Del. Probandt, Mitchell & Flores	629.53	-0.12	630.04	0.00098	5.73	1051.86	112	0.33
11100	Del. Probandt, Mitchell, Flores, & Furnish	628.94	-0.71	629.52	0.001151	6.1	987.24	107.86	0.36
11100	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.94	-0.71	629.52	0.001151	6.1	987.24	107.86	0.36
11012	100-year LMMP	629.65		630.01	0.000637	4.79	1257.94	127.79	0.27
11012	Delete Probandt	629.63	-0.02	629.99	0.000639	4.79	1255.93	127.69	0.27
11012	Del. Probandt & Mitchell	629.59	-0.06	629.95	0.000648	4.82	1249.86	127.39	0.27
11012	Del. Probandt, Mitchell & Flores	629.53	-0.12	629.9	0.000658	4.85	1242.72	127.04	0.27
11012	Del. Probandt, Mitchell, Flores, & Furnish	628.94	-0.71	629.35	0.000775	5.15	1168.87	123.35	0.29
11012	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.94	-0.71	629.35	0.000775	5.15	1168.87	123.35	0.29
10800	100-year LMMP	629.58		629.87	0.000475	4.29	1403.9	188.47	0.23
10800	Delete Probandt	629.57	-0.01	629.85	0.000477	4.3	1401.74	188.11	0.23
10800	Del. Probandt & Mitchell	629.52	-0.06	629.81	0.000483	4.32	1395.19	187.01	0.24
10800	Del. Probandt, Mitchell & Flores	629.46	-0.12	629.75	0.00049	4.34	1387.48	185.73	0.24
10800	Del. Probandt, Mitchell, Flores, & Furnish	628.86	-0.72	629.19	0.000577	4.61	1307.36	172.29	0.26
10800	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.86	-0.72	629.19	0.000577	4.61	1307.36	172.29	0.26



River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
10500	100-year LMMP	629.52		629.73	0.000314	3.73	1616.2	140.09	0.19
10500	Delete Probandt	629.50	-0.02	629.72	0.000315	3.73	1613.92	139.99	0.19
10500	Del. Probandt & Mitchell	629.45	-0.07	629.67	0.000319	3.75	1607.01	139.69	0.19
10500	Del. Probandt, Mitchell & Flores	629.39	-0.13	629.61	0.000323	3.77	1598.88	139.33	0.2
10500	Del. Probandt, Mitchell, Flores, & Furnish	628.78	-0.74	629.02	0.000373	3.98	1514.36	135.55	0.21
10500	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.78	-0.74	629.02	0.000373	3.98	1514.36	135.55	0.21
10200	100-year LMMP	629.50		629.64	0.000186	3.02	1997.24	160.91	0.15
10200	Delete Probandt	629.48	-0.02	629.62	0.000186	3.02	1994.6	160.77	0.15
10200	Del. Probandt & Mitchell	629.43	-0.07	629.58	0.000188	3.03	1986.62	160.33	0.15
10200	Del. Probandt, Mitchell & Flores	629.37	-0.13	629.52	0.00019	3.05	1977.25	159.81	0.15
10200	Del. Probandt, Mitchell, Flores, & Furnish	628.76	-0.74	628.92	0.000215	3.2	1880.15	154.36	0.16
10200	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.76	-0.74	628.92	0.000215	3.2	1880.15	154.36	0.16
10022	100-year LMMP	629.51		629.6	0.000098	2.39	2759.73	337.44	0.11
10022	Delete Probandt	629.50	-0.01	629.58	0.000098	2.4	2754.2	336.63	0.11
10022	Del. Probandt & Mitchell	629.45	-0.06	629.54	0.000099	2.41	2737.53	334.18	0.11
10022	Del. Probandt, Mitchell & Flores	629.39	-0.12	629.48	0.0001	2.42	2718.06	331.29	0.11
10022	Del. Probandt, Mitchell, Flores, & Furnish	628.77	-0.74	628.87	0.000116	2.54	2522.69	300.79	0.12
10022	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.77	-0.74	628.87	0.000116	2.54	2522.69	300.79	0.12
9900	100-year LMMP	629.53		629.58	0.000079	1.84	3269.72	296.09	0.1
9900	Delete Probandt	629.51	-0.02	629.56	0.00008	1.84	3264.88	295.91	0.1
9900	Del. Probandt & Mitchell	629.46	-0.07	629.51	0.000081	1.85	3250.21	295.33	0.1
9900	Del. Probandt, Mitchell & Flores	629.40	-0.13	629.46	0.000082	1.86	3232.96	294.65	0.1
9900	Del. Probandt, Mitchell, Flores, & Furnish	628.78	-0.75	628.85	0.000096	1.97	3053.23	287.49	0.11
9900	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	628.78	-0.75	628.85	0.000096	1.97	3053.23	287.49	0.11
9500	100-year LMMP	627.37		629.1	0.00132	10.56	5154.65	300.52	0.43
9500	Delete Probandt	627.35	-0.02	629.08	0.001324	10.57	5148.66	298.94	0.43
9500	Del. Probandt & Mitchell	627.28	-0.09	629.03	0.001336	10.61	5130.51	294.14	0.43
9500	Del. Probandt, Mitchell & Flores	627.21	-0.16	628.97	0.001351	10.65	5109.07	288.46	0.44
9500	Del. Probandt, Mitchell, Flores, & Furnish	626.37	-1.00	628.3	0.001523	11.15	4880.53	268.64	0.46
9500	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	626.37	-1.00	628.3	0.001523	11.15	4880.53	268.64	0.46

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
9395	100-year LMMP	627.21		628.9	0.002605	10.43	5230.75	276.29	0.41
9395	Delete Probandt	627.19	-0.02	628.88	0.002613	10.44	5224.65	276.04	0.41
9395	Del. Probandt & Mitchell	627.12	-0.09	628.83	0.00264	10.47	5206.14	275.27	0.42
9395	Del. Probandt, Mitchell & Flores	627.04	-0.17	628.76	0.002673	10.52	5184.28	274.36	0.42
9395	Del. Probandt, Mitchell, Flores, & Furnish	626.18	-1.03	628.06	0.003089	11	4950.1	268.39	0.45
9395	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	626.18	-1.03	628.06	0.003089	11	4950.1	268.39	0.45
9348	100-year LMMP	627.13		628.78	0.002093	10.31	5276.71	284.34	0.42
9348	Delete Probandt	627.11	-0.02	628.76	0.0021	10.33	5270.29	284.18	0.42
9348	Del. Probandt & Mitchell	627.04	-0.09	628.71	0.002121	10.36	5250.78	283.67	0.42
9348	Del. Probandt, Mitchell & Flores	626.96	-0.17	628.64	0.002146	10.41	5227.72	282.97	0.43
9348	Del. Probandt, Mitchell, Flores, & Furnish	626.07	-1.06	627.92	0.002419	10.92	4981.11	274.37	0.45
9348	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	626.07	-1.06	627.92	0.002419	10.92	4981.11	274.37	0.45
9319									
<b>So. Pacific Railroad</b>									
9290	100-year LMMP	626.26		627.94	0.002108	10.42	5224.95	286.66	0.43
9290	Delete Probandt	626.23	-0.03	627.92	0.002116	10.43	5217.54	286.29	0.43
9290	Del. Probandt & Mitchell	626.15	-0.11	627.86	0.00214	10.48	5195.02	285.16	0.43
9290	Del. Probandt, Mitchell & Flores	626.06	-0.20	627.78	0.002169	10.53	5168.44	283.82	0.43
9290	Del. Probandt, Mitchell, Flores, & Furnish	625.04	-1.22	626.96	0.002415	11.14	4885.05	269	0.46
9290	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	625.04	-1.22	626.96	0.002415	11.14	4885.05	269	0.46
9233	100-year LMMP	625.99		627.79	0.002045	10.78	5056.78	278.9	0.43
9233	Delete Probandt	625.96	-0.03	627.77	0.002054	10.79	5049.3	278.45	0.44
9233	Del. Probandt & Mitchell	625.88	-0.11	627.7	0.00208	10.84	5026.65	277.06	0.44
9233	Del. Probandt, Mitchell & Flores	625.78	-0.21	627.62	0.002112	10.89	4999.9	275.4	0.44
9233	Del. Probandt, Mitchell, Flores, & Furnish	624.71	-1.28	626.78	0.002502	11.54	4714.28	260.69	0.48
9233	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	624.71	-1.28	626.78	0.002502	11.54	4714.28	260.69	0.48
9100	100-year LMMP	625.23		627.39	0.003878	11.78	4621.91	274.32	0.49
9100	Delete Probandt	625.20	-0.03	627.36	0.0039	11.8	4613.38	271.6	0.49
9100	Del. Probandt & Mitchell	625.11	-0.12	627.29	0.003969	11.86	4587.98	263.34	0.49
9100	Del. Probandt, Mitchell & Flores	624.99	-0.24	627.21	0.004052	11.94	4558.73	253.93	0.5
9100	Del. Probandt, Mitchell, Flores, & Furnish	623.72	-1.51	626.28	0.004876	12.83	4240.71	245.47	0.54
9100	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	623.72	-1.51	626.28	0.004876	12.83	4240.71	245.47	0.54

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #
8900	100-year LMMP	625.52		626.68	0.001276	8.69	6703.35	700.96	0.36
8900	Delete Probandt	625.48	-0.04	626.65	0.001284	8.71	6680.96	696.28	0.36
8900	Del. Probandt & Mitchell	625.39	-0.13	626.57	0.001309	8.76	6613.78	682.06	0.37
8900	Del. Probandt, Mitchell & Flores	625.27	-0.25	626.47	0.00134	8.82	6535.54	665.12	0.37
8900	Del. Probandt, Mitchell, Flores, & Furnish	623.97	-1.55	625.39	0.001743	9.56	5843.73	399.74	0.42
8900	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	623.97	-1.55	625.39	0.001743	9.56	5843.73	399.74	0.42
8754	100-year LMMP	624.64		626.4	0.001934	10.78	5990.71	787.6	0.43
8754	Delete Probandt	624.60	-0.04	626.37	0.001952	10.81	5957.71	786.6	0.43
8754	Del. Probandt & Mitchell	624.47	-0.17	626.28	0.002006	10.91	5857.28	783.55	0.44
8754	Del. Probandt, Mitchell & Flores	624.32	-0.32	626.17	0.002073	11.04	5737.18	779.89	0.44
8754	Del. Probandt, Mitchell, Flores, & Furnish	621.82	-2.82	624.87	0.003719	14.02	3985.06	280.72	0.57
8754	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	621.82	-2.82	624.87	0.003719	14.02	3985.06	280.72	0.57
Furnish Street									
8720									
8686	100-year LMMP	622.08		624.63	0.005097	12.81	4364.32	332.74	0.54
8686	Delete Probandt	622.03	-0.05	624.59	0.005152	12.85	4346.53	328.09	0.55
8686	Del. Probandt & Mitchell	621.81	-0.27	624.71	0.005136	13.66	4081.88	295.81	0.56
8686	Del. Probandt, Mitchell & Flores	621.55	-0.53	624.54	0.005387	13.86	4015.22	281.11	0.58
8686	Del. Probandt, Mitchell, Flores, & Furnish	621.55	-0.53	624.54	0.005387	13.86	4015.22	281.11	0.58
8686	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	621.55	-0.53	624.54	0.005387	13.86	4015.22	281.11	0.58
8500	100-year LMMP	621.52		623.88	0.002548	12.34	4502.95	317.78	0.58
8500	Delete Probandt	621.46	-0.06	623.84	0.002572	12.39	4483.23	316.53	0.58
8500	Del. Probandt & Mitchell	621.39	-0.13	623.8	0.002597	12.45	4462.92	315.24	0.58
8500	Del. Probandt, Mitchell & Flores	621.10	-0.42	623.61	0.002715	12.71	4370.88	309.32	0.6
8500	Del. Probandt, Mitchell, Flores, & Furnish	621.10	-0.42	623.61	0.002715	12.71	4370.88	309.32	0.6
8500	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	621.10	-0.42	623.61	0.002715	12.71	4370.88	309.32	0.6
8137	100-year LMMP	620.72		622.88	0.002661	11.87	4927.46	479.81	0.57
8137	Delete Probandt	620.64	-0.08	622.83	0.00272	11.95	4887.37	477.03	0.58
8137	Del. Probandt & Mitchell	620.55	-0.17	622.77	0.002783	12.03	4845.77	474.13	0.58
8137	Del. Probandt, Mitchell & Flores	620.13	-0.59	622.52	0.003108	12.45	4652.1	460.39	0.61
8137	Del. Probandt, Mitchell, Flores, & Furnish	620.13	-0.59	622.52	0.003108	12.45	4652.1	460.39	0.61
8137	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	620.13	-0.59	622.52	0.003108	12.45	4652.1	460.39	0.61



River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
7963	100-year LMMP	620.13		622.45	0.002107	12.24	4556.3	401.98	0.54
7963	Delete Probandt	620.04	-0.09	622.39	0.002139	12.31	4521.76	401.3	0.54
7963	Del. Probandt & Mitchell	619.95	-0.18	622.33	0.002171	12.38	4491.66	289.99	0.55
7963	Del. Probandt, Mitchell & Flores	619.53	-0.60	622.04	0.002334	12.71	4371.9	282.41	0.56
7963	Del. Probandt, Mitchell, Flores, & Furnish	619.53	-0.60	622.04	0.002334	12.71	4371.9	282.41	0.56
7963	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	619.53	-0.60	622.04	0.002334	12.71	4371.9	282.41	0.56
7735	100-year LMMP	619.80		621.95	0.001839	11.77	4717.53	279.36	0.5
7735	Delete Probandt	619.71	-0.09	621.89	0.001861	11.84	4692.37	278.12	0.51
7735	Del. Probandt & Mitchell	619.62	-0.18	621.82	0.001884	11.9	4666.47	276.84	0.51
7735	Del. Probandt, Mitchell & Flores	619.17	-0.63	621.49	0.001997	12.22	4545.26	270.76	0.53
7735	Del. Probandt, Mitchell, Flores, & Furnish	619.17	-0.63	621.49	0.001997	12.22	4545.26	270.76	0.53
7735	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	619.17	-0.63	621.49	0.001997	12.22	4545.26	270.76	0.53
7590	100-year LMMP	619.73		621.64	0.001465	11.09	5016.28	294.12	0.46
7590	Delete Probandt	619.64	-0.09	621.57	0.001488	11.14	4989.71	291.25	0.46
7590	Del. Probandt & Mitchell	619.55	-0.18	621.5	0.001512	11.2	4962.51	288.29	0.46
7590	Del. Probandt, Mitchell & Flores	619.10	-0.63	621.15	0.001633	11.48	4837.06	274.2	0.48
7590	Del. Probandt, Mitchell, Flores, & Furnish	619.10	-0.63	621.15	0.001633	11.48	4837.06	274.2	0.48
7590	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	619.10	-0.63	621.15	0.001633	11.48	4837.06	274.2	0.48
7522	100-year LMMP	619.66		621.53	0.001447	10.98	5067.38	306.38	0.45
7522	Delete Probandt	619.57	-0.09	621.46	0.00147	11.04	5039.27	302.01	0.46
7522	Del. Probandt & Mitchell	619.47	-0.19	621.38	0.001494	11.1	5010.62	297.49	0.46
7522	Del. Probandt, Mitchell & Flores	619.02	-0.64	621.03	0.001616	11.38	4880.21	275.99	0.48
7522	Del. Probandt, Mitchell, Flores, & Furnish	619.02	-0.64	621.03	0.001616	11.38	4880.21	275.99	0.48
7522	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	619.02	-0.64	621.03	0.001616	11.38	4880.21	275.99	0.48
7478									
	<b>Nogalitos</b>								
7435	100-year LMMP	617.93		619.91	0.001635	11.3	4913.91	282.26	0.48
7435	Delete Probandt	617.82	-0.11	619.83	0.001665	11.38	4882.98	281.69	0.48
7435	Del. Probandt & Mitchell	617.71	-0.22	619.74	0.001696	11.45	4851.79	281.12	0.49
7435	Del. Probandt, Mitchell & Flores	617.18	-0.75	619.35	0.001854	11.81	4704.58	278.4	0.51
7435	Del. Probandt, Mitchell, Flores, & Furnish	617.18	-0.75	619.35	0.001854	11.81	4704.58	278.4	0.51
7435	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	617.18	-0.75	619.35	0.001854	11.81	4704.58	278.4	0.51

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
7356	100-year LMMP	617.14		619.62	0.002195	12.62	4400.02	267.22	0.55
7356	Delete Probandt	617.01	-0.13	619.52	0.002246	12.73	4364.69	266.49	0.55
7356	Del. Probandt & Mitchell	616.87	-0.27	619.43	0.0023	12.83	4328.76	265.75	0.56
7356	Del. Probandt, Mitchell & Flores	616.21	-0.93	618.99	0.002588	13.37	4154.28	262.12	0.59
7356	Del. Probandt, Mitchell, Flores, & Furnish	616.21	-0.93	618.99	0.002588	13.37	4154.28	262.12	0.59
7356	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	616.21	-0.93	618.99	0.002588	13.37	4154.28	262.12	0.59
7100	100-year LMMP	616.72		619.03	0.001979	12.21	4561.14	285.66	0.52
7100	Delete Probandt	616.57	-0.15	618.93	0.002033	12.32	4519.34	285.26	0.53
7100	Del. Probandt & Mitchell	616.42	-0.30	618.82	0.00209	12.43	4476.56	284.85	0.54
7100	Del. Probandt, Mitchell & Flores	615.68	-1.04	618.31	0.002374	13	4272.31	263.43	0.57
7100	Del. Probandt, Mitchell, Flores, & Furnish	615.68	-1.04	618.31	0.002374	13	4272.31	263.43	0.57
7100	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	615.68	-1.04	618.31	0.002374	13	4272.31	263.43	0.57
6800	100-year LMMP	616.26		618.43	0.001808	11.91	5164.34	578.74	0.5
6800	Delete Probandt	616.08	-0.18	618.31	0.001873	12.06	5062.53	572.04	0.51
6800	Del. Probandt & Mitchell	615.90	-0.36	618.19	0.001942	12.21	4958.96	563.33	0.52
6800	Del. Probandt, Mitchell & Flores	614.99	-1.27	617.6	0.002326	13	4469.8	512.62	0.56
6800	Del. Probandt, Mitchell, Flores, & Furnish	614.99	-1.27	617.6	0.002326	13	4469.8	512.62	0.56
6800	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	614.99	-1.27	617.6	0.002326	13	4469.8	512.62	0.56
6500	100-year LMMP	615.86		617.87	0.001622	11.51	5507.38	600.91	0.48
6500	Delete Probandt	615.66	-0.20	617.73	0.001686	11.66	5389.3	590.37	0.49
6500	Del. Probandt & Mitchell	615.46	-0.40	617.59	0.001756	11.83	5268.74	579.41	0.5
6500	Del. Probandt, Mitchell & Flores	614.40	-1.46	616.89	0.002172	12.73	4687.74	514.59	0.55
6500	Del. Probandt, Mitchell, Flores, & Furnish	614.40	-1.46	616.89	0.002172	12.73	4687.74	514.59	0.55
6500	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	614.40	-1.46	616.89	0.002172	12.73	4687.74	514.59	0.55
6200	100-year LMMP	615.52		617.37	0.001415	11.08	5759.79	541.8	0.45
6200	Delete Probandt	615.31	-0.21	617.21	0.001472	11.23	5647.4	526.65	0.46
6200	Del. Probandt & Mitchell	615.09	-0.43	617.05	0.001533	11.39	5533.6	510.85	0.47
6200	Del. Probandt, Mitchell & Flores	613.94	-1.58	616.22	0.001899	12.24	4989.82	438.27	0.52
6200	Del. Probandt, Mitchell, Flores, & Furnish	613.94	-1.58	616.22	0.001899	12.24	4989.82	438.27	0.52
6200	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	613.94	-1.58	616.22	0.001899	12.24	4989.82	438.27	0.52

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top	Width	Froude #
5900	100-year LMMP	615.30		616.86	0.001379	10.13	6055.5	728.46	0.44	
5900	Delete Probandt	615.06	-0.24	616.69	0.001455	10.31	5886.76	703.57	0.45	
5900	Del. Probandt & Mitchell	614.81	-0.49	616.51	0.00154	10.5	5715.66	677.35	0.46	
5900	Del. Probandt, Mitchell & Flores	613.49	-1.81	615.56	0.002075	11.56	4920.47	507.27	0.53	
5900	Del. Probandt, Mitchell, Flores, & Furnish	613.49	-1.81	615.56	0.002075	11.56	4920.47	507.27	0.53	
5900	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	613.49	-1.81	615.56	0.002075	11.56	4920.47	507.27	0.53	
5600	100-year LMMP	614.21		616.33	0.001844	11.76	5070.91	514.29	0.51	
5600	Delete Probandt	613.91	-0.30	616.12	0.001972	12.01	4916.17	498.98	0.52	
5600	Del. Probandt & Mitchell	613.57	-0.64	615.9	0.002124	12.29	4750.91	490.11	0.54	
5600	Del. Probandt, Mitchell & Flores	611.62	-2.59	614.69	0.00323	14.08	3954.35	305.23	0.65	
5600	Del. Probandt, Mitchell, Flores, & Furnish	611.62	-2.59	614.69	0.00323	14.08	3954.35	305.23	0.65	
5600	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	611.62	-2.59	614.69	0.00323	14.08	3954.35	305.23	0.65	
5300	100-year LMMP	613.92		615.76	0.001475	10.95	5500.21	545.7	0.46	
5300	Delete Probandt	613.59	-0.33	615.51	0.001573	11.2	5320.63	530.28	0.47	
5300	Del. Probandt & Mitchell	613.22	-0.70	615.25	0.00169	11.47	5129.5	513.36	0.49	
5300	Del. Probandt, Mitchell & Flores	611.00	-2.92	613.72	0.002584	13.24	4194.59	269.38	0.59	
5300	Del. Probandt, Mitchell, Flores, & Furnish	611.00	-2.92	613.72	0.002584	13.24	4194.59	269.38	0.59	
5300	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	611.00	-2.92	613.72	0.002584	13.24	4194.59	269.38	0.59	
5110	100-year LMMP	613.48		615.46	0.001538	11.28	5058.06	494.11	0.47	
5110	Delete Probandt	613.13	-0.35	615.19	0.001642	11.52	4884.91	488.86	0.48	
5110	Del. Probandt & Mitchell	612.76	-0.72	614.91	0.001745	11.77	4740.93	318.22	0.49	
5110	Del. Probandt, Mitchell & Flores	610.34	-3.14	613.21	0.002645	13.59	4088.56	256.51	0.6	
5110	Del. Probandt, Mitchell, Flores, & Furnish	610.34	-3.14	613.21	0.002645	13.59	4088.56	256.51	0.6	
5110	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	610.34	-3.14	613.21	0.002645	13.59	4088.56	256.51	0.6	
5048	100-year LMMP	613.54		615.3	0.001384	10.64	5220.12	288.63	0.44	
5048	Delete Probandt	613.20	-0.34	615.03	0.001429	10.84	5122.33	281.85	0.45	
5048	Del. Probandt & Mitchell	612.83	-0.71	614.73	0.001493	11.07	5019.06	276.63	0.46	
5048	Del. Probandt, Mitchell & Flores	610.46	-3.08	612.95	0.002145	12.67	4382.91	259.34	0.54	
5048	Del. Probandt, Mitchell, Flores, & Furnish	610.46	-3.08	612.95	0.002145	12.67	4382.91	259.34	0.54	
5048	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	610.46	-3.08	612.95	0.002145	12.67	4382.91	259.34	0.54	



River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #
S. Flores									
5005									
4962	100-year LMMP	611.24		613.42	0.001753	11.84	4693.3	270.51	0.5
4962	Delete Probandt	610.70	-0.54	613.02	0.001902	12.22	4548.14	263.54	0.51
4962	Del. Probandt & Mitchell	610.31	-0.93	612.74	0.002016	12.49	4447.46	258.58	0.53
4962	Del. Probandt, Mitchell & Flores	610.31	-0.93	612.74	0.002016	12.49	4447.46	258.58	0.53
4962	Del. Probandt, Mitchell, Flores, & Furnish	610.31	-0.93	612.74	0.002016	12.49	4447.46	258.58	0.53
4962	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	610.31	-0.93	612.74	0.002016	12.49	4447.46	258.58	0.53
4876	100-year LMMP	610.71		613.17	0.002039	12.59	4414.3	262.91	0.53
4876	Delete Probandt	610.09	-0.62	612.74	0.002282	13.06	4254.05	253.63	0.56
4876	Del. Probandt & Mitchell	609.64	-1.07	612.43	0.002475	13.42	4139.49	250.81	0.58
4876	Del. Probandt, Mitchell & Flores	609.64	-1.07	612.43	0.002475	13.42	4139.49	250.81	0.58
4876	Del. Probandt, Mitchell, Flores, & Furnish	609.64	-1.07	612.43	0.002475	13.42	4139.49	250.81	0.58
4876	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	609.64	-1.07	612.43	0.002475	13.42	4139.49	250.81	0.58
4683	100-year LMMP	610.20		612.76	0.00211	12.87	4356.49	266.11	0.54
4683	Delete Probandt	609.47	-0.73	612.27	0.002416	13.43	4165.04	262.41	0.58
4683	Del. Probandt & Mitchell	608.92	-1.28	611.91	0.002687	13.89	4020.83	259.48	0.61
4683	Del. Probandt, Mitchell & Flores	608.92	-1.28	611.91	0.002687	13.89	4020.83	259.48	0.61
4683	Del. Probandt, Mitchell, Flores, & Furnish	608.92	-1.28	611.91	0.002687	13.89	4020.83	259.48	0.61
4683	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	608.92	-1.28	611.91	0.002687	13.89	4020.83	259.48	0.61
4402	100-year LMMP	609.07		612.07	0.002518	13.93	4070.23	297.15	0.59
4402	Delete Probandt	608.05	-1.02	611.45	0.003032	14.81	3789.64	252.11	0.64
4402	Del. Probandt & Mitchell	607.16	-1.91	610.96	0.003601	15.67	3568.9	242.56	0.7
4402	Del. Probandt, Mitchell & Flores	607.16	-1.91	610.96	0.003601	15.67	3568.9	242.56	0.7
4402	Del. Probandt, Mitchell, Flores, & Furnish	607.16	-1.91	610.96	0.003601	15.67	3568.9	242.56	0.7
4402	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	607.16	-1.91	610.96	0.003601	15.67	3568.9	242.56	0.7
4100	100-year LMMP	609.08		611.21	0.001621	11.75	5108.89	473.35	0.48
4100	Delete Probandt	607.99	-1.09	610.43	0.001992	12.55	4632.18	405.9	0.53
4100	Del. Probandt & Mitchell	607.01	-2.07	609.77	0.002404	13.33	4269.85	333.99	0.58
4100	Del. Probandt, Mitchell & Flores	607.01	-2.07	609.77	0.002404	13.33	4269.85	333.99	0.58
4100	Del. Probandt, Mitchell, Flores, & Furnish	607.01	-2.07	609.77	0.002404	13.33	4269.85	333.99	0.58
4100	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	607.01	-2.07	609.77	0.002404	13.33	4269.85	333.99	0.58

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #
3800	100-year LMMP	608.56		610.72	0.001616	11.96	5363.43	533.18	0.48
3800	Delete Probandt	607.20	-1.36	609.81	0.00208	13.05	4691.38	440.17	0.54
3800	Del. Probandt & Mitchell	605.84	-2.72	608.97	0.002695	14.24	4141.1	368.66	0.61
3800	Del. Probandt, Mitchell & Flores	605.84	-2.72	608.97	0.002695	14.24	4141.1	368.66	0.61
3800	Del. Probandt, Mitchell, Flores, & Furnish	605.84	-2.72	608.97	0.002695	14.24	4141.1	368.66	0.61
3800	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	605.84	-2.72	608.97	0.002695	14.24	4141.1	368.66	0.61
3501	100-year LMMP	608.35		610.17	0.001459	10.98	5877.34	640.83	0.45
3501	Delete Probandt	606.85	-1.50	609.1	0.001957	12.14	5023.87	502.97	0.52
3501	Del. Probandt & Mitchell	605.24	-3.11	608.08	0.002717	13.55	4290.22	397.36	0.6
3501	Del. Probandt, Mitchell & Flores	605.24	-3.11	608.08	0.002717	13.55	4290.22	397.36	0.6
3501	Del. Probandt, Mitchell, Flores, & Furnish	605.24	-3.11	608.08	0.002717	13.55	4290.22	397.36	0.6
3501	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	605.24	-3.11	608.08	0.002717	13.55	4290.22	397.36	0.6
3260	100-year LMMP	608.42		609.73	0.000957	9.34	6966.55	793.29	0.38
3260	Delete Probandt	606.90	-1.52	608.54	0.001306	10.33	5849.39	656.53	0.43
3260	Del. Probandt & Mitchell	605.27	-3.15	607.3	0.001829	11.47	4993.95	402.35	0.5
3260	Del. Probandt, Mitchell & Flores	605.27	-3.15	607.3	0.001829	11.47	4993.95	402.35	0.5
3260	Del. Probandt, Mitchell, Flores, & Furnish	605.27	-3.15	607.3	0.001829	11.47	4993.95	402.35	0.5
3260	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	605.27	-3.15	607.3	0.001829	11.47	4993.95	402.35	0.5
3193	100-year LMMP	608.77		609.5	0.000835	6.9	8827.79	725.07	0.27
3193	Delete Probandt	607.35	-1.42	608.23	0.001075	7.54	7658.03	499.33	0.31
3193	Del. Probandt & Mitchell	605.85	-2.92	606.9	0.001396	8.23	6939.2	458.08	0.35
3193	Del. Probandt, Mitchell & Flores	605.85	-2.92	606.9	0.001396	8.23	6939.2	458.08	0.35
3193	Del. Probandt, Mitchell, Flores, & Furnish	605.85	-2.92	606.9	0.001396	8.23	6939.2	458.08	0.35
3193	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	605.85	-2.92	606.9	0.001396	8.23	6939.2	458.08	0.35
2889	100-year LMMP	608.03		609.14	0.001369	8.61	7397.38	705.33	0.34
2889	Delete Probandt	606.35	-1.68	607.76	0.001791	9.59	6301.9	576.11	0.39
2889	Del. Probandt & Mitchell	604.50	-3.53	606.28	0.002402	10.73	5370.93	398.17	0.45
2889	Del. Probandt, Mitchell & Flores	604.50	-3.53	606.28	0.002402	10.73	5370.93	398.17	0.45
2889	Del. Probandt, Mitchell, Flores, & Furnish	604.50	-3.53	606.28	0.002402	10.73	5370.93	398.17	0.45
2889	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	604.50	-3.53	606.28	0.002402	10.73	5370.93	398.17	0.45





River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
2194	100-year LMMP	604.33		606.35	0.001605	11.4	4950.05	279.21	0.48
2194	Delete Probandt	601.78	-2.55	604.51	0.002526	13.27	4250.26	268.46	0.59
2194	Del. Probandt & Mitchell	601.78	-2.55	604.51	0.002526	13.27	4250.26	268.46	0.59
2194	Del. Probandt, Mitchell & Flores	601.78	-2.55	604.51	0.002526	13.27	4250.26	268.46	0.59
2194	Del. Probandt, Mitchell, Flores, & Furnish	601.78	-2.55	604.51	0.002526	13.27	4250.26	268.46	0.59
2194	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	601.78	-2.55	604.51	0.002526	13.27	4250.26	268.46	0.59
2000	100-year LMMP	604.05		606.03	0.0016	11.31	4988.45	280.18	0.47
2000	Delete Probandt	601.27	-2.78	604.02	0.002506	13.31	4236.85	261.79	0.58
2000	Del. Probandt & Mitchell	601.27	-2.78	604.02	0.002506	13.31	4236.85	261.79	0.58
2000	Del. Probandt, Mitchell & Flores	601.27	-2.78	604.02	0.002506	13.31	4236.85	261.79	0.58
2000	Del. Probandt, Mitchell, Flores, & Furnish	601.27	-2.78	604.02	0.002506	13.31	4236.85	261.79	0.58
2000	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	601.27	-2.78	604.02	0.002506	13.31	4236.85	261.79	0.58
1795	100-year LMMP	603.90		605.67	0.001335	10.67	5293.42	288.62	0.44
1795	Delete Probandt	600.95	-2.95	603.45	0.002327	12.68	4447.04	281.49	0.56
1795	Del. Probandt & Mitchell	600.95	-2.95	603.45	0.002327	12.68	4447.04	281.49	0.56
1795	Del. Probandt, Mitchell & Flores	600.95	-2.95	603.45	0.002327	12.68	4447.04	281.49	0.56
1795	Del. Probandt, Mitchell, Flores, & Furnish	600.95	-2.95	603.45	0.002327	12.68	4447.04	281.49	0.56
1795	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	600.95	-2.95	603.45	0.002327	12.68	4447.04	281.49	0.56
1600	100-year LMMP	603.87		605.33	0.001174	9.68	5839.7	334.65	0.41
1600	Delete Probandt	600.78	-3.09	602.91	0.00212	11.7	4819.67	319.41	0.53
1600	Del. Probandt & Mitchell	600.78	-3.09	602.91	0.00212	11.7	4819.67	319.41	0.53
1600	Del. Probandt, Mitchell & Flores	600.78	-3.09	602.91	0.00212	11.7	4819.67	319.41	0.53
1600	Del. Probandt, Mitchell, Flores, & Furnish	600.78	-3.09	602.91	0.00212	11.7	4819.67	319.41	0.53
1600	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	600.78	-3.09	602.91	0.00212	11.7	4819.67	319.41	0.53
1300	100-year LMMP	603.26		604.96	0.001141	10.46	5413.23	270.97	0.41
1300	Delete Probandt	599.81	-3.45	602.26	0.001988	12.56	4497.32	258.94	0.53
1300	Del. Probandt & Mitchell	599.81	-3.45	602.26	0.001988	12.56	4497.32	258.94	0.53
1300	Del. Probandt, Mitchell & Flores	599.81	-3.45	602.26	0.001988	12.56	4497.32	258.94	0.53
1300	Del. Probandt, Mitchell, Flores, & Furnish	599.81	-3.45	602.26	0.001988	12.56	4497.32	258.94	0.53
1300	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	599.81	-3.45	602.26	0.001988	12.56	4497.32	258.94	0.53

River Sta	Plan	W.S. Elev	W.S. Diff.	E.G. Elev	E.G. Slope	Vel	Chnl Flow Area	Top Width	Froude #
1000	100-year LMMP	603.04		604.59	0.000996	10.01	5662.19	276.45	0.38
1000	Delete Probandt	599.34	-3.70	601.63	0.001885	12.14	4646.41	268.06	0.51
1000	Del. Probandt & Mitchell	599.34	-3.70	601.63	0.001885	12.14	4646.41	268.06	0.51
1000	Del. Probandt, Mitchell & Flores	599.34	-3.70	601.63	0.001885	12.14	4646.41	268.06	0.51
1000	Del. Probandt, Mitchell, Flores, & Furnish	599.34	-3.70	601.63	0.001885	12.14	4646.41	268.06	0.51
1000	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	599.34	-3.70	601.63	0.001885	12.14	4646.41	268.06	0.51
776	100-year LMMP	602.77		604.37	0.000986	10.16	5606.54	268.49	0.38
776	Delete Probandt	598.80	-3.97	601.2	0.001898	12.43	4558.28	260.85	0.52
776	Del. Probandt & Mitchell	598.80	-3.97	601.2	0.001898	12.43	4558.28	260.85	0.52
776	Del. Probandt, Mitchell & Flores	598.80	-3.97	601.2	0.001898	12.43	4558.28	260.85	0.52
776	Del. Probandt, Mitchell, Flores, & Furnish	598.80	-3.97	601.2	0.001898	12.43	4558.28	260.85	0.52
776	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	598.80	-3.97	601.2	0.001898	12.43	4558.28	260.85	0.52
722	100-year LMMP	602.77		604.29	0.000894	9.9	5716.18	259.45	0.37
722	Delete Probandt	598.81	-3.96	601.05	0.00171	12.02	4693.89	256.23	0.49
722	Del. Probandt & Mitchell	598.81	-3.96	601.05	0.00171	12.02	4693.89	256.23	0.49
722	Del. Probandt, Mitchell & Flores	598.81	-3.96	601.05	0.00171	12.02	4693.89	256.23	0.49
722	Del. Probandt, Mitchell, Flores, & Furnish	598.81	-3.96	601.05	0.00171	12.02	4693.89	256.23	0.49
722	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	598.81	-3.96	601.05	0.00171	12.02	4693.89	256.23	0.49
686									
	<b>Probandt</b>								
649	100-year LMMP	598.76		600.86	0.001581	11.63	4864.72	267.01	0.48
649	Delete Probandt	598.76		600.86	0.001581	11.63	4864.72	267.01	0.48
649	Del. Probandt & Mitchell	598.76		600.86	0.001581	11.63	4864.72	267.01	0.48
649	Del. Probandt, Mitchell & Flores	598.76		600.86	0.001581	11.63	4864.72	267.01	0.48
649	Del. Probandt, Mitchell, Flores, & Furnish	598.76		600.86	0.001581	11.63	4864.72	267.01	0.48
649	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	598.76		600.86	0.001581	11.63	4864.72	267.01	0.48
578	100-year LMMP	598.32		600.67	0.001803	12.29	4620.41	265.21	0.5
578	Delete Probandt	598.32		600.67	0.001803	12.29	4620.41	265.21	0.5
578	Del. Probandt & Mitchell	598.32		600.67	0.001803	12.29	4620.41	265.21	0.5
578	Del. Probandt, Mitchell & Flores	598.32		600.67	0.001803	12.29	4620.41	265.21	0.5
578	Del. Probandt, Mitchell, Flores, & Furnish	598.32		600.67	0.001803	12.29	4620.41	265.21	0.5
578	Del. Probandt, Mitchell, Flores, Furnish & Cevallos	598.32		600.67	0.001803	12.29	4620.41	265.21	0.5

HEC-RAS results comparing the effects of removing combinations of bridges on  
San Pedro Creek up to Guadalupe



River Sta	Plan	Q Total	W.S. Elev	W.S. Diff.
<b>17302</b>	<b>2nd Ped Bridge U/S of Dolorosa</b>			
<b>17298.5*</b>	100-LMMP	979	640.36	
	Delete Probandt Bridge	979	640.36	0.00
	Delete Probandt and W. Mitchell Bridges	979	640.36	0.00
	Delete Probandt, W. Mitchell and S. Flores Bridges	979	640.36	0.00
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	979	640.36	0.00
	Delete P, M, Flor, N, and Fur	979	640.36	0.00
	Delete P, M, Flor, N, Fur, and Cev	979	640.35	-0.01
	Delete P, M, Flor, N, Fur, and Camp	979	640.35	-0.01
	Delete P, M, Flor, N, Fur, Camp, and MBC	979	640.35	-0.01
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	979	640.35	-0.01
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	979	640.35	-0.01
<b>17254</b>	100-LMMP	1498	638.35	
	Delete Probandt Bridge	1498	638.35	0.00
	Delete Probandt and W. Mitchell Bridges	1498	638.35	0.00
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	638.35	0.00
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	638.35	0.00
	Delete P, M, Flor, N, and Fur	1498	638.35	0.00
	Delete P, M, Flor, N, Fur, and Cev	1498	638.35	0.00
	Delete P, M, Flor, N, Fur, and Camp	1498	638.34	-0.01
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	638.33	-0.02
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	638.33	-0.02
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	638.35	0.00
<b>17237</b>	<b>1st Ped Bridge U/S of Dolorosa</b>			
<b>17221</b>	100-LMMP	1498	638.09	
	Delete Probandt Bridge	1498	638.09	0.00
	Delete Probandt and W. Mitchell Bridges	1498	638.09	0.00
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	638.10	0.01
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	638.10	0.01
	Delete P, M, Flor, N, and Fur	1498	638.09	0.00
	Delete P, M, Flor, N, Fur, and Cev	1498	638.09	0.00
	Delete P, M, Flor, N, Fur, and Camp	1498	638.07	-0.02
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	638.04	-0.05
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	638.04	-0.05
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	638.09	0.00
<b>17164</b>	<b>Dolorosa Street</b>			
<b>17117</b>	100-LMMP	1498	638.06	
	Delete Probandt Bridge	1498	638.06	0.00
	Delete Probandt and W. Mitchell Bridges	1498	638.06	0.00
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	638.06	0.00
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	638.05	-0.01
	Delete P, M, Flor, N, and Fur	1498	638.05	-0.01
	Delete P, M, Flor, N, Fur, and Cev	1498	638.05	-0.01
	Delete P, M, Flor, N, Fur, and Camp	1498	638.02	-0.04
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	637.97	-0.09
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	637.96	-0.10
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	637.90	-0.16

River Sta	Plan	Q Total	W.S. Elev	W.S. Diff.
<b>17054</b>	<b>100-LMMP</b>	1498	638.57	
	Delete Probandt Bridge	1498	638.57	0.00
	Delete Probandt and W. Mitchell Bridges	1498	638.57	0.00
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	638.57	0.00
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	638.57	0.00
	Delete P, M, Flor, N, and Fur	1498	638.56	-0.01
	Delete P, M, Flor, N, Fur, and Cev	1498	638.56	-0.01
	Delete P, M, Flor, N, Fur, and Camp	1498	638.54	-0.03
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	638.50	-0.07
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	638.50	-0.07
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	638.45	-0.12
<b>16790</b>	<b>100-LMMP</b>	1498	637.10	
	Delete Probandt Bridge	1498	637.10	0.00
	Delete Probandt and W. Mitchell Bridges	1498	637.10	0.00
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	637.10	0.00
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	637.10	0.00
	Delete P, M, Flor, N, and Fur	1498	637.09	-0.01
	Delete P, M, Flor, N, Fur, and Cev	1498	637.08	-0.02
	Delete P, M, Flor, N, Fur, and Camp	1498	637.03	-0.07
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	636.93	-0.17
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	636.92	-0.18
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	636.78	-0.32
<b>16694</b>	<b>Nueva Street</b>			
<b>16653</b>	<b>100-LMMP</b>	1498	637.60	
	Delete Probandt Bridge	1498	637.60	0.00
	Delete Probandt and W. Mitchell Bridges	1498	637.59	-0.01
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	637.59	-0.01
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	637.59	-0.01
	Delete P, M, Flor, N, and Fur	1498	637.58	-0.02
	Delete P, M, Flor, N, Fur, and Cev	1498	637.58	-0.02
	Delete P, M, Flor, N, Fur, and Camp	1498	637.53	-0.07
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	637.45	-0.15
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	637.43	-0.17
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	637.29	-0.31
<b>16575</b>	<b>100-LMMP</b>	1498	637.68	
	Delete Probandt Bridge	1498	637.68	0.00
	Delete Probandt and W. Mitchell Bridges	1498	637.68	0.00
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	637.67	-0.01
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	637.67	-0.01
	Delete P, M, Flor, N, and Fur	1498	637.66	-0.02
	Delete P, M, Flor, N, Fur, and Cev	1498	637.66	-0.02
	Delete P, M, Flor, N, Fur, and Camp	1498	637.62	-0.06
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	637.53	-0.15
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	637.52	-0.16
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	637.38	-0.30

River Sta	Plan	Q Total	W.S. Elev	W.S. Diff.
<b>16500</b>	<b>100-LMMP</b>	1498	637.65	
	Delete Probandt Bridge	1498	637.65	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	1498	637.64	<b>-0.01</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	637.64	<b>-0.01</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	637.64	<b>-0.01</b>
	Delete P, M, Flor, N, and Fur	1498	637.63	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Camp	1498	637.58	<b>-0.07</b>
	Delete P, M, Flor, N, Fur, and Cev	1498	637.63	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	637.50	<b>-0.15</b>
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	637.48	<b>-0.17</b>
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	637.35	<b>-0.30</b>
<b>16300</b>	<b>100-LMMP</b>	1498	637.05	
	Delete Probandt Bridge	1498	637.05	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	1498	637.05	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	637.05	<b>0.00</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	637.04	<b>-0.01</b>
	Delete P, M, Flor, N, and Fur	1498	637.03	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Cev	1498	637.03	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Camp	1498	636.97	<b>-0.08</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	636.86	<b>-0.19</b>
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	636.85	<b>-0.20</b>
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	636.68	<b>-0.37</b>
<b>16175</b>	<b>100-LMMP</b>	1498	637.11	
	Delete Probandt Bridge	1498	637.11	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	1498	637.11	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	637.11	<b>0.00</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	637.10	<b>-0.01</b>
	Delete P, M, Flor, N, and Fur	1498	637.09	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Cev	1498	637.09	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Camp	1498	637.03	<b>-0.08</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	636.93	<b>-0.18</b>
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	636.91	<b>-0.20</b>
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	636.74	<b>-0.37</b>
<b>16111</b>	<b>100-LMMP</b>	1498	637.17	
	Delete Probandt Bridge	1498	637.17	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	1498	637.17	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	637.17	<b>0.00</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	637.17	<b>0.00</b>
	Delete P, M, Flor, N, and Fur	1498	637.16	<b>-0.01</b>
	Delete P, M, Flor, N, Fur, and Cev	1498	637.15	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Camp	1498	637.10	<b>-0.07</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	636.99	<b>-0.18</b>
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	636.98	<b>-0.19</b>
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	636.81	<b>-0.36</b>
<b>16069</b>	<b>Miller St. / Pedestrian Crossing</b>			



River Sta	Plan	Q Total	W.S. Elev	W.S. Diff.
<b>16028</b>	<b>100-LMMP</b>	1498	637.16	
	Delete Probandt Bridge	1498	637.16	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	1498	637.15	<b>-0.01</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	637.15	<b>-0.01</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	637.15	<b>-0.01</b>
	Delete P, M, Flor, N, and Fur	1498	637.14	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Cev	1498	637.13	<b>-0.03</b>
	Delete P, M, Flor, N, Fur, and Camp	1498	637.08	<b>-0.08</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	636.98	<b>-0.18</b>
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	636.96	<b>-0.20</b>
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	636.79	<b>-0.37</b>
<b>15900</b>	<b>100-LMMP</b>	1498	637.20	
	Delete Probandt Bridge	1498	637.20	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	1498	637.20	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	637.19	<b>-0.01</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	637.19	<b>-0.01</b>
	Delete P, M, Flor, N, and Fur	1498	637.18	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Cev	1498	637.17	<b>-0.03</b>
	Delete P, M, Flor, N, Fur, and Camp	1498	637.12	<b>-0.08</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	637.02	<b>-0.18</b>
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	637.00	<b>-0.20</b>
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	636.84	<b>-0.36</b>
<b>15785</b>	<b>100-LMMP</b>	1498	637.35	
	Delete Probandt Bridge	1498	637.35	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	1498	637.35	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	637.35	<b>0.00</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	637.34	<b>-0.01</b>
	Delete P, M, Flor, N, and Fur	1498	637.33	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Cev	1498	637.33	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Camp	1498	637.28	<b>-0.07</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	637.18	<b>-0.17</b>
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	637.16	<b>-0.19</b>
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	637.00	<b>-0.35</b>
<b>15074</b>	<b>4 Box MBC from Durango to Arsenal</b>			
<b>14362</b>	<b>100-LMMP</b>	1498	636.82	
	Delete Probandt Bridge	1498	636.82	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	1498	636.82	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	636.82	<b>0.00</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	636.82	<b>0.00</b>
	Delete P, M, Flor, N, and Fur	1498	636.81	<b>-0.01</b>
	Delete P, M, Flor, N, Fur, and Cev	1498	636.80	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Camp	1498	636.75	<b>-0.07</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	636.65	<b>-0.17</b>
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	636.64	<b>-0.18</b>
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	636.48	<b>-0.34</b>

River Sta	Plan	Q Total	W.S. Elev	W.S. Diff.
<b>14200</b>	<b>100-LMMP</b>	1498	636.84	
	Delete Probandt Bridge	1498	636.84	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	1498	636.84	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	1498	636.83	<b>-0.01</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	1498	636.83	<b>-0.01</b>
	Delete P, M, Flor, N, and Fur	1498	636.82	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Cev	1498	636.82	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Camp	1498	636.77	<b>-0.07</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	1498	636.67	<b>-0.17</b>
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	1498	636.65	<b>-0.19</b>
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	1498	636.50	<b>-0.34</b>
<b>14106</b>	<b>100-LMMP</b>	5387	636.51	
	Delete Probandt Bridge	5387	636.51	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	5387	636.51	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	5387	636.51	<b>0.00</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	5387	636.50	<b>-0.01</b>
	Delete P, M, Flor, N, and Fur	5387	636.49	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Cev	5387	636.49	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Camp	5387	636.43	<b>-0.08</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	5387	636.33	<b>-0.18</b>
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	5387	636.31	<b>-0.20</b>
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	5387	636.14	<b>-0.37</b>
<b>14052</b>	<b>100-LMMP</b>	5387	635.99	
	Delete Probandt Bridge	5387	635.99	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	5387	635.99	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	5387	635.99	<b>0.00</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	5387	635.98	<b>-0.01</b>
	Delete P, M, Flor, N, and Fur	5387	635.97	<b>-0.02</b>
	Delete P, M, Flor, N, Fur, and Cev	5387	635.96	<b>-0.03</b>
	Delete P, M, Flor, N, Fur, and Camp	5387	635.88	<b>-0.11</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	5387	635.73	<b>-0.26</b>
	Delete P, M, N, Flor, Fur, Cev, A, Camp, and G	5387	635.70	<b>-0.29</b>
	Delete P, M, Flo, N, Fur, Cev, Camp, MBC, and G	5387	635.44	<b>-0.55</b>
<b>14013</b>	<b>Guadalupe Street</b>			
<b>13973</b>	<b>100-LMMP</b>	5387	634.59	
	Delete Probandt Bridge	5387	634.58	<b>-0.01</b>
	Delete Probandt and W. Mitchell Bridges	5387	634.58	<b>-0.01</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	5387	634.58	<b>-0.01</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	5387	634.56	<b>-0.03</b>
	Delete P, M, Flor, N, and Fur	5387	634.53	<b>-0.06</b>
	Delete P, M, Flor, N, Fur, and Cev	5387	634.51	<b>-0.08</b>
	Delete P, M, Flor, N, Fur, and Camp	5387	634.32	<b>-0.27</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	5387	633.92	<b>-0.67</b>
<b>13915</b>	<b>100-LMMP</b>	5387	635.21	
	Delete Probandt Bridge	5387	635.21	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	5387	635.21	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	5387	635.20	<b>-0.01</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	5387	635.19	<b>-0.02</b>
	Delete P, M, Flor, N, and Fur	5387	635.16	<b>-0.05</b>
	Delete P, M, Flor, N, Fur, and Cev	5387	635.15	<b>-0.06</b>
	Delete P, M, Flor, N, Fur, and Camp	5387	634.98	<b>-0.23</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	5387	634.63	<b>-0.58</b>

<b>River Sta</b>	<b>Plan</b>	<b>Q Total</b>	<b>W.S. Elev</b>	<b>W.S. Diff.</b>
<b>13700</b>	<b>100-LMMP</b>	5387	634.97	
	Delete Probandt Bridge	5387	634.97	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	5387	634.96	<b>-0.01</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	5387	634.96	<b>-0.01</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	5387	634.94	<b>-0.03</b>
	Delete P, M, Flor, N, and Fur	5387	634.91	<b>-0.06</b>
	Delete P, M, Flor, N, Fur, and Cev	5387	634.89	<b>-0.08</b>
	Delete P, M, Flor, N, Fur, and Camp	5387	634.69	<b>-0.28</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	5387	634.23	<b>-0.74</b>
<b>13525</b>	<b>100-LMMP</b>	5387	635.03	
	Delete Probandt Bridge	5387	635.03	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	5387	635.03	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	5387	635.02	<b>-0.01</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	5387	635.01	<b>-0.02</b>
	Delete P, M, Flor, N, and Fur	5387	634.98	<b>-0.05</b>
	Delete P, M, Flor, N, Fur, and Cev	5387	634.96	<b>-0.07</b>
	Delete P, M, Flor, N, Fur, and Camp	5387	634.77	<b>-0.26</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	5387	634.34	<b>-0.69</b>
<b>13400</b>	<b>100-LMMP</b>	5387	634.57	
	Delete Probandt Bridge	5387	634.57	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	5387	634.57	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	5387	634.56	<b>-0.01</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	5387	634.54	<b>-0.03</b>
	Delete P, M, Flor, N, and Fur	5387	634.51	<b>-0.06</b>
	Delete P, M, Flor, N, Fur, and Cev	5387	634.48	<b>-0.09</b>
	Delete P, M, Flor, N, Fur, and Camp	5387	634.26	<b>-0.31</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	5387	633.75	<b>-0.82</b>
<b>13248</b>	<b>100-LMMP</b>	5387	634.61	
	Delete Probandt Bridge	5387	634.61	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	5387	634.61	<b>0.00</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	5387	634.60	<b>-0.01</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	5387	634.59	<b>-0.02</b>
	Delete P, M, Flor, N, and Fur	5387	634.55	<b>-0.06</b>
	Delete P, M, Flor, N, Fur, and Cev	5387	634.53	<b>-0.08</b>
	Delete P, M, Flor, N, Fur, and Camp	5387	634.31	<b>-0.30</b>
	Delete P, M, Flor, N, Fur, Camp, and MBC	5387	633.81	<b>-0.80</b>
<b>13129</b>	<b>(Long Culvert) Between Camp and Guadalupe</b>			
<b>13010</b>	<b>100-LMMP</b>	5387	633.68	
	Delete Probandt Bridge	5387	633.68	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	5387	633.66	<b>-0.02</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	5387	633.65	<b>-0.03</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	5387	633.61	<b>-0.07</b>
	Delete P, M, Flor, N, and Fur	5387	633.51	<b>-0.17</b>
	Delete P, M, Flor, N, Fur, and Cev	5387	633.46	<b>-0.22</b>
	Delete P, M, Flor, N, Fur, and Camp	5387	632.84	<b>-0.84</b>



River Sta	Plan	Q Total	W.S. Elev	W.S. Diff.
<b>12849</b>	<b>100-LMMP</b>	6022	633.81	
	Delete Probandt Bridge	6022	633.81	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	6022	633.80	<b>-0.01</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	633.79	<b>-0.02</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	633.74	<b>-0.07</b>
	Delete P, M, Flor, N, and Fur	6022	633.65	<b>-0.16</b>
	Delete P, M, Flor, N, Fur, and Camp	6022	632.97	<b>-0.84</b>
	Delete P, M, Flor, N, Fur, and Cev	6022	633.60	<b>-0.21</b>
<b>12791</b>	<b>100-LMMP</b>	6022	633.37	
	Delete Probandt Bridge	6022	633.37	<b>0.00</b>
	Delete Probandt and W. Mitchell Bridges	6022	633.35	<b>-0.02</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	633.34	<b>-0.03</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	633.28	<b>-0.09</b>
	Delete P, M, Flor, N, and Fur	6022	633.15	<b>-0.22</b>
	Delete P, M, Flor, N, Fur, and Cev	6022	633.08	<b>-0.29</b>
	Delete P, M, Flor, N, Fur, and Camp	6022	632.15	<b>-1.22</b>
<b>12733</b>	<b>Camp</b>			
<b>12676</b>	<b>100-LMMP</b>	6022	633.26	
	Delete Probandt Bridge	6022	633.25	<b>-0.01</b>
	Delete Probandt and W. Mitchell Bridges	6022	633.22	<b>-0.04</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	633.20	<b>-0.06</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	633.08	<b>-0.18</b>
	Delete P, M, Flor, N, and Fur	6022	632.85	<b>-0.41</b>
	Delete P, M, Flor, N, Fur, and Cev	6022	632.74	<b>-0.52</b>
<b>12600</b>	<b>100-LMMP</b>	6022	633.00	
	Delete Probandt Bridge	6022	632.99	<b>-0.01</b>
	Delete Probandt and W. Mitchell Bridges	6022	632.96	<b>-0.04</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	632.93	<b>-0.07</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	632.80	<b>-0.20</b>
	Delete P, M, Flor, N, and Fur	6022	632.54	<b>-0.46</b>
	Delete P, M, Flor, N, Fur, and Cev	6022	632.40	<b>-0.60</b>
<b>12500</b>	<b>100-LMMP</b>	6022	632.83	
	Delete Probandt Bridge	6022	632.82	<b>-0.01</b>
	Delete Probandt and W. Mitchell Bridges	6022	632.79	<b>-0.04</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	632.75	<b>-0.08</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	632.61	<b>-0.22</b>
	Delete P, M, Flor, N, and Fur	6022	632.32	<b>-0.51</b>
	Delete P, M, Flor, N, Fur, and Cev	6022	632.17	<b>-0.66</b>
<b>12414</b>	<b>100-LMMP</b>	6022	632.81	
	Delete Probandt Bridge	6022	632.80	<b>-0.01</b>
	Delete Probandt and W. Mitchell Bridges	6022	632.77	<b>-0.04</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	632.73	<b>-0.08</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	632.59	<b>-0.22</b>
	Delete P, M, Flor, N, and Fur	6022	632.30	<b>-0.51</b>
	Delete P, M, Flor, N, Fur, and Cev	6022	632.16	<b>-0.65</b>
<b>12369</b>	<b>S. Alamo</b>			

<b>River Sta Plan</b>	<b>Q Total</b>	<b>W.S. Elev</b>	<b>W.S. Diff.</b>
<b>12325 100-LMMP</b>	6022	632.14	
Delete Probandt Bridge	6022	632.13	-0.01
Delete Probandt and W. Mitchell Bridges	6022	632.10	-0.04
Delete Probandt, W. Mitchell and S. Flores Bridges	6022	632.07	-0.07
Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	631.95	-0.19
Delete P, M, Flor, N, and Fur	6022	631.68	-0.46
Delete P, M, Flor, N, Fur, and Cev	6022	631.49	-0.65
<b>12279 100-LMMP</b>	6022	631.78	
Delete Probandt Bridge	6022	631.77	-0.01
Delete Probandt and W. Mitchell Bridges	6022	631.73	-0.05
Delete Probandt, W. Mitchell and S. Flores Bridges	6022	631.70	-0.08
Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	631.55	-0.23
Delete P, M, Flor, N, and Fur	6022	631.19	-0.59
Delete P, M, Flor, N, Fur, and Cev	6022	630.93	-0.85
<b>12031 100-LMMP</b>	6022	631.49	
Delete Probandt Bridge	6022	631.48	-0.01
Delete Probandt and W. Mitchell Bridges	6022	631.44	-0.05
Delete Probandt, W. Mitchell and S. Flores Bridges	6022	631.40	-0.09
Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	631.20	-0.29
Delete P, M, Flor, N, and Fur	6022	630.73	-0.76
Delete P, M, Flor, N, Fur, and Cev	6022	630.35	-1.14
<b>11897 100-LMMP</b>	6022	631.51	
Delete Probandt Bridge	6022	631.50	-0.01
Delete Probandt and W. Mitchell Bridges	6022	631.46	-0.05
Delete Probandt, W. Mitchell and S. Flores Bridges	6022	631.41	-0.10
Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	631.23	-0.28
Delete P, M, Flor, N, and Fur	6022	630.76	-0.75
Delete P, M, Flor, N, Fur, and Cev	6022	630.39	-1.12
<b>11821 100-LMMP</b>	6022	631.33	
Delete Probandt Bridge	6022	631.32	-0.01
Delete Probandt and W. Mitchell Bridges	6022	631.28	-0.05
Delete Probandt, W. Mitchell and S. Flores Bridges	6022	631.24	-0.09
Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	631.05	-0.28
Delete P, M, Flor, N, and Fur	6022	630.57	-0.76
Delete P, M, Flor, N, Fur, and Cev	6022	630.19	-1.14
<b>11794</b>	<b>R.R. U/S of W. Cevallos &amp; D/S of S. Alamo</b>		
<b>11768 100-LMMP</b>	6022	631.13	
Delete Probandt Bridge	6022	631.11	-0.02
Delete Probandt and W. Mitchell Bridges	6022	631.07	-0.06
Delete Probandt, W. Mitchell and S. Flores Bridges	6022	631.03	-0.10
Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	630.83	-0.30
Delete P, M, Flor, N, and Fur	6022	630.33	-0.80
Delete P, M, Flor, N, Fur, and Cev	6022	629.93	-1.20
<b>11680 100-LMMP</b>	6022	630.87	
Delete Probandt Bridge	6022	630.85	-0.02
Delete Probandt and W. Mitchell Bridges	6022	630.81	-0.06
Delete Probandt, W. Mitchell and S. Flores Bridges	6022	630.76	-0.11
Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	630.54	-0.33
Delete P, M, Flor, N, and Fur	6022	629.99	-0.88
Delete P, M, Flor, N, Fur, and Cev	6022	629.53	-1.34

River Sta	Plan	Q Total	W.S. Elev	W.S. Diff.
<b>11500</b>	<b>100-LMMP</b>	6022	630.74	
	Delete Probandt Bridge	6022	630.73	<b>-0.01</b>
	Delete Probandt and W. Mitchell Bridges	6022	630.68	<b>-0.06</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	630.63	<b>-0.11</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	630.40	<b>-0.34</b>
	Delete P, M, Flor, N, and Fur	6022	629.82	<b>-0.92</b>
	Delete P, M, Flor, N, Fur, and Cev	6022	629.33	<b>-1.41</b>
<b>11300</b>	<b>100-LMMP</b>	6022	630.46	
	Delete Probandt Bridge	6022	630.44	<b>-0.02</b>
	Delete Probandt and W. Mitchell Bridges	6022	630.39	<b>-0.07</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	630.33	<b>-0.13</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	630.08	<b>-0.38</b>
	Delete P, M, Flor, N, and Fur	6022	629.42	<b>-1.04</b>
	Delete P, M, Flor, N, Fur, and Cev	6022	628.84	<b>-1.62</b>
<b>11189</b>	<b>100-LMMP</b>	6022	630.43	
	Delete Probandt Bridge	6022	630.42	<b>-0.01</b>
	Delete Probandt and W. Mitchell Bridges	6022	630.36	<b>-0.07</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	630.30	<b>-0.13</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	630.04	<b>-0.39</b>
	Delete P, M, Flor, N, and Fur	6022	629.37	<b>-1.06</b>
	Delete P, M, Flor, N, Fur, and Cev	6022	628.78	<b>-1.65</b>
<b>11160</b>	<b>100-LMMP</b>	6022	630.46	
	Delete Probandt Bridge	6022	630.44	<b>-0.02</b>
	Delete Probandt and W. Mitchell Bridges	6022	630.39	<b>-0.07</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	630.33	<b>-0.13</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	630.07	<b>-0.39</b>
	Delete P, M, Flor, N, and Fur	6022	629.41	<b>-1.05</b>
	Delete P, M, Flor, N, Fur, and Cev	6022	628.82	<b>-1.64</b>
<b>11130</b>			<b>W. Cevallos</b>	
<b>11100</b>	<b>100-LMMP</b>	6022	629.65	
	Delete Probandt Bridge	6022	629.63	<b>-0.02</b>
	Delete Probandt and W. Mitchell Bridges	6022	629.58	<b>-0.07</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	629.53	<b>-0.12</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	629.29	<b>-0.36</b>
	Delete P, M, Flor, N, and Fur	6022	628.66	<b>-0.99</b>
<b>11012</b>	<b>100-LMMP</b>	6022	629.65	
	Delete Probandt Bridge	6022	629.63	<b>-0.02</b>
	Delete Probandt and W. Mitchell Bridges	6022	629.59	<b>-0.06</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	629.53	<b>-0.12</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	629.29	<b>-0.36</b>
	Delete P, M, Flor, N, and Fur	6022	628.66	<b>-0.99</b>
<b>10800</b>	<b>100-LMMP</b>	6022	629.58	
	Delete Probandt Bridge	6022	629.57	<b>-0.01</b>
	Delete Probandt and W. Mitchell Bridges	6022	629.52	<b>-0.06</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	629.46	<b>-0.12</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	629.21	<b>-0.37</b>
	Delete P, M, Flor, N, and Fur	6022	628.57	<b>-1.01</b>
<b>10500</b>	<b>100-LMMP</b>	6022	629.52	



River Sta	Plan	Q Total	W.S. Elev	W.S. Diff.
	Delete Probandt Bridge	6022	629.50	-0.02
	Delete Probandt and W. Mitchell Bridges	6022	629.45	-0.07
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	629.39	-0.13
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	629.14	-0.38
	Delete P, M, Flor, N, and Fur	6022	628.48	-1.04
<b>10200</b>	100-LMMP	6022	629.50	
	Delete Probandt Bridge	6022	629.48	-0.02
	Delete Probandt and W. Mitchell Bridges	6022	629.43	-0.07
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	629.37	-0.13
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	629.12	-0.38
	Delete P, M, Flor, N, and Fur	6022	628.46	-1.04
<b>10022</b>	100-LMMP	6022	629.51	
	Delete Probandt Bridge	6022	629.50	-0.01
	Delete Probandt and W. Mitchell Bridges	6022	629.45	-0.06
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	629.39	-0.12
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	629.13	-0.38
	Delete P, M, Flor, N, and Fur	6022	628.47	-1.04
<b>9900</b>	100-LMMP	6022	629.53	
	Delete Probandt Bridge	6022	629.51	-0.02
	Delete Probandt and W. Mitchell Bridges	6022	629.46	-0.07
	Delete Probandt, W. Mitchell and S. Flores Bridges	6022	629.40	-0.13
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	6022	629.15	-0.38
	Delete P, M, Flor, N, and Fur	6022	628.49	-1.04
<b>9500</b>	100-LMMP	54418	627.37	
	Delete Probandt Bridge	54418	627.35	-0.02
	Delete Probandt and W. Mitchell Bridges	54418	627.28	-0.09
	Delete Probandt, W. Mitchell and S. Flores Bridges	54418	627.21	-0.16
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	54418	626.87	-0.50
	Delete P, M, Flor, N, and Fur	54418	625.95	-1.42
<b>9395</b>	100-LMMP	54418	627.21	
	Delete Probandt Bridge	54418	627.19	-0.02
	Delete Probandt and W. Mitchell Bridges	54418	627.12	-0.09
	Delete Probandt, W. Mitchell and S. Flores Bridges	54418	627.04	-0.17
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	54418	626.70	-0.51
	Delete P, M, Flor, N, and Fur	54418	625.75	-1.46
<b>9348</b>	100-LMMP	54418	627.13	
	Delete Probandt Bridge	54418	627.11	-0.02
	Delete Probandt and W. Mitchell Bridges	54418	627.04	-0.09
	Delete Probandt, W. Mitchell and S. Flores Bridges	54418	626.96	-0.17
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	54418	626.60	-0.53
	Delete P, M, Flor, N, and Fur	54418	625.63	-1.50
<b>9319</b>	<b>So. Pacific Railroad</b>			
<b>9290</b>	100-LMMP	54418	626.26	
	Delete Probandt Bridge	54418	626.23	-0.03
	Delete Probandt and W. Mitchell Bridges	54418	626.15	-0.11
	Delete Probandt, W. Mitchell and S. Flores Bridges	54418	626.06	-0.20
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	54418	625.65	-0.61
	Delete P, M, Flor, N, and Fur	54418	624.51	-1.75

River Sta	Plan	Q Total	W.S. Elev	W.S. Diff.
<b>9233</b>	100-LMMP	54418	625.99	
	Delete Probandt Bridge	54418	625.96	-0.03
	Delete Probandt and W. Mitchell Bridges	54418	625.88	-0.11
	Delete Probandt, W. Mitchell and S. Flores Bridges	54418	625.78	-0.21
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	54418	625.35	-0.64
	Delete P, M, Flor, N, and Fur	54418	624.14	-1.85
<b>9100</b>	100-LMMP	54418	625.23	
	Delete Probandt Bridge	54418	625.20	-0.03
	Delete Probandt and W. Mitchell Bridges	54418	625.11	-0.12
	Delete Probandt, W. Mitchell and S. Flores Bridges	54418	624.99	-0.24
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	54418	624.49	-0.74
	Delete P, M, Flor, N, and Fur	54418	623.02	-2.21
<b>8900</b>	100-LMMP	55545	625.52	
	Delete Probandt Bridge	55545	625.48	-0.04
	Delete Probandt and W. Mitchell Bridges	55545	625.39	-0.13
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	625.27	-0.25
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	55545	624.76	-0.76
	Delete P, M, Flor, N, and Fur	55545	623.25	-2.27
<b>8754</b>	100-LMMP	55545	624.64	
	Delete Probandt Bridge	55545	624.60	-0.04
	Delete Probandt and W. Mitchell Bridges	55545	624.47	-0.17
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	624.32	-0.32
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	55545	623.60	-1.04
	Delete P, M, Flor, N, and Fur	55545	620.76	-3.88
<b>8720</b>	<b>Furnish Street</b>			
<b>8686</b>	100-LMMP	55545	622.08	
	Delete Probandt Bridge	55545	622.03	-0.05
	Delete Probandt and W. Mitchell Bridges	55545	621.81	-0.27
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	621.55	-0.53
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	55545	620.41	-1.67
<b>8500</b>	100-LMMP	55545	621.52	
	Delete Probandt Bridge	55545	621.46	-0.06
	Delete Probandt and W. Mitchell Bridges	55545	621.39	-0.13
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	621.10	-0.42
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	55545	619.74	-1.78
<b>8137</b>	100-LMMP	55545	620.72	
	Delete Probandt Bridge	55545	620.64	-0.08
	Delete Probandt and W. Mitchell Bridges	55545	620.55	-0.17
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	620.13	-0.59
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	55545	618.45	-2.27
<b>7963</b>	100-LMMP	55545	620.13	
	Delete Probandt Bridge	55545	620.04	-0.09
	Delete Probandt and W. Mitchell Bridges	55545	619.95	-0.18
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	619.53	-0.60
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	55545	617.93	-2.20

<b>River Sta</b>	<b>Plan</b>	<b>Q Total</b>	<b>W.S. Elev</b>	<b>W.S. Diff.</b>
<b>7735</b>	<b>100-LMMP</b>	55545	619.80	
	Delete Probandt Bridge	55545	619.71	<b>-0.09</b>
	Delete Probandt and W. Mitchell Bridges	55545	619.62	<b>-0.18</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	619.17	<b>-0.63</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	55545	617.43	<b>-2.37</b>
<b>7590</b>	<b>100-LMMP</b>	55545	619.73	
	Delete Probandt Bridge	55545	619.64	<b>-0.09</b>
	Delete Probandt and W. Mitchell Bridges	55545	619.55	<b>-0.18</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	619.10	<b>-0.63</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	55545	617.32	<b>-2.41</b>
<b>7522</b>	<b>100-LMMP</b>	55545	619.66	
	Delete Probandt Bridge	55545	619.57	<b>-0.09</b>
	Delete Probandt and W. Mitchell Bridges	55545	619.47	<b>-0.19</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	619.02	<b>-0.64</b>
	Delete Probandt, W. Mitchell S. Flores, and Nogalitos Bridges	55545	617.20	<b>-2.46</b>
<b>7478</b>			<b>Nogalitos</b>	
<b>7435</b>	<b>100-LMMP</b>	55545	617.93	
	Delete Probandt Bridge	55545	617.82	<b>-0.11</b>
	Delete Probandt and W. Mitchell Bridges	55545	617.71	<b>-0.22</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	617.18	<b>-0.75</b>
<b>7356</b>	<b>100-LMMP</b>	55545	617.14	
	Delete Probandt Bridge	55545	617.01	<b>-0.13</b>
	Delete Probandt and W. Mitchell Bridges	55545	616.87	<b>-0.27</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	616.21	<b>-0.93</b>
<b>7100</b>	<b>100-LMMP</b>	55545	616.72	
	Delete Probandt Bridge	55545	616.57	<b>-0.15</b>
	Delete Probandt and W. Mitchell Bridges	55545	616.42	<b>-0.30</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	615.68	<b>-1.04</b>
<b>6800</b>	<b>100-LMMP</b>	55545	616.26	
	Delete Probandt Bridge	55545	616.08	<b>-0.18</b>
	Delete Probandt and W. Mitchell Bridges	55545	615.90	<b>-0.36</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	614.99	<b>-1.27</b>
<b>6500</b>	<b>100-LMMP</b>	55545	615.86	
	Delete Probandt Bridge	55545	615.66	<b>-0.20</b>
	Delete Probandt and W. Mitchell Bridges	55545	615.46	<b>-0.40</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	614.40	<b>-1.46</b>
<b>6200</b>	<b>100-LMMP</b>	55545	615.52	
	Delete Probandt Bridge	55545	615.31	<b>-0.21</b>
	Delete Probandt and W. Mitchell Bridges	55545	615.09	<b>-0.43</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	613.94	<b>-1.58</b>
<b>5900</b>	<b>100-LMMP</b>	55545	615.30	
	Delete Probandt Bridge	55545	615.06	<b>-0.24</b>
	Delete Probandt and W. Mitchell Bridges	55545	614.81	<b>-0.49</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	613.49	<b>-1.81</b>



River Sta	Plan	Q Total	W.S. Elev	W.S. Diff.
<b>5600</b>	100-LMMP	55545	614.21	
	Delete Probandt Bridge	55545	613.91	<b>-0.30</b>
	Delete Probandt and W. Mitchell Bridges	55545	613.57	<b>-0.64</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	611.62	<b>-2.59</b>
<b>5300</b>	100-LMMP	55545	613.92	
	Delete Probandt Bridge	55545	613.59	<b>-0.33</b>
	Delete Probandt and W. Mitchell Bridges	55545	613.22	<b>-0.70</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	611.00	<b>-2.92</b>
<b>5110</b>	100-LMMP	55545	613.48	
	Delete Probandt Bridge	55545	613.13	<b>-0.35</b>
	Delete Probandt and W. Mitchell Bridges	55545	612.76	<b>-0.72</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	610.34	<b>-3.14</b>
<b>5048</b>	100-LMMP	55545	613.54	
	Delete Probandt Bridge	55545	613.20	<b>-0.34</b>
	Delete Probandt and W. Mitchell Bridges	55545	612.83	<b>-0.71</b>
	Delete Probandt, W. Mitchell and S. Flores Bridges	55545	610.46	<b>-3.08</b>
<b>5005</b>			<b>S. Flores</b>	
<b>4962</b>	100-LMMP	55545	611.24	
	Delete Probandt Bridge	55545	610.70	<b>-0.54</b>
	Delete Probandt and W. Mitchell Bridges	55545	610.31	<b>-0.93</b>
<b>4876</b>	100-LMMP	55545	610.71	
	Delete Probandt Bridge	55545	610.09	<b>-0.62</b>
	Delete Probandt and W. Mitchell Bridges	55545	609.64	<b>-1.07</b>
<b>4683</b>	100-LMMP	55545	610.20	
	Delete Probandt Bridge	55545	609.47	<b>-0.73</b>
	Delete Probandt and W. Mitchell Bridges	55545	608.92	<b>-1.28</b>
<b>4402</b>	100-LMMP	55545	609.07	
	Delete Probandt Bridge	55545	608.05	<b>-1.02</b>
	Delete Probandt and W. Mitchell Bridges	55545	607.16	<b>-1.91</b>
<b>4100</b>	100-LMMP	56407	609.08	
	Delete Probandt Bridge	56407	607.99	<b>-1.09</b>
	Delete Probandt and W. Mitchell Bridges	56407	607.01	<b>-2.07</b>
<b>3800</b>	100-LMMP	56407	608.56	
	Delete Probandt Bridge	56407	607.20	<b>-1.36</b>
	Delete Probandt and W. Mitchell Bridges	56407	605.84	<b>-2.72</b>
<b>3501</b>	100-LMMP	56407	608.35	
	Delete Probandt Bridge	56407	606.85	<b>-1.50</b>
	Delete Probandt and W. Mitchell Bridges	56407	605.24	<b>-3.11</b>
<b>3260</b>	100-LMMP	56407	608.42	
	Delete Probandt Bridge	56407	606.90	<b>-1.52</b>
	Delete Probandt and W. Mitchell Bridges	56407	605.27	<b>-3.15</b>
<b>3193</b>	100-LMMP	56407	608.77	
	Delete Probandt Bridge	56407	607.35	<b>-1.42</b>
	Delete Probandt and W. Mitchell Bridges	56407	605.85	<b>-2.92</b>

River Sta	Plan	Q Total	W.S. Elev	W.S. Diff.
<b>2889</b>	100-LMMP	56407	608.03	
	Delete Probandt Bridge	56407	606.35	<b>-1.68</b>
	Delete Probandt and W. Mitchell Bridges	56407	604.50	<b>-3.53</b>
<b>2804</b>	100-LMMP	56407	607.55	
	Delete Probandt Bridge	56407	605.80	<b>-1.75</b>
	Delete Probandt and W. Mitchell Bridges	56407	603.85	<b>-3.70</b>
<b>2743</b>	100-LMMP	56407	607.04	
	Delete Probandt Bridge	56407	605.26	<b>-1.78</b>
	Delete Probandt and W. Mitchell Bridges	56407	603.17	<b>-3.87</b>
<b>2707</b>			<b>W. Mitchell</b>	
<b>2671</b>	100-LMMP	56407	605.05	
	Delete Probandt Bridge	56407	603.03	<b>-2.02</b>
<b>2596</b>	100-LMMP	56407	605.02	
	Delete Probandt Bridge	56407	602.97	<b>-2.05</b>
<b>2400</b>	100-LMMP	56407	604.85	
	Delete Probandt Bridge	56407	602.64	<b>-2.21</b>
<b>2194</b>	100-LMMP	56407	604.33	
	Delete Probandt Bridge	56407	601.78	<b>-2.55</b>
<b>2000</b>	100-LMMP	56407	604.05	
	Delete Probandt Bridge	56407	601.27	<b>-2.78</b>
<b>1795</b>	100-LMMP	56407	603.90	
	Delete Probandt Bridge	56407	600.95	<b>-2.95</b>
<b>1600</b>	100-LMMP	56407	603.87	
	Delete Probandt Bridge	56407	600.78	<b>-3.09</b>
<b>1300</b>	100-LMMP	56407	603.26	
	Delete Probandt Bridge	56407	599.81	<b>-3.45</b>
<b>1000</b>	100-LMMP	56407	603.04	
	Delete Probandt Bridge	56407	599.34	<b>-3.70</b>
<b>776</b>	100-LMMP	56407	602.77	
	Delete Probandt Bridge	56407	598.80	<b>-3.97</b>
<b>722</b>	100-LMMP	56407	602.77	
	Delete Probandt Bridge	56407	598.81	<b>-3.96</b>



# San Pedro Creek - SPC01

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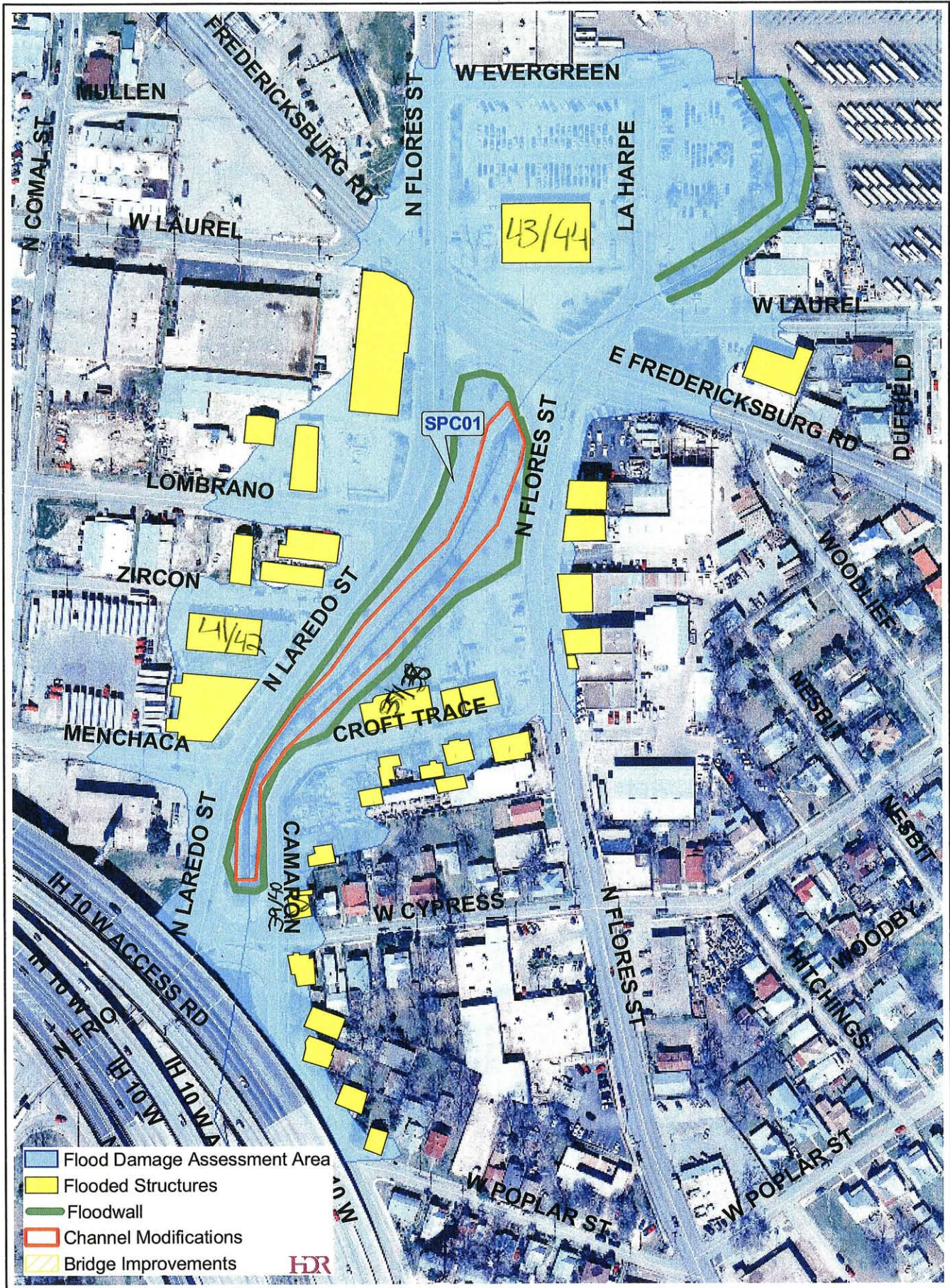


Figure 9

1 inch equals 200 feet







-----[ Detail Report ]-----

Legal: NCB 202 BLK LOT C Can#: 002020000051  
ARB A 2 Site: 1423 N FLORES ST  
Property Use: F1  
Owner: CORBO FAMILY LTD PRTSHP Schl Dist: 57 City Code: 21  
Map Grid: 616D3  
1430 N FLORES ST Comm Bldg Code: 400  
SAN ANTONIO, TX 78212-4968

*1423 CROFT TRACE  
PRINT & BODY SHOP*

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 8636/1589 Tax Yr: 2002 2003  
Sale Date: Land: \$55500 \$55500  
Neighborhood: 10310 Impr: \$33700 \$33700  
Exempt: Not Avail Total: \$89200 \$89200

-----[ Property Characteristics ]-----

Use: Commercial Built: 1960 Gar/Crprt:  
Ex Wall: Metal Stors: 0.0 Poly SqFt: 18624.19  
Found: Not Avail Bdrms: Poly Area: 0.420  
Rf Type: Bar Joist Bths: Res Imp SF:  
Style: Not Avail A/C: Grs Ls Area: 4172  
Heat: Not Avail Fireplace:  
Det Struct: Carport Shed Asphalt Paving

*\* INCLUSIVE OF  
MULTIPLE BUILDING*





PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

833/835 W. CYPRESS

Structure Type:

- 5 1. Single Family    3. Town House, End Unit    5. Duplex
- 2. Low Rise    4. Town House, Inside Unit    6. Mobile Home

Quality :

- 1 1. Low    3. Average    5. Very Good
- 2. Fair    4. Good    6. Excellent

Condition:

- 1 1. Worn Out    3. Average    5. Very Good
- 2. Badly Worn    4. Good    6. Excellent

Style:

- 1 1. One-Story    5. 1-1/2 Story Finished    9. 3-1/2 Story Finished
- 2. Two-Story    6. 1-1/2 Story Unfinished    10. 3-1/2 Story Unfinished
- 3. Three-Story    7. 2-1/2 Story Finished    11. Bi-Level
- 4. Split-Level    8. 2-1/2 Story Unfinished

Heating/Cooling:

- 11 **Heating:**
- 1. Forced Air    6. Ceiling, Rad, Elect.
- 2. Gravity Furnace    7. Baseboard, Elect.
- 3. Floor Furnace    8. Baseboard, Hot H2O
- 4. Wall Furnace    9. Radiators, Hot H2O
- 5. Floor, Radiant    10. Radiators, Steam
- Heating/Cooling:**
- 11. Warmed and Cooled Air
- 12. Heat Pump System
- Cooling Only:**
- 13. Evaporative w/ Ducts
- 14. Refrigerated w/ Ducts
- 15. Refrigerated Window Unit

Exterior Wall:

- 4 **Wood Frame:**
- 1. Plywood    3. Stucco    5. Shingle
- 2. Hardboard Sheet    4. Siding    6. Masonry Veneer
- Masonry:**
- 7. Common Brick    9. Stone
- 8. Face Brick    10. Concrete Block

Roofing:

- 7 1. Comp. Shingle    4. Wood Shake    7. Galvanized Metal
- 2. Built-up Rock    5. Concrete Tile    8. Slate
- 3. Wood Shingle    6. Clay Tile    9. Comp. Roll
- 10. Plastic Tile

Garage:

- 2 1. Attached    3. Built-in    5. None
- 2. Detached    4. Carport

Finished Floor Area: 1400 Square Feet

Effective Built Date: 1940

Exposed Slab Elevation at the Font of Structure: 18" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:

Home 24,000  
 Land 6,700  
 Other Structures \_\_\_\_\_  
 Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 001290010010

Home \_\_\_\_\_  
 Land \_\_\_\_\_  
 Other Structures \_\_\_\_\_  
 Total \_\_\_\_\_

ELEV: 633

N 29° 26.354'  
W 098° 30.265'

-----[ Detail Report ]-----

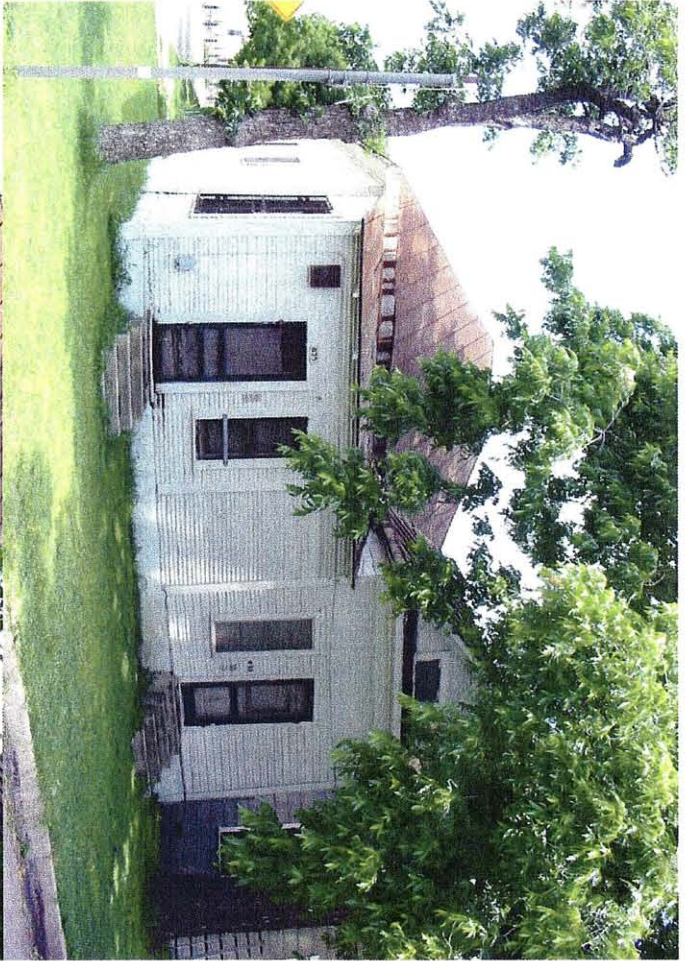
Legal: NCB 129 BLK 1 LOT 1,2 Can#: 001290010010  
AND W 5.3 FEET OF 3 Site: 833 W CYPRESS ST  
Property Use: B1  
Owner: WERNER, VIOLA Schl Dist: 57 City Code: 21  
Map Grid: 616D3  
Comm Bldg Code:  
817 CYPRESS ST W  
SAN ANTONIO, TX 78212-4964

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 9386/1414	Tax Yr: 2002	2003
Sale Date: 05/10/2002	Land: \$6700	\$6700
Neighborhood: 57026	Impr: \$24200	\$24000
Exempt: Not Avail	Total: \$30900	\$30700

-----[ Property Characteristics ]-----

Use: Multi-Family Res	Built: 1940	Gar/Crprt:
Ex Wall: Wood Siding	Stors: 1.0	Poly SqFt: 4239.58
Found: Piers/Posts	Bdrms: 3	Poly Area: 0.090
Rf Type: Inexpensive Metal	Bths: 2/0	Res Imp SF: 1400
Style: Older	A/C: None	Grs Ls Area: 0
Heat: Fl Furnace/Wall Ht	Fireplace:	
Det Struct:		





41/42

PRELIMINARY HEC-FDA SURVEY

Property Owner \_\_\_\_\_  
Address 1615 N. LAREDO - TACO HOUSE  
City, State, ZIP \_\_\_\_\_  
Surveyed by/Date A-26-04

~~8~~ 9  
COMMERCIAL

Structure Type: \_\_\_\_\_  
1. Single Family    3. Town House, End Unit    5. Duplex  
2. Low Rise    4. Town House, Inside Unit    6. Mobile Home

Quality : 3  
1. Low    3. Average    5. Very Good  
2. Fair    4. Good    6. Excellent

Condition: 3  
1. Worn Out    3. Average    5. Very Good  
2. Badly Worn    4. Good    6. Excellent

Style: 1  
1. One-Story    5. 1-1/2 Story Finished    9. 3-1/2 Story Finished  
2. Two-Story    6. 1-1/2 Story Unfinished    10. 3-1/2 Story Unfinished  
3. Three-Story    7. 2-1/2 Story Finished    11. Bi-Level  
4. Split-Level    8. 2-1/2 Story Unfinished

Heating/Cooling: 11  
**Heating:**  
1. Forced Air    6. Ceiling, Rad, Elect.  
2. Gravity Furnace    7. Baseboard, Elect.  
3. Floor Furnace    8. Baseboard, Hot H2O  
4. Wall Furnace    9. Radiators, Hot H2O  
5. Floor, Radiant    10. Radiators, Steam  
**Heating/Cooling:**  
11. Warmed and Cooled Air  
12. Heat Pump System  
**Cooling Only:**  
13. Evaporative w/ Ducts  
14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 10  
**Wood Frame:**  
1. Plywood    3. Stucco    5. Shingle  
2. Hardboard Sheet    4. Siding    6. Masonry Veneer  
**Masonry:**  
7. Common Brick    9. Stone  
8. Face Brick    10. Concrete Block

Roofing: 2  
1. Comp. Shingle    4. Wood Shake    7. Galvanized Metal  
2. Built-up Rock    5. Concrete Tile    8. Slate  
3. Wood Shingle    6. Clay Tile    9. Comp. Roll  
10. Plastic Tile

Garage: N/A  
1. Attached    3. Built-in    5. None  
2. Detached    4. Carport

Finished Floor Area: 6800 Square Feet

Effective Built Date: 1940

Exposed Slab Elevation at the Font of Structure: 2" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home 48,300  
Land 32,200  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 003550030101  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 637

N 29° 26.423'  
W 098° 30.269'

-----[ Detail Report ]-----

Legal: NCB 355 BLK 3 LOT W IRR                   Can#: 003550030101  
      157.2FT OF 10, N 30FT OF 11&            Site: 1615 N LAREDO ST  
      E 2.6 OF N 66.4FT OF 15                Property Use: F1  
Owner: GUTIERREZ, REYNALDO V                Schl Dist: 57 City Code: 21  
      % JOE GARZA                             Map Grid: 616D3  
      4607 SANDERS CIRCLE                    Comm Bldg Code: 200  
      LAREDO, TX 78041-4639

*Taco House*

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 8087/728	Tax Yr: 2002	2003
Sale Date:	Land: \$32200	\$32200
Neighborhood: 10310	Impr: \$48300	\$48300
Exempt: Not Avail	Total: \$80500	\$80500

-----[ Property Characteristics ]-----

Use: Commercial	Built: 1940	Gar/Crppt:	
Ex Wall: Concrete Block	Stors: 0.0	Poly SqFt: 11305.60	
Found: Not Avail	Bdrms:	Poly Area: 0.260	
Rf Type: Wood Joist	Bths:	Res Imp SF:	
Style: Not Avail	A/C:	Grs Ls Area: 6800	
Heat: Not Avail	Fireplace:		
Det Struct: Concrete Paving			





PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

1618 N. Flores / N. Laredo - ROSENBERG SUPPLY

Structure Type:

- 1. Single Family
- 2. Low Rise
- 3. Town House, End Unit
- 4. Town House, Inside Unit
- 5. Duplex
- 6. Mobile Home

Commercial

Quality :

- 1. Low
- 2. Fair
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Condition:

- 1. Worn Out
- 2. Badly Worn
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Style:

- 1. One-Story
- 2. Two-Story
- 3. Three-Story
- 4. Split-Level
- 5. 1-1/2 Story Finished
- 6. 1-1/2 Story Unfinished
- 7. 2-1/2 Story Finished
- 8. 2-1/2 Story Unfinished
- 9. 3-1/2 Story Finished
- 10. 3-1/2 Story Unfinished
- 11. Bi-Level

Heating/Cooling:

- Heating:**
  - 1. Forced Air
  - 2. Gravity Furnace
  - 3. Floor Furnace
  - 4. Wall Furnace
  - 5. Floor, Radiant
  - 6. Ceiling, Rad, Elect.
  - 7. Baseboard, Elect.
  - 8. Baseboard, Hot H2O
  - 9. Radiators, Hot H2O
  - 10. Radiators, Steam
- Heating/Cooling:**
  - 11. Warmed and Cooled Air
  - 12. Heat Pump System
- Cooling Only:**
  - 13. Evaporative w/ Ducts
  - 14. Refrigerated w/ Ducts
  - 15. Refrigerated Window Unit

Exterior Wall:

7/6

- Wood Frame:**
  - 1. Plywood
  - 2. Hardboard Sheet
  - 3. Stucco
  - 4. Siding
  - 5. Shingle
  - 6. Masonry Veneer
- Masonry:**
  - 7. Common Brick
  - 8. Face Brick
  - 9. Stone
  - 10. Concrete Block

Roofing:

- 1. Comp. Shingle
- 2. Built-up Rock
- 3. Wood Shingle
- 4. Wood Shake
- 5. Concrete Tile
- 6. Clay Tile
- 7. Galvanized Metal
- 8. Slate
- 9. Comp. Roll
- 10. Plastic Tile

Garage:

- 1. Attached
- 2. Detached
- 3. Built-in
- 4. Carport
- 5. None

Finished Floor Area: 12,420 Square Feet

Effective Built Date: 1967

Exposed Slab Elevation at the Font of Structure: 36" inches

Other Structures on Property: MULTIPLE BLDGS

Appraised Value:

Home 177,000  
 Land 71,400  
 Other Structures \_\_\_\_\_  
 Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 019170000180

Home \_\_\_\_\_  
 Land \_\_\_\_\_  
 Other Structures \_\_\_\_\_  
 Total \_\_\_\_\_

ELEV: 635

N 29° 26.524'  
W 098° 30.223'

-----[ Detail Report ]-----

Legal: NCB 1917 BLK LOT 18 Can#: 019170000180  
Site: 1608 N FLORES ST  
Property Use: F1  
Owner: BRISENO, JIMMIE C JR Schl Dist: 57 City Code: 21  
Map Grid: 616D2  
2207 QUINTANA Comm Bldg Code: 320  
SAN ANTONIO, TX 78211-2350

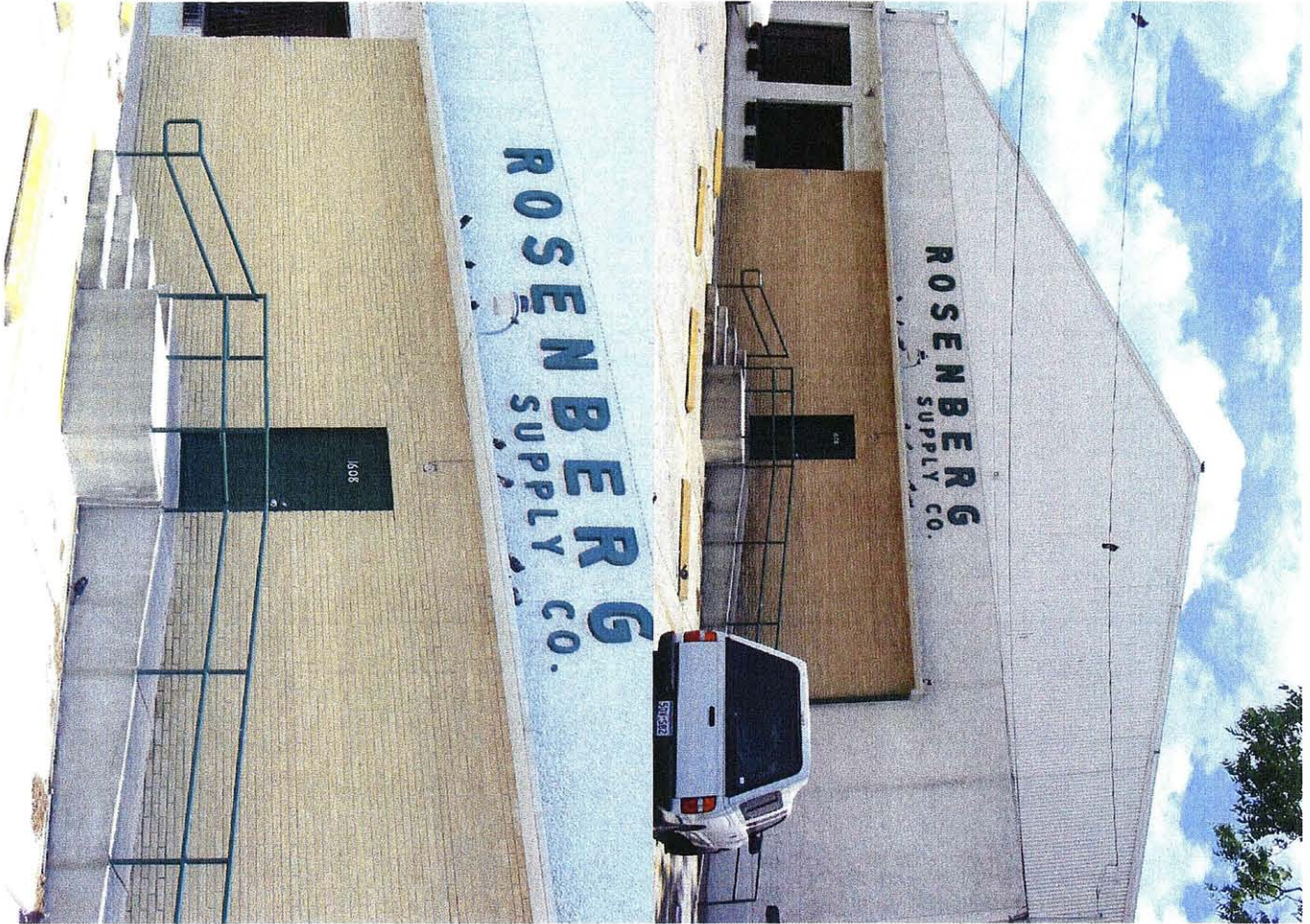
*ROSENBERG  
SUPPLY*

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 4220/1506	Tax Yr: 2002	2003
Sale Date: 03/17/1998	Land: \$71400	\$71400
Neighborhood: 10310	Impr: \$146000	\$177000
Exempt: Not Avail	Total: \$217400	\$248400

-----[ Property Characteristics ]-----

Use: Commercial	Built: 1967	Gar/Crpvt:
Ex Wall: Tilt Up Slab	Stors: 0.0	Poly SqFt: 25162.34
Found: Not Avail	Bdrms:	Poly Area: 0.570
Rf Type: Bar Joist	Bths:	Res Imp SF:
Style: Not Avail	A/C:	Grs Ls Area: 12420
Heat: Not Avail	Fireplace:	
Det Struct: Concrete Paving		



ROSENBERG  
SUPPLY CO.

ROSENBERG  
SUPPLY CO.

1508





# San Pedro Creek - SPC04

18

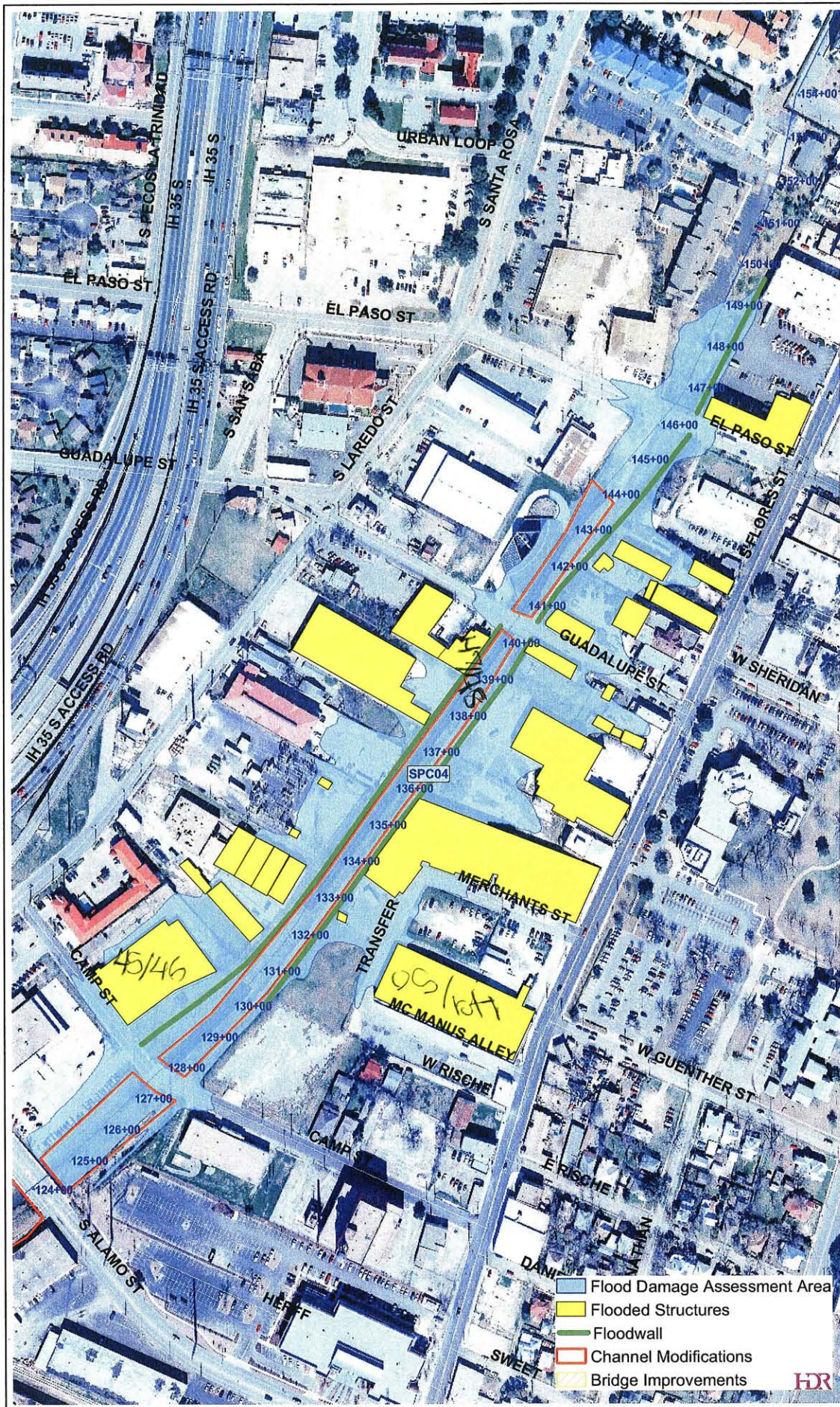


Figure 7

1 inch equals 200 feet





PRELIMINARY HEC-FDA SURVEY

Property Owner \_\_\_\_\_  
Address 207 CAMP ST.  
City, State, ZIP \_\_\_\_\_  
Surveyed by/Date 4-26-04

Structure Type: \_\_\_\_\_  
1. Single Family    3. Town House, End Unit    5. Duplex  
2. Low Rise    4. Town House, Inside Unit    6. Mobile Home

10  
**Commercial**  
**WAREHOUSE**  
**OFFICE**

Quality : 1  
1. Low    3. Average    5. Very Good  
2. Fair    4. Good    6. Excellent

Condition: 1  
1. Worn Out    3. Average    5. Very Good  
2. Badly Worn    4. Good    6. Excellent

Style: 1  
1. One-Story    5. 1-1/2 Story Finished    9. 3-1/2 Story Finished  
2. Two-Story    6. 1-1/2 Story Unfinished    10. 3-1/2 Story Unfinished  
3. Three-Story    7. 2-1/2 Story Finished    11. Bi-Level  
4. Split-Level    8. 2-1/2 Story Unfinished

Heating/Cooling: 11  
**Heating:**  
1. Forced Air    6. Ceiling, Rad, Elect.  
2. Gravity Furnace    7. Baseboard, Elect.  
3. Floor Furnace    8. Baseboard, Hot H2O  
4. Wall Furnace    9. Radiators, Hot H2O  
5. Floor, Radiant    10. Radiators, Steam  
**Heating/Cooling:**  
11. Warmed and Cooled Air  
12. Heat Pump System  
**Cooling Only:**  
13. Evaporative w/ Ducts  
14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

**PARTIAL**

Exterior Wall: 10  
**Wood Frame:**  
1. Plywood    3. Stucco    5. Shingle  
2. Hardboard Sheet    4. Siding    6. Masonry Veneer  
**Masonry:**  
7. Common Brick    9. Stone  
8. Face Brick    10. Concrete Block

Roofing: 2  
1. Comp. Shingle    4. Wood Shake    7. Galvanized Metal  
2. Built-up Rock    5. Concrete Tile    8. Slate  
3. Wood Shingle    6. Clay Tile    9. Comp. Roll  
10. Plastic Tile

Garage: N/A  
1. Attached    3. Built-in    5. None  
2. Detached    4. Carport

Finished Floor Area: 28,000 Square Feet

Effective Built Date: 1926

Exposed Slab Elevation at the Font of Structure: 30 inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home 55,000  
Land 200,000  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 009210000210  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Elev: 632

N 29° 24.824'  
W 098° 30.159'

-----[ Detail Report ]-----

Legal: NCB 921 BLK LOT E Can#: 009210000210  
IRR 235.16 OF 21, 22 & 23 Site: 207 CAMP  
EXC SE TRI OF 23 Property Use: F2  
Owner: LOBO-WAREHOUSE LTD Schl Dist: 57 City Code: 21  
Map Grid: 616D6  
PO BOX 37343 Comm Bldg Code: 325  
SAN ANTONIO, TX 78237-0343

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 6212/1454	Tax Yr: 2002	2003
Sale Date: 09/27/1994	Land: \$200000	\$200000
Neighborhood: 10090	Impr: \$55000	\$55000
Exempt: Not Avail	Total: \$255000	\$255000

-----[ Property Characteristics ]-----

Use: Industrial	Built: 1926	Gar/Crppt:
Ex Wall: Brick	Stors: 0.0	Poly SqFt: 59508.43
Found: Not Avail	Bdrms:	Poly Area: 1.360
Rf Type: Bar Joist	Bths:	Res Imp SF:
Style: Not Avail	A/C:	Grs Ls Area: 28000
Heat: Not Avail	Fireplace:	
Det Struct: Garage	Carport	Asphalt Paving







47/48

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

130 GUADALUPE ST. - T & P

**(10)**  
**COMMERCIAL**  
**WAREHOUSE**  
**& OFFICE**

Structure Type:

- 1. Single Family
- 2. Low Rise
- 3. Town House, End Unit
- 4. Town House, Inside Unit
- 5. Duplex
- 6. Mobile Home

Quality :

- 1. Low
- 2. Fair
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Condition:

- 1. Worn Out
- 2. Badly Worn
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Style:

- 1. One-Story
- 2. Two-Story
- 3. Three-Story
- 4. Split-Level
- 5. 1-1/2 Story Finished
- 6. 1-1/2 Story Unfinished
- 7. 2-1/2 Story Finished
- 8. 2-1/2 Story Unfinished
- 9. 3-1/2 Story Finished
- 10. 3-1/2 Story Unfinished
- 11. Bi-Level

Heating/Cooling:

- Heating:**
  - 1. Forced Air
  - 2. Gravity Furnace
  - 3. Floor Furnace
  - 4. Wall Furnace
  - 5. Floor, Radiant
  - 6. Ceiling, Rad, Elect.
  - 7. Baseboard, Elect.
  - 8. Baseboard, Hot H2O
  - 9. Radiators, Hot H2O
  - 10. Radiators, Steam
- Heating/Cooling:**
  - 11. Warmed and Cooled Air
  - 12. Heat Pump System
- Cooling Only:**
  - 13. Evaporative w/ Ducts
  - 14. Refrigerated w/ Ducts
  - 15. Refrigerated Window Unit

Exterior Wall:

- Wood Frame:**
  - 1. Plywood
  - 2. Hardboard Sheet
  - 3. Stucco
  - 4. Siding
- Masonry:**
  - 7. Common Brick
  - 8. Face Brick
  - 9. Stone
  - 10. Concrete Block
- 5. Shingle
- 6. Masonry Veneer

Roofing:

- 1. Comp. Shingle
- 2. Built-up Rock
- 3. Wood Shingle
- 4. Wood Shake
- 5. Concrete Tile
- 6. Clay Tile
- 7. Galvanized Metal
- 8. Slate
- 9. Comp. Roll
- 10. Plastic Tile

Garage:

- 1. Attached
- 2. Detached
- 3. Built-in
- 4. Carport
- 5. None

Finished Floor Area: 4459 Square Feet

Effective Built Date: 1959

Exposed Slab Elevation at the Font of Structure: 36" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:

Home 31,600  
 Land 50,600  
 Other Structures \_\_\_\_\_  
 Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 009210000043

Home \_\_\_\_\_  
 Land \_\_\_\_\_  
 Other Structures \_\_\_\_\_  
 Total \_\_\_\_\_

ELEV: 631

N 29° 24.985'  
W 098° 29.995'



-----[ Detail Report ]-----

Legal: NCB 921 BLK LOT W Can#: 009210000043  
IRRG 62.45 FT OF E 65.45 FT Site: 130 GUADALUPE ST  
OF A4 & A5 Property Use: F2  
Owner: DAREJV Schl Dist: 57 City Code: 21  
Map Grid: 616D6  
2106 WOOD RUSH ST Comm Bldg Code: 305  
SAN ANTONIO, TX 78232-4944

T&P

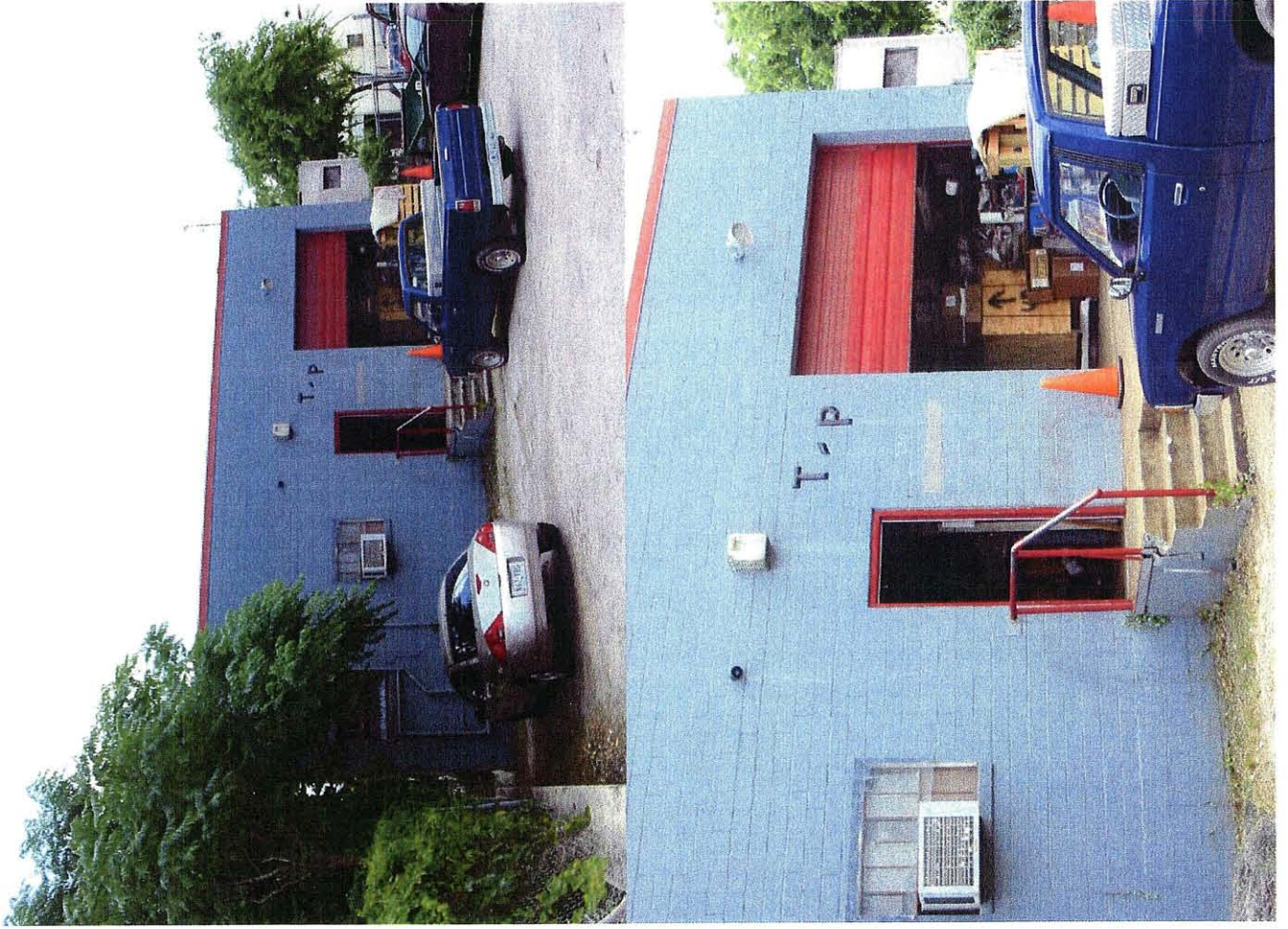
-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 6360/1064	Tax Yr: 2002	2003
Sale Date: 03/07/1995	Land: \$25300	\$50600
Neighborhood: 10090	Impr: \$31600	\$31600
Exempt: Not Avail	Total: \$56900	\$82200

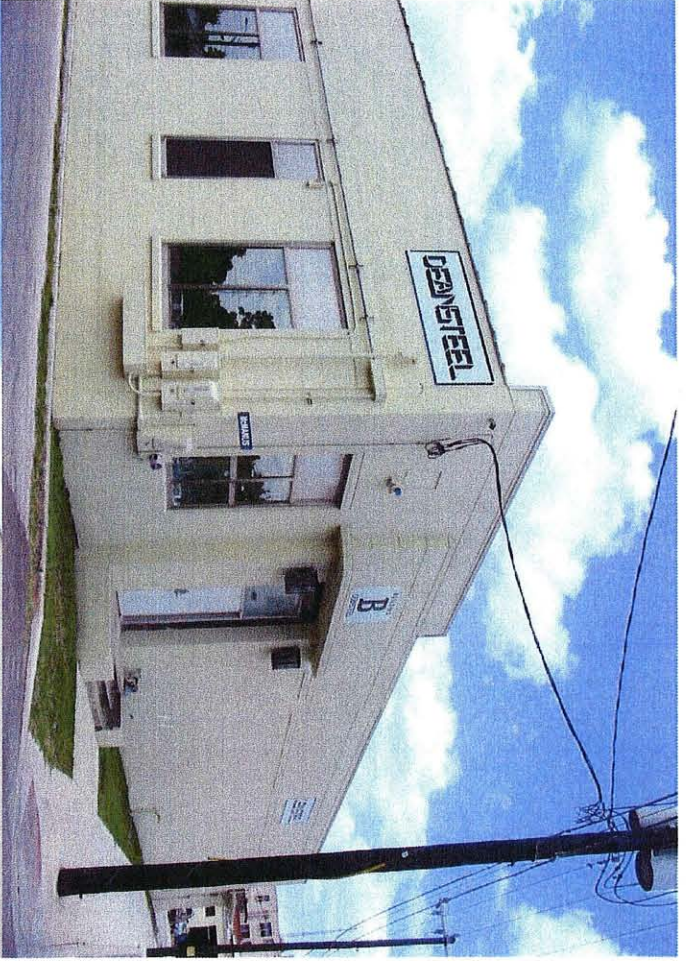
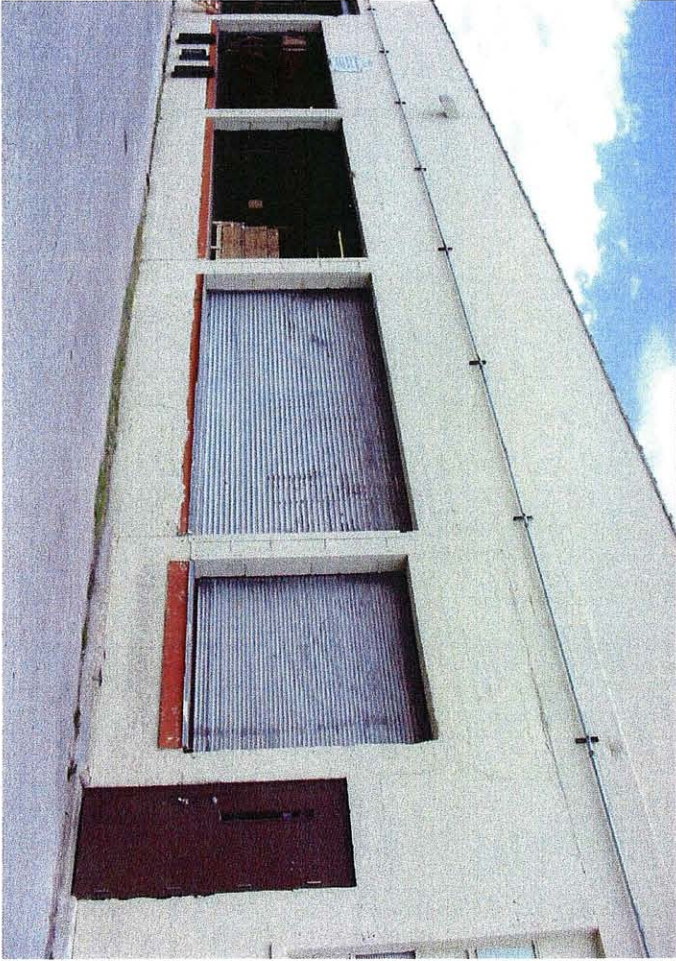
-----[ Property Characteristics ]-----

Use: Industrial	Built: 1959	Gar/Crppt:	
Ex Wall: Concrete Block	Stors: 0.0	Poly SqFt: 8164.95	
Found: Not Avail	Bdrms:	Poly Area: 0.180	
Rf Type: Bar Joist	Bths:	Res Imp SF:	
Style: Not Avail	A/C:	Grs Ls Area: 4459	
Heat: Not Avail	Fireplace:		

Det Struct: Asphalt Paving Loading Dock Concrete Paving









PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

931 S. FLORES - DEAN STEEL BLDG B  
4-26-04

Structure Type:

- 1. Single Family
- 2. Low Rise
- 3. Town House, End Unit
- 4. Town House, Inside Unit
- 5. Duplex
- 6. Mobile Home

Ⓢ Commercial / INDUSTRIAL

Quality :

- 1. Low
- 2. Fair
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Condition:

- 1. Worn Out
- 2. Badly Worn
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Style:

- 1. One-Story
- 2. Two-Story
- 3. Three-Story
- 4. Split-Level
- 5. 1-1/2 Story Finished
- 6. 1-1/2 Story Unfinished
- 7. 2-1/2 Story Finished
- 8. 2-1/2 Story Unfinished
- 9. 3-1/2 Story Finished
- 10. 3-1/2 Story Unfinished
- 11. Bi-Level

Heating/Cooling:

- 11 Heating:
- 1. Forced Air
  - 2. Gravity Furnace
  - 3. Floor Furnace
  - 4. Wall Furnace
  - 5. Floor, Radiant
  - 6. Ceiling, Rad, Elect.
  - 7. Baseboard, Elect.
  - 8. Baseboard, Hot H2O
  - 9. Radiators, Hot H2O
  - 10. Radiators, Steam

- Heating/Cooling:
- 11. Warmed and Cooled Air
  - 12. Heat Pump System
  - 13. Evaporative w/ Ducts
  - 14. Refrigerated w/ Ducts
  - 15. Refrigerated Window Unit

PARTIAL

Exterior Wall:

- 10 Wood Frame:
- 1. Plywood
  - 2. Hardboard Sheet
  - 3. Stucco
  - 4. Siding
  - 5. Shingle
  - 6. Masonry Veneer
- Masonry:
- 7. Common Brick
  - 8. Face Brick
  - 9. Stone
  - 10. Concrete Block

Roofing:

- 7
- 1. Comp. Shingle
  - 2. Built-up Rock
  - 3. Wood Shingle
  - 4. Wood Shake
  - 5. Concrete Tile
  - 6. Clay Tile
  - 7. Galvanized Metal
  - 8. Slate
  - 9. Comp. Roll
  - 10. Plastic Tile

Garage:

- N/A
- 1. Attached
  - 2. Detached
  - 3. Built-in
  - 4. Carport
  - 5. None

Finished Floor Area: 42,800 Square Feet

Effective Built Date: 1950

Exposed Slab Elevation at the Font of Structure: 36" inches

Other Structures on Property: MULTIPLE BLDGS

Appraised Value:  
Home 259,400  
Land 279,200  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 009850000200  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 634

N 29° 24.822'  
W 098° 30.022'

-----[ Detail Report ]-----

Legal: NCB 985 BLK LOT 20,23 THRU      Can#: 009850000200  
27.W 33.38 FT OF 22,P-101 &      Site: 931 S FLORES ST  
19 EXC NE 25FT OF E 50 FT      Property Use: F1  
Owner: DEAN, JOHN H FAMILY      Schl Dist: 57 City Code: 21  
PARTNERS LTD      Map Grid: 616D7  
111 MERCHANT ST      Comm Bldg Code: 325  
SAN ANTONIO, TX 78204-1435

DEAN STEEL  
BLDG "B"

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 6550/0746	Tax Yr: 2002	2003
Sale Date: 09/29/1995	Land: \$223000	\$279200
Neighborhood: 10090	Impr: \$150000	\$259400
Exempt: Not Avail	Total: \$373000	\$538600

-----[ Property Characteristics ]-----

Use: Commercial	Built: 1950	Gar/Crprt:
Ex Wall: Masonry	Stors: 0.0	Poly SqFt: 75759.35
Found: Not Avail	Bdrms:	Poly Area: 1.730
Rf Type: Bar Joist	Bths:	Res Imp SF:
Style: Not Avail	A/C:	Grs Ls Area: 42800
Heat: Not Avail	Fireplace:	

Det Struct: Carport Asphalt Paving Concrete Paving



# San Pedro Creek - SPC07, SPC08, and SPC09

9

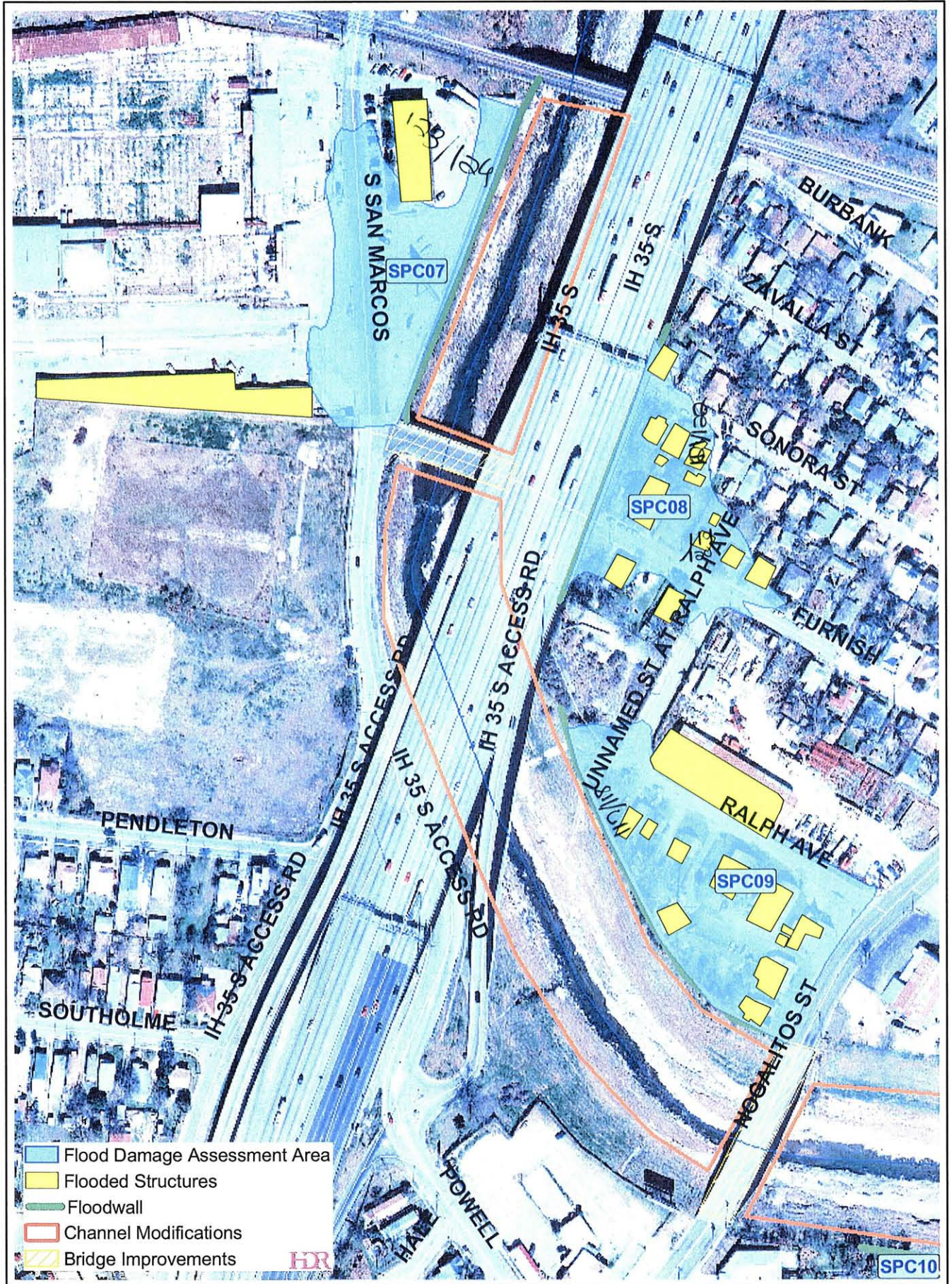


Figure 5

1 inch equals 200 feet





11/7/11/8

PRELIMINARY HEC-FDA SURVEY

Property Owner \_\_\_\_\_  
Address 122 RALPH AVE.  
City, State, ZIP \_\_\_\_\_  
Surveyed by/Date \_\_\_\_\_

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 1 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 1 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 15 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. **Heating/Cooling:** 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:** 13. Evaporative w/ Ducts  
4. Wall Furnace 9. Radiators, Hot H2O 14. Refrigerated w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 15. Refrigerated Window Unit

Exterior Wall: 4 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 5 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 18" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value: \_\_\_\_\_ Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_ Home \_\_\_\_\_  
Land \_\_\_\_\_ Land \_\_\_\_\_  
Other Structures \_\_\_\_\_ Other Structures \_\_\_\_\_  
Total \_\_\_\_\_ Total \_\_\_\_\_

ELEV: 582 N 29° 24.300'  
W 098° 30.587'

-----[ Detail Report ]-----

Legal: NCB 18 BLK LOT PT OF Can#: 000180000062  
A6 EXC E IRR 13 FT TRI Site: 905 NOGALITOS

*1122 RALPH AVE.*

Owner: HETOS, MARIA GALANOS Property Use: F1  
Schl Dist: 57 City Code: 21  
Map Grid: 616C8  
Comm Bldg Code: 230

510 BALLYTORE RD  
WYNNEWOOD, PA 19096-2208

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	4552/0840	Tax Yr:	2002	2003
Sale Date:	09/22/1994	Land:	\$42200	\$105700
Neighborhood:	10110	Impr:	\$42200	\$42200
Exempt:	Not Avail	Total:	\$84400	\$147900

-----[ Property Characteristics ]-----

Use:	Commercial	Built:	1945	Gar/Crprt:	
Ex Wall:	Wood	Stors:	0.0	Poly SqFt:	79562.62
Found:	Not Avail	Bdrms:		Poly Area:	1.820
Rf Type:	Wood Joist	Bths:		Res Imp SF:	
Style:	Not Avail	A/C:		Grs Ls Area:	8900
Heat:	Not Avail	Fireplace:			
Det Struct:	Carport Equipment Shed Living Area 2nd				

*\* MULTIPLE HOUSES  
ON THIS ACCT.*





119/120

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

443 FURNISH

Structure Type:

- 1 1. Single Family      3. Town House, End Unit      5. Duplex
- 2. Low Rise      4. Town House, Inside Unit      6. Mobile Home

Quality :

- 1 1. Low      3. Average      5. Very Good
- 2. Fair      4. Good      6. Excellent

Condition:

- 1 1. Worn Out      3. Average      5. Very Good
- 2. Badly Worn      4. Good      6. Excellent

Style:

- 1 1. One-Story      5. 1-1/2 Story Finished      9. 3-1/2 Story Finished
- 2. Two-Story      6. 1-1/2 Story Unfinished      10. 3-1/2 Story Unfinished
- 3. Three-Story      7. 2-1/2 Story Finished      11. Bi-Level
- 4. Split-Level      8. 2-1/2 Story Unfinished

Heating/Cooling:

- 15 **Heating:**
- 1. Forced Air      6. Ceiling, Rad, Elect.
- 2. Gravity Furnace      7. Baseboard, Elect.
- 3. Floor Furnace      8. Baseboard, Hot H2O
- 4. Wall Furnace      9. Radiators, Hot H2O
- 5. Floor, Radiant      10. Radiators, Steam
- Heating/Cooling:**
- 11. Warmed and Cooled Air
- 12. Heat Pump System
- Cooling Only:**
- 13. Evaporative w/ Ducts
- 14. Refrigerated w/ Ducts
- 15. Refrigerated Window Unit

Exterior Wall:

- 4 **Wood Frame:**
- 1. Plywood      3. Stucco      5. Shingle
- 2. Hardboard Sheet      4. Siding      6. Masonry Veneer
- Masonry:**
- 7. Common Brick      9. Stone
- 8. Face Brick      10. Concrete Block

Roofing:

- 1 1. Comp. Shingle      4. Wood Shake      7. Galvanized Metal
- 2. Built-up Rock      5. Concrete Tile      8. Slate
- 3. Wood Shingle      6. Clay Tile      9. Comp. Roll
- 10. Plastic Tile

Garage:

- 2 1. Attached      3. Built-in      5. None
- 2. Detached      4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 16" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 587

N 29° 24.335'  
W 098° 30.570'

-----[ Detail Report ]-----

Legal: NCB 3127 BLK LOT 12 Can#: 031270000120  
Site: 443 FURNISH AVE  
Property Use: A1  
Owner: HERNANDEZ, ASCENSION S Schl Dist: 57 City Code: 21  
Map Grid: 616C8  
Comm Bldg Code:  
9610 QUICKSILVER  
SAN ANTONIO, TX 78245-1238

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$6800	\$6800
Neighborhood:	57055	Impr:	\$11000	\$9100
Exempt:	Not Avail	Total:	\$17800	\$15900

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1930	Gar/Crppt:	
Ex Wall:	Wood Siding	Stors:	1.0	Poly SqFt:	5123.72
Found:	Piers/Posts	Bdrms:	1	Poly Area:	0.110
Rf Type:	Asphalt Shingle	Bths:	1/0	Res Imp SF:	354
Style:	Older	A/C:	None	Grs Ls Area:	0
Heat:	Fl Furnace/Wall Ht	Fireplace:			
Det Struct:	Shed				





PRELIMINARY HEC-FDA SURVEY

12/1/22

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

218 SONORA

Structure Type:

- 1
- |                  |                            |                |
|------------------|----------------------------|----------------|
| 1. Single Family | 3. Town House, End Unit    | 5. Duplex      |
| 2. Low Rise      | 4. Town House, Inside Unit | 6. Mobile Home |

Quality :

- 3
- |         |            |              |
|---------|------------|--------------|
| 1. Low  | 3. Average | 5. Very Good |
| 2. Fair | 4. Good    | 6. Excellent |

Condition:

- 3
- |               |            |              |
|---------------|------------|--------------|
| 1. Worn Out   | 3. Average | 5. Very Good |
| 2. Badly Worn | 4. Good    | 6. Excellent |

Style:

- 1
- |                |                           |                            |
|----------------|---------------------------|----------------------------|
| 1. One-Story   | 5. 1-1/2 Story Finished   | 9. 3-1/2 Story Finished    |
| 2. Two-Story   | 6. 1-1/2 Story Unfinished | 10. 3-1/2 Story Unfinished |
| 3. Three-Story | 7. 2-1/2 Story Finished   | 11. Bi-Level               |
| 4. Split-Level | 8. 2-1/2 Story Unfinished |                            |

Heating/Cooling:

- 11
- |                    |                         |                              |
|--------------------|-------------------------|------------------------------|
| <b>Heating:</b>    |                         | <b>Heating/Cooling:</b>      |
| 1. Forced Air      | 6. Ceiling, Rad, Elect. | 11. Warmed and Cooled Air    |
| 2. Gravity Furnace | 7. Baseboard, Elect.    | 12. Heat Pump System         |
| 3. Floor Furnace   | 8. Baseboard, Hot H2O   | <b>Cooling Only:</b>         |
| 4. Wall Furnace    | 9. Radiators, Hot H2O   | 13. Evaporative w/ Ducts     |
| 5. Floor, Radiant  | 10. Radiators, Steam    | 14. Refrigerated w/ Ducts    |
|                    |                         | 15. Refrigerated Window Unit |

Exterior Wall:

- 4
- |                    |                    |                   |
|--------------------|--------------------|-------------------|
| <b>Wood Frame:</b> |                    |                   |
| 1. Plywood         | 3. Stucco          | 5. Shingle        |
| 2. Hardboard Sheet | 4. Siding          | 6. Masonry Veneer |
| <b>Masonry:</b>    |                    |                   |
| 7. Common Brick    | 9. Stone           |                   |
| 8. Face Brick      | 10. Concrete Block |                   |

Roofing:

- 1
- |                  |                  |                     |
|------------------|------------------|---------------------|
| 1. Comp. Shingle | 4. Wood Shake    | 7. Galvanized Metal |
| 2. Built-up Rock | 5. Concrete Tile | 8. Slate            |
| 3. Wood Shingle  | 6. Clay Tile     | 9. Comp. Roll       |
|                  |                  | 10. Plastic Tile    |

Garage:

- 5
- |             |             |         |
|-------------|-------------|---------|
| 1. Attached | 3. Built-in | 5. None |
| 2. Detached | 4. Carport  |         |

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 20" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 603

N 29° 24.382'  
W 109° 30.563'







123/124

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

1716 So. San Marcos - Stockyard Cafe

Structure Type:

- 1. Single Family
- 2. Low Rise
- 3. Town House, End Unit
- 4. Town House, Inside Unit
- 5. Duplex
- 6. Mobile Home

*Commercial*

Quality :

- 1. Low
- 2. Fair
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Condition:

- 1. Worn Out
- 2. Badly Worn
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Style:

- 1. One-Story
- 2. Two-Story
- 3. Three-Story
- 4. Split-Level
- 5. 1-1/2 Story Finished
- 6. 1-1/2 Story Unfinished
- 7. 2-1/2 Story Finished
- 8. 2-1/2 Story Unfinished
- 9. 3-1/2 Story Finished
- 10. 3-1/2 Story Unfinished
- 11. Bi-Level

Heating/Cooling:

- Heating:**
  - 1. Forced Air
  - 2. Gravity Furnace
  - 3. Floor Furnace
  - 4. Wall Furnace
  - 5. Floor, Radiant
  - 6. Ceiling, Rad, Elect.
  - 7. Baseboard, Elect.
  - 8. Baseboard, Hot H2O
  - 9. Radiators, Hot H2O
  - 10. Radiators, Steam
- Heating/Cooling:**
  - 11. Warmed and Cooled Air
  - 12. Heat Pump System
- Cooling Only:**
  - 13. Evaporative w/ Ducts
  - 14. Refrigerated w/ Ducts
  - 15. Refrigerated Window Unit

Exterior Wall:

- Wood Frame:**
  - 1. Plywood
  - 2. Hardboard Sheet
  - 3. Stucco
  - 4. Siding
  - 5. Shingle
  - 6. Masonry Veneer
- Masonry:**
  - 7. Common Brick
  - 8. Face Brick
  - 9. Stone
  - 10. Concrete Block

Roofing:

- 1. Comp. Shingle
- 2. Built-up Rock
- 3. Wood Shingle
- 4. Wood Shake
- 5. Concrete Tile
- 6. Clay Tile
- 7. Galvanized Metal
- 8. Slate
- 9. Comp. Roll
- 10. Plastic Tile

Garage:

- 1. Attached
- 2. Detached
- 3. Built-in
- 4. Carport
- 5. None

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 48" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

*Elev: 597*

*N 29° 24.423'  
W 098° 30.643'*

-----[ Detail Report ]-----

Legal: NCB 9644 BLK LOT 6 Can#: 096440000061  
Site: 1716 S SAN MARCOS  
Property Use: F1  
Owner: UNION STOCK YARDS Schl Dist: 57 City Code: 21  
Map Grid: 616C8  
Comm Bldg Code: 400  
1716 S SAN MARCOS #221  
SAN ANTONIO, TX 78207-7085

*STOCKYARD CAFE*

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$117400	\$117400
Neighborhood:	11650	Impr:	\$335600	\$478850
Exempt:	Not Avail	Total:	\$453000	\$596250

-----[ Property Characteristics ]-----

Use:	Commercial	Built:	1935	Gar/Crppt:	
Ex Wall:	Concrete Block	Stors:	0.0	Poly SqFt:	75469.05
Found:	Not Avail	Bdrms:		Poly Area:	1.730
Rf Type:	Bar Joist	Bths:		Res Imp SF:	
Style:	Not Avail	A/C:		Grs Ls Area:	23250
Heat:	Not Avail	Fireplace:			
Det Struct:	Asphalt Paving				









PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

SAISD - HARRIS JR. HIGH GYM  
325 PRUITT

Structure Type:

- 1. Single Family
- 2. Low Rise
- 3. Town House, End Unit
- 4. Town House, Inside Unit
- 5. Duplex
- 6. Mobile Home

SCHOOL / INSTITUTIONAL

Quality :

- 1. Low
- 2. Fair
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Condition:

- 1. Worn Out
- 2. Badly Worn
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Style:

- 1. One-Story
- 2. Two-Story
- 3. Three-Story
- 4. Split-Level
- 5. 1-1/2 Story Finished
- 6. 1-1/2 Story Unfinished
- 7. 2-1/2 Story Finished
- 8. 2-1/2 Story Unfinished
- 9. 3-1/2 Story Finished
- 10. 3-1/2 Story Unfinished
- 11. Bi-Level

Heating/Cooling:

- Heating:**
  - 1. Forced Air
  - 2. Gravity Furnace
  - 3. Floor Furnace
  - 4. Wall Furnace
  - 5. Floor, Radiant
  - 6. Ceiling, Rad, Elect.
  - 7. Baseboard, Elect.
  - 8. Baseboard, Hot H2O
  - 9. Radiators, Hot H2O
  - 10. Radiators, Steam
- Heating/Cooling:**
  - 11. Warmed and Cooled Air
  - 12. Heat Pump System
- Cooling Only:**
  - 13. Evaporative w/ Ducts
  - 14. Refrigerated w/ Ducts
  - 15. Refrigerated Window Unit

Exterior Wall:

- Wood Frame:**
  - 1. Plywood
  - 2. Hardboard Sheet
  - 3. Stucco
  - 4. Siding
  - 5. Shingle
  - 6. Masonry Veneer
- Masonry:**
  - 7. Common Brick
  - 8. Face Brick
  - 9. Stone
  - 10. Concrete Block

Roofing:

- 1. Comp. Shingle
- 2. Built-up Rock
- 3. Wood Shingle
- 4. Wood Shake
- 5. Concrete Tile
- 6. Clay Tile
- 7. Galvanized Metal
- 8. Slate
- 9. Comp. Roll
- 10. Plastic Tile

Garage:

- 1. Attached
- 2. Detached
- 3. Built-in
- 4. Carport
- 5. None

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 36" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:

Home \_\_\_\_\_  
 Land \_\_\_\_\_  
 Other Structures \_\_\_\_\_  
 Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_

Home \_\_\_\_\_  
 Land \_\_\_\_\_  
 Other Structures \_\_\_\_\_  
 Total \_\_\_\_\_

ELEV: 612

N 29° 24.028'  
W 098° 30.438'

-----[ Detail Report ]-----

Legal: NCB 3875 BLK 7 LOT 1 Can#: 038750070010  
Site: 325 PRUITT AVE  
HARRIS MIDDLE SCHOOL Property Use: Z0  
Owner: SAN ANTONIO I S D Schl Dist: 57 City Code: 21  
HARRIS MIDDLE SCHOOL Map Grid: 650C1  
Comm Bldg Code:

, 00000-0000

-----[ Sales Information & Prop Values ]-----

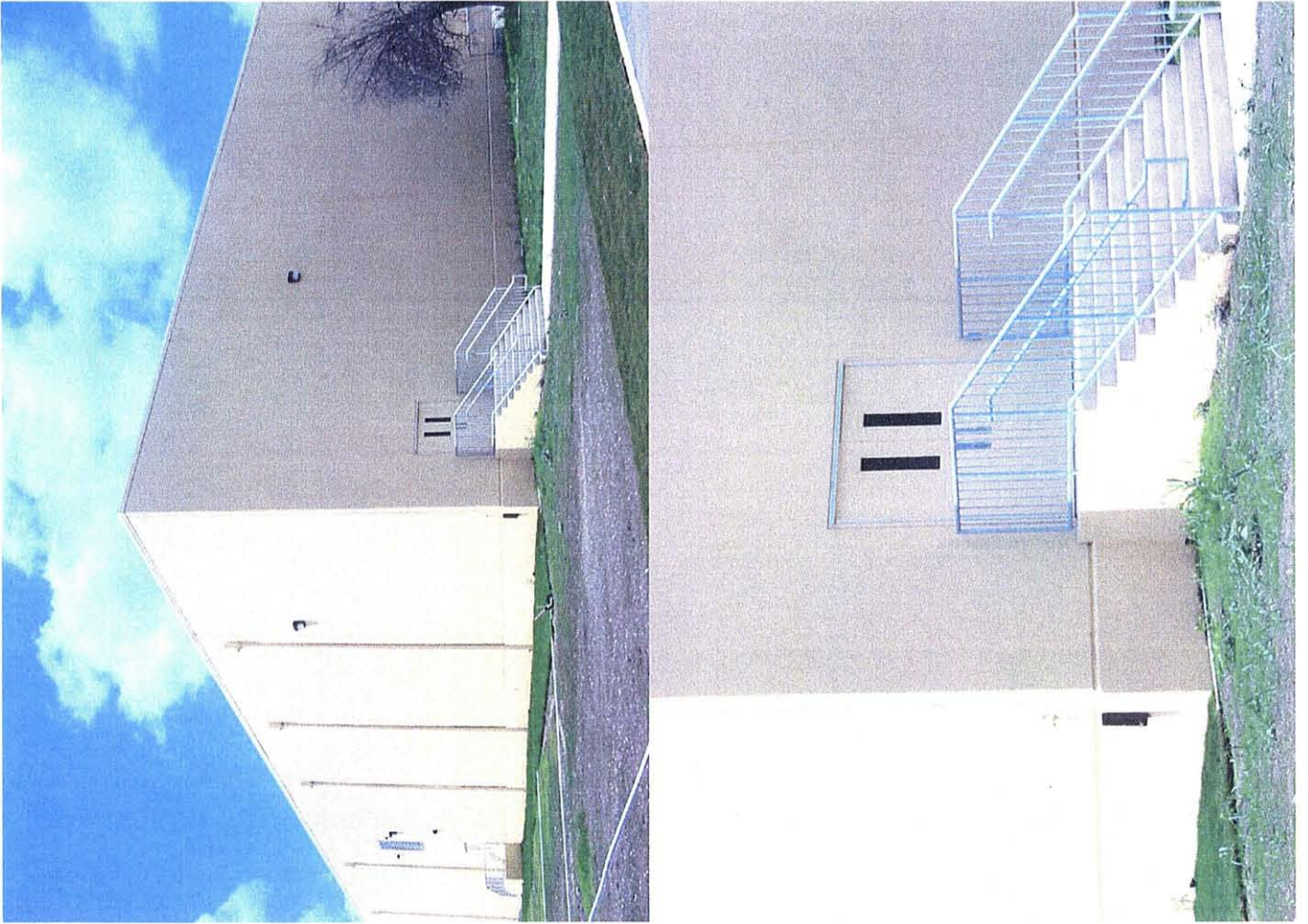
Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$0	\$0
Neighborhood:	10110	Impr:	\$0	\$0
Exempt:	PUB	Total:	\$0	\$0

-----[ Property Characteristics ]-----

Use:	Exempt	Built:	Gar/Crprt:
Ex Wall:	Not Avail	Stors: 0.0	Poly SqFt: 511941.66
Found:	Not Avail	Bdrms:	Poly Area: 11.750
Rf Type:	Not Avail	Bths:	Res Imp SF:
Style:	Not Avail	A/C:	Grs Ls Area: 0
Heat:	Not Avail	Fireplace:	
Det Struct:			

\* INCLUSIVE OF MULTIPLE BLDGS.





105/106

PRELIMINARY HEC-FDA SURVEY

Property Owner \_\_\_\_\_  
Address 428 HANSTED  
City, State, ZIP \_\_\_\_\_  
Surveyed by/Date \_\_\_\_\_

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 5 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 5 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 11 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. **Heating/Cooling:** 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:** 13. Evaporative w/ Ducts  
4. Wall Furnace 9. Radiators, Hot H2O 14. Refrigerated w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 15. Refrigerated Window Unit

Exterior Wall: 7 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 5 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 4 inches

Other Structures on Property: \_\_\_\_\_

Appraised Value: \_\_\_\_\_ Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_ Home \_\_\_\_\_  
Land \_\_\_\_\_ Land \_\_\_\_\_  
Other Structures \_\_\_\_\_ Other Structures \_\_\_\_\_  
Total \_\_\_\_\_ Total \_\_\_\_\_

ELEV: 613 N 29' 24.082'  
W 098 30.445'

-----[ Detail Report ]-----

Legal: NCB 3881 BLK 12 LOT N Can#: 038810120020  
70 FT OF W IRR 87 FT OF 2 Site: 428 HALSTEAD  
Property Use: A1  
Owner: SANCHEZ, FRANCISCO & JULIA Schl Dist: 57 City Code: 21  
Map Grid: 616C8  
428 HALSTEAD Comm Bldg Code:  
SAN ANTONIO, TX 78204-2137

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 9712/2137	Tax Yr: 2002	2003
Sale Date: 12/06/2002	Land: \$7100	\$7100
Neighborhood: 57055	Impr: \$23900	\$24800
Exempt: HOM	Total: \$31000	\$31900

-----[ Property Characteristics ]-----

Use: Single-Family Res	Built: 1930	Gar/Crppt:	
Ex Wall: Wood Siding	Stors: 1.0	Poly SqFt: 6113.12	
Found: Slab	Bdrms: 3	Poly Area: 0.140	
Rf Type: Asphalt Shingle	Bths: 1/0	Res Imp SF: 1200	
Style: Older	A/C: None	Grs Ls Area: 0	
Heat: Fl Furnace/Wall Ht	Fireplace:		
Det Struct: Shed			





107/108

PRELIMINARY HEC-FDA SURVEY

Property Owner \_\_\_\_\_  
Address 520 HALSTEAD  
City, State, ZIP \_\_\_\_\_  
Surveyed by/Date 4-27-04

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 1 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 2 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 15 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:**  
4. Wall Furnace 9. Radiators, Hot H2O 13. Evaporative w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 4 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 4 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 12" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value: \_\_\_\_\_ Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_ Home \_\_\_\_\_  
Land \_\_\_\_\_ Land \_\_\_\_\_  
Other Structures \_\_\_\_\_ Other Structures \_\_\_\_\_  
Total \_\_\_\_\_ Total \_\_\_\_\_

Elev: N 29° 24.057'  
W 098° 30.448'

-----[ Detail Report ]-----

Legal: NCB 3881 BLK 12 LOT 11 Can#: 038810120110  
Site: 520 HALSTEAD  
Property Use: A1  
Owner: MUCKLERoy FINANCIAL INC Schl Dist: 57 City Code: 21  
Map Grid: 616C8  
Comm Bldg Code:  
710 LOST STAR  
SAN ANTONIO, TX 78258-4013

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	8795/858	Tax Yr:	2002	2003
Sale Date:	03/07/2001	Land:	\$6500	\$6500
Neighborhood:	57055	Impr:	\$23200	\$24900
Exempt:	Not Avail	Total:	\$29700	\$31400

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1955	Gar/Crprt:	/54
Ex Wall:	Wood Siding	Stors:	1.0	Poly SqFt:	4287.55
Found:	Piers/Posts	Bdrms:	2	Poly Area:	0.090
Rf Type:	Asphalt Shingle	Bths:	1/0	Res Imp SF:	720
Style:	Older	A/C:	None	Grs Ls Area:	0
Heat:	Fl Furnace/Wall Ht	Fireplace:			
Det Struct:					







-----[ Detail Report ]-----

Legal: NCB 3881 BLK 12 LOT W Can#: 038810120090  
IRR 73 FT OF 9 Site: 402 HALSTEAD  
Property Use: A1  
Owner: NAVEJAR, LUCIA G Schl Dist: 57 City Code: 21  
Map Grid: 616C8  
307 W BAYLOR Comm Bldg Code:  
SAN ANTONIO, TX 78204-2512

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 8017/1032	Tax Yr: 2002	2003
Sale Date: 06/18/1999	Land: \$6000	\$6000
Neighborhood: 57055	Impr: \$19000	\$20400
Exempt: Not Avail	Total: \$25000	\$26400

-----[ Property Characteristics ]-----

Use: Single-Family Res	Built: 1947	Gar/Crppt:	
Ex Wall: Wood Siding	Stors: 1.0	Poly SqFt: 2978.45	
Found: Slab	Bdrms: 2	Poly Area: 0.060	
Rf Type: Inexpensive Metal	Bths: 1/0	Res Imp SF: 600	
Style: Older	A/C: None	Grs Ls Area: 0	
Heat: Fl Furnace/Wall Ht	Fireplace:		
Det Struct: Shed			





111/112

PRELIMINARY HEC-FDA SURVEY

Property Owner \_\_\_\_\_  
Address 235 GLASS AVE  
City, State, ZIP \_\_\_\_\_  
Surveyed by/Date 4-27-04

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 2 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 2 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 11 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. **Heating/Cooling:** 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:** 13. Evaporative w/ Ducts  
4. Wall Furnace 9. Radiators, Hot H2O 14. Refrigerated w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 15. Refrigerated Window Unit

Exterior Wall: 4 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 4 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 2" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value: \_\_\_\_\_ Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_ Home \_\_\_\_\_  
Land \_\_\_\_\_ Land \_\_\_\_\_  
Other Structures \_\_\_\_\_ Other Structures \_\_\_\_\_  
Total \_\_\_\_\_ Total \_\_\_\_\_

ELEV: 613 N 29° 24.143'  
W 098° 30.461'

-----[ Detail Report ]-----

Legal: NCB 3884 BLK 15 LOT S Can#: 038840150120  
IRR 125 FT OF 12 Site: 235 GLASS AVE  
Property Use: A1  
Owner: LOZANO, GLORIA & Schl Dist: 57 City Code: 21  
DULCE LIMAS Map Grid: 616C8  
235 GLASS AVE Comm Bldg Code:  
SAN ANTONIO, TX 78204-2135

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	9017/1506	Tax Yr:	2002	2003
Sale Date:	08/15/2001	Land:	\$7000	\$7000
Neighborhood:	57055	Impr:	\$36000	\$38900
Exempt:	HOM	Total:	\$43000	\$45900

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1947	Gar/Crprt:	
Ex Wall:	Concrete Block	Stors:	1.0	Poly SqFt:	5573.08
Found:	Slab	Bdrms:	2	Poly Area:	0.120
Rf Type:	Asphalt Shingle	Bths:	1/0	Res Imp SF:	1200
Style:	Older	A/C:	None	Grs Ls Area:	0
Heat:	F1 Furnace/Wall Ht	Fireplace:			
Det Struct:	Shed Open Porch				





113/114

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

223 GLASS AVE.

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality: 2 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 2 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 11 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. **Heating/Cooling:** 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:** 13. Evaporative w/ Ducts  
4. Wall Furnace 9. Radiators, Hot H2O 14. Refrigerated w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 15. Refrigerated Window Unit

Exterior Wall: 4 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Vencer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 5 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 24' inches

Other Structures on Property: \_\_\_\_\_

Appraised Value: \_\_\_\_\_ Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_ Home \_\_\_\_\_  
Land \_\_\_\_\_ Land \_\_\_\_\_  
Other Structures \_\_\_\_\_ Other Structures \_\_\_\_\_  
Total \_\_\_\_\_ Total \_\_\_\_\_

Elev: 618  
N 29° 24.147'  
W 098° 30.494'

-----[ Detail Report ]-----

Legal: NCB 3884 BLK 15 LOT 9                   Can#: 038840150090  
  Site: 223 GLASS AVE  
  Property Use: A1  
Owner: CASTILLO, MUCIO E & JANIE           Schl Dist: 57 City Code: 21  
  Map Grid: 616C8  
  Comm Bldg Code:  
223       GLASS  
SAN ANTONIO, TX 78204-2135

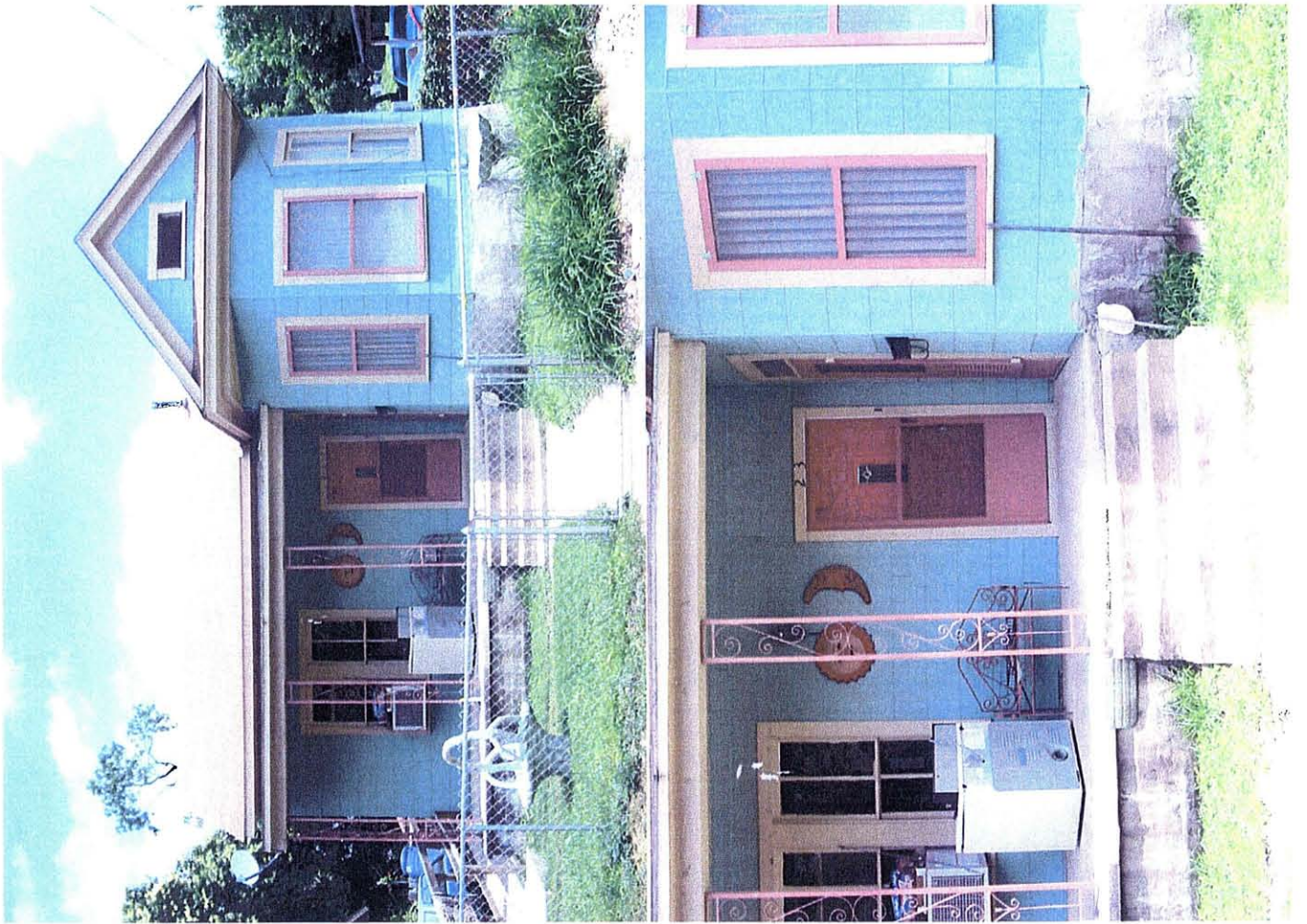
-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$7400	\$7400
Neighborhood:	57055	Impr:	\$38500	\$41100
Exempt:	HOM	Total:	\$45900	\$48500

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1902	Gar/Crprt:	/99
Ex Wall:	Asbestos Siding	Stors:	1.0	Poly SqFt:	7023.33
Found:	Piers/Posts	Bdrms:	2	Poly Area:	0.160
Rf Type:	Asphalt Shingle	Bths:	1/0	Res Imp SF:	1361
Style:	Older	A/C:	None	Grs Ls Area:	0
Heat:	Fl Furnace/Wall Ht	Fireplace:			
Det Struct:	Shed				





115/116

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

222 GLASS AVE.

Structure Type:

- 1 1. Single Family      3. Town House, End Unit      5. Duplex
- 2. Low Rise      4. Town House, Inside Unit      6. Mobile Home

Quality :

- 3 1. Low      3. Average      5. Very Good
- 2. Fair      4. Good      6. Excellent

Condition:

- 3 1. Worn Out      3. Average      5. Very Good
- 2. Badly Worn      4. Good      6. Excellent

Style:

- 1 1. One-Story      5. 1-1/2 Story Finished      9. 3-1/2 Story Finished
- 2. Two-Story      6. 1-1/2 Story Unfinished      10. 3-1/2 Story Unfinished
- 3. Three-Story      7. 2-1/2 Story Finished      11. Bi-Level
- 4. Split-Level      8. 2-1/2 Story Unfinished

Heating/Cooling:

- 11 **Heating:**
- 1. Forced Air      6. Ceiling, Rad, Elect.
- 2. Gravity Furnace      7. Baseboard, Elect.
- 3. Floor Furnace      8. Baseboard, Hot H2O
- 4. Wall Furnace      9. Radiators, Hot H2O
- 5. Floor, Radiant      10. Radiators, Steam
- Heating/Cooling:**
- 11. Warmed and Cooled Air
- 12. Heat Pump System
- Cooling Only:**
- 13. Evaporative w/ Ducts
- 14. Refrigerated w/ Ducts
- 15. Refrigerated Window Unit

Exterior Wall:

- 3 **Wood Frame:**
- 1. Plywood      3. Stucco      5. Shingle
- 2. Hardboard Sheet      4. Siding      6. Masonry Veneer
- Masonry:**
- 7. Common Brick      9. Stone
- 8. Face Brick      10. Concrete Block

Roofing:

- 1 1. Comp. Shingle      4. Wood Shake      7. Galvanized Metal
- 2. Built-up Rock      5. Concrete Tile      8. Slate
- 3. Wood Shingle      6. Clay Tile      9. Comp. Roll
- 10. Plastic Tile

Garage:

- 2 1. Attached      3. Built-in      5. None
- 2. Detached      4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 18" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 615

N 29° 24.145'  
W 098° 30.488'

-----[ Detail Report ]-----

Legal: NCB 3882 BLK 13 LOT 13           Can#: 038820130130  
  Site: 222 GLASS AVE  
  Property Use: A1  
Owner: MARTINEZ, JOSE ANGEL           Schl Dist: 57 City Code: 21  
  Map Grid: 616C8  
  Comm Bldg Code:  
222 GLASS AVE  
SAN ANTONIO, TX 78204-2134

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 75CI/03829	Tax Yr: 2002	2003
Sale Date: 04/22/1998	Land: \$7400	\$7400
Neighborhood: 57055	Impr: \$45900	\$48700
Exempt: HOM O65	Total: \$53300	\$56100

-----[ Property Characteristics ]-----

Use: Single-Family Res	Built: 1948	Gar/Crprt:	
Ex Wall: Stucco Siding	Stors: 1.0	Poly SqFt: 6959.98	
Found: Piers/Posts	Bdrms: 2	Poly Area: 0.160	
Rf Type: Asphalt Shingle	Bths: 1/0	Res Imp SF: 1010	
Style: Older	A/C: None	Grs Ls Area: 0	
Heat: Fl Furnace/Wall Ht	Fireplace:		
Det Struct:			







# San Pedro Creek - SPC11



Figure 3

1 inch equals 200 feet





PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

115 Cass  
4-27-04

Structure Type:

- 1
- |                  |                            |                |
|------------------|----------------------------|----------------|
| 1. Single Family | 3. Town House, End Unit    | 5. Duplex      |
| 2. Low Rise      | 4. Town House, Inside Unit | 6. Mobile Home |

Quality :

- 2
- |         |            |              |
|---------|------------|--------------|
| 1. Low  | 3. Average | 5. Very Good |
| 2. Fair | 4. Good    | 6. Excellent |

Condition:

- 2
- |               |            |              |
|---------------|------------|--------------|
| 1. Worn Out   | 3. Average | 5. Very Good |
| 2. Badly Worn | 4. Good    | 6. Excellent |

Style:

- 1
- |                |                           |                            |
|----------------|---------------------------|----------------------------|
| 1. One-Story   | 5. 1-1/2 Story Finished   | 9. 3-1/2 Story Finished    |
| 2. Two-Story   | 6. 1-1/2 Story Unfinished | 10. 3-1/2 Story Unfinished |
| 3. Three-Story | 7. 2-1/2 Story Finished   | 11. Bi-Level               |
| 4. Split-Level | 8. 2-1/2 Story Unfinished |                            |

Heating/Cooling:

- 15
- |                    |                         |                              |
|--------------------|-------------------------|------------------------------|
| <b>Heating:</b>    |                         | <b>Heating/Cooling:</b>      |
| 1. Forced Air      | 6. Ceiling, Rad, Elect. | 11. Warmed and Cooled Air    |
| 2. Gravity Furnace | 7. Baseboard, Elect.    | 12. Heat Pump System         |
| 3. Floor Furnace   | 8. Baseboard, Hot H2O   | <b>Cooling Only:</b>         |
| 4. Wall Furnace    | 9. Radiators, Hot H2O   | 13. Evaporative w/ Ducts     |
| 5. Floor, Radiant  | 10. Radiators, Steam    | 14. Refrigerated w/ Ducts    |
|                    |                         | 15. Refrigerated Window Unit |

Exterior Wall:

- 4
- |                    |                    |                   |
|--------------------|--------------------|-------------------|
| <b>Wood Frame:</b> |                    |                   |
| 1. Plywood         | 3. Stucco          | 5. Shingle        |
| 2. Hardboard Sheet | 4. Siding          | 6. Masonry Veneer |
| <b>Masonry:</b>    |                    |                   |
| 7. Common Brick    | 9. Stone           |                   |
| 8. Face Brick      | 10. Concrete Block |                   |

Roofing:

- 1
- |                  |                  |                     |
|------------------|------------------|---------------------|
| 1. Comp. Shingle | 4. Wood Shake    | 7. Galvanized Metal |
| 2. Built-up Rock | 5. Concrete Tile | 8. Slate            |
| 3. Wood Shingle  | 6. Clay Tile     | 9. Comp. Roll       |
|                  |                  | 10. Plastic Tile    |

Garage:

- 2
- |             |             |         |
|-------------|-------------|---------|
| 1. Attached | 3. Built-in | 5. None |
| 2. Detached | 4. Carport  |         |

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 12" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ENCL: 609

N 29° 24.004'  
W 098° 30.301'



-----[ Detail Report ]-----

Legal: NCB 2593 BLK 2 LOT 25 Can#: 025930020250  
Site: 115 CASS AVE  
Property Use: A1  
Owner: BARRERA, HERMINIA R & Schl Dist: 57 City Code: 21  
REYNALDO D GONZALEZ C/S Map Grid: 650D1  
219 NORTHAVEN ST Comm Bldg Code:  
SAN ANTONIO, TX 78229-4228

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$7700	\$7700
Neighborhood:	57055	Impr:	\$33800	\$36100
Exempt:	HOM	Total:	\$41500	\$43800

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1950	Gar/Crprt:	
Ex Wall:	Wood Siding	Stors:	1.0	Poly SqFt:	7730.20
Found:	Piers/Posts	Bdrms:	3	Poly Area:	0.170
Rf Type:	Asphalt Shingle	Bths:	1/0	Res Imp SF:	1152
Style:	Older	A/C:	None	Grs Ls Area:	0
Heat:	Fl Furnace/Wall Ht	Fireplace:			
Det Struct:					



PRELIMINARY HEC-FDA SURVEY

101/102

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

133 CASS

Structure Type:

- 1 1. Single Family    3. Town House, End Unit    5. Duplex
- 2. Low Rise    4. Town House, Inside Unit    6. Mobile Home

Quality :

- 1 1. Low    3. Average    5. Very Good
- 2. Fair    4. Good    6. Excellent

Condition:

- 1 1. Worn Out    3. Average    5. Very Good
- 2. Badly Worn    4. Good    6. Excellent

Style:

- 1 1. One-Story    5. 1-1/2 Story Finished    9. 3-1/2 Story Finished
- 2. Two-Story    6. 1-1/2 Story Unfinished    10. 3-1/2 Story Unfinished
- 3. Three-Story    7. 2-1/2 Story Finished    11. Bi-Level
- 4. Split-Level    8. 2-1/2 Story Unfinished

Heating/Cooling:

- 15 **Heating:**
  - 1. Forced Air    6. Ceiling, Rad, Elect.
  - 2. Gravity Furnace    7. Baseboard, Elect.
  - 3. Floor Furnace    8. Baseboard, Hot H2O
  - 4. Wall Furnace    9. Radiators, Hot H2O
  - 5. Floor, Radiant    10. Radiators, Steam
- Heating/Cooling:**
  - 11. Warmed and Cooled Air
  - 12. Heat Pump System
- Cooling Only:**
  - 13. Evaporative w/ Ducts
  - 14. Refrigerated w/ Ducts
  - 15. Refrigerated Window Unit

Exterior Wall:

- 4 **Wood Frame:**
  - 1. Plywood    3. Stucco    5. Shingle
  - 2. Hardboard Sheet    4. Siding    6. Masonry Veneer
- Masonry:**
  - 7. Common Brick    9. Stone
  - 8. Face Brick    10. Concrete Block

Roofing:

- 1 1. Comp. Shingle    4. Wood Shake    7. Galvanized Metal
- 2. Built-up Rock    5. Concrete Tile    8. Slate
- 3. Wood Shingle    6. Clay Tile    9. Comp. Roll
- 10. Plastic Tile

Garage:

- 5 1. Attached    3. Built-in    5. None
- 2. Detached    4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 20" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 611

N 29° 24.012'  
W 098° 30.343'



-----[ Detail Report ]-----

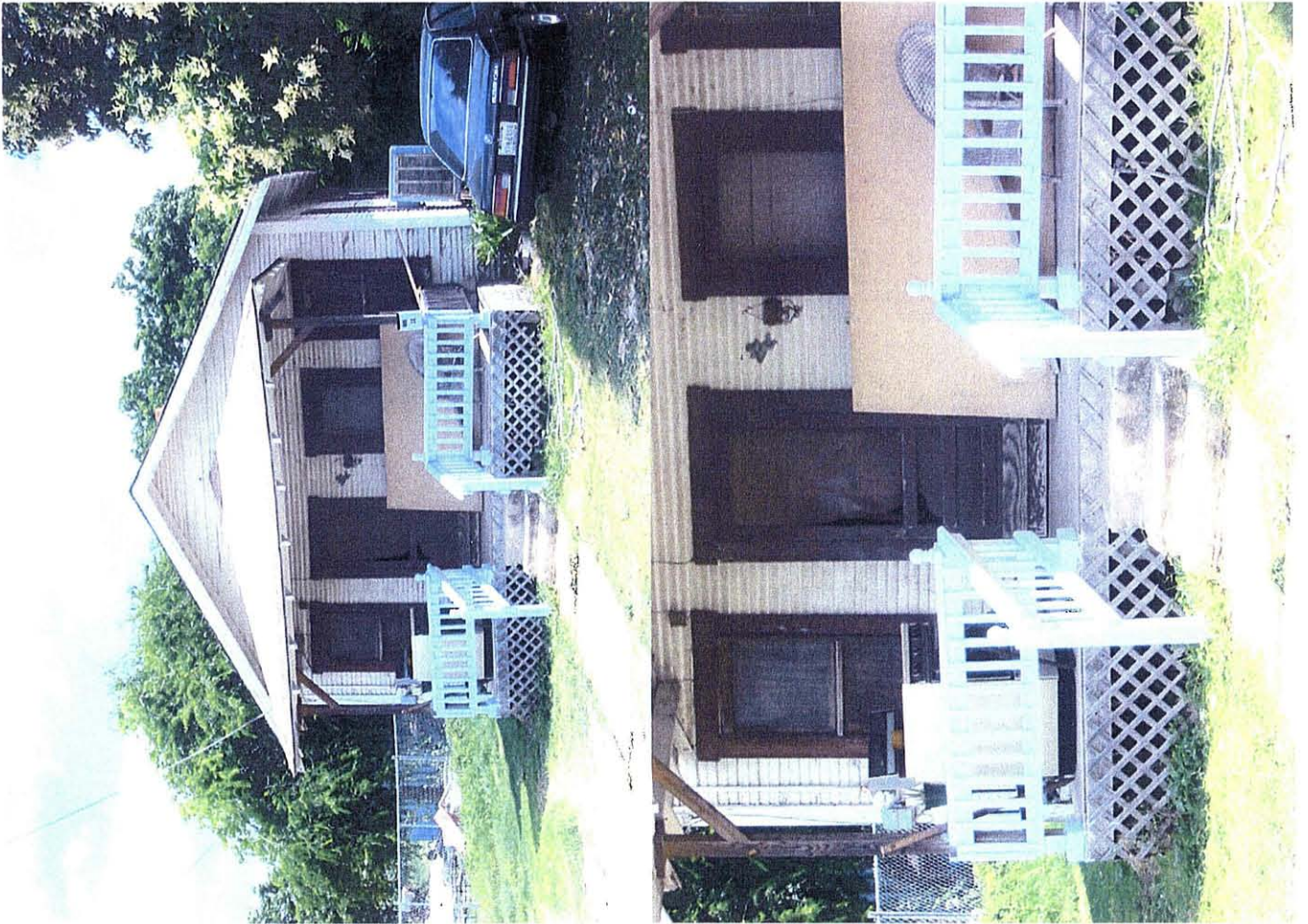
Legal: NCB 2593 BLK 2 LOT E Can#: 025930020211  
16.67 FT OF 20 & W 16.67' Site: 133 CASS AVE  
OF 21 EXC S TRI 9.41 FT Property Use: A1  
Owner: CABALLERO, GLORIA Schl Dist: 57 City Code: 21  
Map Grid: 616C8  
Comm Bldg Code:  
133 CASS AVE  
SAN ANTONIO, TX 78204-2202

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 3476/0317	Tax Yr: 2002	2003
Sale Date: 01/02/1991	Land: \$6700	\$6700
Neighborhood: 57055	Impr: \$15000	\$15500
Exempt: HOM	Total: \$21700	\$22200

-----[ Property Characteristics ]-----

Use: Single-Family Res	Built: 1924	Gar/Crppt:
Ex Wall: Wood Siding	Stors: 1.0	Poly SqFt: 5041.69
Found: Piers/Posts	Bdrms: 2	Poly Area: 0.110
Rf Type: Asphalt Shingle	Bths: 1/0	Res Imp SF: 568
Style: Older	A/C: None	Grs Ls Area: 0
Heat: Fl Furnace/Wall Ht	Fireplace:	
Det Struct:		





# San Pedro Creek - SPC12

12



Figure 2

1 inch equals 200 feet





9/1/92

PRELIMINARY HEC-FDA SURVEY

Property Owner: 223 E. W. BOCK  
Address: \_\_\_\_\_  
City, State, ZIP: \_\_\_\_\_  
Surveyed by/Date: 4-22-04

Structure Type: 1  
1. Single Family    3. Town House, End Unit    5. Duplex  
2. Low Rise    4. Town House, Inside Unit    6. Mobile Home

Quality: 2  
1. Low    3. Average    5. Very Good  
2. Fair    4. Good    6. Excellent

Condition: 2  
1. Worn Out    3. Average    5. Very Good  
2. Badly Worn    4. Good    6. Excellent

Style: 1  
1. One-Story    5. 1-1/2 Story Finished    9. 3-1/2 Story Finished  
2. Two-Story    6. 1-1/2 Story Unfinished    10. 3-1/2 Story Unfinished  
3. Three-Story    7. 2-1/2 Story Finished    11. Bi-Level  
4. Split-Level    8. 2-1/2 Story Unfinished

Heating/Cooling: 15  
**Heating:**  
1. Forced Air    6. Ceiling, Rad, Elect.  
2. Gravity Furnace    7. Baseboard, Elect.  
3. Floor Furnace    8. Baseboard, Hot H2O  
4. Wall Furnace    9. Radiators, Hot H2O  
5. Floor, Radiant    10. Radiators, Steam  
**Heating/Cooling:**  
11. Warmed and Cooled Air  
12. Heat Pump System  
**Cooling Only:**  
13. Evaporative w/ Ducts  
14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 4  
**Wood Frame:**  
1. Plywood    3. Stucco    5. Shingle  
2. Hardboard Sheet    4. Siding    6. Masonry Veneer  
**Masonry:**  
7. Common Brick    9. Stone  
8. Face Brick    10. Concrete Block

Roofing: 7/1  
1. Comp. Shingle    4. Wood Shake    7. Galvanized Metal  
2. Built-up Rock    5. Concrete Tile    8. Slate  
3. Wood Shingle    6. Clay Tile    9. Comp. Roll  
10. Plastic Tile

Garage: 2  
1. Attached    3. Built-in    5. None  
2. Detached    4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 16" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value: \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_  
Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 605

N 29° 23.837'  
W 098° 30.161'

-----[ Detail Report ]-----

Legal: NCB 2865 BLK 3 LOT E Can#: 028650030100  
33 FT OF 6 Site: 223 E LUBBOCK  
Property Use: A1  
Owner: DEVAZQUEZ, ENEDELIA DELAROSA Schl Dist: 57 City Code: 21  
Map Grid: 650D1  
Comm Bldg Code:  
1538 COMMERCIAL AVE  
SAN ANTONIO, TX 78221-1034

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$6200	\$6200
Neighborhood:	57055	Impr:	\$16800	\$17400
Exempt:	Not Avail	Total:	\$23000	\$23600

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1945	Gar/Crprt:	
Ex Wall:	Wood Siding	Stors:	1.0	Poly SqFt:	3560.02
Found:	Piers/Posts	Bdrms:	2	Poly Area:	0.080
Rf Type:	Inexpensive Metal	Bths:	1/0	Res Imp SF:	720
Style:	Older	A/C:	None	Grs Ls Area:	0
Heat:	Fl Furnace/Wall Ht	Fireplace:			
Det Struct:	Shed				





PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

230 E. LUBBOCK

89/90

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 2 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 3 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 15 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:**  
4. Wall Furnace 9. Radiators, Hot H2O 13. Evaporative w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 4 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Vencer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 5 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

SHEARER / TUG  
OIL FENCE  
ORANGE BUCKET

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 12" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 605

N 29° 23.839'  
W 098° 30.124'

-----[ Detail Report ]-----

Legal: NCB 2866 BLK 4 LOT E 33 Can#: 028660040120  
OF 9 EXC S 48.15 OF E TRI 33 Site: 230 E LUBBOCK  
& N 58 FT OF W TRI 45 OF 10 Property Use: A1  
Owner: MANZANO, MONICA A Schl Dist: 57 City Code: 21  
Map Grid: 650D1  
230 E LUBBOCK ST Comm Bldg Code:  
SAN ANTONIO, TX 78204-2925

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$6300	\$6300
Neighborhood:	57055	Impr:	\$18300	\$19600
Exempt:	Not Avail	Total:	\$24600	\$25900

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1944	Gar/Crppt:	/16
Ex Wall:	Wood Siding	Stors:	1.0	Poly SqFt:	2987.25
Found:	Piers/Posts	Bdrms:	2	Poly Area:	0.060
Rf Type:	Inexpensive Metal	Bths:	1/0	Res Imp SF:	600
Style:	Older	A/C:	None	Grs Ls Area:	0
Heat:	Fl Furnace/Wall Ht	Fireplace:			
Det Struct:					





PRELIMINARY HEC-FDA SURVEY

93/94

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

158 E. BAYHOLE (119 LUBBOCK)  
4-27-04

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 1 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 2 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 11 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:**  
4. Wall Furnace 9. Radiators, Hot H2O 13. Evaporative w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 4 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
**Masonry:**  
7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 4 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 2" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 603

N 29° 23.878'  
W 098° 30.130'

-----[ Detail Report ]-----

Legal: NCB 2867 BLK 1 LOT W Can#: 028670010030  
IRR 32 FT OF 3 Site: 158 E BAYLOR ST  
Property Use: B1  
Owner: MENDOZA, JUAN D & PEDRO D Schl Dist: 57 City Code: 21  
Map Grid: 650D1  
Comm Bldg Code:  
158 BAYLOR ST E  
SAN ANTONIO, TX 78204-2901

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	9080/606	Tax Yr:	2002	2003
Sale Date:	08/16/2001	Land:	\$6400	\$6400
Neighborhood:	57055	Impr:	\$27500	\$28500
Exempt:	Not Avail	Total:	\$33900	\$34900

-----[ Property Characteristics ]-----

Use:	Multi-Family Res	Built:	1948	Gar/Crppt:	
Ex Wall:	Wood Siding	Stors:	1.0	Poly SqFt:	4437.83
Found:	Slab	Bdrms:	2	Poly Area:	0.100
Rf Type:	Asphalt Shingle	Bths:	2/0	Res Imp SF:	1485
Style:	Contemporary	A/C:	None	Grs Ls Area:	0
Heat:	Fl Furnace/Wall Ht	Fireplace:			
Det Struct:	Carport Shed				







-----[ Detail Report ]-----

Legal: NCB 2597 BLK LOT 18 Can#: 025970000180  
Site: 153 E BAYLOR  
Property Use: B1  
Owner: HERNANDEZ, ANNETTE C Schl Dist: 57 City Code: 21  
Map Grid: 650D1  
835 W MULBERRY AVE Comm Bldg Code: 800  
SAN ANTONIO, TX 78212-3262

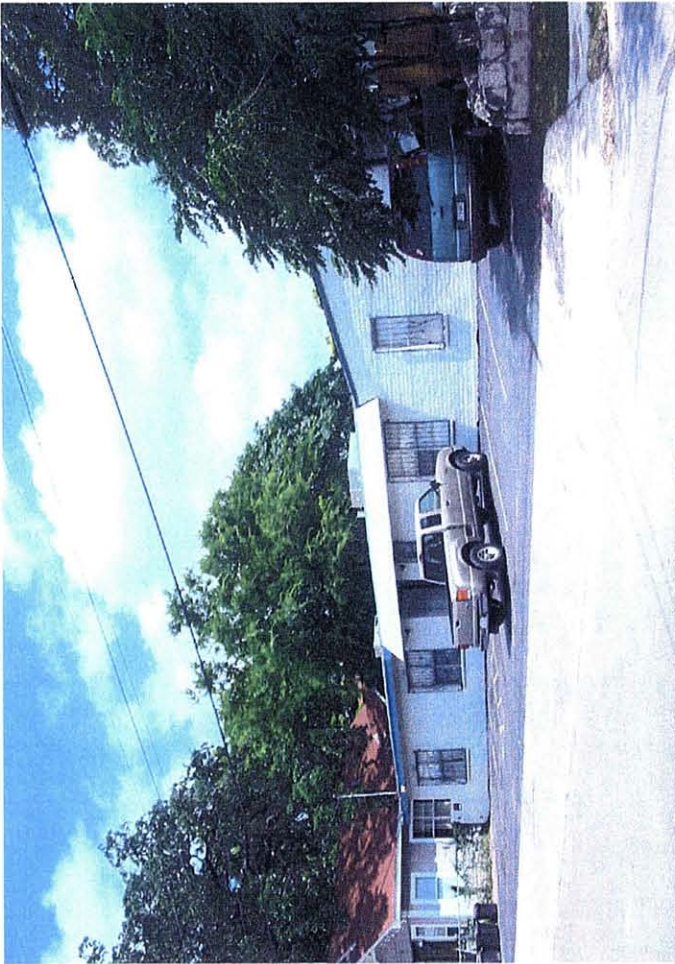
*APARTMENTS*

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 9240/28	Tax Yr: 2002	2003
Sale Date: 11/02/2001	Land: \$14000	\$23400
Neighborhood: 10110	Impr: \$40300	\$53700
Exempt: Not Avail	Total: \$54300	\$77100

-----[ Property Characteristics ]-----

Use:	Not Avail	Built: 1974	Gar/Crppt:	
Ex Wall:	Brick	Stors: 0.0	Poly SqFt:	8835.52
Found:	Not Avail	Bdrms:	Poly Area:	0.200
Rf Type:	Wood Joist	Bths:	Res Imp SF:	
Style:	Not Avail	A/C:	Grs Ls Area:	2856
Heat:	Not Avail	Fireplace:		
Det Struct:	Asphalt Paving			





97/98

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

139 E. BAYLOR  
4-27-04

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 2 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 2 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 15 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:**  
4. Wall Furnace 9. Radiators, Hot H2O 13. Evaporative w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 4 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 2 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 18" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 606

N 29° 23.887'  
W 098° 30.171'

-----[ Detail Report ]-----

Legal: NCB 2597 BLK 0 LOT 10 Can#: 025970000100  
Site: 139 E BAYLOR  
Property Use: A1  
Owner: ROJAS, GLORIA S Schl Dist: 57 City Code: 21  
Map Grid: 650D1  
Comm Bldg Code:  
139 BAYLOR ST E  
SAN ANTONIO, TX 78204-2902

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$6700	\$6700
Neighborhood:	57055	Impr:	\$25900	\$27600
Exempt:	HOM O65	Total:	\$32600	\$34300

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1947	Gar/Crprt:	
Ex Wall:	Wood Siding	Stors:	1.0	Poly SqFt:	5079.99
Found:	Piers/Posts	Bdrms:	3	Poly Area:	0.110
Rf Type:	Asphalt Shingle	Bths:	1/0	Res Imp SF:	933
Style:	Older	A/C:	None	Grs Ls Area:	0
Heat:	Fl Furnace/Wall Ht	Fireplace:			
Det Struct:	Garage				





# San Pedro Creek - SPC13 and SPC14

13

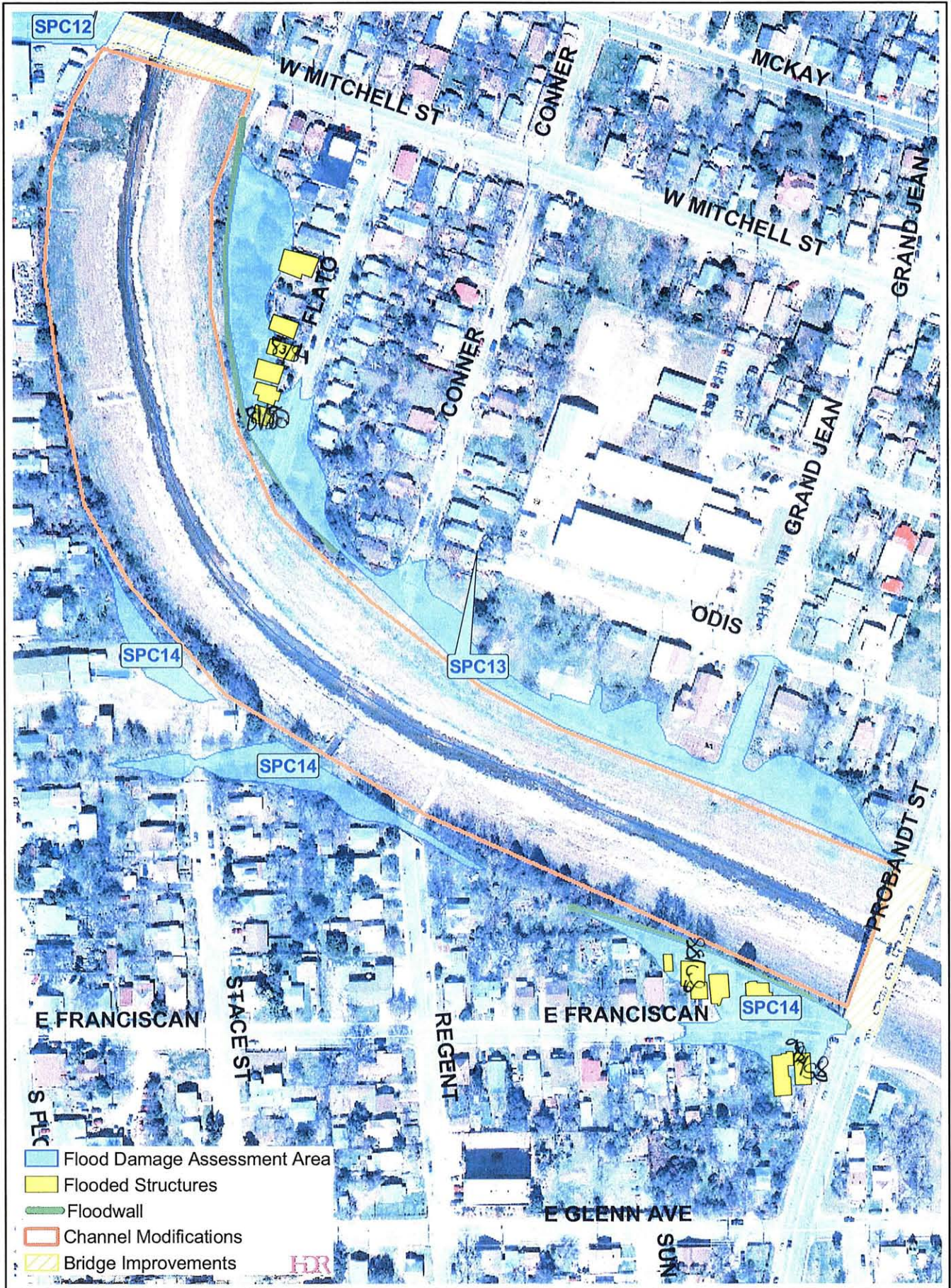


Figure 1

1 inch equals 200 feet





B1/B2

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

129 PLATO  
4-27-04

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 2 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 2 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 15 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:**  
4. Wall Furnace 9. Radiators, Hot H2O 13. Evaporative w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 4 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Vencer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 5 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

"BELOW OF DOG"

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 6 inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 609

N 29° 23.632'  
W 098° 30.151'

-----[ Detail Report ]-----

Legal: NCB 6082 BLK 3 LOT E Can#: 060820030260  
IRR 43 FT OF 25 & 26 Site: 129 FLATO  
Property Use: A1  
Owner: KIKAPOO, SILVIA G Schl Dist: 57 City Code: 21  
Map Grid: 650D1  
129 FLATO ST Comm Bldg Code:  
SAN ANTONIO, TX 78204-2746

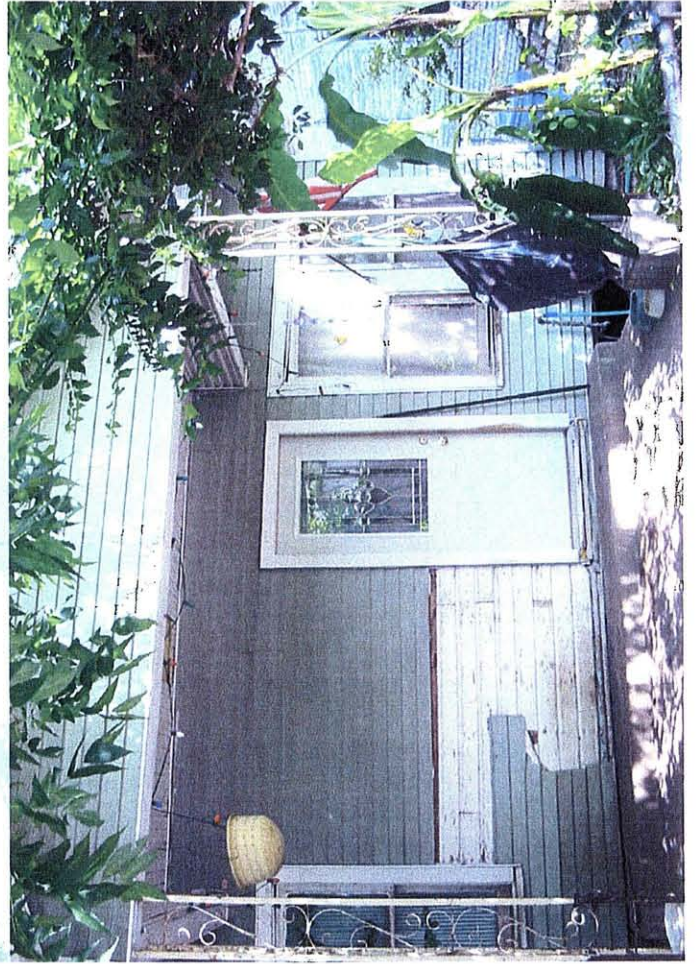
-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$4710	\$4700
Neighborhood:	57071	Impr:	\$11220	\$12500
Exempt:	HOM DRH	Total:	\$15930	\$17200

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1947	Gar/Crppt:	
Ex Wall:	Alum/Vinyl Siding	Stors:	1.0	Poly SqFt:	2203.42
Found:	Piers/Posts	Bdrms:	1	Poly Area:	0.050
Rf Type:	Asphalt Shingle	Bths:	1/0	Res Imp SF:	528
Style:	Older	A/C:	None	Grs Ls Area:	0
Heat:	F1 Furnace/Wall Ht	Fireplace:			
Det Struct:					





PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

123 FLATO  
4-27-04

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 3 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 3 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 11 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:**  
4. Wall Furnace 9. Radiators, Hot H2O 13. Evaporative w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 4 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Vencer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 7 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 5 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 20" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value: \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 610

N 29° 23.642'  
W 098° 30.149'

-----[ Detail Report ]-----

Legal: NCB 6082 BLK 3 LOT 22 Can#: 060820030220  
EXC SW TRI 10 X 19 FT Site: 123 FLATO  
Property Use: A1  
Owner: GUZMAN, CRUZ C Schl Dist: 57 City Code: 21  
Map Grid: 650D1  
Comm Bldg Code:  
2719 S FLORES ST  
SAN ANTONIO, TX 78204-2916

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$5220	\$5200
Neighborhood:	57071	Impr:	\$16610	\$17400
Exempt:	Not Avail	Total:	\$21830	\$22600

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1947	Gar/Crprt:	/150
Ex Wall:	Alum/Vinyl Siding	Stors:	1.0	Poly SqFt:	3438.94
Found:	Piers/Posts	Bdrms:	3	Poly Area:	0.070
Rf Type:	Inexpensive Metal	Bths:	1/0	Res Imp SF:	720
Style:	Older	A/C:	None	Grs Ls Area:	0
Heat:	Fl Furnace/Wall Ht	Fireplace:			
Det Struct:					





85/86

PRELIMINARY HEC-FDA SURVEY

Property Owner \_\_\_\_\_  
Address 422 E. FRANCISCAN  
City, State, ZIP \_\_\_\_\_  
Surveyed by/Date 4-27-04

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 2 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 3 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 15 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. **Heating/Cooling:** 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:**  
4. Wall Furnace 9. Radiators, Hot H2O 13. Evaporative w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 4 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 7 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 4 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 4" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value: \_\_\_\_\_ Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 608 N 29° 23.481'  
W 098° 30.014'

-----[ Detail Report ]-----

Legal: NCB 2907 BLK 8 LOT E 17 Can#: 029070080113  
OF N IRR 118.91 FT OF 11 & W Site: 422 E FRANCISCAN  
17 OF N IRR 78.4 FT OF 12 Property Use: A1  
Owner: MALDONADO, ENCARNACION Schl Dist: 57 City Code: 21  
Map Grid: 650D2  
Comm Bldg Code:  
422 E FRANCISCAN  
SAN ANTONIO, TX 78204-2850

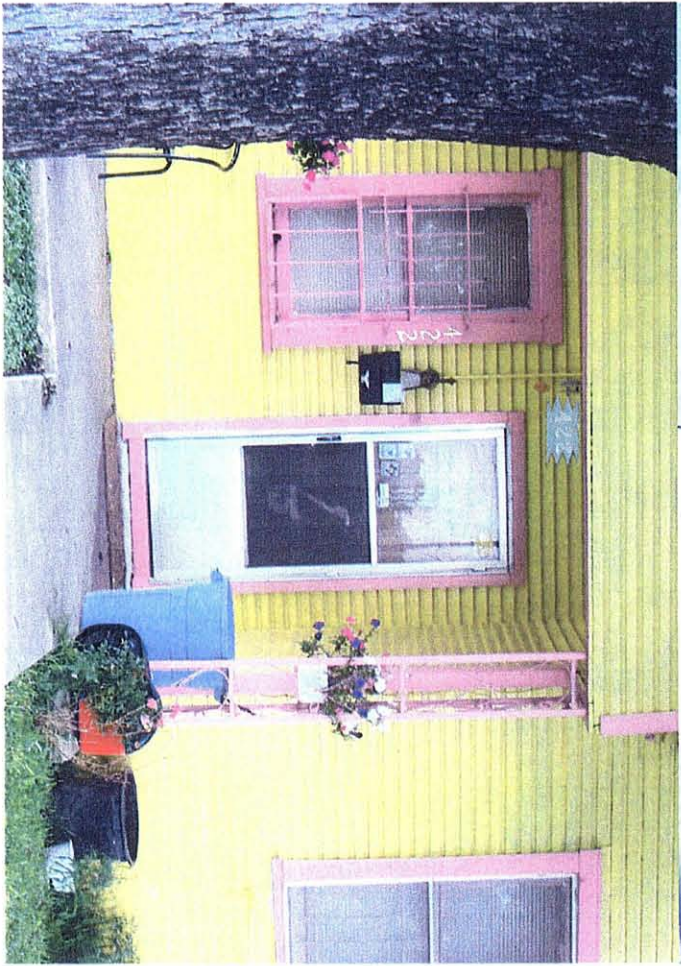
-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 7452/1877	Tax Yr: 2002	2003
Sale Date: 05/04/1998	Land: \$4990	\$5000
Neighborhood: 57071	Impr: \$15710	\$17900
Exempt: Not Avail	Total: \$20700	\$22900

-----[ Property Characteristics ]-----

Use: Single-Family Res	Built: 1938	Gar/Crprt: /24
Ex Wall: Wood Siding	Stors: 1.0	Poly SqFt: 2464.38
Found: Piers/Posts	Bdrms: 2	Poly Area: 0.050
Rf Type: Inexpensive Metal	Bths: 1/0	Res Imp SF: 660
Style: Older	A/C: None	Grs Ls Area: 0
Heat: Fl Furnace/Wall Ht	Fireplace:	
Det Struct:		





87/88

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

407 E. FRANCISCAN  
4-27-04

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 1 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 2 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 15 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:**  
4. Wall Furnace 9. Radiators, Hot H2O 13. Evaporative w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 5 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 7 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 4 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 16" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # \_\_\_\_\_  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Elev: 607

N 29° 23.477'  
W 098° 30.042'

-----[ Detail Report ]-----

Legal: NCB 2906 BLK 7 LOT 11 Can#: 029060070110  
EXC N IRR 32 FT Site: 407 E FRANCISCAN  
Property Use: A1  
Owner: GARCIA, OSCAR G SR L/E Schl Dist: 57 City Code: 21  
Map Grid: 650D2  
Comm Bldg Code:  
407 E FRANCISCAN  
SAN ANTONIO, TX 78204-2851

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	3093/0939	Tax Yr:	2002	2003
Sale Date:	01/29/1998	Land:	\$5600	\$5600
Neighborhood:	57071	Impr:	\$28370	\$29600
Exempt:	HOM 065	Total:	\$33970	\$35200

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1925	Gar/Crprt:	
Ex Wall:	Asbestos Siding	Stors:	1.0	Poly SqFt:	5265.35
Found:	Piers/Posts	Bdrms:	3	Poly Area:	0.120
Rf Type:	Asphalt Shingle	Bths:	1/1	Res Imp SF:	1156
Style:	Older	A/C:	None	Grs Ls Area:	0
Heat:	Fl Furnace/Wall Ht	Fireplace:			
Det Struct:					







# San Antonio River - SAR03 and SAR04

1



Figure 21

1 inch equals 200 feet





PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

BASE MAGNOLIA AVE  
5-26-02

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 3 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 4 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 3 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:**  
4. Wall Furnace 9. Radiators, Hot H2O 13. Evaporative w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 5 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 2 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: 900 Square Feet

Effective Built Date: 1943

Exposed Slab Elevation at the Font of Structure: 12" inches

Other Structures on Property: Garage

Appraised Value:  
Home 72,700  
Land 19,600  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 069390000110  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: ~~686~~  
686

LIGHT ON  
CEDAR POST  
FLOWER POT @ LEFT  
(Lat) N 29° 27.25'  
(Long) W 98° 28.720'



-----[ Detail Report ]-----

Legal: NCB 6939 BLK LOT E Can#: 069390000110  
25 FT OF 11 & W 37.5 FT OF Site: 845 E MAGNOLIA AVE  
12 Property Use: A1  
Owner: GOODWIN, GORDON F Schl Dist: 57 City Code: 21  
Map Grid: 617A1  
2526 RIM OAK Comm Bldg Code:  
SAN ANTONIO, TX 78232-2604

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 7784/1910	Tax Yr: 2002	2003
Sale Date: 12/22/1998	Land: \$11100	\$19600
Neighborhood: 57032	Impr: \$64300	\$72700
Exempt: Not Avail	Total: \$75400	\$92300

-----[ Property Characteristics ]-----

Use: Single-Family Res	Built: 1943	Gar/Crprt:
Ex Wall: Asbestos Siding	Stors: 1.0	Poly SqFt: 8326.50
Found: Piers/Posts	Bdrms: 2	Poly Area: 0.190
Rf Type: Asphalt Shingle	Bths: 1/0	Res Imp SF: 900
Style: Older	A/C: Central	Grs Ls Area: 0
Heat: Forced Hot Air	Fireplace:	
Det Struct: Garage		



PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

838 E. MAGNOLIA AVE.  
5-26-04

Structure Type:

- 1
- |                  |                            |                |
|------------------|----------------------------|----------------|
| 1. Single Family | 3. Town House, End Unit    | 5. Duplex      |
| 2. Low Rise      | 4. Town House, Inside Unit | 6. Mobile Home |

Quality :

- 4
- |         |            |              |
|---------|------------|--------------|
| 1. Low  | 3. Average | 5. Very Good |
| 2. Fair | 4. Good    | 6. Excellent |

Condition:

- 3
- |               |            |              |
|---------------|------------|--------------|
| 1. Worn Out   | 3. Average | 5. Very Good |
| 2. Badly Worn | 4. Good    | 6. Excellent |

Style:

- 1
- |                |                           |                            |
|----------------|---------------------------|----------------------------|
| 1. One-Story   | 5. 1-1/2 Story Finished   | 9. 3-1/2 Story Finished    |
| 2. Two-Story   | 6. 1-1/2 Story Unfinished | 10. 3-1/2 Story Unfinished |
| 3. Three-Story | 7. 2-1/2 Story Finished   | 11. Bi-Level               |
| 4. Split-Level | 8. 2-1/2 Story Unfinished |                            |

Heating/Cooling:

- 
- |                    |                         |                              |
|--------------------|-------------------------|------------------------------|
| <b>Heating:</b>    |                         | <b>Heating/Cooling:</b>      |
| 1. Forced Air      | 6. Ceiling, Rad, Elect. | 11. Warmed and Cooled Air    |
| 2. Gravity Furnace | 7. Baseboard, Elect.    | 12. Heat Pump System         |
| 3. Floor Furnace   | 8. Baseboard, Hot H2O   | <b>Cooling Only:</b>         |
| 4. Wall Furnace    | 9. Radiators, Hot H2O   | 13. Evaporative w/ Ducts     |
| 5. Floor, Radiant  | 10. Radiators, Steam    | 14. Refrigerated w/ Ducts    |
|                    |                         | 15. Refrigerated Window Unit |

Exterior Wall:

- 5
- |                    |                    |                   |
|--------------------|--------------------|-------------------|
| <b>Wood Frame:</b> |                    |                   |
| 1. Plywood         | 3. Stucco          | 5. Shingle        |
| 2. Hardboard Sheet | 4. Siding          | 6. Masonry Veneer |
| <b>Masonry:</b>    |                    |                   |
| 7. Common Brick    | 9. Stone           |                   |
| 8. Face Brick      | 10. Concrete Block |                   |

Roofing:

- 7
- |                  |                  |                     |
|------------------|------------------|---------------------|
| 1. Comp. Shingle | 4. Wood Shake    | 7. Galvanized Metal |
| 2. Built-up Rock | 5. Concrete Tile | 8. Slate            |
| 3. Wood Shingle  | 6. Clay Tile     | 9. Comp. Roll       |
|                  |                  | 10. Plastic Tile    |

Garage:

- 2
- |             |             |         |
|-------------|-------------|---------|
| 1. Attached | 3. Built-in | 5. None |
| 2. Detached | 4. Carport  |         |

Finished Floor Area: 997 Square Feet

BIRD HOUSE

Effective Built Date: 1941

HANGING PLANT

Exposed Slab Elevation at the Font of Structure: 12" inches

Other Structures on Property: Garage

Appraised Value:  
Home 41,900  
Land 18,400  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 065300020240  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV. 685

N 29° 27.238'  
W 098° 28.750'



-----[ Detail Report ]-----

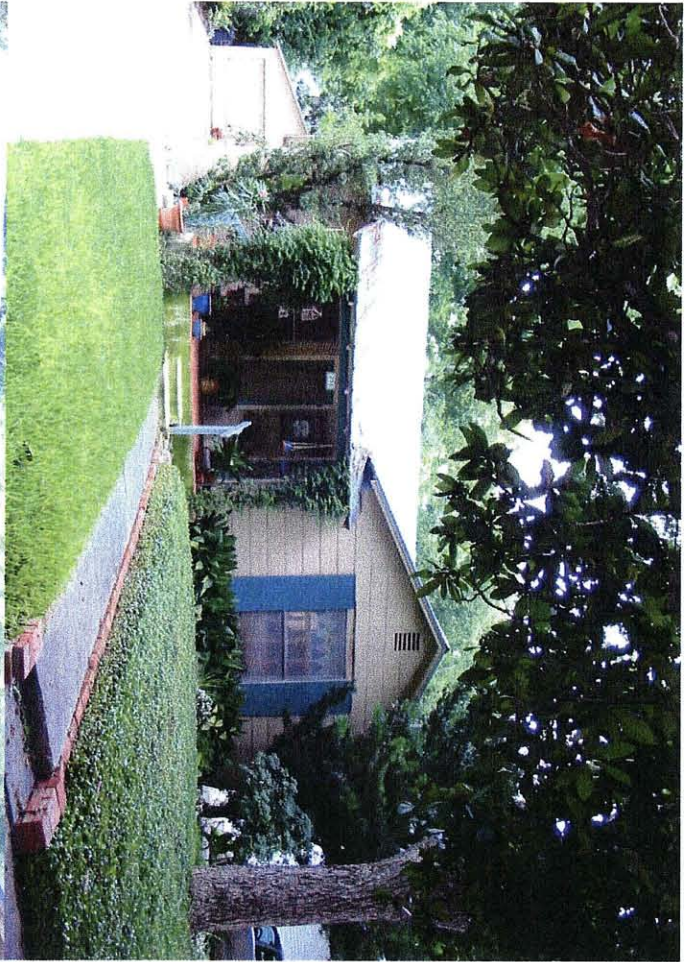
Legal: NCB 6530 BLK 2 LOT 24 Can#: 065300020240  
Site: 838 E MAGNOLIA AVE  
Property Use: A1  
Owner: CATALALOS, ROSEMARY Schl Dist: 57 City Code: 21  
Map Grid: 617A1  
127 CROFTON AVE # 3 Comm Bldg Code:  
SAN ANTONIO, TX 78210-1126

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 2972/0074	Tax Yr: 2002	2003
Sale Date: 06/03/1992	Land: \$10300	\$18400
Neighborhood: 57032	Impr: \$41100	\$41900
Exempt: Not Avail	Total: \$51400	\$60300

-----[ Property Characteristics ]-----

Use: Single-Family Res	Built: 1941	Gar/Crppt:	
Ex Wall: Asbestos Siding	Stors: 1.0	Poly SqFt: 6845.28	
Found: Piers/Posts	Bdrms: 2	Poly Area: 0.150	
Rf Type: Inexpensive Metal	Bths: 1/0	Res Imp SF: 997	
Style: Older	A/C: None	Grs Ls Area: 0	
Heat: Fl Furnace/Wall Ht	Fireplace:		
Det Struct: Garage			



PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address 143 MAGNOLIA DR.  
City, State, ZIP  
Surveyed by/Date A-26-04

Structure Type: 1  
1. Single Family    3. Town House, End Unit    5. Duplex  
2. Low Rise    4. Town House, Inside Unit    6. Mobile Home

Quality : 2  
1. Low    3. Average    5. Very Good  
2. Fair    4. Good    6. Excellent

Condition: 3  
1. Worn Out    3. Average    5. Very Good  
2. Badly Worn    4. Good    6. Excellent

Style: 1  
1. One-Story    5. 1-1/2 Story Finished    9. 3-1/2 Story Finished  
2. Two-Story    6. 1-1/2 Story Unfinished    10. 3-1/2 Story Unfinished  
3. Three-Story    7. 2-1/2 Story Finished    11. Bi-Level  
4. Split-Level    8. 2-1/2 Story Unfinished

Heating/Cooling: \_\_\_\_\_  
**Heating:**  
1. Forced Air    6. Ceiling, Rad, Elect.  
2. Gravity Furnace    7. Baseboard, Elect.  
3. Floor Furnace    8. Baseboard, Hot H2O  
4. Wall Furnace    9. Radiators, Hot H2O  
5. Floor, Radiant    10. Radiators, Steam  
**Heating/Cooling:**  
11. Warmed and Cooled Air  
12. Heat Pump System  
**Cooling Only:**  
13. Evaporative w/ Ducts  
14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 5  
**Wood Frame:**  
1. Plywood    3. Stucco    5. Shingle  
2. Hardboard Sheet    4. Siding    6. Masonry Veneer  
**Masonry:**  
7. Common Brick    9. Stone  
8. Face Brick    10. Concrete Block

Roofing: 1  
1. Comp. Shingle    4. Wood Shake    7. Galvanized Metal  
2. Built-up Rock    5. Concrete Tile    8. Slate  
3. Wood Shingle    6. Clay Tile    9. Comp. Roll  
10. Plastic Tile

Garage: 2  
1. Attached    3. Built-in    5. None  
2. Detached    4. Carport

Finished Floor Area: 1416 Square Feet

Effective Built Date: 1924

*DBL FRENCH DOORS  
FO WALLS CHANGES*

Exposed Slab Elevation at the Font of Structure: \_\_\_\_\_ inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home 58,700  
Land 19,400  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 065300020120  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

*ELEV: 689*

*N 29° 27.173'  
W 098° 28.725'*



-----[ Detail Report ]-----

Legal: NCB 6530 BLK 2 LOT 12, Can#: 065300020120  
& W 25 FT OF 13 Site: 143 MAGNOLIA DR  
Property Use: A1  
Owner: POWELL, GREGORY A & Schl Dist: 57 City Code: 21  
MALIN WILSON-POWELL Map Grid: 617A1  
143 MAGNOLIA DR Comm Bldg Code:  
SAN ANTONIO, TX 78212-3116

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 8785/823	Tax Yr: 2002	2003
Sale Date: 03/13/2001	Land: \$11000	\$19400
Neighborhood: 57032	Impr: \$58300	\$58700
Exempt: HOM	Total: \$69300	\$78100

-----[ Property Characteristics ]-----

Use: Single-Family Res	Built: 1924	Gar/Crprt:	
Ex Wall: Wood Siding	Stors: 1.0	Poly SqFt: 8484.94	
Found: Piers/Posts	Bdrms: 2	Poly Area: 0.190	
Rf Type: Asphalt Shingle	Bths: 1/0	Res Imp SF: 1416	
Style: Older	A/C: None	Grs Ls Area: 0	
Heat: Fl Furnace/Wall Ht	Fireplace: 1		
Det Struct: Garage Carport	Living Area 1st		



PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

154 MAENOWIA DR.  
4-26-04

Structure Type:

- 1
- |                  |                            |                |
|------------------|----------------------------|----------------|
| 1. Single Family | 3. Town House, End Unit    | 5. Duplex      |
| 2. Low Rise      | 4. Town House, Inside Unit | 6. Mobile Home |

Quality :

- 5
- |         |            |              |
|---------|------------|--------------|
| 1. Low  | 3. Average | 5. Very Good |
| 2. Fair | 4. Good    | 6. Excellent |

Condition:

- 5
- |               |            |              |
|---------------|------------|--------------|
| 1. Worn Out   | 3. Average | 5. Very Good |
| 2. Badly Worn | 4. Good    | 6. Excellent |

Style:

- 1
- |                |                           |                            |
|----------------|---------------------------|----------------------------|
| 1. One-Story   | 5. 1-1/2 Story Finished   | 9. 3-1/2 Story Finished    |
| 2. Two-Story   | 6. 1-1/2 Story Unfinished | 10. 3-1/2 Story Unfinished |
| 3. Three-Story | 7. 2-1/2 Story Finished   | 11. Bi-Level               |
| 4. Split-Level | 8. 2-1/2 Story Unfinished |                            |

Heating/Cooling:

- 11
- |                    |                         |                              |
|--------------------|-------------------------|------------------------------|
| <b>Heating:</b>    |                         | <b>Heating/Cooling:</b>      |
| 1. Forced Air      | 6. Ceiling, Rad, Elect. | 11. Warmed and Cooled Air    |
| 2. Gravity Furnace | 7. Baseboard, Elect.    | 12. Heat Pump System         |
| 3. Floor Furnace   | 8. Baseboard, Hot H2O   | <b>Cooling Only:</b>         |
| 4. Wall Furnace    | 9. Radiators, Hot H2O   | 13. Evaporative w/ Ducts     |
| 5. Floor, Radiant  | 10. Radiators, Steam    | 14. Refrigerated w/ Ducts    |
|                    |                         | 15. Refrigerated Window Unit |

Exterior Wall:

- 7
- |                    |                    |                   |
|--------------------|--------------------|-------------------|
| <b>Wood Frame:</b> |                    |                   |
| 1. Plywood         | 3. Stucco          | 5. Shingle        |
| 2. Hardboard Sheet | 4. Siding          | 6. Masonry Veneer |
| <b>Masonry:</b>    |                    |                   |
| 7. Common Brick    | 9. Stone           |                   |
| 8. Face Brick      | 10. Concrete Block |                   |

Roofing:

- 2
- |                  |                  |                     |
|------------------|------------------|---------------------|
| 1. Comp. Shingle | 4. Wood Shake    | 7. Galvanized Metal |
| 2. Built-up Rock | 5. Concrete Tile | 8. Slate            |
| 3. Wood Shingle  | 6. Clay Tile     | 9. Comp. Roll       |
|                  |                  | 10. Plastic Tile    |

Garage:

- 1
- |             |             |         |
|-------------|-------------|---------|
| 1. Attached | 3. Built-in | 5. None |
| 2. Detached | 4. Carport  |         |

Finished Floor Area: 1718 Square Feet

*Patio Set*  
*Summer Weather*  
*Light Covers*

Effective Built Date: 1970

Exposed Slab Elevation at the Font of Structure: 12 inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home 150,000  
Land 16,000  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 065310030141  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

*Elev. 699*

*N 29° 27.171'*  
*W 098° 28.710'*



-----[ Detail Report ]-----

Legal: NCB: 6531 BLK: 3 LOT: N Can#: 065310030141  
74.68' OF 14 Site: 154 MAGNOLIA DR  
Property Use: A1  
Owner: GARZA, ANNA L Schl Dist: 57 City Code: 21  
Map Grid: 617A1  
Comm Bldg Code:  
PO BOX 91126  
SAN ANTONIO, TX 78209-1126

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$8900	\$16000
Neighborhood: 57032		Impr:	\$138700	\$150600
Exempt: HOM		Total:	\$147600	\$166600

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1970	Gar/Crprt:	276/
Ex Wall:	Stone/Brick Siding	Stors:	1.0	Poly SqFt:	3751.50
Found:	Slab	Bdrms:	2	Poly Area:	0.080
Rf Type:	Tar & Gravel	Bths:	2/0	Res Imp SF:	1718
Style:	Contemporary	A/C:	Central	Grs Ls Area:	0
Heat:	Forced Hot Air	Fireplace:			
Det Struct:					



9/10

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address 403 RIVER RD  
City, State, ZIP  
Surveyed by/Date

Structure Type: 1  
1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality: 4  
1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 4  
1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1  
1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: 11  
**Heating:**  
1. Forced Air 6. Ceiling, Rad, Elect.  
2. Gravity Furnace 7. Baseboard, Elect.  
3. Floor Furnace 8. Baseboard, Hot H2O  
4. Wall Furnace 9. Radiators, Hot H2O  
5. Floor, Radiant 10. Radiators, Steam  
**Heating/Cooling:**  
11. Warmed and Cooled Air  
12. Heat Pump System  
**Cooling Only:**  
13. Evaporative w/ Ducts  
14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: 4  
**Wood Frame:**  
1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
**Masonry:**  
7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1  
1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 2  
1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: 1322 Square Feet

RED DOOR

Effective Built Date: 1963

FOUR COLUMNS

Exposed Slab Elevation at the Font of Structure: 24" inches

Other Structures on Property: GARAGE

Appraised Value:  
Home 57,800  
Land 18,600  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 062040050340  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 684

N 29° 27.028'  
W 098° 28.786'



-----[ Detail Report ]-----

Legal: NCB 6204 BLK 5 LOT 34 Can#: 062040050340  
Site: 403 RIVER RD  
Property Use: A1  
Owner: BRISENO, DIANE M Schl Dist: 57 City Code: 21  
Map Grid: 617A1  
Comm Bldg Code:  
403 RIVER RD  
SAN ANTONIO, TX 78212-3121

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$10500	\$18600
Neighborhood:	57032	Impr:	\$56300	\$57800
Exempt:	HOM	Total:	\$66800	\$76400

-----[ Property Characteristics ]-----

Use:	Single-Family Res	Built:	1963	Gar/Crprt:	
Ex Wall:	Wood Siding	Stors:	1.0	Poly SqFt:	6773.23
Found:	Piers/Posts	Bdrms:	3	Poly Area:	0.150
Rf Type:	Asphalt Shingle	Bths:	2/0	Res Imp SF:	1322
Style:	Contemporary	A/C:	None	Grs Ls Area:	0
Heat:	F1 Furnace/Wall Ht	Fireplace:			
Det Struct:	Garage				











11/12

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

WATER OF DPT - 307 E. JOSEPHINE  
4-26-04

Structure Type: \_\_\_\_\_  
1. Single Family    3. Town House, End Unit    5. Duplex  
2. Low Rise    4. Town House, Inside Unit    6. Mobile Home  
**(7) COMMERCIAL / INDUSTRIAL**

Quality : 4  
1. Low    3. Average    5. Very Good  
2. Fair    4. Good    6. Excellent

Condition: 4  
1. Worn Out    3. Average    5. Very Good  
2. Badly Worn    4. Good    6. Excellent

Style: \_\_\_\_\_  
1. One-Story    5. 1-1/2 Story Finished    9. 3-1/2 Story Finished  
2. Two-Story    6. 1-1/2 Story Unfinished    10. 3-1/2 Story Unfinished  
3. Three-Story    7. 2-1/2 Story Finished    11. Bi-Level  
4. Split-Level    8. 2-1/2 Story Unfinished

Heating/Cooling: \_\_\_\_\_  
**Heating:**  
1. Forced Air    6. Ceiling, Rad, Elect.  
2. Gravity Furnace    7. Baseboard, Elect.  
3. Floor Furnace    8. Baseboard, Hot H2O  
4. Wall Furnace    9. Radiators, Hot H2O  
5. Floor, Radiant    10. Radiators, Steam  
**Heating/Cooling:**  
11. Warmed and Cooled Air  
12. Heat Pump System  
**Cooling Only:**  
13. Evaporative w/ Ducts  
14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall: \_\_\_\_\_  
**Wood Frame:**  
1. Plywood    3. Stucco  
2. Hardboard Sheet    4. Siding  
**Masonry:**  
7. Common Brick    9. Stone  
8. Face Brick    10. Concrete Block  
5. Shingle **(M) (H) SHEET METAL**  
6. Masonry Veneer

Roofing: 7  
1. Comp. Shingle    4. Wood Shake    7. Galvanized Metal  
2. Built-up Rock    5. Concrete Tile    8. Slate  
3. Wood Shingle    6. Clay Tile    9. Comp. Roll  
10. Plastic Tile

Garage: N/A  
1. Attached    3. Built-in    5. None  
2. Detached    4. Carport

Finished Floor Area: 139490 Square Feet

Effective Built Date: 1972

Exposed Slab Elevation at the Font of Structure: 4" inches

Other Structures on Property: MULTIPLE STRUCTURES <sup>6 (L 11/19/04)</sup>

Appraised Value: \_\_\_\_\_  
Home 2,689,400    Bexar County Appraisal : Parcel # 017K20000250  
Land 1,700,700    Home \_\_\_\_\_  
Other Structures \_\_\_\_\_    Land \_\_\_\_\_  
Total \_\_\_\_\_    Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV. 639  
N 29° 26.798'  
W 098° 28.809'

-----[ Detail Report ]-----

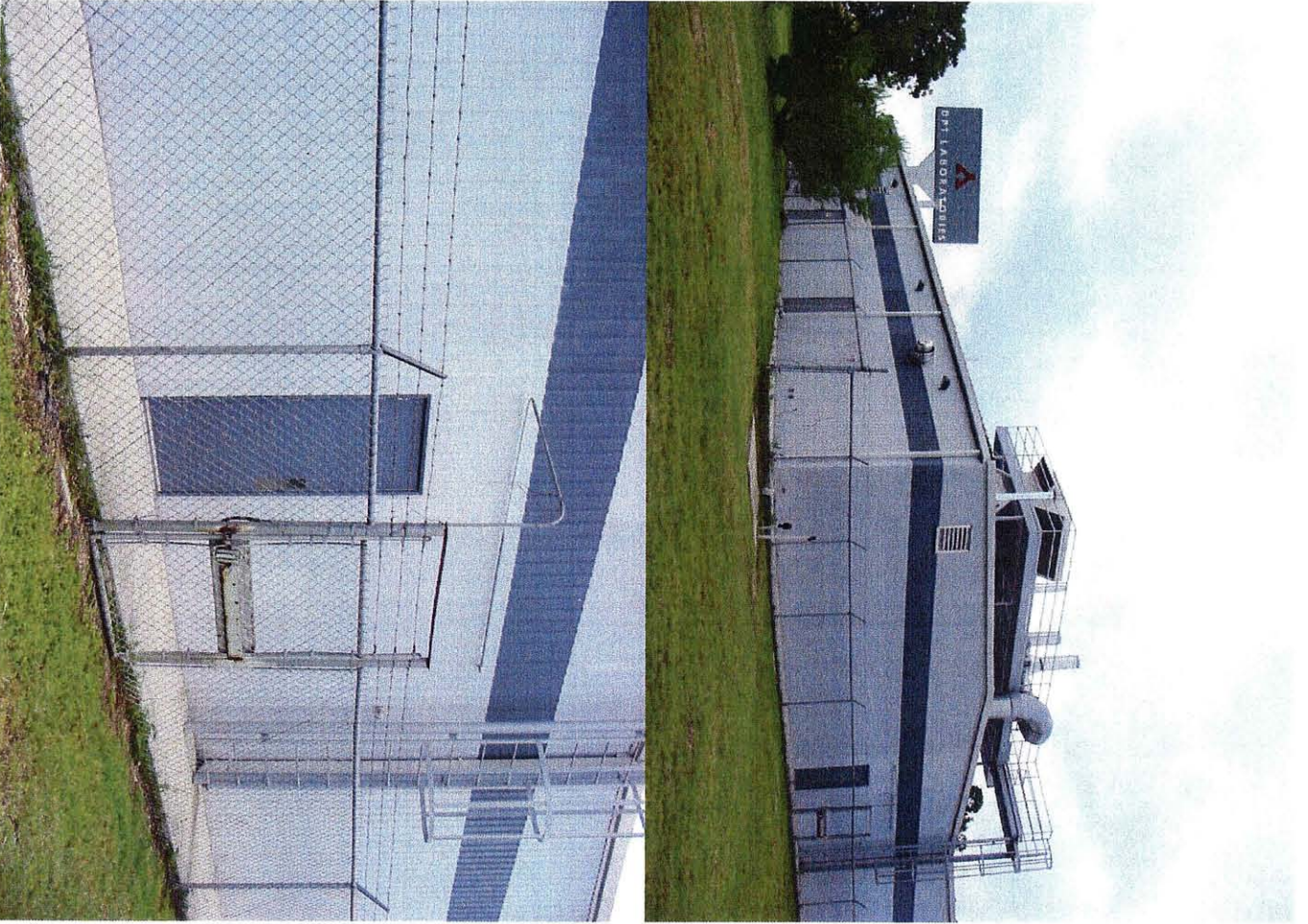
Legal: NCB 1762 BLK LOT 25 Can#: 017620000250  
Site: 307 E JOSEPHINE ST  
(DPT SUBD UT-1) Property Use: F1  
Owner: DPT LABORATORIES, INC Schl Dist: 57 City Code: 21  
Map Grid: 617A2  
318 MCCULLOUGH Comm Bldg Code: 305  
SAN ANTONIO, TX 78215-1833

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	9150/2048	Tax Yr:	2002	2003
Sale Date:	11/13/2001	Land:	\$600600	\$700700
Neighborhood:	10490	Impr:	\$2789800	\$2689400
Exempt:	Not Avail	Total:	\$3390400	\$3390100

-----[ Property Characteristics ]-----

Use:	Commercial	Built:	1972	Gar/Crppt:	
Ex Wall:	Concrete Block	Stors:	0.0	Poly SqFt:	251621.58
Found:	Not Avail	Bdrms:		Poly Area:	5.770
Rf Type:	Bar Joist	Bths:		Res Imp SF:	
Style:	Not Avail	A/C:		Grs Ls Area:	139490
Heat:	Not Avail	Fireplace:			
Det Struct:	Carport Asphalt Paving Loading Dock				





\*

B/14

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

600 E. ASHBY - STAR STORAGE

Structure Type:

1. Single Family 3. Town House, End Unit 5. Duplex **Commercial**  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home **INDUSTRIAL**

Quality :

4 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition:

4 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style:

2 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling:

11 **Heating:** 1. Forced Air 6. Ceiling, Rad, Elect. **Heating/Cooling:** 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O **Cooling Only:** 13. Evaporative w/ Ducts  
4. Wall Furnace 9. Radiators, Hot H2O 14. Refrigerated w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 15. Refrigerated Window Unit

Exterior Wall:

10 **Wood Frame:** 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
**Masonry:** 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing:

2 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage:

1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: 64155 Square Feet

Effective Built Date: 1930

Exposed Slab Elevation at the Font of Structure: 48<sup>±</sup> inches

Other Structures on Property: MULTIPLE STRUCTURES

Appraised Value:

Home 775,000  
Land 475,000  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 030530000131

Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 624

N 29° 26.777'  
W 098° 28.882'

-----[ Detail Report ]-----

Legal: NCB 3053 BLK LOT 13, 14, Can#: 030530000131  
N 138.4 OF E 50 FT OF 12 & E Site: 875 E ASHBY PL  
80 OF W 186 FT OF 12 Property Use: F1  
Owner: BORDEN PARK LP Schl Dist: 57 City Code: 21  
% DAVID H ARRINGTON Map Grid: 617A2  
214 W TEXAS STE 400 Comm Bldg Code: 320  
MIDLAND, TX 79701-4614

STAR STORAGE

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 7801/1677	Tax Yr: 2002	2003
Sale Date:	Land: \$213400	\$475000
Neighborhood: 10490	Impr: \$2111600	\$775000
Exempt: Not Avail	Total: \$2325000	\$1250000

-----[ Property Characteristics ]-----

Use: Commercial Built: 1930 Gar/Crprt:  
Ex Wall: Reinforced Concrete Stors: 0.0 Poly SqFt: 94784.02  
Found: Not Avail Bdrms: Poly Area: 2.170  
Rf Type: Concrete Bths: Res Imp SF:  
Style: Not Avail A/C: Grs Ls Area: 64155  
Heat: Not Avail Fireplace:  
Det Struct: Loading Dock Canopy (Fr/Mtc) Concrete Paving





# San Antonio River - SAR06

3

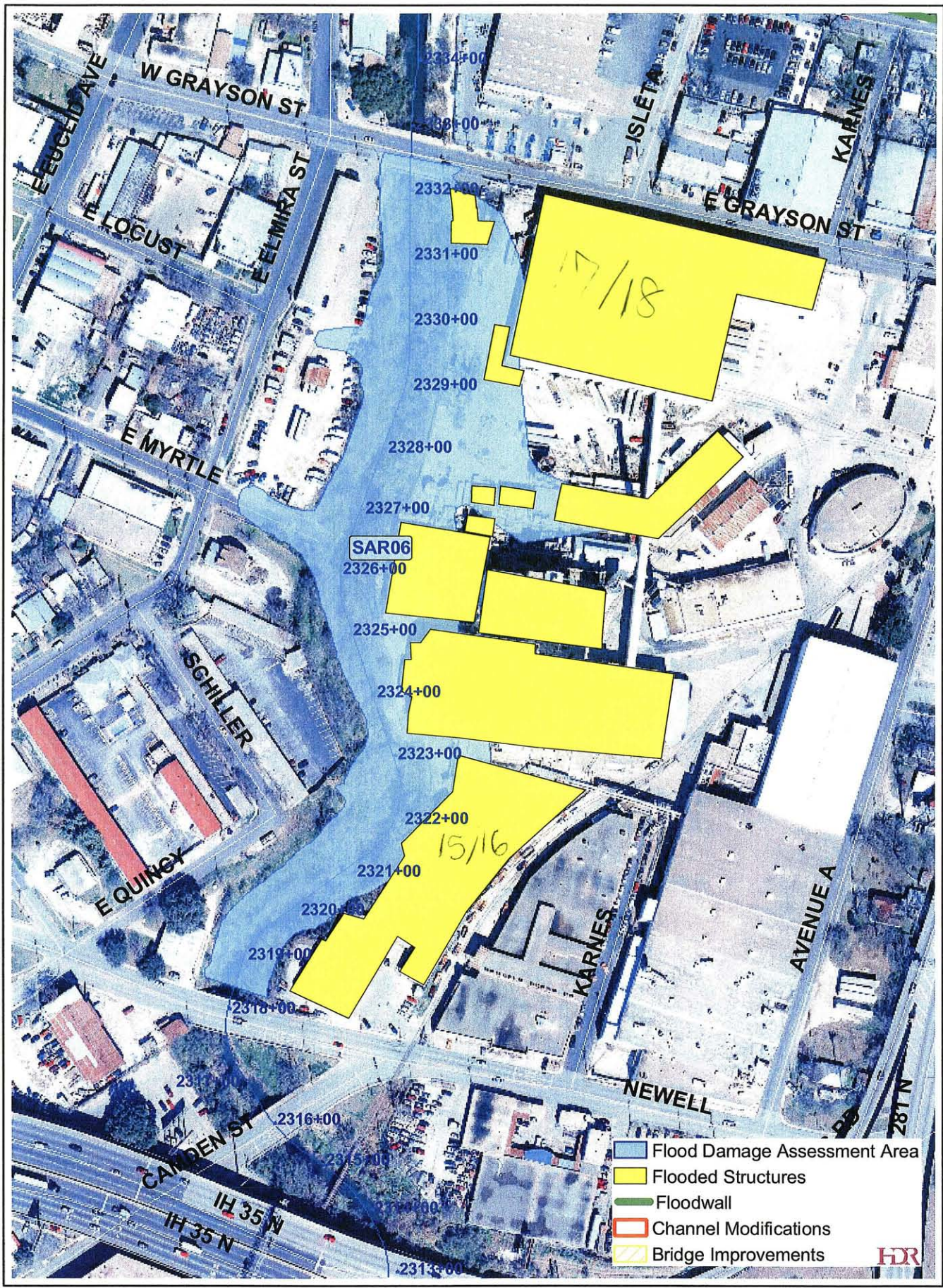


Figure 19

1 inch equals 200 feet





K

15/16

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

100 NEWELL - SAMUELS GLASS STORAGE

Structure Type:

- 1. Single Family
- 2. Low Rise
- 3. Town House, End Unit
- 4. Town House, Inside Unit
- 5. Duplex
- 6. Mobile Home

COMMERCIAL / INDUSTRIAL

Quality :

- 1. Low
- 2. Fair
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Condition:

- 1. Worn Out
- 2. Badly Worn
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Style:

- 1. One-Story
- 2. Two-Story
- 3. Three-Story
- 4. Split-Level
- 5. 1-1/2 Story Finished
- 6. 1-1/2 Story Unfinished
- 7. 2-1/2 Story Finished
- 8. 2-1/2 Story Unfinished
- 9. 3-1/2 Story Finished
- 10. 3-1/2 Story Unfinished
- 11. Bi-Level

Heating/Cooling:

- 11\* Heating:
- 1. Forced Air
  - 2. Gravity Furnace
  - 3. Floor Furnace
  - 4. Wall Furnace
  - 5. Floor, Radiant
  - 6. Ceiling, Rad, Elect.
  - 7. Baseboard, Elect.
  - 8. Baseboard, Hot H2O
  - 9. Radiators, Hot H2O
  - 10. Radiators, Steam

- Heating/Cooling: \* PHASED
- 11. Warmed and Cooled Air
  - 12. Heat Pump System
  - Cooling Only:
  - 13. Evaporative w/ Ducts
  - 14. Refrigerated w/ Ducts
  - 15. Refrigerated Window Unit

Exterior Wall:

- 10 Wood Frame:
- 1. Plywood
  - 2. Hardboard Sheet
  - 3. Stucco
  - 4. Siding
  - 5. Shingle
  - 6. Masonry Veneer
- Masonry:
- 7. Common Brick
  - 8. Face Brick
  - 9. Stone
  - 10. Concrete Block

Roofing:

- 7
- 1. Comp. Shingle
  - 2. Built-up Rock
  - 3. Wood Shingle
  - 4. Wood Shake
  - 5. Concrete Tile
  - 6. Clay Tile
  - 7. Galvanized Metal
  - 8. Slate
  - 9. Comp. Roll
  - 10. Plastic Tile

Garage:

- N/A
- 1. Attached
  - 2. Detached
  - 3. Built-in
  - 4. Carport
  - 5. None

Finished Floor Area: 17413 Square Feet

Effective Built Date: 1960

Exposed Slab Elevation at the Font of Structure: -0- inches

Other Structures on Property: MULTIPLE STRUCTURES

Appraised Value:  
Home 88,200  
Land 144,100  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 0095B0000400  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 645

N. 29° 26.432'  
W 098° 28.898'

-----[ Detail Report ]-----

Legal: NCB 958 BLK LOT 40 Can#: 009580000400  
THRU 44 & 53 EXC NE IRR 100 Site: 221 NEWELL AVE  
FT Property Use: F1  
Owner: SAMUELS GLASS CO Schl Dist: 57 City Code: 21  
Map Grid: 617A3  
P O BOX 1769 Comm Bldg Code: 305  
SAN ANTONIO, TX 78296-1769

*SAMUELS GLASS*

*STORAGE BLDG*

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$123500	\$144100
Neighborhood:	10490	Impr:	\$170600	\$88200
Exempt:	Not Avail	Total:	\$294100	\$232300

-----[ Property Characteristics ]-----

Use:	Commercial	Built:	1960	Gar/Crprt:	
Ex Wall:	Concrete Block	Stors:	0.0	Poly SqFt:	36837.43
Found:	Not Avail	Bdrms:		Poly Area:	0.840
Rf Type:	Bar Joist	Bths:		Res Imp SF:	
Style:	Not Avail	A/C:		Grs Ls Area:	17413
Heat:	Not Avail	Fireplace:			
Det Struct:	Asphalt Paving	Concrete Paving	Equipment	Shed	





PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

E. GRAYSON - PEARL BREWERY  
4/26/04

Structure Type:

1. Single Family 3. Town House, End Unit 5. Duplex (A) Commercial  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home Industrial

Quality :

2 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition:

2 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style:

2 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling:

Heating:  
1. Forced Air 6. Ceiling, Rad, Elect.  
2. Gravity Furnace 7. Baseboard, Elect.  
3. Floor Furnace 8. Baseboard, Hot H2O  
4. Wall Furnace 9. Radiators, Hot H2O  
5. Floor, Radiant 10. Radiators, Steam  
Heating/Cooling:  
11. Warmed and Cooled Air  
12. Heat Pump System  
Cooling Only:  
13. Evaporative w/ Ducts  
14. Refrigerated w/ Ducts  
15. Refrigerated Window Unit

Exterior Wall:

3/10 Wood Frame:  
1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
Masonry:  
7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing:

7/2 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage:

N/A 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: 406,932 Square Feet

Effective Built Date: 1940

Exposed Slab Elevation at the Font of Structure: 60" inches

Other Structures on Property: MULTIPLE STRUCTURES

Appraised Value:

Home 2,056,300  
Land 2,093,700  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 141640010010

Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 642

N 29° 26.667'  
W 098° 28.833'

-----[ Detail Report ]-----

Legal: NCB 14164 BLK 1 LOT 1 Can#: 141640010010  
/C/ Site: 312 PEARL PKWY  
Property Use: F1  
Owner: RIO PERLA PROPERTIES LP Schl Dist: 57 City Code: 21  
Map Grid: 617A2  
5121 BROADWAY Comm Bldg Code: 400  
SAN ANTONIO, TX 78209-5709

-----[ Sales Information & Prop Values ]-----

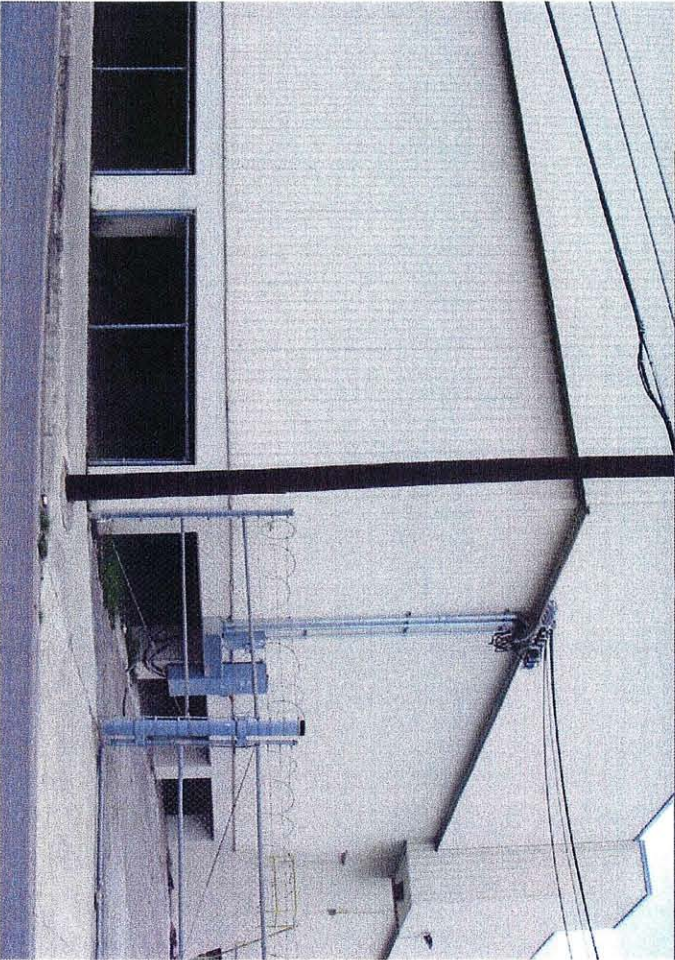
Deed Vol/Pg:	9498/399	Tax Yr:	2002	2003
Sale Date:	07/31/2002	Land:	\$1794600	\$2093700
Neighborhood:	10490	Impr:	\$881700	\$2056300
Exempt:	Not Avail	Total:	\$2676300	\$4150000

-----[ Property Characteristics ]-----

Use:	Commercial	Built:	1940	Gar/Crprt:	
Ex Wall:	Masonry	Stors:	0.0	Poly SqFt:	832920.15
Found:	Not Avail	Bdrms:		Poly Area:	19.120
Rf Type:	Wood Joist	Bths:		Res Imp SF:	
Style:	Not Avail	A/C:		Grs Ls Area:	406932
Heat:	Not Avail	Fireplace:			
Det Struct:	Carport	Asphalt Paving			

\* THIS DATA  
IS INCLUSIVE  
OF ALL IMPROVE  
MENTS ON THE  
PEARL BROWNEY  
SITE.







# San Antonio River - SAR07 and SAR08

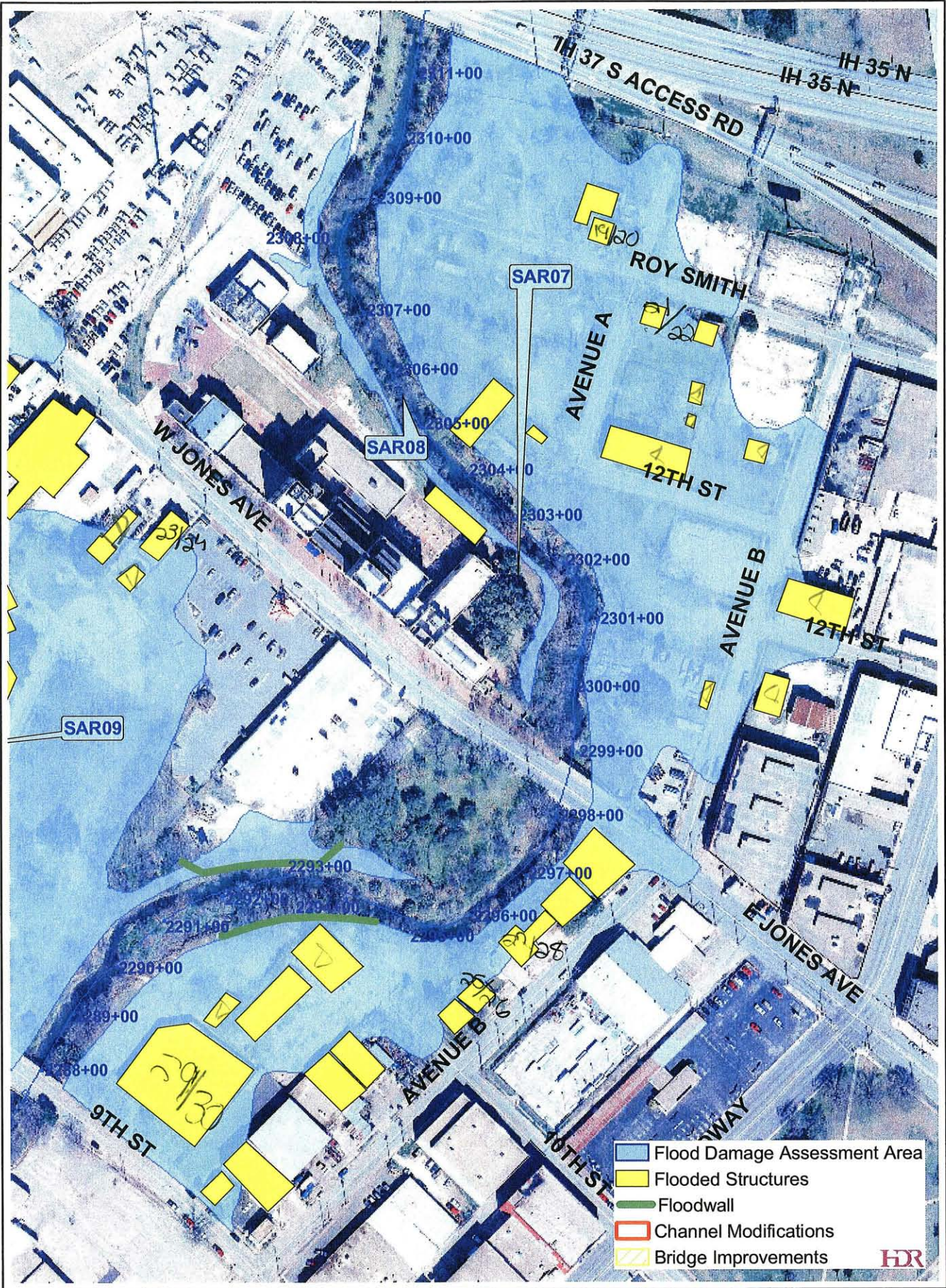


Figure 18

1 inch equals 200 feet





19/20

PRELIMINARY HEC-FDA SURVEY

Property Owner \_\_\_\_\_  
Address 303 AVE A  
City, State, ZIP \_\_\_\_\_  
Surveyed by/Date 4-26-04

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality : 1 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 1 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: \_\_\_\_\_ Heating: 1. Forced Air 6. Ceiling, Rad, Elect. Heating/Cooling: 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O Cooling Only: 13. Evaporative w/ Ducts  
4. Wall Furnace 9. Radiators, Hot H2O 14. Refrigerated w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 15. Refrigerated Window Unit

Exterior Wall: 6 Wood Frame: 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
Masonry: 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 2 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 36" inches

Other Structures on Property: NEXT HOUSE - DILAPIDATED

Appraised Value:  
Home 100  
Land 37200  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 004760570070  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 649 N 29° 26.310'  
W 098° 28.837'



-----[ Detail Report ]-----

Legal: NCB 476 BLK 57 LOT S Can#: 004760570070  
93 FT OF 6 & 7 Site: 301 AVENUE A  
Property Use: C1  
Owner: HENSLEY, KATIE FRANCES Schl Dist: 57 City Code: 21  
Map Grid: 617A3  
Comm Bldg Code:  
303 AVENUE A  
SAN ANTONIO, TX 78215-1306

*303 AVE A*

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$37200	\$37200
Neighborhood: 10081		Impr:	\$100	\$100
Exempt: Not Avail		Total:	\$37300	\$37300

-----[ Property Characteristics ]-----

Use:	Commercial Platted	Built:		Gar/Crprt:	
Ex Wall:	Not Avail	Stors:	0.0	Poly SqFt:	7225.59
Found:	Not Avail	Bdrms:		Poly Area:	0.160
Rf Type:	Not Avail	Bths:		Res Imp SF:	
Style:	Not Avail	A/C:		Grs Ls Area:	0
Heat:	Not Avail	Fireplace:			
Det Struct:	Carport Living Area 2nd Open Porch				



2/1/22

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

202 NOY SMITH

Structure Type: 1 1. Single Family 3. Town House, End Unit 5. Duplex  
2. Low Rise 4. Town House, Inside Unit 6. Mobile Home

Quality: 1 1. Low 3. Average 5. Very Good  
2. Fair 4. Good 6. Excellent

Condition: 1 1. Worn Out 3. Average 5. Very Good  
2. Badly Worn 4. Good 6. Excellent

Style: 1 1. One-Story 5. 1-1/2 Story Finished 9. 3-1/2 Story Finished  
2. Two-Story 6. 1-1/2 Story Unfinished 10. 3-1/2 Story Unfinished  
3. Three-Story 7. 2-1/2 Story Finished 11. Bi-Level  
4. Split-Level 8. 2-1/2 Story Unfinished

Heating/Cooling: \_\_\_\_\_ Heating: 1. Forced Air 6. Ceiling, Rad, Elect. Heating/Cooling: 11. Warmed and Cooled Air  
2. Gravity Furnace 7. Baseboard, Elect. 12. Heat Pump System  
3. Floor Furnace 8. Baseboard, Hot H2O Cooling Only: 13. Evaporative w/ Ducts  
4. Wall Furnace 9. Radiators, Hot H2O 14. Refrigerated w/ Ducts  
5. Floor, Radiant 10. Radiators, Steam 15. Refrigerated Window Unit

Exterior Wall: 4 Wood Frame: 1. Plywood 3. Stucco 5. Shingle  
2. Hardboard Sheet 4. Siding 6. Masonry Veneer  
Masonry: 7. Common Brick 9. Stone  
8. Face Brick 10. Concrete Block

Roofing: 1 1. Comp. Shingle 4. Wood Shake 7. Galvanized Metal  
2. Built-up Rock 5. Concrete Tile 8. Slate  
3. Wood Shingle 6. Clay Tile 9. Comp. Roll  
10. Plastic Tile

Garage: 2 1. Attached 3. Built-in 5. None  
2. Detached 4. Carport

Finished Floor Area: \_\_\_\_\_ Square Feet

Effective Built Date: \_\_\_\_\_

Exposed Slab Elevation at the Font of Structure: 24" inches

Other Structures on Property: DILAPIDATED

Appraised Value:  
Home 9600  
Land 12200  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 004660470053  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 651

N 29° 26.30'  
W 098° 28.830'



-----[ Detail Report ]-----

Legal: NCB 466 BLK 47 LOT W, Can#: 004660470053  
65 FT OF 5 Site: 200 ROY SMITH ST  
Property Use: C1  
Owner: HENSLEY, KATIE FRANCES Schl Dist: 57 City Code: 21  
Map Grid: 617A3  
Comm Bldg Code:  
303 AVENUE A  
SAN ANTONIO, TX 78215-1306

*202 Roy Smith*

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$9750	\$12200
Neighborhood:	10081	Impr:	\$9600	\$9600
Exempt:	Not Avail	Total:	\$19350	\$21800

-----[ Property Characteristics ]-----

Use:	Commercial Platted	Built:		Gar/Crppt:	
Ex Wall:	Not Avail	Stors:	0.0	Poly SqFt:	3374.70
Found:	Not Avail	Bdrms:		Poly Area:	0.070
Rf Type:	Not Avail	Bths:		Res Imp SF:	
Style:	Not Avail	A/C:		Grs Ls Area:	0
Heat:	Not Avail	Fireplace:			
Det Struct:	Garage Living Area 2nd Open Porch				



23/24

PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

230 E. JONES AVE - SAMA ANNEX

Structure Type:

- |             |                  |                            |                |
|-------------|------------------|----------------------------|----------------|
| <u>    </u> | 1. Single Family | 3. Town House, End Unit    | 5. Duplex      |
|             | 2. Low Rise      | 4. Town House, Inside Unit | 6. Mobile Home |
- (8) (9) **COMMERCIAL**

Quality :

- |          |         |            |              |
|----------|---------|------------|--------------|
| <u>5</u> | 1. Low  | 3. Average | 5. Very Good |
|          | 2. Fair | 4. Good    | 6. Excellent |

Condition:

- |          |               |            |              |
|----------|---------------|------------|--------------|
| <u>5</u> | 1. Worn Out   | 3. Average | 5. Very Good |
|          | 2. Badly Worn | 4. Good    | 6. Excellent |

Style:

- |          |                |                           |                            |
|----------|----------------|---------------------------|----------------------------|
| <u>2</u> | 1. One-Story   | 5. 1-1/2 Story Finished   | 9. 3-1/2 Story Finished    |
|          | 2. Two-Story   | 6. 1-1/2 Story Unfinished | 10. 3-1/2 Story Unfinished |
|          | 3. Three-Story | 7. 2-1/2 Story Finished   | 11. Bi-Level               |
|          | 4. Split-Level | 8. 2-1/2 Story Unfinished |                            |

Heating/Cooling:

- |           |                         |                              |
|-----------|-------------------------|------------------------------|
| <u>11</u> | <b>Heating:</b>         | <b>Heating/Cooling:</b>      |
|           | 1. Forced Air           | 11. Warmed and Cooled Air    |
|           | 2. Gravity Furnace      | 12. Heat Pump System         |
|           | 3. Floor Furnace        | <b>Cooling Only:</b>         |
|           | 4. Wall Furnace         | 13. Evaporative w/ Ducts     |
|           | 5. Floor, Radiant       | 14. Refrigerated w/ Ducts    |
|           | 6. Ceiling, Rad, Elect. | 15. Refrigerated Window Unit |
|           | 7. Baseboard, Elect.    |                              |
|           | 8. Baseboard, Hot H2O   |                              |
|           | 9. Radiators, Hot H2O   |                              |
|           | 10. Radiators, Steam    |                              |

Exterior Wall:

- |           |                    |                    |
|-----------|--------------------|--------------------|
| <u>10</u> | <b>Wood Frame:</b> |                    |
|           | 1. Plywood         | 3. Stucco          |
|           | 2. Hardboard Sheet | 4. Siding          |
|           | <b>Masonry:</b>    | 5. Shingle         |
|           | 7. Common Brick    | 6. Masonry Veneer  |
|           | 8. Face Brick      | 9. Stone           |
|           |                    | 10. Concrete Block |

Roofing:

- |          |                  |                  |                     |
|----------|------------------|------------------|---------------------|
| <u>7</u> | 1. Comp. Shingle | 4. Wood Shake    | 7. Galvanized Metal |
|          | 2. Built-up Rock | 5. Concrete Tile | 8. Slate            |
|          | 3. Wood Shingle  | 6. Clay Tile     | 9. Comp. Roll       |
|          |                  |                  | 10. Plastic Tile    |

Garage:

- |            |             |             |         |
|------------|-------------|-------------|---------|
| <u>N/A</u> | 1. Attached | 3. Built-in | 5. None |
|            | 2. Detached | 4. Carport  |         |

Finished Floor Area: 106,000 Square Feet

Effective Built Date: 1904

Exposed Slab Elevation at the Font of Structure: 4" inches

Other Structures on Property: MULTIPLE STRUCTURES

Appraised Value:  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 010360010010  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

ELEV: 652

N 29° 26.226'  
W 098° 28.984'



-----[ Detail Report ]-----

Legal: NCB 1036 BLK 1 LOT 1 Can#: 010360010010  
Site: 230 W JONES AVE  
Property Use: Z0  
Owner: SAN ANTONIO MUSEUM OF ART Schl Dist: 57 City Code: 21  
Map Grid: 616F3  
Comm Bldg Code: 470

0- 0

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$0	\$0
Neighborhood:	10063	Impr:	\$0	\$0
Exempt:	CHA	Total:	\$0	\$0

-----[ Property Characteristics ]-----

Use:	Exempt	Built:	1904	Gar/Crprt:	
Ex Wall:	Stone	Stors:	0.0	Poly SqFt:	230925.19
Found:	Not Avail	Bdrms:		Poly Area:	5.300
Rf Type:	Bar Joist	Bths:		Res Imp SF:	
Style:	Not Avail	A/C:		Grs Ls Area:	106000
Heat:	Not Avail	Fireplace:			
Det Struct:	Asphalt Paving	Canopy (Fr/Mtc)	Concrete Paving		

\* THIS DATA IS  
INCLUSIVE OF ALL  
IMPROVEMENTS ON  
THE SAMA PROPERTY







-----[ Detail Report ]-----

Legal: NCB 457 BLK 35 LOT S Can#: 004570350030  
69 FT OF 2 Site: 1005 AVENUE B  
Property Use: F1  
Owner: GUERRERO, RUDY & EVELYN H Schl Dist: 57 City Code: 21  
Map Grid: 617A3  
203 VIVIAN LN Comm Bldg Code: 200  
SAN ANTONIO, TX 78201-6814

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 9313/1514	Tax Yr: 2002	2003
Sale Date: 03/20/2002	Land: \$16600	\$16600
Neighborhood: 10081	Impr: \$27500	\$27500
Exempt: Not Avail	Total: \$44100	\$44100

-----[ Property Characteristics ]-----

Use: Commercial	Built: 1901	Gar/Crppt:	
Ex Wall: Wood	Stors: 0.0	Poly SqFt: 3414.28	
Found: Not Avail	Bdrms:	Poly Area: 0.070	
Rf Type: Wood Joist	Bths:	Res Imp SF:	
Style: Not Avail	A/C:	Grs Ls Area: 1014	
Heat: Not Avail	Fireplace:		
Det Struct: Equipment Shed	Open Porch		







-----[ Detail Report ]-----

Legal: NCB 457 BLK 35 LOT N Can#: 004570350050  
23.535 FT OF 3 & S 7.78 FT Site: 1011 AVENUE B  
OF 4 AT 1011 AVE B Property Use: F1  
Owner: MORALES, PAUL N Schl Dist: 57 City Code: 21  
Map Grid: 617A3  
P O BOX 873 Comm Bldg Code: 305  
SAN ANTONIO, TX 78293-0873

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	5475/1086	Tax Yr:	2002	2003
Sale Date:	05/09/1996	Land:	\$12700	\$12700
Neighborhood:	10081	Impr:	\$10500	\$27600
Exempt:	Not Avail	Total:	\$23200	\$40300

-----[ Property Characteristics ]-----

Use:	Commercial	Built:	1905	Gar/Crppt:	
Ex Wall:	Masonry	Stors:	0.0	Poly SqFt:	2489.86
Found:	Not Avail	Bdrms:		Poly Area:	0.050
Rf Type:	Wood Joist	Bths:		Res Imp SF:	
Style:	Not Avail	A/C:		Grs Ls Area:	1578
Heat:	Not Avail	Fireplace:			

Det Struct: Wood Deck Concrete Paving Open Porch



PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

120 NIMETH ST. - TURNER'S BOWLING  
4-26-06

Structure Type:

- 1. Single Family
- 2. Low Rise
- 3. Town House, End Unit
- 4. Town House, Inside Unit
- 5. Duplex
- 6. Mobile Home

**9**  
**COMMERCIAL**

Quality :

- 2   1. Low
- 2. Fair
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Condition:

- 2   1. Worn Out
- 2. Badly Worn
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Style:

- 1   1. One-Story
- 2. Two-Story
- 3. Three-Story
- 4. Split-Level
- 5. 1-1/2 Story Finished
- 6. 1-1/2 Story Unfinished
- 7. 2-1/2 Story Finished
- 8. 2-1/2 Story Unfinished
- 9. 3-1/2 Story Finished
- 10. 3-1/2 Story Unfinished
- 11. Bi-Level

Heating/Cooling:

- 11
- Heating:**
- 1. Forced Air
  - 2. Gravity Furnace
  - 3. Floor Furnace
  - 4. Wall Furnace
  - 5. Floor, Radiant
  - 6. Ceiling, Rad, Elect.
  - 7. Baseboard, Elect.
  - 8. Baseboard, Hot H2O
  - 9. Radiators, Hot H2O
  - 10. Radiators, Steam

- Heating/Cooling:**
- 11. Warmed and Cooled Air
  - 12. Heat Pump System
- Cooling Only:**
- 13. Evaporative w/ Ducts
  - 14. Refrigerated w/ Ducts
  - 15. Refrigerated Window Unit

Exterior Wall:

- 10/8
- Wood Frame:**
- 1. Plywood
  - 2. Hardboard Sheet
  - 3. Stucco
  - 4. Siding
- Masonry:**
- 7. Common Brick
  - 8. Face Brick
  - 9. Stone
  - 10. Concrete Block

5. Shingle  
6. Masonry Veneer  
**\* SHEET METAL**  
**11**

Roofing:

- 2   1. Comp. Shingle
- 2. Built-up Rock
- 3. Wood Shingle
- 4. Wood Shake
- 5. Concrete Tile
- 6. Clay Tile
- 7. Galvanized Metal
- 8. Slate
- 9. Comp. Roll
- 10. Plastic Tile

Garage:

- N/A
- 1. Attached
  - 2. Detached
  - 3. Built-in
  - 4. Carport
  - 5. None

Finished Floor Area:   20662   Square Feet

Effective Built Date:   1965  

Exposed Slab Elevation at the Font of Structure:   36"   inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:

Home   100,000  

Land   337,800  

Other Structures \_\_\_\_\_

Total \_\_\_\_\_

Bexar County Appraisal : Parcel #   007830340192  

Home \_\_\_\_\_

Land \_\_\_\_\_

Other Structures \_\_\_\_\_

Total \_\_\_\_\_

ELEV: 651

N 29° 26.086'  
W 098° 28.995'



-----[ Detail Report ]-----

Legal: NCB 783 BLK 34 LOT A-19, Can#: 007830340192  
A-20, SW 170 FT OF A-21 & Site: 120 9TH ST  
ARB A-23 Property Use: F1  
Owner: TURNERS INC Schl Dist: 57 City Code: 21  
Map Grid: 616F3  
120 9TH ST Comm Bldg Code: 170  
SAN ANTONIO, TX 78215-1524

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$250000	\$337800
Neighborhood: 10081		Impr:	\$100000	\$100000
Exempt: Not Avail		Total:	\$350000	\$437800

-----[ Property Characteristics ]-----

Use:	Commercial	Built:	1965	Gar/Crppt:	
Ex Wall:	Brick	Stors:	0.0	Poly SqFt:	63971.90
Found:	Not Avail	Bdrms:		Poly Area:	1.460
Rf Type:	Bar Joist	Bths:		Res Imp SF:	
Style:	Not Avail	A/C:		Grs Ls Area:	20662
Heat:	Not Avail	Fireplace:			
Det Struct:	Asphalt Paving	Concrete Paving	Equipment Shed		





# San Antonio River - SAR09

4

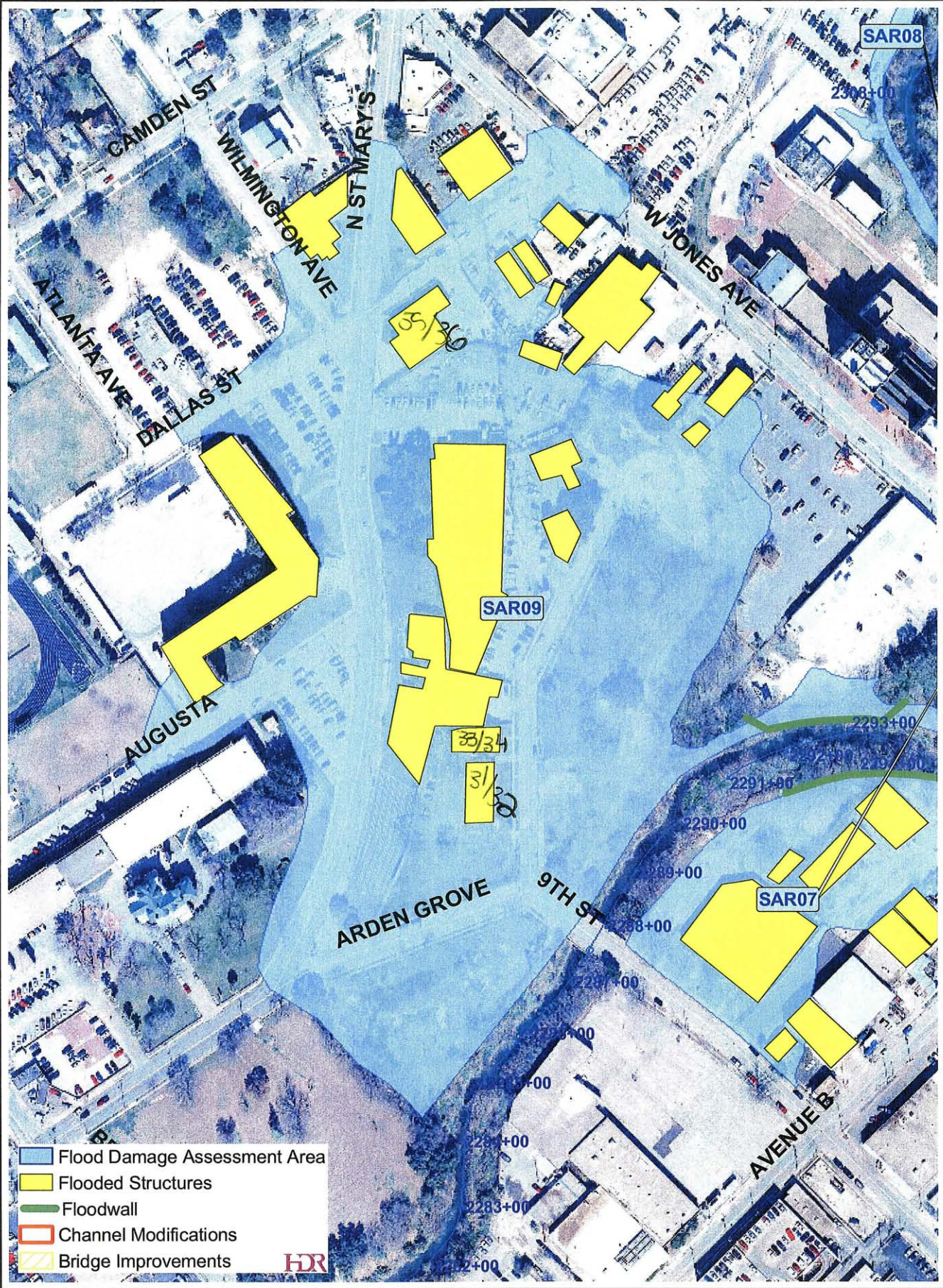


Figure 17

1 inch equals 200 feet





PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

207 ARDOR GROVE

Structure Type:

- 1. Single Family
- 2. Low Rise
- 3. Town House, End Unit
- 4. Town House, Inside Unit
- 5. Duplex
- 6. Mobile Home

9  
*COMMERCIAL*

Quality :

- 1. Low
- 2. Fair
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Condition:

- 1. Worn Out
- 2. Badly Worn
- 3. Average
- 4. Good
- 5. Very Good
- 6. Excellent

Style:

- 1. One-Story
- 2. Two-Story
- 3. Three-Story
- 4. Split-Level
- 5. 1-1/2 Story Finished
- 6. 1-1/2 Story Unfinished
- 7. 2-1/2 Story Finished
- 8. 2-1/2 Story Unfinished
- 9. 3-1/2 Story Finished
- 10. 3-1/2 Story Unfinished
- 11. Bi-Level

Heating/Cooling:

- Heating:**
  - 1. Forced Air
  - 2. Gravity Furnace
  - 3. Floor Furnace
  - 4. Wall Furnace
  - 5. Floor, Radiant
  - 6. Ceiling, Rad, Elect.
  - 7. Baseboard, Elect.
  - 8. Baseboard, Hot H2O
  - 9. Radiators, Hot H2O
  - 10. Radiators, Steam
- Heating/Cooling:**
  - 11. Warmed and Cooled Air
  - 12. Heat Pump System
- Cooling Only:**
  - 13. Evaporative w/ Ducts
  - 14. Refrigerated w/ Ducts
  - 15. Refrigerated Window Unit

Exterior Wall:

- Wood Frame:**
  - 1. Plywood
  - 2. Hardboard Sheet
  - 3. Stucco
  - 4. Siding
  - 5. Shingle
  - 6. Masonry Veneer
- Masonry:**
  - 7. Common Brick
  - 8. Face Brick
  - 9. Stone
  - 10. Concrete Block

Roofing:

- 1. Comp. Shingle
- 2. Built-up Rock
- 3. Wood Shingle
- 4. Wood Shake
- 5. Concrete Tile
- 6. Clay Tile
- 7. Galvanized Metal
- 8. Slate
- 9. Comp. Roll
- 10. Plastic Tile

Garage:

- 1. Attached
- 2. Detached
- 3. Built-in
- 4. Carport
- 5. None

Finished Floor Area: 3640 Square Feet

Effective Built Date: 1966

Exposed Slab Elevation at the Font of Structure: 4" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
 Home 76,000  
 Land 144,000  
 Other Structures \_\_\_\_\_  
 Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 007830260021  
 Home \_\_\_\_\_  
 Land \_\_\_\_\_  
 Other Structures \_\_\_\_\_  
 Total \_\_\_\_\_

ELEV. 630

N 29° 26.133'  
W 098° 29.039'

-----[ Detail Report ]-----

Legal: NCB 783 BLK 26 LOT 2 & Can#: 007830260021  
3 Site: 207 ARDEN GROVE ST  
Property Use: F1  
Owner: GARZA/GONZALEZ & ASSOC Schl Dist: 57 City Code: 21  
Map Grid: 616F3  
207 ARDEN GROVE ST Comm Bldg Code: 400  
SAN ANTONIO, TX 78215-1704

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$90000	\$144000
Neighborhood:	10063	Impr:	\$85300	\$76000
Exempt:	Not Avail	Total:	\$175300	\$220000

-----[ Property Characteristics ]-----

Use:	Commercial	Built:	1966	Gar/Crprt:	
Ex Wall:	Brick	Stors:	0.0	Poly SqFt:	17069.47
Found:	Not Avail	Bdrms:		Poly Area:	0.390
Rf Type:	Bar Joist	Bths:		Res Imp SF:	
Style:	Not Avail	A/C:		Grs Ls Area:	3640
Heat:	Not Avail	Fireplace:			
Det Struct:	Asphalt Paving				





PRELIMINARY HEC-FDA SURVEY

Property Owner  
Address  
City, State, ZIP  
Surveyed by/Date

217 AUDON GROVE

Structure Type:

- 1 1. Single Family      3. Town House, End Unit      5. Duplex
- 2. Low Rise      4. Town House, Inside Unit      6. Mobile Home

**(X)**  
**COMMERCIAL**  
**CONVERT. RESID.**

Quality :

- 3 1. Low      3. Average      5. Very Good
- 2. Fair      4. Good      6. Excellent

Condition:

- 3 1. Worn Out      3. Average      5. Very Good
- 2. Badly Worn      4. Good      6. Excellent

Style:

- 1 1. One-Story      5. 1-1/2 Story Finished      9. 3-1/2 Story Finished
- 2. Two-Story      6. 1-1/2 Story Unfinished      10. 3-1/2 Story Unfinished
- 3. Three-Story      7. 2-1/2 Story Finished      11. Bi-Level
- 4. Split-Level      8. 2-1/2 Story Unfinished

Heating/Cooling:

- 11 **Heating:**
  - 1. Forced Air      6. Ceiling, Rad, Elect.
  - 2. Gravity Furnace      7. Baseboard, Elect.
  - 3. Floor Furnace      8. Baseboard, Hot H2O
  - 4. Wall Furnace      9. Radiators, Hot H2O
  - 5. Floor, Radiant      10. Radiators, Steam
- Heating/Cooling:**
  - 11. Warmed and Cooled Air
  - 12. Heat Pump System
  - Cooling Only:**
  - 13. Evaporative w/ Ducts
  - 14. Refrigerated w/ Ducts
  - 15. Refrigerated Window Unit

Exterior Wall:

- 4 **Wood Frame:**
- 1. Plywood      3. Stucco      5. Shingle
- 2. Hardboard Sheet      4. Siding      6. Masonry Veneer
- Masonry:**
- 7. Common Brick      9. Stone
- 8. Face Brick      10. Concrete Block

Roofing:

- 7 1. Comp. Shingle      4. Wood Shake      7. Galvanized Metal
- 2. Built-up Rock      5. Concrete Tile      8. Slate
- 3. Wood Shingle      6. Clay Tile      9. Comp. Roll
- 10. Plastic Tile

Garage:

- 2 1. Attached      3. Built-in      5. None
- 2. Detached      4. Carport

Finished Floor Area: 1777 Square Feet

Effective Built Date: 1922

Exposed Slab Elevation at the Font of Structure: 30" inches

Other Structures on Property: \_\_\_\_\_

Appraised Value:  
Home 70,600  
Land 56,700  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Bexar County Appraisal : Parcel # 007B30260040  
Home \_\_\_\_\_  
Land \_\_\_\_\_  
Other Structures \_\_\_\_\_  
Total \_\_\_\_\_

Elev: 629

N 29° 26.151'  
W 098° 29.034'

-----[ Detail Report ]-----

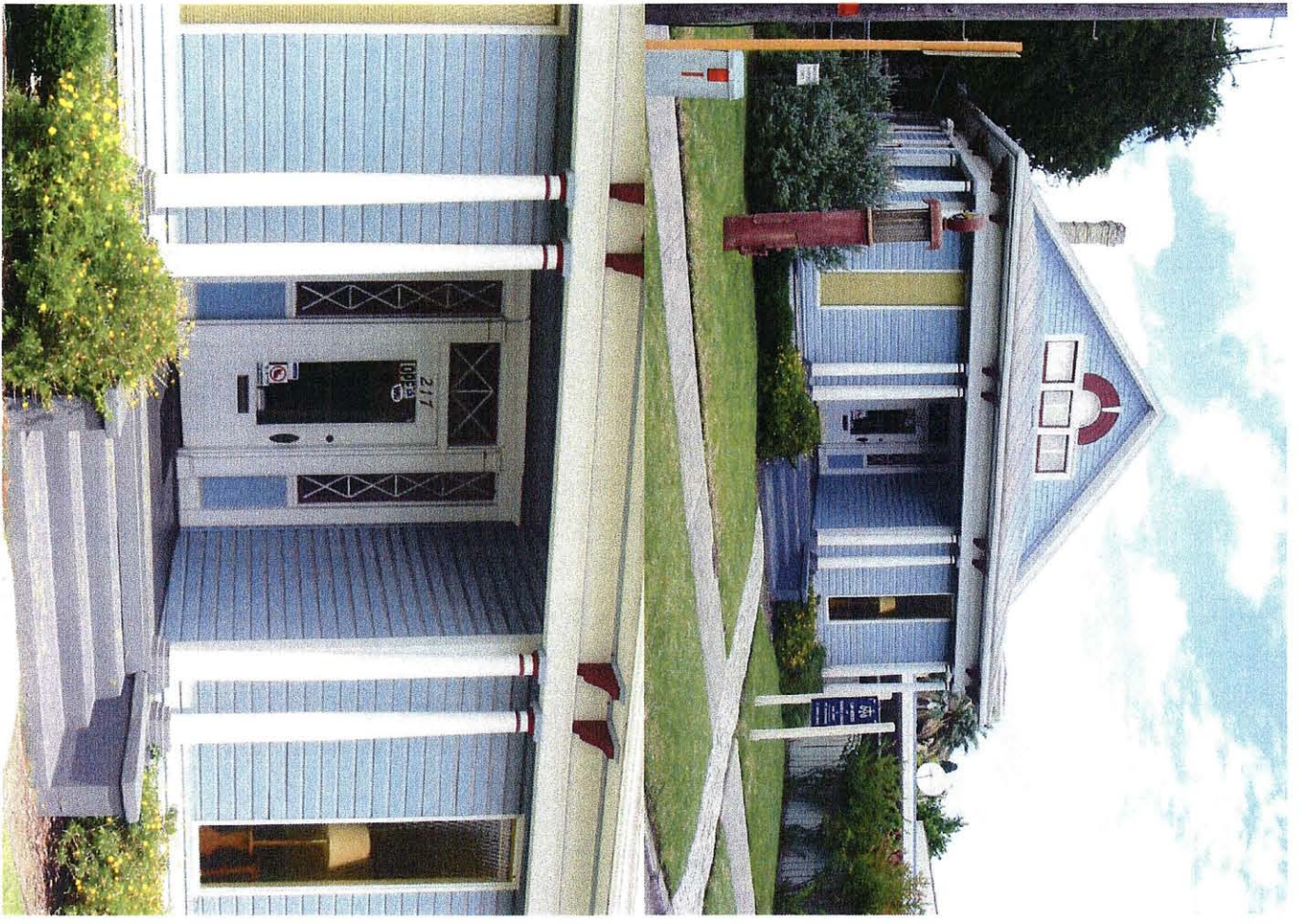
Legal: NCB 783 BLK 26 LOT 4 Can#: 007830260040  
Site: 217 ARDEN GROVE ST  
Property Use: F1  
Owner: LANGLOIS, RICHARD E Schl Dist: 57 City Code: 21  
Map Grid: 616F3  
Comm Bldg Code: 400  
217 ARDEN GROVE ST  
SAN ANTONIO, TX 78215-1704

-----[ Sales Information & Prop Values ]-----

Deed Vol/Pg: 9053/1333	Tax Yr: 2002	2003
Sale Date: 09/01/2001	Land: \$35400	\$56700
Neighborhood: 10063	Impr: \$70600	\$70600
Exempt: Not Avail	Total: \$106000	\$127300

-----[ Property Characteristics ]-----

Use: Commercial	Built: 1922	Gar/Crppt:
Ex Wall: Wood	Stors: 0.0	Poly SqFt: 7380.12
Found: Not Avail	Bdrms:	Poly Area: 0.160
Rf Type: Wood Joist	Bths:	Res Imp SF:
Style: Not Avail	A/C:	Grs Ls Area: 1777
Heat: Not Avail	Fireplace:	
Det Struct: Concrete Paving	Open Porch	







-----[ Detail Report ]-----

Legal: NCB 1759 BLK H LOT E Can#: 017590000010  
75 FT OF 1 OR A-9-W IRR 32.5 Site: 1430 N SAINT MARYS  
FT OF 1 OR A-9 & ALL OF 1 Property Use: Z0  
Owner: CITY OF SAN ANTONIO Schl Dist: 57 City Code: 21  
Map Grid: 616F3  
Comm Bldg Code:

*FIRE STATION*

, 00000-0000

-----[ Sales Information & Prop Values ]-----

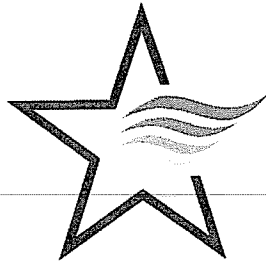
Deed Vol/Pg:	NA/NA	Tax Yr:	2002	2003
Sale Date:		Land:	\$0	\$0
Neighborhood: 10063		Impr:	\$0	\$0
Exempt: PUB		Total:	\$0	\$0

-----[ Property Characteristics ]-----

Use:	Exempt	Built:	Gar/Crprt:	
Ex Wall:	Not Avail	Stors: 0.0	Poly SqFt:	19683.06
Found:	Not Avail	Bdrms:	Poly Area:	0.450
Rf Type:	Not Avail	Bths:	Res Imp SF:	
Style:	Not Avail	A/C:	Grs Ls Area:	0
Heat:	Not Avail	Fireplace:		
Det Struct:				







SAN ANTONIO  
RIVER AUTHORITY

Water Brings Us Together

Application for:  
TEXAS WATER DEVELOPMENT BOARD  
FLOOD PROTECTION PLANNING GRANT

UPPER SAN ANTONIO RIVER and SAN PEDRO CREEK  
MITIGATION STUDY

December 16, 2003

APPLICATION FOR TEXAS WATER DEVELOPMENT BOARD  
FLOOD PROTECTION PLANNING GRANT  
UPPER SAN ANTONIO RIVER and SAN PEDRO CREEK MITIGATION  
STUDY

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**Table of Contents**

Section I.	General Information
Section II.	Planning Information
Section III.	Written Assurances
Section IV.	Proof of Notification
Section V.	Resolution

**List of Attachments**

Attachment A	Staff Qualification, Resumes
Attachment B	Minutes of SARA Operations Committee Meeting Recommending authorization of application by Board
Attachment C	Interlocal Agreement between the City of San Antonio Bexar County, and San Antonio River Authority

**APPLICATION FOR TEXAS WATER DEVELOPMENT BOARD  
FLOOD PROTECTION PLANNING GRANT  
UPPER SAN ANTONIO AND SAN PEDRO CREEK MITIGATION STUDY**

---

**INTRODUCTION**

The San Antonio River Authority (SARA) City of San Antonio (COSA) and Bexar County (County) are seeking a Flood Protection Planning Grant to help develop solutions to flooding issues in the Upper San Antonio River Watershed in the City of San Antonio. A recent flood mapping study of the area has found a significant increase in limits of the 100-year floodplain. Prior to the recent study, the last update to the Federal Emergency Management Agency (FEMA) maps occurred in 1978.

These local entities are partners in two major initiatives which compel them to work together to identify effective solutions to mitigate the increase in the floodplain. The first initiative in which the local entities are partnered is the San Antonio River Improvements Project, a 10 year project to increase water quality, flood control, and habitat along the river in Bexar County, including the area to be the subject of this grant. The development of these improvements provides a timely opportunity to implement some of the solutions that could be identified through this flood protection planning grant.

The second initiative that these entities are involved with is the Regional Flood Control, Drainage and Storm Water Management Program. SARA, COSA and County entered into an Interlocal Agreement in December 2002 to establish a consistent, unified and equitable flood control, drainage and storm water program. Rather than taking a jurisdiction-by-jurisdiction approach, the Regional Flood Management Program is aimed at taking a holistic, regional approach, to addressing the management of flood control, storm water and water quality issues throughout Bexar County. Through this more comprehensive watershed-wide approach, the entities promote more effective use of public resources, and reduce the future threat to and loss of life and property due to flooding and heavy rain events. The result of the program will be a consistent, unified, equitable flood control, drainage, and storm water program for the citizens of Bexar County through coordinated planning, project evaluation, funding, and prioritization of flood control and storm water projects. In addition, the program will establish uniform design, operation, and maintenance standards; coordinate local, state, and federal funding; and provide an opportunity to collectively measure and evaluate the quality of services delivered to the citizens of Bexar County.

This collaborative effort provides an efficient and established program within which this proposed planning effort can be implemented and supported through existing data and knowledge. In addition implementation of solutions that may be identified through this study effort can be incorporated into a regional Capital Improvement Program that will be designed, funded and implemented collectively by the three entities.



## **I. GENERAL INFORMATION**

### **1. Legal Names of Applicants**

San Antonio River Authority (SARA), City of San Antonio (COSA), and County of Bexar (County)

### **2. All participating political subdivisions in the planning area are co-applicants for this proposal.**

### **3. Authority of law under which each political subdivision was created.**

The San Antonio River Authority was created under Article 16, Section 59 of the Constitution of Texas.

The City of San Antonio is a Texas Home Rule Municipality with powers enumerated in Tex. Rev. Civ. Stat. Ann. Art. 1175.

County of Bexar was created by the Texas Legislature pursuant to provisions of Article 9 Section 1 of the Texas Constitution.

### **4. Applicants official representative**

Stephen Graham, Director of Watershed Management  
San Antonio River Authority  
P.O. Box 839980  
San Antonio, Texas 78283-9980  
Phone: (210) 302-3622  
Fax: (210) 302-3211

### **5. Applicant's legal authority to carry out proposal**

San Antonio River Authority: According to statute, "the District shall include . . . the Counties of Bexar, Wilson, Karnes and Goliad." And "it shall be the duty of the District to exercise for the greatest practicable measure of the conservation and beneficial utilization of all ground, storm, flood and unappropriated flow waters of the District . . ."

Section 3 of Chapter 276, Page 556, Acts of the 45<sup>th</sup> Legislature, 1937, as Subsequently Amended and the Bylaws of the San Antonio River Authority, 1990, grants SARA the power to "effectuate flood control, to effectuate the conservation and use, for all beneficial purposes, of ground, storm, flood and unappropriated flow waters in the District . . ."  
(House Bill 726)

City of San Antonio: The City of San Antonio, Director of Public Works serves as the Flood Plain Administrator within the city limits.

Bexar County: The County Engineer serves as the Flood Plain Administrator for the unincorporated area of Bexar County.

Regional Flood Control, Drainage and Storm Water Management Program: SARA, COSA and County entered into an Interlocal Agreement in December 2002 to establish a consistent, unified and equitable flood control, drainage and storm water program (The Regional Management Program) for the citizens of Bexar County that will improve the quality of life, protect life and property, and provide safe transportation during heavy rain and flood events. The Regional Management Program will address both water quality and water quantity issues.

The partnership is being expanded to include participation by other municipalities within Bexar County, military bases and other entities within Bexar County with duties and responsibilities which impact the management of water within watersheds in Bexar County.

Rather than taking a jurisdiction-by-jurisdiction approach, the Regional Flood Management Program is aimed at taking a holistic, regional approach, to addressing the management of flood control, storm water and water quality issues throughout Bexar County. Through this more comprehensive watershed-wide approach, the entities promote more effective use of public resources, and reduce the future threat to and loss of life and property due to flooding and heavy rain events. The result of the program will be a consistent, unified, equitable flood control, drainage, and storm water program for the citizens of Bexar County through coordinated planning, project evaluation, funding, and prioritization of flood control and storm water projects. In addition, the program will establish uniform design, operation, and maintenance standards; coordinate local, state, and federal funding; and provide an opportunity to collectively measure and evaluate the quality of services delivered to the citizens of Bexar County.

Over the past year, the Regional Flood Management Program has produced many accomplishments, including but not limited to, the creation of a Watershed Masterplan for developing consistent technical hydrologic and hydraulic modeling tools for each watershed in the county for use by all entities; produced a coordinated list of Capital Improvement Projects which served as the basis for successful COSA and County bond issues; and initiated a coordinated program to address natural creekway maintenance.

**6. Is this application in response to a published Request for Proposals listed in the *Texas Register*?**

Yes

**7. Document number and date of publication.**

TRD-200306058 , September 26, 2003

**8. Total proposed planning cost**

\$260,000

**9. Total grant funds requested**

\$130,000

**10 Applicant cash contribution to the study**

\$110,000

**11. Source of cash contribution and explanation**

<u>Participant</u>	<u>Cash Contribution (to be verified with CSA, BxCo)</u>
San Antonio River Authority	\$ 10,000
City of San Antonio	\$ 50,000
Bexar County	\$ 50,000

Note: The San Antonio River Authority is committed to obtaining the required match for this project. The COSA and County are committed to supporting the project by virtue of being co-applicants and will provide matching funds. However, there has been insufficient time to finalize the level of each entity's contribution.

**12. Applicant in-kind contribution.**

<u>Participant</u>	<u>In-kind Contribution</u>
San Antonio River Authority	\$ 20,000

Description of In-kind services:  
Project Management, engineering review, quality assurance, public input, and community relations

**13. Why proposed planning is needed.**

SARA, COSA, and County are seeking the Flood Protection Planning Grant to help develop solutions to flooding issues in the Upper San Antonio River Watershed in the City of San Antonio. A recent flood mapping study in of the area has resulted in a significant increase in limits of the 100-year floodplain. Prior to the recent study, the last update to the Federal Emergency Management Agency (FEMA) maps occurred in 1978.

The recent flood study was completed in conjunction with the U.S. Army Corps of Engineers (USCOE) to document the change in conditions in the watershed resulting from the addition of two underground flood diversion tunnels. Bexar County and the U.S. Army Corps of Engineers funded the construction of the San Antonio River and San Pedro Creek Tunnels. The tunnels divert a major portion of the 100-year storm floodwaters beneath downtown San Antonio and release it safely into the San Antonio



River and San Pedro Creek downstream. The tunnels are 24-foot 4-inch diameter inverted siphons located approximately 140 feet below ground level. The 6,000-foot-long San Pedro Creek Tunnel became operational in 1991, and the 16,200-foot-long San Antonio River Tunnel became operational in 1996.

The tunnels “paid for themselves” by preventing property damage in the central business and government district during the October 1998 flood.

The USCOE performed an updated flood study developed after the construction of San Antonio River and San Pedro Creek Tunnels. Although the tunnels, along with other improvements constructed in the watershed since the 1920s, provide much flood protection benefit, increased residential and commercial development within the watershed, and improvements in technology and methodologies to delineate floodplains, indicate a significant change since the 1978 maps. The new maps are not yet published by FEMA, but indicate an increase of 200-300 homes now affected by the 100-year floodplain.

**14. Why state funding assistance is needed.**

State funding for this planning effort is needed to support the identification of possible solutions to reduce the impact of the new flood plain designation on residents and businesses in the study area. Local funds are not available to fully support the timely development of solutions to coincide with other ongoing studies on this reach of the San Antonio River. By receiving these funds citizens now affected will see not only local help but also state and possibly federal assistance. This study would allow local floodplain managers and planners to address the flooding concerns in conjunction with the San Antonio River Improvements Project, an ongoing improvement project along the study area. By combining study efforts, local sponsors gain efficiencies through a more comprehensive analysis of the upstream and downstream impacts of proposed solutions. In addition, the potential of implementation of the identified solutions is more probable if done now while the San Antonio River Improvement Project is in the design phase.

**15. Potential funding for implementation of plan.**

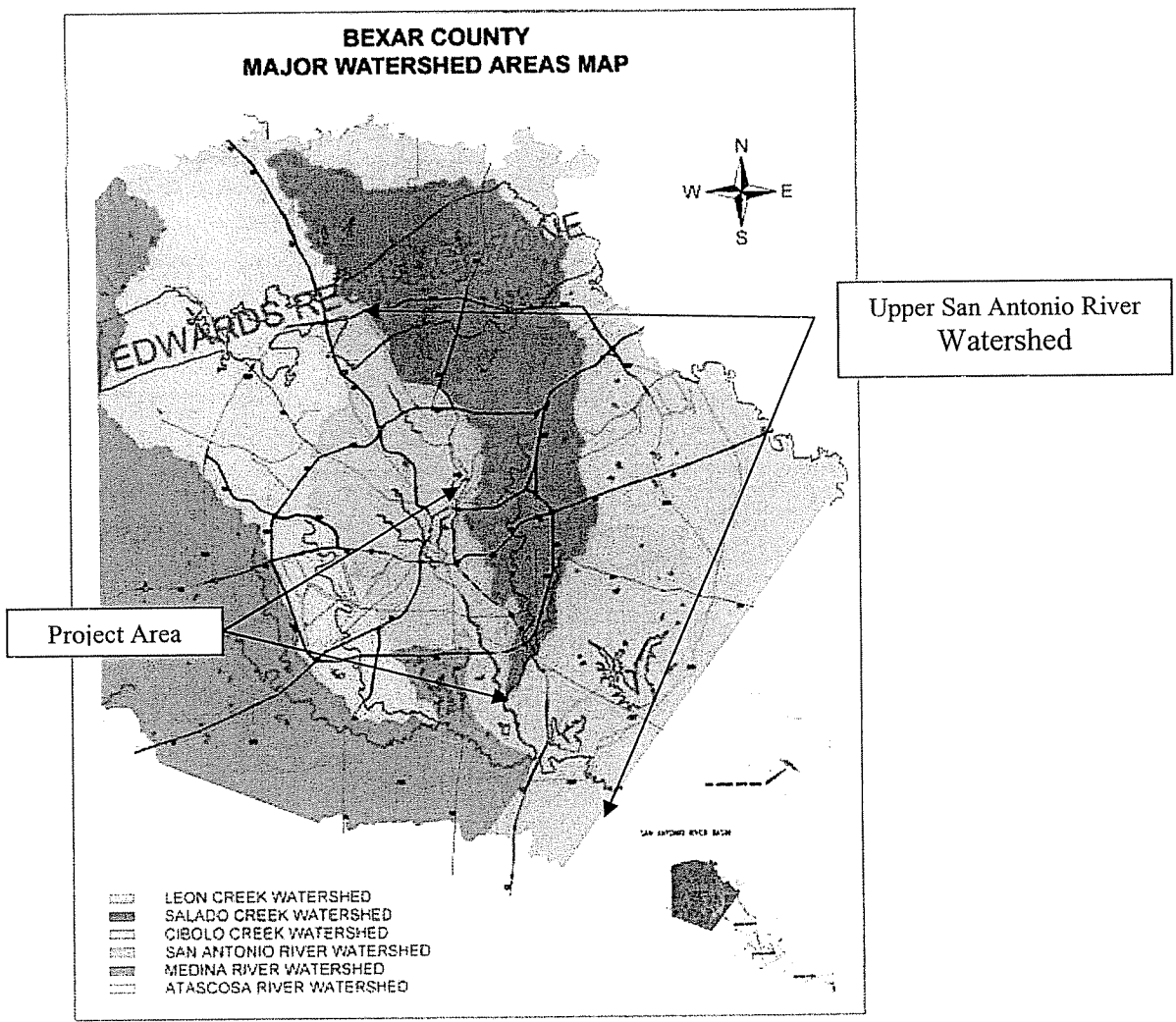
Some of the solutions identified in this plan will be incorporated into and funded through the San Antonio River Improvement Project, a 10-year effort to increase water quality, flood control, and habitat along the river in Bexar County, funded by the USCOE, COSA, and County. SARA serves as project manager and local sponsor for the USCOE. Other grants and gifts from individuals and businesses to the San Antonio River Foundation are additional funding resources. The San Antonio River Improvement Project is a \$140 million project involving 13 miles of the San Antonio River and overlaps with the boundaries of the study area. Solutions that are not incorporated in the San Antonio River Improvements Project will be added to the Regional Management Program’s annual Capital Improvement Program project list, whose priority is determined by a standard matrix of criteria. Funding for that will come through various mechanisms.

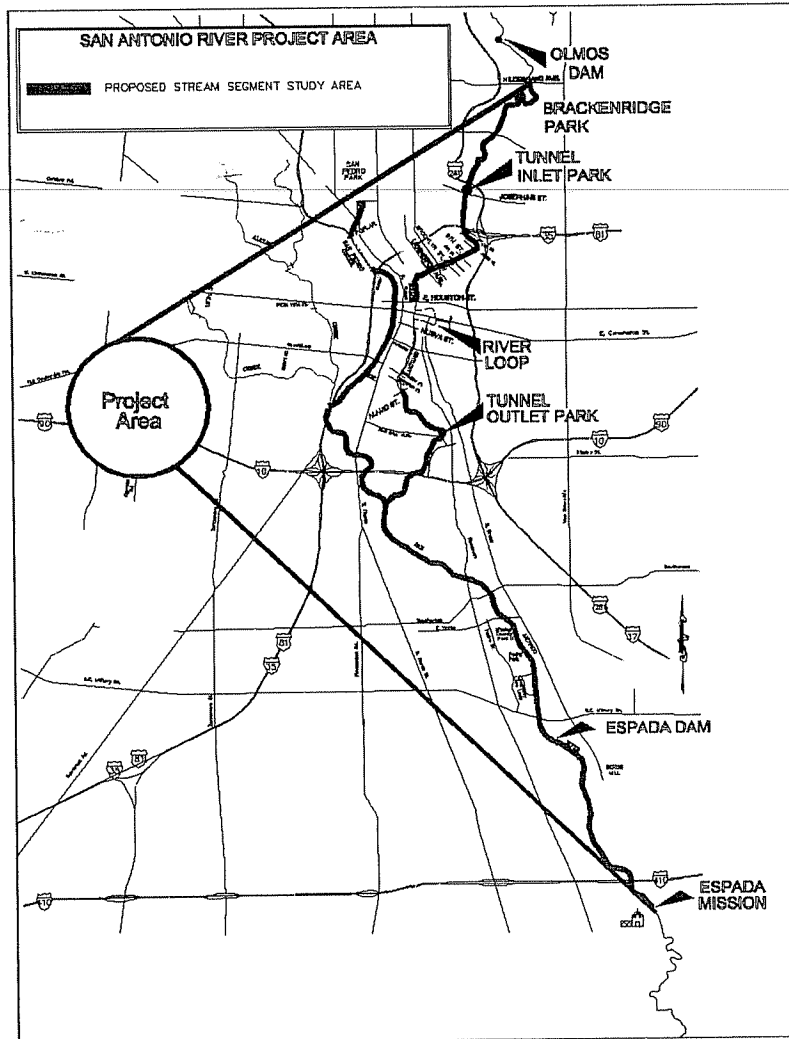
#### IV. PLANNING INFORMATION

##### 16. Geographical planning area.

The proposed planning area is located in south central Texas in the San Antonio River Basin, a major tributary of the Guadalupe River. The area is in what is referred to as the Upper San Antonio River Watershed. The stream limits for the study are the San Antonio River from Hildebrand Avenue in north-central San Antonio to highway 410 in south Bexar County and includes the entire San Pedro Creek, a tributary to the San Antonio River. The planning area is completely within the San Antonio city limits.

##### 17. A Map of the proposed planning area





18. **Flood hazard that planning will address.**
19. **Historical flooding and flood damage in planning area.**

The San Antonio River watersheds, and many of its contributing streams, have exhibited volatile flooding during its history. According to the U.S. Geological Survey, “Texas storms represent some of the largest storms in the world.” And “many of the largest storms in the State have occurred in [the Balcones Escarpment],” causing extensive precipitation in the Hill Country and South Central Texas, with devastating floods as the waters flow south, including into Bexar County and San Antonio.

According to the current Flood Insurance Study (FIS), the watershed areas of the San Antonio River lie in the center of a special climatic zone influenced by the Balcones Escarpment. Humid southerly winds off the Gulf of Mexico strike the 500- to 800-foot face of the escarpment and are lifted orographically to produce intense localized rainfall. This process is aided by frequent cold fronts (northers) and occasional tropical cyclones (hurricanes), especially in the months of August and September. This combination of factors has produced some of the most intense rainstorms ever recorded in the



coterminous United States. A 15-inch rainfall is no longer considered rare, and it is not unheard of to have a 20-inch rainfall. More than 30 inches of rainfall in some areas were recorded over a period of 5 days during the July, 2002, rainfall event. These intense rainfall events can produce equally significant flood events in the San Antonio River watershed.

The City of San Antonio has developed longer and better flood records than rural Bexar County and many other areas. The City has recorded disastrous floods in 1921, 1946, 1965, and 1998. The San Antonio Express-News reported that the 1998 flood, alone, left 1,150 homes damaged and \$71 million in damage to infrastructure. Texas Department of Health recorded 29 deaths for that flood; eleven of them in San Antonio.

Other major storms occurred in 1819, 1865, 1880, 1893, 1899, 1913, 1919, 1923, 1935, 1946, 1957, 1958, and 1972. The floods of July, 2002, had far reaching effects on the watershed as well, particularly in northwest and southern Bexar County, eastern Medina and Bandera Counties. Generally, floods initiated in the upper watersheds of the San Antonio River pass downstream through Wilson, Karnes, and Goliad Counties, causing further loss of life, extensive property damage and NFIP claims.

In order to address the floodplain issues within Bexar County, the City of San Antonio, the County, and the San Antonio River Authority (SARA) have participated in the Citizens Watershed Advisory Committee for several years in order to coordinate regional and local planning and capital improvement projects to address the flooding problems in the watershed. Recently, and in response to the devastation caused by floods of October, 1998, and July, 2002, these entities have taken this a step further by executing an interlocal agreement to clarify and define the roles and responsibilities of each stakeholder in regard to planning, design, and execution of flood management and water quality-related projects. Concurrently, the San Antonio River Authority is undertaking the challenging task of addressing regional floodplain and water quality management for the broad range of municipalities and areas within its constituent counties including: Bexar, Wilson, Karnes, and Goliad Counties.

## **20. How planning will address public safety and welfare.**

This proposed planning will address public safety and welfare by examining and quantifying opportunities to improve the available flood protection for residents and properties within the San Antonio River watershed. The San Antonio River and San Pedro Creek, a tributary to the San Antonio River, encompass a large area of the watershed that has been highly urbanized and exhibits high degrees of population and structure densities. By quantifying opportunities to execute feasible flood protection projects in these areas, the potential for life threatening and catastrophic flood damage will be reduced by providing a higher degree of flood protection.

Experience has shown us the variety of possible solutions that can have significant effects on flooding and its damage. Previous remediation efforts have successfully reduced damage in Bexar County. Unfortunately, recent updates of floodplain maps for the San

Antonio River and San Pedro Creek have indicated another 200-300 homes may be impacted by the 100-year floodplain in the proposed planning area.

**21. Unemployment rate.**

The unemployment rate in San Antonio as of 2003 is 5.1%.

**22. Per-capita income.**

The per-capita income in the City of San Antonio as of 2001 is just under \$27,000 per year.

**23. Population of area.**

**24. Population in 100-year floodplain area.**

A major part of this proposed planning effort is to identify in detail and mitigate flood hazards impacting residences in the 100-year floodplain. The population in the City of San Antonio is 1.4 million, and the population in the Upper San Antonio River watershed is approximately 582,000. The current population residing in the 100-year floodplain in the specific area of study is not known due to the fact that the current FEMA maps, published in 1978, are not up to date. We have identified 200-300 homes in the updated floodplain study, but this is just an approximation.

**25. Property value in 100-year floodplain planning area.**

Using a query of local County records, the estimated total value of properties in the newly established floodplain is estimated to be \$418,000,000. The estimated values of properties vary greatly throughout the study area, from the historical mission area to the downtown riverwalk, and include older developments and residential subdivisions, industrial areas and farmsteads to the south.

**26. NFIP policies in effect in planning area.**

The number of National Flood Insurance Program policies in effect in the study area will be part of our investigation, but, as of July 2003, there were 2645 policies in effect in City of San Antonio, representing over \$386,000,000 in coverage and annual premiums of over \$1.2 million. Cumulative claims have been 816, to the tune of over \$12 million.

**27. Method to determine cost-effectiveness of solutions.**

Project capital cost estimates will be reviewed and refined for each alternative. The cost of each alternative will be compared with the anticipated benefits. In addition, avoided damages for each alternative will also be calculated using the USCOE Flood Damage Assessment methodology. Benefits ("B" in the B/C ratio) would be the avoided damage that could occur due to flooding. This would be computed using standard USCOE

damage curves adjusted for San Antonio property values. The economic database will be developed using existing Bexar County Assessor's information in a GIS database.

## **28. Most recent planning in area.**

A previous study effort within the proposed study area is the San Antonio River Limited Map Maintenance Program (LMMP), funded by the USCOE in coordination with FEMA. The LMMP was done to determine the floodplain due to the constructed San Antonio and San Pedro Creek tunnels and watershed development. This study will update the FEMA FIS map published in 1978. This model, which is in the process of being submitted to FEMA, is the best available data in this study area and will be the basis for any mitigation efforts that this proposed study will develop.

Another project in design is the San Antonio River Improvements Project (SARIP), which is a project is developing plans to construct amenities, flood control enhancements, and geomorphic and environmental restoration. The project will address flooding by incorporating mitigation solutions developed from this proposed grant opportunity to the SARIP vision and preliminary design. This is a multi-funded, multi-phase project to create improvements along the San Antonio River. The Museum Reach, north of the downtown area, extends from the San Antonio Downtown Riverwalk north to near the San Antonio River headwater at Hildebrand Avenue. The improvements in this area will be very similar to the San Antonio Riverwalk, and includes a partial creek restoration effort in Brackenridge Park along an existing concrete ditch. The Mission reach, south of downtown, is an effort being designed in collaboration with the USCOE (Fort Worth district). This project will create a partial restoration to a natural river from the present nine miles of grass-lined trapezoidal channel. The focus of this project is environmental restoration and enhancement to existing flood mitigation, where possible. The extent of the potential flood damage resulting from the updated LMMP was not realized and programmed into the original scope of the SARIP. Capital projects beyond the scope of the SARIP or on the San Pedro Creek will be needed to fully mitigate the effects of the newly identified floodplain.

Major flood protection planning is coordinated through the County, COSA, and SARA through the Regional Flood Management Program described above (#5, 18-19). The Regional Flood Management Program provides an opportunity for these political subdivisions to come together and collaborate by sharing resources and expertise to manage flooding on a region-wide basis. These entities are working together to create an integrated system to most effectively address flood control and water quality issues within the five watersheds and multiple jurisdictions that comprise the San Antonio River Basin in Bexar County. The intent of this cooperative and collaborative effort is to create uniform tools, techniques, and guidelines for use by all the governmental entities within Bexar County in order to base storm water management decisions upon proven science, reliable data, and uniform standards and criteria. The program is now bringing cooperation with other agencies including all other suburban cities and communities within Bexar County and--through the San Antonio River Authority--the participation of the United States Army Corps of Engineer (USCOE), the Natural Resource Conservation



Service (NRCS), the Federal Emergency Management Agency (FEMA), Texas Commission for Environmental Quality (TCEQ), and Texas Department of Transportation (TXDOT).

## **29. Coordination with others planning in area.**

The goal of this proposed study is to identify and plan, from a regional scope, mitigation solutions to flooding problems. The results from this planning effort will provide regional CIP projects as well as possible incorporation of activities to the existing project on the San Antonio River, the SARIP. This planning effort will become a model for the other tributaries to the San Antonio River in the Bexar County area and throughout the San Antonio River Basin

### **Item 30 – SCOPE OF SERVICES for the San Antonio River and San Pedro Creek Flood Protection Planning**

This scope of work describes Design and Engineering services to be provided by a consultant to the San Antonio River Authority, the designated planning partner in the ILA. This scope of services defines the effort required to provide planning and design criteria formulation to proceed to the next phase of planning in conjunction with currently authorized studies. The study areas for this scope of work include:

Study Reaches:           Approximately 5 miles of San Pedro Creek from the confluence with the San Antonio River upstream to West Laurel Street.

Approximately 13 miles of the San Antonio River from Hildebrand Avenue in north-central San Antonio to highway 410 in south Bexar County and includes the entire San Pedro Creek, a tributary to the San Antonio River.

The Study Reach does not include tributary streams or creeks to San Pedro Creek or the San Antonio River.

Previous study efforts for these reaches include a review of the current FIS and the proposed LMMP floodplain mapping to identify areas that are candidates for feasible flood protection plans and formulate conceptual-level flood protection alternatives for the candidate areas.

The objective of this scope of services will be to analyze the alternatives developed in the previous SARIP. Studies on a more detailed level, establish benefit/cost ratios, perform additional hydrologic or hydraulic modeling, if required, and identify preferred, cost effective alternatives for each area identified in the previous studies. The level of effort for this scope of work will be commensurate with a feasibility or preliminary design study focused on regional flood protection planning for a watershed or section of a watershed.

Planning level preferred flood protection alternatives will be analyzed and developed for the study area along San Pedro Creek. Because a preliminary design effort for the San Antonio River Improvements Project is currently underway design criteria for flood protection measures will be developed for incorporation into the final design for this project.

The consultant will perform the following tasks:

**Task 1 – Kick-off Meeting** A kick-off meeting will be held to discuss the project scope, organization, and communication, and to receive data from SARA and make initial assignments.

**Task 2 – Surveying** An allowance is included in this scope for miscellaneous survey services that may be required to augment existing data for the evaluation of flood protection alternatives.

### **Task 3 – Evaluation of Alternative Plans**

**Task 3.1 – Organization of Potential Mitigation Options** Each area identified as a potential mitigation option in the previous study will be reviewed to determine if additional information, such as additional survey data obtained through Task 2, is required or if a particular alternative requires further refinement. The base criteria for each identified flooding site will then be organized for analyses in the subsequent tasks.

**Task 3.2 – Design Flows** In the case of storage or diversion alternatives, hydrologic analysis will be required to estimate storage requirements and modified 100-year peak discharges in the channels. The HEC-HMS model established under previous study efforts will be used for this purpose. For alternatives not involving storage or diversions, existing FIS or LMMP peak flows will be used for sizing, with no additional hydrologic analyses required.

**Task 3.3 – Hydraulic Sizing** Hydraulic sizing using modified versions of the existing hydraulic models will be conducted to size facilities for each alternative concept. Where velocities are found to be excessive, scour protection will be included in the alternative.

LOOK FOR PUBLIC LAND FOR DETENTION

**Task 3.4 – Bridge Alternatives** Bridges identified as having insufficient hydraulic capacity or freeboard will be visited in the field by a registered structural engineer to assess the viability of modifying the bridge. Computations will then be performed to estimate the structural requirements and the cost of the proposed alternative(s).

**Task 3.5 – Drawings** Conceptual drawings will be prepared for each of the final alternatives using the base sheets and information obtained from previous studies or developed specifically for this study.

**Task 3.6 – Cost and Benefit Estimates** Project capital cost estimates will be reviewed and refined for each alternative. The cost estimates will be used for comparison of alternatives and identification of funding needs. In addition, avoided damages for each alternative will also be calculated using the USCOE Flood Damage Assessment methodology. Benefits (“B” in the B/C ratio) would be the avoided damage that could occur due to flooding. This would be computed using standard COE damage curves adjusted for San Antonio property values. The economic database will be developed using existing Bexar County Assessor’s information in a GIS database.

**Task 3.7 – Review of Alternatives** Information developed for each alternative will be organized for comparison to other alternatives. SARA will then review the comparison information, drawings, and cost estimates. A meeting will then be held with the consultants so they can field questions and comments.

### **Task 4 – Screening and Selection of Plan(s)**

**Task 4.1 – Screening Criteria** Criteria for alternative screening will be reviewed the consultant and SARA and may include:

- Cost comparison or Benefit/Cost (B/C) ratio analyses
  - Effects on local drainage
  - Effects on local utilities and civil infrastructure.
  - Effects on local and regional transportation
- 
- Operation and Maintenance
  - Environmental impacts.
  - Public acceptance
  - FEMA and USCOE acceptance
  - Institutional constraints (delays, fatal flaws)
  - Time required to implement
  - Funding constraints.

**Task 4.2 – Screening Workshop** A day-long workshop will be held with the stakeholders to screen the alternatives. The goal of the workshop will be to leave with a preferred alternative for each identified flood-prone location.

**Task 5 – Report**

**Task 5.1 – Draft Report** A draft report will be prepared and submitted for review (to SARA outlined as follows:

1. Executive Summary
2. Introduction
3. Hydrology
4. Existing Conditions – Floodplain Assessment
5. Alternative Evaluation
6. Recommended Flood Protection Alternatives for San Pedro Creek
7. Recommended Flood Protection Alternative for the San Antonio River
8. Appendices
  - Hydrologic and Hydraulic Calculations
  - Cost Estimates
  - Exhibits

**Task 5.2 – Final Report** Comments received from the review of the draft report will be incorporated and a final report will be compiled and delivered.

**Task 6 – Project Management**

Monthly progress reporting, scheduling, office administration, coordination meetings, general correspondence, contract administration, and invoicing will be included under this task.

**Task 7 – SARA expenses**

**Task 8 – SARA in-kind service**



This planning effort will develop a number of regional flood protection projects or CIP projects. These projects, once identified, will be prioritized by the ILA agencies (responsible for the entire watershed) using an agreed-upon ranking method; the table presented below illustrates the CIP ranking spreadsheet. These projects will be ranked and an independent financial model developed for this coalition will identify the possible funding sources to construct these mitigating projects. The following table is the prioritization system developed by the ILA for ranking storm water-related capital improvement projects.

**Prioritization System  
For  
Storm Water Related Capital Improvement Projects**

**SAMPLE SCORING SYSTEM**

*SPECIFIC PROJECT*

Item #	Potential Prioritization Ranking Factors	Ranking	Project	Project
		Factor Assigned	Weight	Specific Factor
1	Hydraulic/hydrologic significance or impact	4	3	12
2	Public safety	4	3	12
3	Cost/benefit ratio	4	2	8
4	Element of a comprehensive watershed plan	4	2	8
5	Dependency on other projects	3	2	6
6	Mobility or effects on transportation system	3	2	6
7	Sustainability or low operations & maintenance cost	3	1	3
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	3	2	6
9	Funding sources (leverage of participants available funds)	3	1	3
10	Beneficial neighborhood impacts	3	2	6
11	Water quality enhancement	2	0	0
12	Promote orderly development or improve economic development/redevelopment potential	2	2	4
13	Time to implement or construct	2	1	2
14	Permitting resistance or difficulty	2	0	0
15	Environmental or habitat enhancement	2	1	2
15	Potential for Recreation/Open Space/Connectivity for linear parks	2	0	0
<b>Total Project Score</b>				<b>78</b>

Notes:

- Average group score of ranking factor greater than or equal to 2.5
- Average group score of ranking factor greater than or equal to 2.0
- Average group score of ranking factor less than 2.0

Assumed Project Specific Factors range from 0 to 3 as follows:

- 3 - High or best possible score
- 2 - Moderate score
- 1 - Low score

0 - Not applicable or not positive.

Highest possible total project score is 135.

**Public Outreach:** Upon award of this grant, SARA will announce its receipt through a press release, and SARA will issue a press release upon completion of the project to announce the results, benefits, and parameters of the findings. SARA will also provide a vehicle for public input via agenda items for meetings of the Watershed Improvement Advisory Committee, a citizen-based advisory committee supporting the Regional Flood Management Program, and the Committee of Six, the elected official steering committee for the Regional Flood Management Program. To integrate identified solutions with the San Antonio River Improvements Project, public presentations and comment will be coordinated through the San Antonio River Oversight Committee, a committee representing stakeholders along the San Antonio River. In addition, each of the co-applicants are public agencies and will provide reports to governing boards in public sessions.

**31. Task budget.**

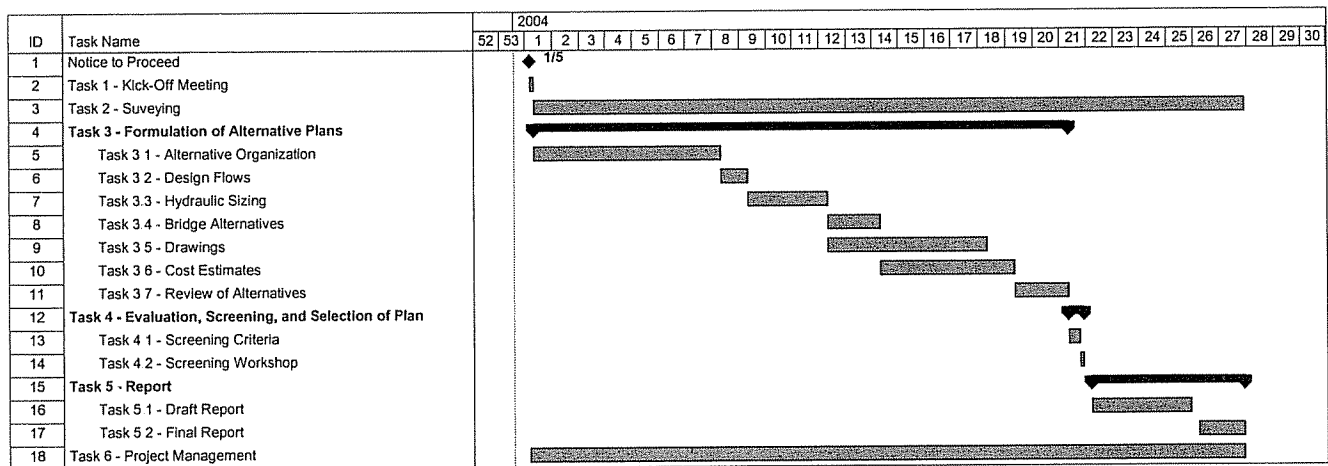
<b>Task 1 - Planning Initiation</b>	\$3,000
<b>Task 2 - Surveying</b>	\$25,000
<b>Task 3 - Evaluation of Alternative Plans</b>	\$0.00
Task 3.1 – Alternative Organization	\$5,500
Task 3.2 - Design Flows	\$10,000
Task 3.3 - Hydraulic Sizing	\$20,000
Task 3.4 - Bridge Alternatives	\$15,000
Task 3.5 - Drawings	\$29,000
Task 3.6 - Cost Estimates	\$54,000
Task 3.7 - Review of Alternatives	\$13,400
<b>Task 4 - Screening and Selection of Plan</b>	\$0.00
Task 4.1 - Screening Criteria	\$5,000
Task 4.2 - Screening Workshop	\$8,000
<b>Task 5 - Report</b>	\$690
Task 5.1 - Draft Report	\$20,000
Task 5.2 - Final Report	\$8,000
<b>Task 6 - Project Management</b>	\$13,410
<b>Task 7 – Misc. expenses cash</b>	\$10,000
<b>Task 8 – SARA in-kind labor</b>	\$20,000
<b>Total</b>	<b>\$260,000</b>

**33. Expense budget by category.**

Category	Total Budget
Salaries	\$68,000
Travel	\$ -
Communication	\$5322
Supplies	\$3140
Tech/Computer	\$9,940
Reproduction	\$4000
Subcontractor	\$32,000
Fringes	\$27,500
Profit	\$28,000
Overhead	\$62,098
In kind Labor	\$20,000
Total	\$260,000

**Item 32 – Schedule**

The schedule below indicates the duration of each task in weeks.



**34. Qualifications and experience.**

See attached resumes for staff and consultants' qualifications (Appendix A).

**35. Identification of watershed.**

The proposed planning area is located in south central Texas in the San Antonio River Basin, a major tributary of the Guadalupe River. The area is in what is referred to as the Upper San Antonio River Watershed, which is entirely within Bexar County. The stream limits are the San Antonio River from Hildebrand Avenue in north-central San Antonio



to highway 410 south, which is a more rural part of San Antonio, and includes the entire San Pedro Creek, a tributary to the San Antonio River. The planning area is completely within San Antonio city limits

**36. How flood protection needs of entire watershed will be considered.**

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This planning effort will develop a number of regional flood protection projects or CIP projects. These projects, once identified, will be prioritized by the ILA agencies (responsible for the entire watershed) using an agreed-upon ranking method; the table presented below illustrates the CIP ranking spreadsheet. These projects will be ranked and an independent financial model developed for this coalition will identify the possible funding sources to construct these mitigating projects. The following table is the prioritization system developed by the ILA for ranking storm water-related capital improvement projects.

**37. Method of monitoring study progress.**

This project's progress will be monitored through project management tools. SARA has a Project Management office that monitors its programs and projects, and progress is also monitored by executive management. Through standard project management methodology, tools, and reporting procedures applied to SARA activities of varying size and complexity, efficient and consistent initiation, planning, execution, and closing of SARA projects are assured.

**III Written Assurance**

- The proposed planning effort does not duplicate existing project; instead, it compliments and updates existing plans such as the SARIP and the region's ILA planning efforts.
- Implementation of viable solutions identified through the planning process and identification of potential sources of funding for implementation of viable solution will be diligently pursued. This will be done by the ranking of the flood protection projects identified and through the financial model developed for the region. The solutions identified in the current Museum and Mission reach projects will be rolled into the their current cost with additional funding supplemented, where needed. SARA has committed to funding this project through its interlocal agreement with the City and County, its tax revenue, US Corp of Engineers funding, other grant funding, and private donations received through the newly-established San Antonio River Foundation.
- If a grant is awarded, written evidence that local matching funds and in-kind services are available for the proposed planning will be provided when the contract is executed.
- The COSA and County are NFIP participants and COSA and SARA are Cooperating Technical Partner (CTP) with FEMA.

**V. RESOLUTION**

The next meeting for the San Antonio River Authority to authorize this application is after this grant's deadline. However, the board's Operations Committee has met and recommended authorization, which will be presented to the full board as a consent item. Attached are the minutes for the Operations Committee meeting. Final authorization will be forwarded after the board meeting.

Resolutions from the City of San Antonio and from Bexar County are in process and will be forwarded as soon as possible.

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FLOOD PROTECTION PLANNING GRANT  
UPPER SAN ANTONIO RIVER and SAN PEDRO CREEK MITIGATION

APPENDIX A  
**RESUMES OF KEY PERSONNEL**



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FLOOD PROTECTION PLANNING GRANT  
UPPER SAN ANTONIO RIVER and SAN PEDRO CREEK MITIGATION

APPENDIX B

Minutes of the San Antonio River Authority Board's Operation Committee  
Recommending Authorization to apply to TWDB to the Board

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FLOOD PROTECTION PLANNING GRANT

UPPER SAN ANTONIO RIVER and SAN PEDRO CREEK MITIGATION

**APPENDIX C**

Interlocal Agreement Between the City of San Antonio, Bexar County, and the San Antonio  
River Authority

## FDMA Phase II Bridge Assessment

**BRIDGE LOCATION:** Probandt St.

General View:



### **DESCRIPTION:**

#### ***Type of Construction:***

Cast-in-place concrete deck with integral joists. Each bent consists of four columns with a rectangular cap.

<b><i>No. of Spans</i></b>	<b><i>Width</i></b>	<b><i>Length</i></b>	<b><i>Total Deck Area</i></b>	<b><i>Low Chord El.</i></b>	<b><i>Existing 100 YR WSE</i></b>
7	55'	262'	14,410 sf	600.50'	602.77'

### **COMMENTS:**

Based on the construction of this bridge, the deck cannot be raised to provide clearance of the floodway. The bridge would need to be demolished and replaced. This would require removal of the bridge deck, bents and abutment walls. Adjacent retaining walls and sheet pile walls may require modification or replacement to accommodate the new bridge height.

In addition to the bridge replacement, the adjacent roadway would require modification. Directly adjacent to the end of the bridge, approximately 20', there are side streets that intersect the roadway; East Franciscan on the south and Riverview on the north. Both of these streets would require modification to accommodate raising the bridge.



## FDMA Phase II Bridge Assessment

**BRIDGE LOCATION:** W. Mitchell St.

General View:



### **DESCRIPTION:**

#### ***Type of Construction:***

Cast-in-place concrete deck with integral joists. Each bent consists of four columns with a rectangular cap.

<b><i>No. of Spans</i></b>	<b><i>Width</i></b>	<b><i>Length</i></b>	<b><i>Total Deck Area</i></b>	<b><i>Low Chord El.</i></b>	<b><i>Existing 100 YR WSE</i></b>
6	55'	223'	12,265 sf	603.0'	607.03'

### **COMMENTS:**

Based on the construction of this bridge, the deck cannot be raised to provide clearance of the floodway. The bridge would need to be demolished and replaced. This would require removal of the bridge deck, bents and abutment walls. Concrete retaining walls on the west end of the bridge would require modification or replacement to accommodate the new bridge height.

In addition to the bridge replacement, the adjacent roadway would require modification. Directly adjacent to the east end of the bridge and approximately 15' from the west end there are residential driveways on both sides of the street. Both driveways would require modification to accommodate raising the bridge, in addition to potential impacts to the residences.

## FDMA Phase II Bridge Assessment

**BRIDGE LOCATION:** S. Flores St.

General View:



### **DESCRIPTION:**

#### ***Type of Construction:***

Cast-in-place concrete deck with steel I-beam girders. Each bent consists of 5 columns with a rectangular cap.

<b><i>No. of Spans</i></b>	<b><i>Width</i></b>	<b><i>Length</i></b>	<b><i>Total Deck Area</i></b>	<b><i>Low Chord El.</i></b>	<b><i>Existing 100 YR WSE</i></b>
6	51'	259'	13,209 sf	610.0'	613.54'

### **COMMENTS:**

Based on the construction of this bridge, the deck cannot be raised to provide clearance of the floodway. The bridge would need to be demolished and replaced. This would require removal of the bridge deck, girders, bents and abutment walls. Steel sheet piling on both ends of the bridge would require modification or replacement to accommodate the new bridge height. This bridge also has a number of utilities that are supported from below the deck, including a natural gas line.

In addition to the bridge replacement, the adjacent roadway would require modification. Approximately 20' to 30' from the end of the bridge there are side streets that intersect the roadway, Pruitt Street on the south and Cass Street on the north. Both of these streets would require modification to accommodate raising the bridge. There is also potential interference on the south end of the bridge with an adjacent business entrance.

## FDMA Phase II Bridge Assessment

**BRIDGE LOCATION:** Nogalitos St.

General View:



**DESCRIPTION:**

***Type of Construction:***

Cast-in-place concrete deck with pre-cast concrete girders. Each bent consists of 3 columns with a rectangular cap.

<i>No. of Spans</i>	<i>Width</i>	<i>Length</i>	<i>Total Deck Area</i>	<i>Low Chord El.</i>	<i>Existing 100 YR WSE</i>
5	49'	295'	14,455 sf	617.0'	619.66'

**COMMENTS:**

Based on the construction of this bridge, the deck cannot be raised to provide clearance of the floodway. The bridge would need to be demolished and replaced. This would require removal of the bridge deck, girders, bents and abutment walls. This bridge has a number of utilities that are supported from below the deck that would have to be relocated.

In addition to the bridge replacement, the adjacent roadway would require modification. Directly adjacent to the south end of the bridge there are business drives that would require modification to accommodate raising the bridge.



## FDMA Phase II Bridge Assessment

**BRIDGE LOCATION:** Furnish St.

General View:



### **DESCRIPTION:**

#### ***Type of Construction:***

Cast-in-place slab that spans from bent to bent. The bents consist of concrete columns infilled with concrete wall.

<b><i>No. of Spans</i></b>	<b><i>Width</i></b>	<b><i>Length</i></b>	<b><i>Total Deck Area</i></b>	<b><i>Low Chord El.</i></b>	<b><i>Existing 100 YR WSE</i></b>
8	41'	211'	8,651 sf	619.29'	624.64'

### **COMMENTS:**

Based on the construction of this bridge, the deck cannot be raised to provide clearance of the floodway. The bridge would need to be demolished and replaced. This would require removal of the bridge deck, bents and abutment walls.

In addition to the bridge replacement, the adjacent roadway would require modification. On the west side of the creek there is a concrete retaining wall approximately 25' to 30' tall that runs north and south of the bridge. This wall would require extensive modification, especially to the south, to accommodate the raised bridge and street elevation on San Marcos street which intersects Furnish street on the west side of the bridge.

This bridge crosses under I-35 and raising the bridge deck could potentially cause clearance problems with the existing I-35 bridge.

## FDMA Phase II Bridge Assessment

**BRIDGE LOCATION:** W. Cevallos St.

General View:



### **DESCRIPTION:**

#### ***Type of Construction:***

Cast-in-place concrete deck with steel I-beam girders. Each bent consists of 5 columns with a rectangular concrete cap.

<b><i>No. of Spans</i></b>	<b><i>Width</i></b>	<b><i>Length</i></b>	<b><i>Total Deck Area</i></b>	<b><i>Low Chord El.</i></b>	<b><i>Existing 100 YR WSE</i></b>
2	51'	97'	4,947 sf	626.62'	629.44'

### **COMMENTS:**

Based on the construction of this bridge, the deck cannot be raised to provide clearance of the floodway. The bridge would need to be demolished and replaced. This would require removal of the bridge deck, girders, bents and abutment walls. This bridge has utilities that are supported from below the deck that would have to be relocated.

In addition to the bridge replacement, the adjacent roadway would require modification. Approximately 5' to 10' from the bridge on the southwest and northeast corners there are business drives that would require modification to accommodate raising the bridge and adjacent roadway.

## FDMA Phase II Bridge Assessment

**BRIDGE LOCATION:** S. Alamo St.

General View:



### **DESCRIPTION:**

#### ***Type of Construction:***

Cast-in-place slab that spans from bent to bent. Each bent consists of 5 columns with a rectangular cap.

<b><i>No. of Spans</i></b>	<b><i>Width</i></b>	<b><i>Length</i></b>	<b><i>Total Deck Area</i></b>	<b><i>Low Chord El.</i></b>	<b><i>Existing 100 YR WSE</i></b>
3	56'	83'	4,648 sf	631.97'	632.45'

### **COMMENTS:**

Based on the construction of this bridge, the deck cannot be raised to provide clearance of the floodway. The bridge would need to be demolished and replaced. This would require removal of the bridge deck, bents and abutment walls.

In addition to the bridge replacement, the adjacent roadway would require modification. Approximately 20' from the end of the bridge on the southwest corner there is a business drive that would require modification to accommodate raising the bridge and adjacent roadway.



## FDMA Phase II Bridge Assessment

**BRIDGE LOCATION:** Camp St.

General View:



### **DESCRIPTION:**

#### ***Type of Construction:***

Cast-in-place slab that spans from bent to bent. Each bent consists of a cast-in-place concrete wall.

<b><i>No. of Spans</i></b>	<b><i>Width</i></b>	<b><i>Length</i></b>	<b><i>Total Deck Area</i></b>	<b><i>Low Chord El.</i></b>	<b><i>Existing 100 YR WSE</i></b>
3	57'	33'	1,881 sf	633.37'	629.92'

### **COMMENTS:**

Based on the construction of this bridge, the deck cannot be raised to provide clearance of the floodway. The bridge would need to be demolished and replaced. This would require removal of the bridge deck, bents and abutment walls.

In addition to the bridge replacement, the adjacent roadway would require modification. Approximately 50' from the end of the bridge on the southwest corner there is a United States Post Office Facility drive that would require modification to accommodate raising the bridge and adjacent roadway. The concrete channel walls on the north side of the bridge would also require modification to accommodate the construction of new abutments.

## FDMA Phase II Bridge Assessment

**BRIDGE LOCATION:** Guadalupe St.

General View:



### **DESCRIPTION:**

#### ***Type of Construction:***

Cast-in-place slab that spans from bent to bent. Each bent consists of a cast-in-place concrete wall.

<b><i>No. of Spans</i></b>	<b><i>Width</i></b>	<b><i>Length</i></b>	<b><i>Total Deck Area</i></b>	<b><i>Low Chord El.</i></b>	<b><i>Existing 100 YR WSE</i></b>
3	44'	34'	1,496 sf	631.23'	635.99'

### **COMMENTS:**

Based on the construction of this bridge, the deck cannot be raised to provide clearance of the floodway. The bridge would need to be demolished and replaced. This would require removal of the bridge deck, bents and abutment walls.

In addition to the bridge replacement, the adjacent roadway would require modification. The concrete channel walls on the north and south side of the bridge would also require modification to accommodate the construction of new abutments.

























**HDR Computation**

Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	Cypress to Fred	Checked		Date	
Task	SPC 01 Channel Modifications	Sheet	1	Of	1

Is underground drainage required?	<input type="text" value="Yes"/>	Improv. Length	<input type="text" value="984"/>
		Avg. Depth	<input type="text" value="11"/>
Will the project change the floodplain?	<input type="text" value="Yes"/>	Bottom Width	<input type="text" value="60"/>

Item	Description	Unit	Quantity	Unit Cost	Extension
	Mobilization	LS		11%	\$103,095
	Insurance & Bonds	LS		3%	\$28,117
	Preparing Right-of-Way	LS		4%	\$37,489
	Dewatering/Care of Water	LS		12%	\$112,468
	Erosion/Sedimentation Controls	LS	1	\$35,000.00	\$35,000
	General Excavation	CY	16966	\$8.00	\$135,728
	Structural Backfill	CY	1697	\$2.85	\$4,835
	Extend Existing Drainage Structure with Splash Pad	EA	1	\$8,000.00	\$8,000
	Flap Gate	EA	1	\$8,000.00	\$8,000
	Gabions 6" Deep	SY	0	\$35.00	\$0
	Gabions 9" Deep	SY		\$45.00	\$0
	Gabions 12" Deep	SY		\$50.00	\$0
	Gabions 18" Deep	SY		\$65.00	\$0
	Gabions 36" Deep	SY		\$115.00	\$0
	Cantilever Retaining Wall - 20' High 500lb/lf Surcharge	LF	0	\$950.00	\$0
	Cantilever Retaining Wall - 12' High 33 deg slope	LF	0	\$400.00	\$0
	Stone Gabions- 12' High 33 deg slope	LF	2000	\$350.00	\$700,000
	Segmental Retaining Wall - 8x18x20 Straight Wall	SF Face	0	\$20.00	\$0
	Segmental Retaining Wall - Base	LF	0	\$45.00	\$0
	RSP / Pilot Channel	LF	0	\$19.00	\$0
	Topsoil	CY	0	\$10.00	\$0
	Hydromulching	SY	0	\$0.64	\$0
	Concrete Rip-Rap - 6"	SY	0	\$40.00	\$0
	Gravel Access Road (with Geotextile)	SY	0	\$5.75	\$0
	Chainlink Fencing - 6 FT	LF	0	\$12.00	\$0
	Chainlink Fencing - 10 FT	LF	0	\$75.00	\$0
	Landscaping/Tree Protection/Tree	LS	1	\$25,000.00	\$25,000
	Concrete Ramp	SY	0	\$29.50	\$0
	Ramp Guardrail - Metal Rail	LF	0	\$19.13	\$0
	Ramp Guardrail - Wood Posts	EA	0	\$39.00	\$0
	Dewatering System - Gravel	CY	468	\$11.90	\$5,573
	Dewatering System - PVC Pipe	LF	0	\$10.25	\$0
	Dewatering System - Geotextile	SY	4193	\$3.60	\$15,095
	Streets - 30'	LF		\$265.00	\$0
					\$0
					\$0
<b>CHANNEL IMPROVEMENTS SUBTOTAL</b>					<b>\$1,218,401.17</b>

Miscellaneous Costs 40% of Drainage Cost Subtotal \$487,360

**TOTAL COST** \$1,705,761.64

Planning Period, years 50

Discount Rate 5.625

**Annualized PV Cost** \$ **102,599**





Job No.

No.

**HDR Computation****HDR**

Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	Camp to Guadalupe	Checked		Date	
Task	SPC 04 Channel Modifications	Sheet	2	Of	1

Is underground drainage required?	<input type="text" value="Yes"/>	Improv. Length	<input type="text" value="1182"/>
		Avg. Depth	<input type="text" value="16"/>
Will the project change the floodplain?	<input type="text" value="Yes"/>	Bottom Width	<input type="text" value="250"/>

Item	Description	Unit	Quantity	Unit Cost	Extension
	Mobilization	LS		11%	\$293,921
	Insurance & Bonds	LS		3%	\$80,160
	Preparing Right-of-Way	LS		4%	\$106,880
	Dewatering/Care of Water	LS		12%	\$320,641
	Erosion/Sedimentation Controls	LS	1	\$35,000.00	\$35,000
	General Excavation	CY	31242	\$8.00	\$249,936
	Structural Backfill	CY	3124.2	\$2.85	\$8,904
	Extend Existing Drainage Structure with Splash Pad	EA	0	\$8,000.00	\$0
	Flap Gate	EA	0	\$8,000.00	\$0
	Gabions 6" Deep	SY	0	\$35.00	\$0
	Gabions 9" Deep	SY		\$45.00	\$0
	Gabions 12" Deep	SY		\$50.00	\$0
	Gabions 18" Deep	SY		\$65.00	\$0
	Gabions 36" Deep	SY		\$115.00	\$0
	Cantilever Retaining Wall - 20' High 500lb/lf Surcharge	LF	2370	\$950.00	\$2,251,500
	Cantilever Retaining Wall - 10' High 33 deg slope	LF	0	\$200.00	\$0
	Stone Gabions- 12' High 33 deg slope	LF		\$350.00	\$0
	Segmental Retaining Wall - 8x18x20 Straight Wall	SF Face	0	\$20.00	\$0
	Segmental Retaining Wall - Base	LF	0	\$45.00	\$0
	RSP / Pilot Channel	LF	1182	\$19.00	\$22,458
	Topsoil	CY	0	\$10.00	\$0
	Hydromulching	SY	0	\$0.64	\$0
	Concrete Rip-Rap - 6"	SY	0	\$40.00	\$0
	Gravel Access Road (with Geotextile)	SY	0	\$5.75	\$0
	Chainlink Fencing - 6 FT	LF	0	\$12.00	\$0
	Chainlink Fencing - 10 FT	LF	0	\$75.00	\$0
	Landscaping/Tree Protection/Tree	LS	1	\$25,000.00	\$25,000
	Concrete Ramp	SY	400	\$29.50	\$11,800
	Ramp Guardrail - Metal Rail	LF	200	\$19.13	\$3,826
	Ramp Guardrail - Wood Posts	EA	50	\$39.00	\$1,950
	Dewatering System - Gravel	CY	862	\$11.90	\$10,263
	Dewatering System - PVC Pipe	LF	2300	\$10.25	\$23,575
	Dewatering System - Geotextile	SY	7721	\$3.60	\$27,797
	Streets - 30'	LF		\$265.00	\$0
					\$0
					\$0
<b>STREET COST SUBTOTAL</b>					<b>\$3,473,611.27</b>

Miscellaneous Costs 40% of Drainage Cost Subtotal \$1,389,445

**TOTAL COST**

\$4,863,056

Planning Period, years 50  
Discount Rate 5.625

**Annualized PV Cost****\$ 292,505**

Job No.

No.

**HDR Computation****HDR**

Project	Computer	MWJ	Date	7/21/2005
Subject Alamo to Camp	Checked		Date	
Task SPC 04 Channel Modifications	Sheet	2	Of	1

Is underground drainage required?	<input type="text" value="Yes"/>	Improv. Length	<input type="text" value="262"/>
		Avg. Depth	<input type="text" value="13"/>
Will the project change the floodplain?	<input type="text" value="Yes"/>	Bottom Width	<input type="text" value="250"/>

Item	Description	Unit	Quantity	Unit Cost	Extension
	Mobilization	LS		11%	\$81,011
	Insurance & Bonds	LS		3%	\$22,094
	Preparing Right-of-Way	LS		4%	\$29,459
	Dewatering/Care of Water	LS		12%	\$88,376
	Erosion/Sedimentation Controls	LS	1	\$35,000.00	\$35,000
	General Excavation	CY	57477	\$8.00	\$459,816
	Structural Backfill	CY	5747.7	\$2.85	\$16,381
	Extend Existing Drainage Structure with Splash Pad	EA	0	\$8,000.00	\$0
	Flap Gate	EA	0	\$8,000.00	\$0
	Gabions 6" Deep	SY	0	\$35.00	\$0
	Gabions 9" Deep	SY		\$45.00	\$0
	Gabions 12" Deep	SY		\$50.00	\$0
	Gabions 18" Deep	SY		\$65.00	\$0
	Gabions 36" Deep	SY		\$115.00	\$0
	Cantilever Retaining Wall - 20' High 500lb/lf Surcharge	LF	0	\$950.00	\$0
	Cantilever Retaining Wall - 10' High 33 deg slope	LF	550	\$200.00	\$110,000
	Stone Gabions- 12' High 33 deg slope	LF		\$350.00	\$0
	Segmental Retaining Wall - 8x18x20 Straight Wall	SF Face	0	\$20.00	\$0
	Segmental Retaining Wall - Base	LF	0	\$45.00	\$0
	RSP / Pilot Channel	LF	250	\$19.00	\$4,750
	Topsoil	CY	0	\$10.00	\$0
	Hydromulching	SY	0	\$0.64	\$0
	Concrete Rip-Rap - 6"	SY	0	\$40.00	\$0
	Gravel Access Road (with Geotextile)	SY	0	\$5.75	\$0
	Chainlink Fencing - 6 FT	LF	0	\$12.00	\$0
	Chaining Fencing - 10 FT	LF	0	\$75.00	\$0
	Landscaping/Tree Protection/Tree	LS	1	\$25,000.00	\$25,000
	Concrete Ramp	SY	200	\$29.50	\$5,900
	Ramp Guardrail - Metal Rail	LF	30	\$19.13	\$574
	Ramp Guardrail - Wood Posts	EA	100	\$39.00	\$3,900
	Dewatering System - Gravel	CY	1587	\$11.90	\$18,882
	Dewatering System - PVC Pipe	LF	500	\$10.25	\$5,125
	Dewatering System - Geotextile	SY	14205	\$3.60	\$51,138
	Streets - 30'	LF		\$265.00	\$0
					\$0
					\$0
<b>STREET COST SUBTOTAL</b>					<b>\$957,405.29</b>

Miscellaneous Costs 40% of Drainage Cost Subtotal \$382,962

**TOTAL COST**

\$1,340,367

Planning Period, years 50  
Discount Rate 5.625

**Annualized PV Cost****\$ 80,621**



Job No.

No.

**HDR Computation****HDR**

Project	Computer	MWJ	Date	7/21/2005
Subject RR to Alamo	Checked		Date	
Task SPC 05 Channel Modifications	Sheet	2	Of	1

Is underground drainage required?	<input type="text" value="Yes"/>	Improv. Length	<input type="text" value="504"/>
		Avg. Depth	<input type="text" value="16"/>
Will the project change the floodplain?	<input type="text" value="Yes"/>	Bottom Width	<input type="text" value="250"/>

Item	Description	Unit	Quantity	Unit Cost	Extension
	Mobilization	LS		11%	\$174,888
	Insurance & Bonds	LS		3%	\$47,697
	Preparing Right-of-Way	LS		4%	\$63,596
	Dewatering/Care of Water	LS		12%	\$190,787
	Erosion/Sedimentation Controls	LS	1	\$35,000.00	\$35,000
	General Excavation	CY	57477	\$8.00	\$459,816
	Structural Backfill	CY	5747.7	\$2.85	\$16,381
	Extend Existing Drainage Structure with Splash Pad	EA	0	\$8,000.00	\$0
	Flap Gate	EA	0	\$8,000.00	\$0
	Gabions 6" Deep	SY		\$35.00	\$0
	Gabions 9" Deep	SY		\$45.00	\$0
	Gabions 12" Deep	SY		\$50.00	\$0
	Gabions 18" Deep	SY		\$65.00	\$0
	Gabions 36" Deep	SY		\$115.00	\$0
	Cantilever Retaining Wall - 20' High 500lb/lf Surcharge	LF	1000	\$950.00	\$950,000
	Cantilever Retaining Wall - 10' High 33 deg slope	LF		\$350.00	\$0
	Stone Gabions- 12' High 33 deg slope	LF		\$350.00	\$0
	Segmental Retaining Wall - 8x18x20 Straight Wall	SF Face	0	\$20.00	\$0
	Segmental Retaining Wall - Base	LF	0	\$45.00	\$0
	RSP / Pilot Channel	LF	500	\$19.00	\$9,500
	Topsoil	CY	0	\$10.00	\$0
	Hydromulching	SY	0	\$0.64	\$0
	Concrete Rip-Rap - 6"	SY	0	\$40.00	\$0
	Gravel Access Road (with Geotextile)	SY	0	\$5.75	\$0
	Chainlink Fencing - 6 FT	LF	0	\$12.00	\$0
	Chainlink Fencing - 10 FT	LF	0	\$75.00	\$0
	Landscaping/Tree Protection/Tree	LS	1	\$25,000.00	\$25,000
	Concrete Ramp	SY	400	\$29.50	\$11,800
	Ramp Guardrail - Metal Rail	LF	50	\$19.13	\$957
	Ramp Guardrail - Wood Posts	EA	30	\$39.00	\$1,170
	Dewatering System - Gravel	CY	1587	\$11.90	\$18,882
	Dewatering System - PVC Pipe	LF	1000	\$10.25	\$10,250
	Dewatering System - Geotextile	SY	14205	\$3.60	\$51,138
	Streets - 30'	LF		\$265.00	\$0
					\$0
					\$0
<b>STREET COST SUBTOTAL</b>					<b>\$2,066,861.17</b>

Miscellaneous Costs 40% of Drainage Cost Subtotal \$826,744

**TOTAL COST**

\$2,893,606

Planning Period, years 50

Discount Rate 5.625

**Annualized PV Cost****\$ 174,046**

Job No.

No.

**HDR Computation****HDR**

Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	Cevallos to RR	Checked		Date	
Task	SPC 06 Channel Modifications	Sheet	2	Of	1

Is underground drainage required?	<input type="text" value="Yes"/>	Improv. Length	<input type="text" value="579"/>
		Avg. Depth	<input type="text" value="18"/>
Will the project change the floodplain?	<input type="text" value="Yes"/>	Bottom Width	<input type="text" value="250"/>

Item	Description	Unit	Quantity	Unit Cost	Extension
	Mobilization	LS		11%	\$222,414
	Insurance & Bonds	LS		3%	\$60,658
	Preparing Right-of-Way	LS		4%	\$80,878
	Dewatering/Care of Water	LS		12%	\$242,633
	Erosion/Sedimentation Controls	LS	1	\$35,000.00	\$35,000
	General Excavation	CY	78225	\$8.00	\$625,800
	Structural Backfill	CY	7822.5	\$2.85	\$22,294
	Extend Existing Drainage Structure with Splash Pad	EA	1	\$8,000.00	\$8,000
	Flap Gate	EA	1	\$8,000.00	\$8,000
	Gabions 6" Deep	SY		\$35.00	\$0
	Gabions 9" Deep	SY		\$45.00	\$0
	Gabions 12" Deep	SY		\$50.00	\$0
	Gabions 18" Deep	SY		\$65.00	\$0
	Gabions 36" Deep	SY		\$115.00	\$0
	Cantilever Retaining Wall - 20' High 500lb/lf Surcharge	LF	1200	\$950.00	\$1,140,000
	Cantilever Retaining Wall - 10' High 33 deg slope	LF		\$350.00	\$0
	Stone Gabions- 12' High 33 deg slope	LF		\$350.00	\$0
	Segmental Retaining Wall - 8x18x20 Straight Wall	SF Face	0	\$20.00	\$0
	Segmental Retaining Wall - Base	LF	0	\$45.00	\$0
	RSP / Pilot Channel	LF	1800	\$19.00	\$34,200
	Topsoil	CY	0	\$10.00	\$0
	Hydromulching	SY	0	\$0.64	\$0
	Concrete Rip-Rap - 6"	SY	0	\$40.00	\$0
	Gravel Access Road (with Geotextile)	SY	0	\$5.75	\$0
	Chainlink Fencing - 6 FT	LF	0	\$12.00	\$0
	Chainlink Fencing - 10 FT	LF	0	\$75.00	\$0
	Landscaping/Tree Protection/Tree	LS	1	\$25,000.00	\$25,000
	Concrete Ramp	SY	400	\$29.50	\$11,800
	Ramp Guardrail - Metal Rail	LF	100	\$19.13	\$1,913
	Ramp Guardrail - Wood Posts	EA	60	\$39.00	\$2,340
	Dewatering System - Gravel	CY	2159	\$11.90	\$25,697
	Dewatering System - PVC Pipe	LF	1200	\$10.25	\$12,300
	Dewatering System - Geotextile	SY	19333	\$3.60	\$69,598
	Streets - 30'	LF		\$265.00	\$0
					\$0
					\$0
<b>STREET COST SUBTOTAL</b>					<b>\$2,628,525.33</b>

Miscellaneous Costs 40% of Drainage Cost Subtotal \$1,051,410

**TOTAL COST****\$3,679,935**

Planning Period, years 50

Discount Rate 5.625

**Annualized PV Cost****\$ 221,342**













**HDR Computation**

Project	Computer	MWJ	Date	7/21/2005
Subject	Checked	Date		
Task	SPC 12 Channel Modifications	Sheet	2	Of 1

Is underground drainage required?	<input type="text" value="Yes"/>	Improv. Length	<input type="text" value="1800"/>
		Avg. Depth	<input type="text" value="26"/>
Will the project change the floodplain?	<input type="text" value="Yes"/>	Bottom Width	<input type="text" value="250"/>

Item	Description	Unit	Quantity	Unit Cost	Extension
	Mobilization	LS		11%	\$504,420
	Insurance & Bonds	LS		3%	\$137,569
	Preparing Right-of-Way	LS		4%	\$183,425
	Dewatering/Care of Water	LS		12%	\$550,276
	Erosion/Sedimentation Controls	LS	1	\$35,000.00	\$35,000
	General Excavation	CY	245112	\$8.00	\$1,960,896
	Structural Backfill	CY	24511.2	\$2.85	\$69,857
	Extend Existing Drainage Structure with Splash Pad	EA	4	\$8,000.00	\$32,000
	Flap Gate	EA	4	\$8,000.00	\$32,000
	Gabions 6" Deep	SY		\$35.00	\$0
	Gabions 9" Deep	SY		\$45.00	\$0
	Gabions 12" Deep	SY		\$50.00	\$0
	Gabions 18" Deep	SY		\$65.00	\$0
	Gabions 36" Deep	SY		\$115.00	\$0
	Cantilever Retaining Wall - 20' High 500lb/lf Surcharge	LF		\$950.00	\$0
	Cantilever Retaining Wall - 10' High 33 deg slope	LF		\$350.00	\$0
	Stone Gabions- 12' High 33 deg slope	LF		\$350.00	\$0
	Segmental Retaining Wall - 8x18x20 Straight Wall	SF Face	93600	\$20.00	\$1,872,000
	Segmental Retaining Wall - Base	LF	3600	\$45.00	\$162,000
	RSP / Pilot Channel	LF	1800	\$19.00	\$34,200
	Topsoil	CY	0	\$10.00	\$0
	Hydromulching	SY	0	\$0.64	\$0
	Concrete Rip-Rap - 6"	SY	0	\$40.00	\$0
	Gravel Access Road (with Geotextile)	SY	0	\$5.75	\$0
	Chainlink Fencing - 6 FT	LF	0	\$12.00	\$0
	Chainlink Fencing - 10 FT	LF	0	\$75.00	\$0
	Landscaping/Tree Protection/Tree	LS	1	\$25,000.00	\$25,000
	Concrete Ramp	SY	400	\$29.50	\$11,800
	Ramp Guardrail - Metal Rail	LF	600	\$19.13	\$11,478
	Ramp Guardrail - Wood Posts	EA	100	\$39.00	\$3,900
	Dewatering System - Gravel	CY	6766	\$11.90	\$80,521
	Dewatering System - PVC Pipe	LF	3600	\$10.25	\$36,900
	Dewatering System - Geotextile	SY	60578	\$3.60	\$218,080
	Streets - 30'	LF		\$265.00	\$0
					\$0
					\$0
<b>STREET COST SUBTOTAL</b>					<b>\$5,961,321.37</b>

Miscellaneous Costs 40% of Drainage Cost Subtotal \$2,384,529

**TOTAL COST \$8,345,850**

Planning Period, years 50

Discount Rate 5.625

**Annualized PV Cost \$ 501,990**

TOTAL COST

**\$8,345,849.92**



**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR03	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_No	Street	Struc Val	Land Val	Notes	Perm. Relocation Value	
SAR118	129 MAGNOLIA DR	50700	19400		\$ 93,290	
SAR121	135 MAGNOLIA DR	62300	19400		\$ 109,530	
SAR123	139 MAGNOLIA DR	63000	17300		\$ 108,095	
SAR124	143 MAGNOLIA DR	58700	19400		\$ 104,490	
SAR125	146 MAGNOLIA DR	64100	21500		\$ 114,465	
SAR126	147 MAGNOLIA DR	84800	20300		\$ 142,065	
SAR127	150 MAGNOLIA DR	64000	17300		\$ 109,495	
SAR129	157 MAGNOLIA DR	90200	23700		\$ 153,535	
SAR172	607 RIVER RD	101000	14200		\$ 157,730	
SAR173	615 RIVER RD	137800	23900		\$ 220,405	
SAR155	715 RIVER RD	71900	13100		\$ 115,725	
SAR107	834 MAGNOLIA AV E	71100	18400		\$ 120,700	
SAR108	838 MAGNOLIA AV E	41900	18400		\$ 79,820	
SAR109	841 MAGNOLIA AV E	66100	18300		\$ 113,585	
SAR110	842 MAGNOLIA AV E	30800	18400		\$ 64,280	
SAR111	845 MAGNOLIA AV E	72700	19600		\$ 124,320	
SAR112	846 MAGNOLIA AV E	70600	18400		\$ 120,000	
SAR113	850 MAGNOLIA AV E	47800	23700		\$ 94,175	
SAR114	853 MAGNOLIA AV E	51900	39400		\$ 117,970	
SAR115	857 MAGNOLIA AV E	122700	20100		\$ 194,895	
Number of Structures		20				
					<b>Total</b>	<b>\$ 2,458,570</b>
					<b>Annualized PV Cost</b>	<b>\$ 147,879</b>

Struc_No	Street	Struc Val	Land Val	Notes	Perm. Relocation Value
SAR118	129 MAGNOLIA DR	50700	19400		\$ 93,290
SAR121	135 MAGNOLIA DR	62300	19400		\$ 109,530
SAR123	139 MAGNOLIA DR	63000	17300		\$ 108,095
SAR124	143 MAGNOLIA DR	58700	19400		\$ 104,490
SAR125	146 MAGNOLIA DR	64100	21500		\$ 114,465
SAR126	147 MAGNOLIA DR	84800	20300		\$ 142,065
SAR127	150 MAGNOLIA DR	64000	17300		\$ 109,495
SAR129	157 MAGNOLIA DR	90200	23700		\$ 153,535
SAR172	607 RIVER RD	101000	14200		\$ 157,730
SAR173	615 RIVER RD	137800	23900		\$ 220,405
SAR155	715 RIVER RD	71900	13100		\$ 115,725
SAR107	834 MAGNOLIA AV E	71100	18400		\$ 120,700
SAR108	838 MAGNOLIA AV E	41900	18400		\$ 79,820
SAR109	841 MAGNOLIA AV E	66100	18300		\$ 113,585
SAR110	842 MAGNOLIA AV E	30800	18400		\$ 64,280
SAR111	845 MAGNOLIA AV E	72700	19600		\$ 124,320
SAR112	846 MAGNOLIA AV E	70600	18400		\$ 120,000
SAR113	850 MAGNOLIA AV E	47800	23700		\$ 94,175
SAR114	853 MAGNOLIA AV E	51900	39400		\$ 117,970
SAR115	857 MAGNOLIA AV E	122700	20100		\$ 194,895
SAR116	121 MAGNOLIA DR	62700	17200		\$ 107,560
SAR117	125 MAGNOLIA DR	114800	17200		\$ 180,500



SAR119	130 MAGNOLIA DR	49600	17200	\$ 89,220
SAR120	134 MAGNOLIA DR	55000	17200	\$ 96,780
SAR122	138 MAGNOLIA DR	51400	17300	\$ 91,855
SAR202	603 RIVER RD	318400	30800	\$ 481,180
SAR128	154 MAGNOLIA DR	150600	16000	\$ 229,240
SAR156	811 RIVER RD	97200	21800	\$ 161,150
SAR157	815 RIVER RD	122100	19800	\$ 193,710
SAR203	833 MAGNOLIA AV E	90800	19600	\$ 149,660

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Number of Structures            30

**Total        \$        4,239,425**

**Annualized PV Cost                                \$        254,995**

Job No.

No.

**HDR Computation**

Project	SARA FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SAR04	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

100-year Perm. Relocation				Perm. Relocation	
Struc_Nam	Street	Struc Val	Land Val	Notes	Value
SAR158	403 RIVER RD	67700	18600		\$ 116,170
Number of Structures		1			

Total \$ 116,170  
Annualized PV Cost \$ 6,987

500-year and 100-year Perm. Relocation				Perm. Relocation	
Struc_Nam	Street	Struc Val	Land Val	Notes	Value
SAR158	403 RIVER RD	67700	18600		\$ 116,170
Number of Structures		1			

Total \$ 116,170  
Annualized PV Cost \$ 6,987

**HDR Computation**

Project	SARA FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SAR05	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

**100-year Perm. Relocation**

Struc_Nam	Street	Struc Val	Land Val	Notes	Perm. Relocation Value
SAR93	307 JOSEPHINE ST E	2724000	700700		\$ 4,619,405
SAR13	875 ASHBY PL E	918700	475000		\$ 1,832,430
Number of Structures		2			
				<b>Total</b>	<b>\$ 6,451,835</b>
				<b>Annualized PV Cost</b>	<b>\$ 388,068</b>

**100-year & 500-year Perm. Relocation**

Struc_Nam	Street	Struc Val	Land Val	Notes	Perm. Relocation Value
SAR93	307 JOSEPHINE ST E	2724000	700700		\$ 4,619,405
SAR13	875 ASHBY PL E	918700	475000		\$ 1,832,430
SAR94	102 JOSEPHINE ST W	172300	118900		\$ 377,955
SAR95	110 JOSEPHINE ST W	195600	115000		\$ 406,090
SAR209	328 JOSEPHINE ST E	68000	97000		\$ 206,750
SAR210	328 JOSEPHINE ST E	84900	60200		\$ 188,090
Number of Structures		6			
				<b>Total</b>	<b>\$ 7,630,720</b>
				<b>Annualized PV Cost</b>	<b>\$ 458,976</b>



**HDR Computation****HDR**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR06	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Narr Street	Struc Val	Land Val	Notes	Buy-out Value		
SAR70	100 GRAYSON ST E	43000	36000		101600	500
SAR77	221 NEWELL AV	114000	144000		325200	500
SAR78	221 NEWELL AV	562000	201000		1017950	500
SAR165	312 PEARL PKWY	2056000	2094000		5286500	500
SAR154	101 NEWELL AV	37300	13400		67630	500
SAR76	102 GRAYSON ST W	77000	17000		127350	500
SAR71	104 GRAYSON ST W	16400	43200		72640	500
SAR72	109 GRAYSON ST W	77000	40000		153800	500
SAR41	1104 ELMIRA ST E	66860	58240		160580	500
SAR58	1106 EUCLID AV E	47000	20000		88800	500
SAR42	1107 ELMIRA ST E	32500	10500		57575	500
SAR59	1107 EUCLID AV E	23000	9000		42550	500
SAR166	1107 QUINCY ST E	44400	10900		74695	500
SAR60	1110 EUCLID AV E	59000	10500		94675	500
SAR43	1111 ELMIRA ST E	38000	6300		60445	500
SAR61	1111 EUCLID AV E	27000	9000		48150	500
SAR167	1111 QUINCY ST E	28900	12100		54375	500
SAR44	1115 ELMIRA ST E	37900	6300		60305	500
SAR62	1115 EUCLID AV E	45000	10000		74500	500
SAR168	1115 QUINCY ST E	20000	10500		40075	500
SAR63	1118 EUCLID AV E	156000	152000		393200	500
SAR45	1119 ELMIRA ST E	41500	10500		70175	500
SAR169	1119 QUINCY ST E	0	8500		9775	500
SAR46	1123 ELMIRA ST E	37000	6300		59045	500
SAR47	1126 ELMIRA ST E	47000	34000		104900	500
SAR48	1126 ELMIRA ST E	46000	72000		147200	500
SAR170	1126 QUINCY ST E	7900	107100		134225	500
SAR49	1127 ELMIRA ST E	40000	10000		67500	500
SAR73	119 GRAYSON ST W	38000	30000		87700	500
SAR50	1200 ELMIRA ST E	21200	67000		106730	500
SAR51	1200 ELMIRA ST E	75000	80000		197000	500
SAR52	1201 ELMIRA ST E	49000	61000		138750	500
SAR53	1209 ELMIRA ST E	24400	46300		87405	500
SAR54	1210 ELMIRA ST E	4100	96000		116140	500
SAR64	1212 EUCLID AV E	93000	76000		217600	500
SAR171	1213 QUINCY ST E	211000	186800		510220	500
SAR65	1216 EUCLID AV E	33600	50000		104540	500
SAR66	1223 EUCLID AV E	131000	60000		252400	500
SAR74	125 GRAYSON ST W	119300	56600		232110	500
SAR75	126 GRAYSON ST W	738045	73566		1117864	500
SAR68	127 GRAYSON ST E	51000	76000		158800	500
SAR55	1301 ELMIRA ST E	21600	27400		61750	500
SAR67	1302 EUCLID AV E	35600	55000		113090	500
SAR56	1311 ELMIRA ST E	9400	23500		40185	500
SAR69	135 GRAYSON ST E	993000	86000		1489100	500
SAR57	1366 ELMIRA ST E	47000	128000		213000	500
SAR79	226 NEWELL AV	80000	210000		353500	500
SAR132	725 MYRTLE ST E	40500	12000		70500	500

SAR159	727 PARK AV E	27700	8600	48670	500
SAR133	731 MYRTLE ST E	36900	10400	63620	500
SAR160	733 PARK AV E	33800	9500	58245	500
SAR134	735 MYRTLE ST E	36600	12000	65040	500
SAR135	736 MYRTLE ST E	45000	10800	75420	500
SAR161	737 PARK AV E	50500	9900	82085	500
SAR136	740 MYRTLE ST E	46300	9700	75975	500
SAR137	741 MYRTLE ST E	49400	10400	81120	500
SAR98	742 LOCUST ST E	40000	12000	69800	500
SAR138	745 MYRTLE ST E	25400	10400	47520	500
SAR139	746 MYRTLE ST E	46400	10300	76805	500
SAR99	747 LOCUST ST E	94000	80000	223600	500
SAR100	748 LOCUST ST E	55600	12000	91640	500
SAR101	751 LOCUST ST E	19300	76600	115110	500
SAR140	751 MYRTLE ST E	49700	10400	81540	500
SAR141	752 MYRTLE ST E	52500	10300	85345	500
SAR142	755 MYRTLE ST E	44700	10400	74540	500
SAR102	756 LOCUST ST E	39300	10400	66980	500
SAR143	756 MYRTLE ST E	30800	10400	55080	500
SAR144	759 MYRTLE ST E	49100	10400	80700	500
SAR103	760 LOCUST ST E	42300	10400	71180	500
SAR145	760 MYRTLE ST E	36000	34900	90535	500
SAR146	767 MYRTLE ST E	78500	7300	118295	500
SAR147	771 MYRTLE ST E	33700	10100	58795	500
SAR104	774 LOCUST ST E	49500	46000	122200	500
SAR162	811 PARK AV E	37700	11300	65775	500
SAR163	815 PARK AV E	12100	11300	29935	500
SAR105	818 LOCUST ST E	15000	75000	107250	500
SAR148	823 MYRTLE ST E	47000	45000	117550	500
SAR106	825 LOCUST ST E	61500	127100	232265	500
SAR164	923 PARK AV E	30600	93200	150020	500

Number of Structures 79

<b>100-year Perm. Relocation Total</b>	<b>\$</b>	<b>6,731,250</b>
<b>Annualized PV Cost</b>	<b>\$</b>	<b>404,874</b>
<b>100-year &amp; 500-year Perm. Relocation Total</b>	<b>\$</b>	<b>17,446,434</b>
<b>Annualized PV Cost</b>	<b>\$</b>	<b>1,049,375</b>

**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR07	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Narr Street	Struc Val	Land Val	Notes	Buy-out Value		
SAR21	1120 AVENUE B	8300	19500	34045	100	500
SAR22	1123 AVENUE B	3700	238000	278880	100	500
SAR34	1201 BROADWAY	9348000	464000	13620800	100	500
SAR23	1203 AVENUE B	11200	32500	53055	100	500
SAR174	200 ROY SMITH	8400	12200	25790	100	500
SAR01	201 AVENUE A	100	255700	294195	100	500
SAR02	202 AVENUE A	1401860	130700	2112909	100	500
SAR175	204 ROY SMITH	8700	12200	26210	100	500
SAR03	210 AVENUE A	200	16300	19025	100	500
SAR04	301 AVENUE A	29100	46600	94330	100	500
SAR06	10 10TH ST	710775	189927	1213501		500
SAR31	1001 AVENUE B	29100	16000	59140		500
SAR14	1005 AVENUE B	27500	16600	57590		500
SAR15	1011 AVENUE B	27600	12700	53245		500
SAR16	1013 AVENUE B	25500	16700	54905		500
SAR17	1015 AVENUE B	38400	17800	74230		500
SAR18	1021 AVENUE B	205000	29700	321155		500
SAR19	1033 AVENUE B	86000	29000	153750		500
SAR20	1102 AVENUE B	303000	142000	587500		500
SAR32	1121 BROADWAY	26000	17000	55950		500
SAR33	1133 BROADWAY	104000	146000	313500		500
SAR07	120 9TH ST	140300	34380	235957		500
SAR08	135 9TH ST	108000	12980	166127		500
SAR09	142 9TH ST	42700	14700	76685		500
SAR26	815 AVENUE B	582000	461000	1344950		500
SAR27	905 AVENUE B	43000	54000	122300		500
SAR28	925 AVENUE B	60000	85000	181750		500
SAR29	929 AVENUE B	1700	26200	32510		500
SAR30	930 AVENUE B	629000	66000	956500		500
Number of Structures	29					

<b>100-year Perm. Relocation Total</b>	<b>\$ 16,559,239</b>
<b>Annualized PV Cost</b>	<b>\$ 996,012</b>
<b>100-year &amp; 500-year Perm. Relocation Total</b>	<b>\$ 22,620,484</b>
<b>Annualized PV Cost</b>	<b>\$ 1,360,586</b>



**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR08	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Nam	Street	Struc Val	Land Val	Notes	Buy-out Value		
SAR211	230 JONES AV W	11826200	1812792		18641391	100	500
SAR35	1119 CAMDEN ST	17000	196000		249200		500
SAR36	1203 CAMDEN ST	50000	78200		159930		500
SAR195	1603 ST MARYS ST N	38000	110000	no info in BCAD	179700		500
SAR196	1610 ST MARYS ST N	500	176000	no info in BCAD	203100		500
SAR197	1614 ST MARYS ST N	860510	357100	no info in BCAD	1615379		500
Number of Structures		6					

<b>100-year Perm. Relocation Total</b>	<b>\$ 18,641,391</b>
<b>Annualized PV Cost</b>	<b>\$ 1,121,250</b>
<b>100-year &amp; 500-year Perm. Relocation Total</b>	<b>\$ 21,048,700</b>
<b>Annualized PV Cost</b>	<b>\$ 1,266,046</b>

**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR09	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Name	Street	Struc Val	Land Val	Notes	Buy-out Value		
SAR187	1322 ST MARYS ST N	239600	415600		813,380	100	500
SAR188	1403 ST MARYS ST N	4021560	3575357		9,741,845	100	500
SAR189	1408 ST MARYS ST N	0	133000		152,950	100	500
SAR190	1430 ST MARYS ST N	8969400	139978		12,718,135	100	500
SAR191	1507 ST MARYS ST N	64600	54800		153,460	100	500
SAR192	1511 ST MARYS ST N	23300	51400		91,730	100	500
SAR10	207 ARDEN GROVE	139900	144000		361,460	100	500
SAR11	217 ARDEN GROVE	70600	56700		164,045	100	500
SAR86	307 JONES AV W	1010600	69889		1,495,212	100	500
SAR87	315 JONES AV W	780000	192743		1,313,654	100	500
SAR12	317 ARDEN GROVE	1529600	667390		2,908,939	100	500
SAR88	317 JONES AV W	109800	125300		297,815	100	500
SAR90	325 JONES AV W	20400	47400		83,070	100	500
SAR92	405 JONES AV W	61200	98200		198,610	100	500
SAR37	915 DALLAS ST	64000	64000		163,200	100	500
SAR38	920 DALLAS ST	14000	97000		131,150	100	500
SAR39	922 DALLAS ST	13200	39700		64,135	100	500
SAR176	1010 ST MARYS ST N	2665000	266500		4,037,475		500
SAR184	1027 ST MARYS ST N	94000	176000		334,000		500
SAR96	110 LEXINGTON AV	5859000	777000		9,096,150		500
SAR185	1201 ST MARYS ST N	77900	56900		174,495		500
SAR186	1215 ST MARYS ST N	4724640	2230272		9,179,309		500
SAR193	1515 ST MARYS ST N	52000	88200		174,230		500
SAR194	1518 ST MARYS ST N	60500	126500		230,175		500
SAR83	207 JONES AV W	4109000	359520		6,166,048		500
SAR82	210 JONES AV E	100000	113000		269,950		500
SAR89	321 JONES AV W	21600	40600		76,930		500
SAR91	326 JONES AV W	12872115	1532534		19,783,375		500
Number of Structures		28					

100-year Perm. Relocation Total	\$	30,852,790
Annualized PV Cost	\$	1,855,746
100-year & 500-year Perm. Relocation To	\$	80,374,926
Annualized PV Cost	\$	4,834,424

**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR10	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Name	Street	Struc Val	Land Val	Notes	Buy-out Value	
SAR24	115 AUDITORIUM CIRC	1054620	154663		1,654,330	500
SAR25	123 AUDITORIUM CIRC	92000	112000		257,600	500
SAR97	110 LEXINGTON AV	616000	104000		982,000	500
SAR131	530 MC CULLOUGH AV	21176000	1323900		31,168,885	500
Number of Structures		4				

<b>100-year Perm. Relocation Total</b>	\$	-
<b>Annualized PV Cost</b>	\$	-
<b>100-year &amp; 500-year Perm. Relocation To</b>	\$	<b>34,062,815</b>
<b>Annualized PV Cost</b>	\$	<b>2,048,824</b>



**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR11	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Name	Street	Struc Val	Land Val	Notes	Buy-out Value	
SAR149	1015 NAVARRO ST	802700	247300		1,408,175	500
SAR151	927 NAVARRO ST	214000	182700		509,705	500
SAR152	1012 NAVARRO ST	50200	145800		237,950	500
Number of Structures		3				

<b>100-year Perm. Relocation Total</b>	\$	-
<b>Annualized PV Cost</b>	\$	-

<b>100-year &amp; 500-year Perm. Relocation To</b>	\$	2,155,830
<b>Annualized PV Cost</b>	\$	129,670

**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR12	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Name	Street	Struc Val	Land Val	Notes	Buy-out Value	
SAR150	1022 NAVARRO ST	3392000	221229		5,003,213	500
SAR198	700 ST MARYS ST N	711300	303700		1,345,075	500
SAR199	701 ST MARYS ST N	3700000	1706005		7,141,906	500
SAR200	720 ST MARYS ST N	281000	156000		572,800	500
SAR201	904 ST MARYS ST N	522000	262500		1,032,675	500
Number of Structures		5				

<b>100-year Perm. Relocation Total</b>	\$	-
<b>Annualized PV Cost</b>	\$	-
<b>100-year &amp; 500-year Perm. Relocation To</b>	\$	15,095,669
<b>Annualized PV Cost</b>	\$	907,981

**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR13	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Name	Street	Struc Val	Land Val	Notes	Buy-out Value	
SAR130	120 MARTIN ST E	100	277900		319,725	500
SAR181	454 SOLEDAD ST	525000	250000		1,022,500	500
Number of Structures		2				

<b>100-year Perm. Relocation Total</b>	\$	-
<b>Annualized PV Cost</b>	\$	-
<b>100-year &amp; 500-year Perm. Relocation To</b>	\$	1,342,225
<b>Annualized PV Cost</b>	\$	80,733



**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR14	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Name	Street	Struc Val	Land Val	Notes	Buy-out Value	
SAR80	175 HOUSTON ST E	17055000	9944000		35,312,600	500
Number of Structures		1				

<b>100-year Perm. Relocation Total</b>	\$	-
<b>Annualized PV Cost</b>	\$	-
<b>100-year &amp; 500-year Perm. Relocation To</b>	\$	35,312,600
<b>Annualized PV Cost</b>	\$	2,123,997

**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR15	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Name	Street	Struc Val	Land Val	Notes	Buy-out Value	
SAR81	140 HOUSTON ST E	197000	845000		1,247,550	500
SAR177	110 SOLEDAD ST	100	319000		366,990	500
SAR178	112 SOLEDAD ST	35100	395000		503,390	500
SAR179	114 SOLEDAD ST	56700	2794000		3,292,480	500
SAR180	130 SOLEDAD ST	66000	934000		1,166,500	500
SAR182	100 SOLEDAD ST	53000	1298000		1,566,900	500
SAR183	108 SOLEDAD ST	101700	273000		456,330	500
Number of Structures		7				

<b>100-year Perm. Relocation Total</b>	\$	-
<b>Annualized PV Cost</b>	\$	-
<b>100-year &amp; 500-year Perm. Relocation To</b>	\$	<b>8,600,140</b>
<b>Annualized PV Cost</b>	\$	<b>517,285</b>

Job No.

No.

**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR16	Checked		Date	
Task	Real Estate Cost Estimate - Buy Out	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Name	Street	Struc Val	Land Val	Notes	Buy-out Value	
SAR206	100 GUENTHER ST E	145260	62675		275,440	500
Number of Structures		1				

<b>100-year Perm. Relocation Total</b>	\$	-
<b>Annualized PV Cost</b>	\$	-
<b>100-year &amp; 500-year Perm. Relocation To</b>	\$	275,440
<b>Annualized PV Cost</b>	\$	16,567



Job No.

No.

**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR17	Checked		Date	
Task	Real Estate Cost Estimate - Buy Out	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Name	Street	Struc Val	Land Val	Notes	Perm. Relocation Value	
SAR207	129 GUENTHER ST E	5095000	190500		7,352,075	500
Number of Structures		1				

<b>100-year Perm. Relocation Total</b>	\$	-
<b>Annualized PV Cost</b>	\$	-
<b>100-year &amp; 500-year Perm. Relocation To</b>	\$	7,352,075
<b>Annualized PV Cost</b>	\$	442,216

Job No.

No.

**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR19	Checked		Date	
Task	Permanent Relocation Costs	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

Struc_Name	Street	Struc Val	Land Val	Notes	Value		
SAR208	409 GUENTHER ST E	336000	75146		556,818	100	500
Number of Structures		1					

<b>100-year Perm. Relocation Total</b>	\$	<b>556,818</b>
<b>Annualized PV Cost</b>	\$	<b>33,492</b>
<b>100-year &amp; 500-year Perm. Relocation Total</b>	\$	<b>556,818</b>
<b>Annualized PV Cost</b>	\$	<b>33,492</b>

Job No.

No.

**HDR Computation**

Project	SARA FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SAR20	Checked		Date	
Task	Permanent Relocation Costs	Sheet	1	Of	1

Planning Period, years 50  
Discount Rate 5.625

Struc_Name	Street	Struc Val	Land Val	Notes	Perm. Relocation Value	
SAR204	354 BLUE STAR ST	66000	109000		217,750	500
SAR205	401 BLUE STAR ST	57000	277000		398,350	500
Number of Structures		2				

<b>100-year Perm. Relocation Total</b>	\$	-
<b>Annualized PV Cost</b>	\$	-
<b>100-year &amp; 500-year Perm. Relocation Total</b>	\$	<b>616,100</b>
<b>Annualized PV Cost</b>	\$	<b>37,057</b>















































**HDR Computation**

Project		Computer	MWJ	Date	7/21/2005
Subject	SPC 01	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1

100-year Structures      Planning Period, years      50  
Discount Rate      5.625

**Perm. Relocation**

Struc_Name	Street	Struc Val	Land Val	Notes	Value
SPC3	1037 POPLAR ST W	\$ 17,100	\$ 6,800		\$ 31,760
SPC4	114 LOMBRANO ST	\$ 31,000	\$ 46,400		\$ 96,760
SPC11	1411 FLORES ST N	\$ 25,400	\$ 14,300		\$ 52,005
SPC12	1415 FLORES ST N	\$ 54,100	\$ 69,100		\$ 155,205
SPC13	1419 FLORES ST N	\$ 21,400	\$ 7,100		\$ 38,125
SPC14	1423 FLORES ST N	\$ 49,100	\$ 137,800		\$ 227,210
SPC15	1430 FLORES ST N	\$ 248,100	\$ 122,300		\$ 487,985
SPC16	1436 FLORES ST N	\$ 210,200	\$ 109,800		\$ 420,550
SPC18	1450 FLORES ST N	\$ 112,300	\$ 66,800		\$ 234,040
SPC19	1506 CAMARON ST	\$ 17,900	\$ 15,400		\$ 42,770
SPC20	1510 CAMARON ST	\$ 26,300	\$ 8,700		\$ 46,825
SPC21	1514 CAMARON ST	\$ 34,700	\$ 9,100		\$ 59,045
SPC23	1608 FLORES ST N	\$ 177,000	\$ 71,400		\$ 329,910
SPC24	1603 LAREDO ST N	\$ 106,200	\$ 59,300		\$ 216,875
SPC25	1615 LAREDO ST N	\$ 48,300	\$ 41,200		\$ 115,000
SPC26	1625 LAREDO ST N	\$ 12,800	\$ 16,800		\$ 37,240
SPC27	1631 LAREDO ST N	\$ 8,400	\$ 14,200		\$ 28,090
SPC28	1701 LAREDO ST N	\$ 67,100	\$ 164,900		\$ 283,575
SPC29	1720 FLORES ST N	\$ 1,642,545	\$ 510,762		\$ 2,886,939
SPC30	203 FREDERICKSBURG RD	\$ 109,200	\$ 86,800		\$ 252,700
SPC31	610 CROFT TRACE LN	\$ 20,500	\$ 7,400		\$ 37,210
SPC32	618 CROFT TRACE LN	\$ 19,500	\$ 7,400		\$ 35,810
SPC44	830 CYPRESS ST W	\$ 17,300	\$ 6,700		\$ 31,925
SPC45	833 CYPRESS ST W	\$ 15,100	\$ 6,700		\$ 28,845
SPC47	904 LAUREL ST W	\$ 97,300	\$ 51,000		\$ 194,870

Number of Structures      25

	<b>Total</b>	<b>\$</b>	<b>6,371,269</b>
<b>Annualized PV Cost</b>		<b>\$</b>	<b>383,222</b>

**HDR Computation**

Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SPC 01	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1

**500-yr & 100-year Structures**

Struc_Name	Street	ZIP	Struc Val	Land Val	Notes	Perm. Relocation Value
SPC3	1037 POPLAR ST W		17100	6800		\$ 31,760
SPC4	114 LOMBRANO ST		31000	46400		\$ 96,760
SPC11	1411 FLORES ST N		25400	14300		\$ 52,005
SPC12	1415 FLORES ST N		54100	69100		\$ 155,205
SPC13	1419 FLORES ST N		21400	7100		\$ 38,125
SPC14	1423 FLORES ST N		49100	137800		\$ 227,210
SPC15	1430 FLORES ST N		248100	122300		\$ 487,985
SPC16	1436 FLORES ST N		210200	109800		\$ 420,550
SPC18	1450 FLORES ST N		112300	66800		\$ 234,040
SPC19	1506 CAMARON ST		17900	15400		\$ 42,770
SPC20	1510 CAMARON ST		26300	8700		\$ 46,825
SPC21	1514 CAMARON ST		34700	9100		\$ 59,045
SPC23	1608 FLORES ST N		177000	71400		\$ 329,910
SPC24	1603 LAREDO ST N		106200	59300		\$ 216,875
SPC25	1615 LAREDO ST N		48300	41200		\$ 115,000
SPC26	1625 LAREDO ST N		12800	16800		\$ 37,240
SPC27	1631 LAREDO ST N		8400	14200		\$ 28,090
SPC28	1701 LAREDO ST N		67100	164900		\$ 283,575
SPC29	1720 FLORES ST N		1642545	510762		\$ 2,886,939
SPC30	203 FREDERICKSBURG RD		109200	86800		\$ 252,700
SPC31	610 CROFT TRACE LN		20500	7400		\$ 37,210
SPC32	618 CROFT TRACE LN		19500	7400		\$ 35,810
SPC44	830 CYPRESS ST W		17300	6700		\$ 31,925
SPC45	833 CYPRESS ST W		15100	6700		\$ 28,845
SPC47	904 LAUREL ST W		97300	51000		\$ 194,870
SPC1	1025 POPLAR ST W		24500	8800		\$ 44,420
SPC2	1027 POPLAR ST W		30000	8900		\$ 52,235
SPC5	1203 FRIO ST N		985200	107600		\$ 1,503,020
SPC6	1214 FRIO ST N		186400	40400		\$ 307,420
SPC7	1220 POPLAR ST W		145800	39400		\$ 249,430
SPC8	1325 FLORES ST N		879400	152700		\$ 1,406,765
SPC9	1401 FLORES ST N		23900	6500		\$ 40,935
SPC10	1405 FLORES ST N		53900	16100		\$ 93,975
SPC22	1515 LAREDO ST N		70000	80800		\$ 190,920
SPC33	705 LAUREL ST W		849240	48137		\$ 1,244,294
SPC34	807 CYPRESS ST W		2000	6100		\$ 9,815
SPC35	811 CYPRESS ST W		24700	7400		\$ 43,090
SPC36	815 CYPRESS ST W		18900	6700		\$ 34,165
SPC37	816 CYPRESS ST W		27000	6700		\$ 45,505
SPC38	817 CYPRESS ST W		30600	6700		\$ 50,545
SPC39	820 CYPRESS ST W		40700	6700		\$ 64,685
SPC40	821 CYPRESS ST W		32900	6700		\$ 53,765
SPC41	822 CYPRESS ST W		38900	6700		\$ 62,165
SPC42	825 CYPRESS ST W		37300	6700		\$ 59,925
SPC43	829 CYPRESS ST W		18300	6700		\$ 33,325
SPC46	834 CYPRESS ST W		21600	6800		\$ 38,060
SPC48	926 LAUREL ST W		122200	72400		\$ 254,340
Number of Structures			47			

<b>Total</b>	<b>\$</b>	<b>12,254,068</b>
<b>Annualized PV Cost</b>	<b>\$</b>	<b>737,063</b>

Job No.

No.

# HDR Computation



Project		Computer	MWJ	Date	7/21/2005
Subject	SPC 02	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1

<b>100-year Structures</b>	Planning Period, years	50		
	Discount Rate	5.625		
<b>Struc_Name</b>	<b>Street</b>	<b>Struc Val</b>	<b>Land Val</b>	<b>Notes</b>
				<b>Perm. Relocation Value</b>

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Number of Structures	0
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	<b>Total</b>	\$	-
<b>Annualized PV Cost</b>		\$	-



Job No.

No.

**HDR Computation****HDR**

Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SPC 02	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1

**500-yr & 100-year Structures**

Struc_Name	Street	ZIP	Struc Val	Land Val	Notes	Perm. Relocation
						Value
SPC49	124 KINGSBURY ST		35400	10600		\$ 61,750
SPC50	126 KINGSBURY ST		35300	10600		\$ 61,610
SPC52	204 KINGSBURY ST		32200	7800		\$ 54,050
SPC54	327 MARTIN ST W		75300	652800		\$ 856,140
SPC56	526 CAMARON ST		7700	207900		\$ 249,865
Number of Structures			5			

	<b>Total</b>	\$	<b>1,283,415</b>
<b>Annualized PV Cost</b>		\$	<b>77,195</b>

# HDR Computation



Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SPC 03	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1

## 500-yr & 100-year Structures

Struc_Name	Street	ZIP	Struc Val	Land Val	Notes	Perm. Relocation Value
SPC60	233 TRAVIS ST W		18100	119000		\$ 162,190
SPC61	310 COMMERCE ST W		80000	70000		\$ 192,500
SPC62	311 COMMERCE ST W		94200	510900		\$ 719,415
SPC63	319 TRAVIS ST W		3096900	612655		\$ 5,040,213
SPC64	322 COMMERCE ST W		4145580	934008		\$ 6,877,921
SPC65	323 COMMERCE ST W		146600	193400		\$ 427,650
SPC66	331 COMMERCE ST W		29800	180900		\$ 249,755
SPC67	337 COMMERCE ST W		20300	447400		\$ 542,930
SPC68	341 COMMERCE ST W		102900	203100		\$ 377,625
SPC69	401 COMMERCE ST W		488700	811300		\$ 1,617,175
SPC71	500 SANTA ROSA ST N		3269200	1023800		\$ 5,754,250
SPC70	406 COMMERCE ST W		135000	321500		\$ 558,725
SPC72	601 DOLOROSA ST		198300	851700		\$ 1,257,075

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Number of Structures 13

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<b>Total</b>	<b>\$</b>	<b>23,777,424</b>
<b>Annualized PV Cost</b>	<b>\$</b>	<b>1,430,174</b>

**HDR Computation**

Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SPC04	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

100-yr Floodplain				Perm. Relocation	
Struc_Nar	Street	Struc Val	Land Val	Notes	Value
SPC106	931 FLORES ST S	259400	279200		\$ 684,240
SPC105	920 LAREDO ST S	582800	344700		\$ 1,212,325
SPC103	831 FLORES ST S	160000	540000		\$ 845,000
SPC101	815 FLORES ST S	1000	135000		\$ 156,650
SPC98	735 FLORES ST S	66500	142000		\$ 256,400
SPC97	729 FLORES ST S	40600	101300		\$ 173,335
SPC96	719 FLORES ST S	450600	149400		\$ 802,650
SPC93	635 FLORES ST S	179400	216900		\$ 500,595
SPC87	207 CAMP ST	55000	200000		\$ 307,000
SPC86	146 GUADALUPE ST	70000	105000		\$ 218,750
SPC84	130 GUADALUPE ST	23100	379000		\$ 468,190
SPC83	125 GUADALUPE ST	25000	30000		\$ 69,500
SPC82	120 GUADALUPE ST	4900	18100		\$ 27,675
SPC77	111 MERCHANTS ST	14000	28800		\$ 52,720
SPC78	111 MERCHANTS ST	560500	347500		\$ 1,184,325
SPC76	1024 LAREDO ST S	5000	375000		\$ 438,250
SPC74	1003 FLORES ST S	10000	264700		\$ 318,405

Number of Structures 17

Total \$ 7,716,010  
Annualized PV Cost \$ 464,106

100-yr and 500-yr Floodplain				Perm. Relocation	
Struc_Nar	Street	Struc Val	Land Val	Notes	Value
SPC106	931 FLORES ST S	259400	279200		\$ 684,240
SPC105	920 LAREDO ST S	582800	344700		\$ 1,212,325
SPC103	831 FLORES ST S	160000	540000		\$ 845,000
SPC101	815 FLORES ST S	1000	135000		\$ 156,650
SPC98	735 FLORES ST S	66500	142000		\$ 256,400
SPC97	729 FLORES ST S	40600	101300		\$ 173,335
SPC96	719 FLORES ST S	450600	149400		\$ 802,650
SPC93	635 FLORES ST S	179400	216900		\$ 500,595
SPC87	207 CAMP ST	55000	200000		\$ 307,000
SPC86	146 GUADALUPE ST	70000	105000		\$ 218,750
SPC84	130 GUADALUPE ST	23100	379000		\$ 468,190
SPC83	125 GUADALUPE ST	25000	30000		\$ 69,500
SPC82	120 GUADALUPE ST	4900	18100		\$ 27,675
SPC77	111 MERCHANTS ST	14000	28800		\$ 52,720
SPC78	111 MERCHANTS ST	560500	347500		\$ 1,184,325
SPC76	1024 LAREDO ST S	5000	375000		\$ 438,250
SPC74	1003 FLORES ST S	10000	264700		\$ 318,405
SPC104	915 FLORES ST S	23600	48400		\$ 88,700
SPC100	811 FLORES ST S	13500	19500		\$ 41,325
SPC99	743 FLORES ST S	22000	27000		\$ 61,850
SPC95	715 FLORES ST S	47700	38300		\$ 110,825
SPC94	714 SANTA ROSA ST	349300	782300		\$ 1,388,665
SPC92	628 SANTA ROSA S	3927000	1187100		\$ 6,862,965

SPC91	621 FLORES ST S	452400	319600	\$	1,000,900
SPC90	605 FLORES ST S	37000	148800	\$	222,920
SPC89	541 FLORES ST S	43500	139800	\$	221,670
SPC88	537 FLORES ST S	145600	67900	\$	281,925
SPC85	142 CAMP ST	86800	186200	\$	335,650
SPC81	118 GUADALUPE ST	500	8500	\$	10,475
SPC80	1140 LAREDO ST S	3215025	658875	\$	5,258,741
SPC79	1122 LAREDO ST S	821800	228200	\$	1,412,950
SPC73	1002 LAREDO ST S	2291600	274700	\$	3,524,145

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Number of Structures 32

<b>Total</b>	<b>\$</b>	<b>28,539,716</b>
<b>Annualized PV Cost</b>	<b>\$</b>	<b>1,716,619</b>



**HDR Computation**

Project	FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SPC05	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

<b>100-yr Floodplain</b>				<b>Perm. Relocation</b>
<b>Struc_Nar Street</b>	<b>Struc Val</b>	<b>Land Val</b>	<b>Notes</b>	<b>Value</b>
SPC118 127 SHARP ST	2300	4700		\$ 8,625
SPC116 1222 LAREDO ST S	100	63700		\$ 73,395
SPC112 119 TUNSTALL ST	15200	5900		\$ 28,065
SPC111 118 SHARP ST	100	510000		\$ 586,640
SPC110 117 TUNSTALL ST	28500	6200		\$ 47,030
SPC109 115 TUNSTALL ST	21300	6700		\$ 37,525
SPC107 114 TUNSTALL ST	9800	4200		\$ 18,550
SPC108 114 TUNSTALL ST	5000	5700		\$ 13,555

Number of Structures	8
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<b>Total</b>	<b>\$ 813,385</b>
<b>Annualized PV Cost</b>	<b>\$ 48,924</b>

<b>100-yr and 500-yr Floodplain</b>				<b>Perm. Relocation</b>
<b>Struc_Nar Street</b>	<b>Struc Val</b>	<b>Land Val</b>	<b>Notes</b>	<b>Value</b>
SPC118 127 SHARP ST	2300	4700		\$ 8,625
SPC116 1222 LAREDO ST S	100	63700		\$ 73,395
SPC112 119 TUNSTALL ST	15200	5900		\$ 28,065
SPC111 118 SHARP ST	100	510000		\$ 586,640
SPC110 117 TUNSTALL ST	28500	6200		\$ 47,030
SPC109 115 TUNSTALL ST	21300	6700		\$ 37,525
SPC107 114 TUNSTALL ST	9800	4200		\$ 18,550
SPC108 114 TUNSTALL ST	5000	5700		\$ 13,555
SPC122 2030 ALAMO ST S	33200	138100		\$ 205,295
SPC121 2026 ALAMO ST S	50500	116900		\$ 205,135
SPC120 1970 ALAMO ST S	670000	683000		\$ 1,723,450
SPC119 1300 LAREDO ST S	24000	246000		\$ 316,500
SPC117 1232 LAREDO ST S	30900	45500		\$ 95,585
SPC115 1218 LAREDO ST S	73400	7500		\$ 111,385
SPC114 1214 LAREDO ST S	46300	7400		\$ 73,330
SPC113 1210 LAREDO ST S	25900	6900		\$ 44,195

Number of Structures	16
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<b>Total</b>	<b>\$ 3,588,260</b>
<b>Annualized PV Cost</b>	<b>\$ 215,828</b>

**HDR Computation**

Project	FDMA Phase II	Computed	MWJ	Date	7/21/2005
Subject	SPC06	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

100-yr Floodplain				Perm. Relocation	
Struc_Nar	Street	Struc Val	Land Val	Notes	Value
SPC137	527 CEVALLOS ST W	86300	219200		\$ 372,900

Number of Structures	1
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Total	\$ 372,900
Annualized PV Cost	\$ 22,429

100-yr and 500-yr Floodplain				Perm. Relocation	
Struc_Nar	Street	Struc Val	Land Val	Notes	Value
SPC137	527 CEVALLOS ST W	86300	219200		\$ 372,900
SPC123	1310 LAREDO ST S	105100	166900		\$ 339,075
SPC124	1318 LAREDO ST S	84500	141300		\$ 280,795
SPC125	1330 LAREDO ST S	180500	370400		\$ 678,660
SPC126	1500 IH 35 S	1161900	683100		\$ 2,412,225
SPC127	213 STARK ST	21800	8100		\$ 39,835
SPC128	217 STARK ST	21900	7600		\$ 39,400
SPC129	219 REHMANN ST	24300	7400		\$ 42,530
SPC130	316 KELLER ST	41800	6200		\$ 65,650
SPC131	333 CEVALLOS ST W	98400	151600		\$ 312,100
SPC132	334 CEVALLOS ST W	0	8100		\$ 9,315
SPC133	402 CEVALLOS ST W	90900	50900		\$ 185,795
SPC134	419 CEVALLOS ST W	261300	148700		\$ 536,825
SPC135	514 CEVALLOS ST W	107200	281800		\$ 474,150
SPC136	526 CEVALLOS ST W	215000	214300		\$ 547,445

Number of Structures	15
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Total	\$ 6,336,700
Annualized PV Cost	\$ 381,142

**HDR Computation**

Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SPC07	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

100-yr Floodplain				Perm. Relocation	
Struc_Nar	Street	Struc Val	Land Val	Notes	Value
SPC138	1716 SAN MARCOS S	534600	117400		\$ 883,450
SPC139	1731 SAN MARCOS S	952400	579900		\$ 2,000,245

Number of Structures

2

Total \$ 2,883,695

Annualized PV Cost \$ 173,450

**100-yr and 500-yr Floodplain**

Struc_Nar	Street	Struc Val	Land Val	Notes	Perm. Relocation
					Value
SPC138	1716 SAN MARCOS S	534600	117400		\$ 883,450
SPC139	1731 SAN MARCOS S	952400	579900		\$ 2,000,245

Number of Structures

2

Total \$ 2,883,695

Annualized PV Cost \$ 173,450

**HDR Computation**

Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SPC08	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1

Planning Period, years 50  
Discount Rate 5.625

100-yr Floodplain				Perm. Relocation		
Struc	Nar	Street	Struc Val	Land Val	Notes	Value
SPC200	218	SONORA ST	23900	6000		\$ 40,360
SPC201	222	SONORA ST	29100	6000		\$ 47,640
SPC208	231	SONORA ST	30900	6300		\$ 50,505
SPC211	435	FURNISH AV	31100	6800		\$ 51,360
SPC212	437	FURNISH AV	38000	7200		\$ 61,480
SPC213	441	FURNISH AV	7800	6800		\$ 18,740
SPC214	442	FURNISH AV	16200	6600		\$ 30,270
SPC215	443	FURNISH AV	9100	6800		\$ 20,560
SPC216	448	FURNISH AV	38200	6700		\$ 61,185
SPC217	457	FURNISH AV	18300	6700		\$ 33,325
Number of Structures			10			

Total \$ 415,425  
Annualized PV Cost \$ 24,987

100-yr and 500-yr Floodplain				Perm. Relocation		
Struc	Nar	Street	Struc Val	Land Val	Notes	Value
SPC200	218	SONORA ST	23900	6000		\$ 40,360
SPC201	222	SONORA ST	29100	6000		\$ 47,640
SPC208	231	SONORA ST	30900	6300		\$ 50,505
SPC211	435	FURNISH AV	31100	6800		\$ 51,360
SPC212	437	FURNISH AV	38000	7200		\$ 61,480
SPC213	441	FURNISH AV	7800	6800		\$ 18,740
SPC214	442	FURNISH AV	16200	6600		\$ 30,270
SPC215	443	FURNISH AV	9100	6800		\$ 20,560
SPC216	448	FURNISH AV	38200	6700		\$ 61,185
SPC217	457	FURNISH AV	18300	6700		\$ 33,325
SPC140	102	BURBANK ST	2300	16000		\$ 21,620
SPC141	107	SONORA ST	30400	5900		\$ 49,345
SPC142	110	BURBANK ST	30900	6100		\$ 50,275
SPC143	110	ZAVALA ST	20000	28700		\$ 61,005
SPC144	111	SONORA ST	19000	5900		\$ 33,385
SPC145	114	BURBANK ST	26100	6100		\$ 43,555
SPC146	114	ZAVALA ST	25800	5900		\$ 42,905
SPC147	115	SONORA ST	22500	5900		\$ 38,285
SPC148	118	ZAVALA ST	20300	5800		\$ 35,090
SPC149	119	SONORA ST	21000	5900		\$ 36,185
SPC150	119	ZAVALA ST	23600	6100		\$ 40,055
SPC151	122	BURBANK ST	3700	4900		\$ 10,815
SPC152	122	SONORA ST	26500	5800		\$ 43,770
SPC153	122	ZAVALA ST	0	2500		\$ 2,875
SPC154	123	SONORA ST	23000	5800		\$ 38,870
SPC155	123	ZAVALA ST	25500	5700		\$ 42,255
SPC156	126	BURBANK ST	42700	4900		\$ 65,415
SPC157	126	SONORA ST	29800	5800		\$ 48,390
SPC158	126	ZAVALA ST	27400	6000		\$ 45,260
SPC159	127	SONORA ST	22400	6000		\$ 38,260
SPC160	127	ZAVALA ST	3200	5800		\$ 11,150
SPC161	130	SONORA ST	20800	5800		\$ 35,790



SPC162	130 ZAVALA ST	3200	5800	\$	11,150
SPC163	131 SONORA ST	25600	6000	\$	42,740
SPC164	131 ZAVALA ST	21300	5700	\$	36,375
SPC165	134 SONORA ST	26100	5800	\$	43,210
SPC166	134 ZAVALA ST	23100	5800	\$	39,010
SPC167	135 SONORA ST	28300	5700	\$	46,175
SPC168	135 ZAVALA ST	28300	5700	\$	46,175
SPC169	138 SONORA ST	41400	6000	\$	64,860
SPC170	138 ZAVALA ST	41400	6000	\$	64,860
SPC171	139 ZAVALA ST	7300	5700	\$	16,775
SPC172	142 ZAVALA ST	20600	5900	\$	35,625
SPC173	143 SONORA ST	32100	5900	\$	51,725
SPC174	143 ZAVALA ST	30400	5800	\$	49,230
SPC175	146 SONORA ST	21200	5900	\$	36,465
SPC176	146 ZAVALA ST	15800	5800	\$	28,790
SPC177	147 SONORA ST	36600	6100	\$	58,255
SPC178	147 ZAVALA ST	18100	5800	\$	32,010
SPC179	150 SONORA ST	21200	5900	\$	36,465
SPC180	150 ZAVALA ST	17200	5800	\$	30,750
SPC181	151 SONORA ST	25500	6100	\$	42,715
SPC182	151 ZAVALA ST	14600	5800	\$	27,110
SPC183	154 SONORA ST	25100	5900	\$	41,925
SPC184	154 ZAVALA ST	17300	5800	\$	30,890
SPC185	155 SONORA ST	25000	6000	\$	41,900
SPC186	155 ZAVALA ST	11900	5800	\$	23,330
SPC187	202 SONORA ST	11100	5900	\$	22,325
SPC188	202 ZAVALA ST	22500	5900	\$	38,285
SPC189	203 SONORA ST	19700	5800	\$	34,250
SPC190	203 ZAVALA ST	19700	5800	\$	34,250
SPC191	206 SONORA ST	17600	6000	\$	31,540
SPC192	206 ZAVALA ST	18800	6000	\$	33,220
SPC193	207 SONORA ST	24100	6200	\$	40,870
SPC194	210 SONORA ST	27300	5900	\$	45,005
SPC195	210 ZAVALA ST	15600	5900	\$	28,625
SPC196	211 SONORA ST	23000	6000	\$	39,100
SPC197	214 SONORA ST	27800	6000	\$	45,820
SPC198	214 ZAVALA ST	29200	7200	\$	49,160
SPC199	215 SONORA ST	21800	5900	\$	37,305
SPC202	222 ZAVALA ST	14300	6100	\$	27,035
SPC203	223 SONORA ST	25300	6000	\$	42,320
SPC204	226 SONORA ST	20800	4800	\$	34,640
SPC205	226 ZAVALA ST	19400	6200	\$	34,290
SPC206	227 SONORA ST	25400	6200	\$	42,690
SPC207	230 ZAVALA ST	11300	6000	\$	22,720
SPC209	234 ZAVALA ST	13800	5900	\$	26,105
SPC210	433 FURNISH AV	29800	6800	\$	49,540
SPC218	705 NOGALITOS ST	32300	12800	\$	59,940
SPC219	705 NOGALITOS ST	9400	12300	\$	27,305
SPC220	725 NOGALITOS ST	20000	5600	\$	34,440

Number of Structures 81

**Total** \$ **3,109,275**  
**Annualized PV Cost** \$ **187,018**

Job No.

No.

**HDR Computation**

Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SPC09	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

<b>100-yr Floodplain</b>				<b>Perm. Relocation Value</b>
<b>Struc_Nar</b>	<b>Street</b>	<b>Struc Val</b>	<b>Land Val</b>	<b>Notes</b>
SPC221	829 NOGALITOS ST	5000	50000	
SPC222	905 NOGALITOS ST	47000	105000	

Number of Structures	2			
		<b>Total</b>	<b>\$</b>	<b>251,050</b>
		<b>Annualized PV Cost</b>	<b>\$</b>	<b>15,100</b>

<b>100-yr and 500-yr Floodplain</b>				<b>Perm. Relocation Value</b>
<b>Struc_Nar</b>	<b>Street</b>	<b>Struc Val</b>	<b>Land Val</b>	<b>Notes</b>
SPC221	829 NOGALITOS ST	5000	50000	
SPC222	905 NOGALITOS ST	47000	105000	

Number of Structures	2			
		<b>Total</b>	<b>\$</b>	<b>251,050</b>
		<b>Annualized PV Cost</b>	<b>\$</b>	<b>15,100</b>

**HDR Computation**

Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SPC10	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

100-yr Floodplain				Perm. Relocation	
Struc_Nar	Street	Struc Val	Land Val	Notes	Value
SPC223	102 ALVAREZ PL	21700	7400		\$ 38,890
SPC224	103 ALVAREZ PL	23200	7400		\$ 40,990
SPC225	106 ALVAREZ PL	42300	7400		\$ 67,730
SPC226	107 ALVAREZ PL	19700	7400		\$ 36,090
SPC229	111 ALVAREZ PL	26100	7400		\$ 45,050
SPC232	115 ALVAREZ PL	36800	7400		\$ 60,030
SPC234	119 ALVAREZ PL	34100	7400		\$ 56,250
SPC245	209 GLASS AV	33300	7400		\$ 55,130
SPC246	215 GLASS AV	32600	7400		\$ 54,150
SPC249	219 GLASS AV	26500	7400		\$ 45,610
SPC250	220 GLASS AV	28800	7400		\$ 48,830
SPC251	222 GLASS AV	48700	7400		\$ 76,690
SPC252	223 GLASS AV	41100	7400		\$ 66,050
SPC253	226 GLASS AV	23900	7400		\$ 41,970
SPC254	227 GLASS AV	47000	7400		\$ 74,310
SPC255	230 GLASS AV	17300	7400		\$ 32,730
SPC256	231 GLASS AV	24900	7100		\$ 43,025
SPC257	234 GLASS AV	16200	7400		\$ 31,190
SPC258	235 GLASS AV	38900	7000		\$ 62,510
SPC259	241 GLASS AV	22900	6500		\$ 39,535
SPC260	303 CASS AV	24800	7400		\$ 43,230
SPC261	305 CASS AV	36200	7400		\$ 59,190
SPC262	311 CASS AV	27100	7400		\$ 46,450
SPC263	315 CASS AV	3600	7400		\$ 13,550
SPC264	319 CASS AV	23200	7400		\$ 40,990
SPC266	325 PRUITT AV	10980000	959126		\$ 16,474,995
SPC269	402 HALSTEAD ST	20400	6000		\$ 35,460
SPC270	406 HALSTEAD ST	200	6600		\$ 7,870
SPC271	408 HALSTEAD ST	51500	6400		\$ 79,460
SPC272	412 HALSTEAD ST	20800	6400		\$ 36,480
SPC273	414 HALSTEAD ST	15400	6400		\$ 28,920
SPC274	426 HALSTEAD ST	25200	7300		\$ 43,675
SPC275	428 HALSTEAD ST	51500	7100		\$ 80,265
SPC276	514 HALSTEAD ST	26400	6500		\$ 44,435
SPC277	520 HALSTEAD ST	24900	6500		\$ 42,335
SPC278	522 HALSTEAD ST	27000	6500		\$ 45,275

Number of Structures	36
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Total	\$ 18,139,340
Annualized PV Cost	\$ 1,091,053

100-yr and 500-yr Floodplain				Perm. Relocation	
Struc_Nar	Street	Struc Val	Land Val	Notes	Value
SPC223	102 ALVAREZ PL	21700	7400		\$ 38,890
SPC224	103 ALVAREZ PL	23200	7400		\$ 40,990

SPC225	106 ALVAREZ PL	42300	7400	\$	67,730
SPC226	107 ALVAREZ PL	19700	7400	\$	36,090
SPC229	111 ALVAREZ PL	26100	7400	\$	45,050
SPC232	115 ALVAREZ PL	36800	7400	\$	60,030
SPC234	119 ALVAREZ PL	34100	7400	\$	56,250
SPC245	209 GLASS AV	33300	7400	\$	55,130
SPC246	215 GLASS AV	32600	7400	\$	54,150
SPC249	219 GLASS AV	26500	7400	\$	45,610
SPC250	220 GLASS AV	28800	7400	\$	48,830
SPC251	222 GLASS AV	48700	7400	\$	76,690
SPC252	223 GLASS AV	41100	7400	\$	66,050
SPC253	226 GLASS AV	23900	7400	\$	41,970
SPC254	227 GLASS AV	47000	7400	\$	74,310
SPC255	230 GLASS AV	17300	7400	\$	32,730
SPC256	231 GLASS AV	24900	7100	\$	43,025
SPC257	234 GLASS AV	16200	7400	\$	31,190
SPC258	235 GLASS AV	38900	7000	\$	62,510
SPC259	241 GLASS AV	22900	6500	\$	39,535
SPC260	303 CASS AV	24800	7400	\$	43,230
SPC261	305 CASS AV	36200	7400	\$	59,190
SPC262	311 CASS AV	27100	7400	\$	46,450
SPC263	315 CASS AV	3600	7400	\$	13,550
SPC264	319 CASS AV	23200	7400	\$	40,990
SPC266	325 PRUITT AV	10980000	959126	\$	16,474,995
SPC269	402 HALSTEAD ST	20400	6000	\$	35,460
SPC270	406 HALSTEAD ST	200	6600	\$	7,870
SPC271	408 HALSTEAD ST	51500	6400	\$	79,460
SPC272	412 HALSTEAD ST	20800	6400	\$	36,480
SPC273	414 HALSTEAD ST	15400	6400	\$	28,920
SPC274	426 HALSTEAD ST	25200	7300	\$	43,675
SPC275	428 HALSTEAD ST	51500	7100	\$	80,265
SPC276	514 HALSTEAD ST	26400	6500	\$	44,435
SPC277	520 HALSTEAD ST	24900	6500	\$	42,335
SPC278	522 HALSTEAD ST	27000	6500	\$	45,275
SPC227	108 MIDWAY ST	22200	6000	\$	37,980
SPC228	110 ALVAREZ PL	24600	7400	\$	42,950
SPC230	112 MIDWAY ST	13900	6000	\$	26,360
SPC231	114 ALVAREZ PL	29400	7400	\$	49,670
SPC233	118 ALVAREZ PL	56600	7400	\$	87,750
SPC235	122 ALVAREZ PL	42900	7400	\$	68,570
SPC236	123 ALVAREZ PL	35700	7400	\$	58,490
SPC237	126 ALVAREZ PL	35200	7400	\$	57,790
SPC238	127 ALVAREZ PL	41600	7400	\$	66,750
SPC239	130 ALVAREZ PL	35600	7700	\$	58,695
SPC240	131 ALVAREZ PL	36000	7400	\$	58,910
SPC241	134 ALVAREZ PL	22700	8000	\$	40,980
SPC242	135 ALVAREZ PL	51300	6900	\$	79,755
SPC243	203 GLASS AV	27700	7900	\$	47,865
SPC244	208 GLASS AV	44400	7400	\$	70,670
SPC247	216 GLASS AV	40500	7400	\$	65,210
SPC248	218 GLASS AV	18100	7400	\$	33,850
SPC265	323 CASS AV	19400	7400	\$	35,670
SPC267	327 CASS AV	28400	7400	\$	48,270
SPC268	331 CASS AV	90000	10500	\$	138,075

Number of Structures 56

**Total** \$ **19,313,600**  
**Annualized PV Cost** \$ **1,161,682**



# HDR Computation



Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SPC11	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1

Planning Period, years 50  
Discount Rate 5.625

## 100-yr Floodplain

Struc_Nar Street	Struc Val	Land Val	Notes	Perm. Relocation Value
SPC280 115 CASS AV	36100	7700		\$ 59,395
SPC281 117 CASS AV	27000	7700		\$ 46,655
SPC284 120 KLEIN ST	38500	7700		\$ 62,755
SPC285 121 CASS AV	28100	7700		\$ 48,195
SPC286 122 KLEIN ST	50500	7700		\$ 79,555
SPC290 131 CASS AV	28600	6700		\$ 47,745
SPC292 133 CASS AV	15500	6700		\$ 29,405
SPC293 138 KLEIN ST	19700	6700		\$ 35,285
SPC294 139 CASS AV	27800	6700		\$ 46,625
SPC296 146 KLEIN ST	51600	7400		\$ 80,750
SPC299 2411 FLORES ST S	28100	7100		\$ 47,505
SPC300 2419 FLORES ST S	38200	7100		\$ 61,645
SPC301 2423 FLORES ST S	9200	13800		\$ 28,750
SPC302 2501 FLORES ST S	15500	10900		\$ 34,235
Number of Structures	14			

Total \$ 708,500  
Annualized PV Cost \$ 42,615

## 100-yr and 500-yr Floodplain

Struc_Nar Street	Struc Val	Land Val	Notes	Perm. Relocation Value
SPC280 115 CASS AV	36100	7700		\$ 59,395
SPC281 117 CASS AV	27000	7700		\$ 46,655
SPC284 120 KLEIN ST	38500	7700		\$ 62,755
SPC285 121 CASS AV	28100	7700		\$ 48,195
SPC286 122 KLEIN ST	50500	7700		\$ 79,555
SPC290 131 CASS AV	28600	6700		\$ 47,745
SPC292 133 CASS AV	15500	6700		\$ 29,405
SPC293 138 KLEIN ST	19700	6700		\$ 35,285
SPC294 139 CASS AV	27800	6700		\$ 46,625
SPC296 146 KLEIN ST	51600	7400		\$ 80,750
SPC299 2411 FLORES ST S	28100	7100		\$ 47,505
SPC300 2419 FLORES ST S	38200	7100		\$ 61,645
SPC301 2423 FLORES ST S	9200	13800		\$ 28,750
SPC302 2501 FLORES ST S	15500	10900		\$ 34,235
SPC279 109 PRUITT AV	32900	6400		\$ 53,420
SPC282 118 KLEIN ST	30100	7700		\$ 50,995
SPC283 119 PRUITT AV	23200	6700		\$ 40,185
SPC287 124 KLEIN ST	29900	7700		\$ 50,715
SPC288 126 KLEIN ST	53900	7700		\$ 84,315
SPC289 130 KLEIN ST	27400	6700		\$ 46,065
SPC291 132 KLEIN ST	25300	6700		\$ 43,125
SPC295 142 KLEIN ST	40800	7700		\$ 65,975
SPC297 2401 FLORES ST S	28600	14800		\$ 57,060
SPC298 2409 FLORES ST S	32900	7100		\$ 54,225
SPC303 2601 FLORES ST S	88000	120000		\$ 261,200
SPC304 2619 FLORES ST S	40700	30900		\$ 92,515
SPC305 2701 FLORES ST S	218000	47700		\$ 360,055
Number of Structures	27			

Total \$ 1,968,350  
Annualized PV Cost \$ 118,393



# HDR Computation



Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SPC 12	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	2

## 500-yr & 100-year Structures

### Perm. Relocation

Struc_Name	Street	Struc Val	Land Val	Notes	Value
SPC307	119 LUBBOCK ST E	23700	6800		\$ 41,000
SPC309	123 BAYLOR ST E	28800	6700		\$ 48,025
SPC312	135 BAYLOR ST E	35600	6700		\$ 57,545
SPC313	136 BAYLOR ST E	25600	6900		\$ 43,775
SPC314	139 BAYLOR ST E	26200	6700		\$ 44,385
SPC315	140 BAYLOR ST E	21300	6840		\$ 37,686
SPC316	143 BAYLOR ST E	25100	6700		\$ 42,845
SPC317	144 BAYLOR ST E	38900	6900		\$ 62,395
SPC318	147 BAYLOR ST E	35300	6700		\$ 57,125
SPC319	148 BAYLOR ST E	36700	6900		\$ 59,315
SPC320	150 BAYLOR ST E	38100	6900		\$ 61,275
SPC321	151 BAYLOR ST E	65500	6700		\$ 99,405
SPC323	153 BAYLOR ST E	53700	23400		\$ 102,090
SPC324	200 LUBBOCK ST E	20100	6400		\$ 35,500
SPC325	202 LUBBOCK ST E	28900	6400		\$ 47,820
SPC327	204 LUBBOCK ST E	32800	6500		\$ 53,395
SPC328	206 LUBBOCK ST E	21300	6200		\$ 36,950
SPC329	209 LUBBOCK ST E	22500	6200		\$ 38,630
SPC330	211 LUBBOCK ST E	18900	6200		\$ 33,590
SPC331	213 LUBBOCK ST E	24200	6100		\$ 40,895
SPC332	215 LUBBOCK ST E	12300	6200		\$ 24,350
SPC333	216 LUBBOCK ST E	18900	6100		\$ 33,475
SPC334	216 LUBBOCK ST E	23900	6200		\$ 40,590
SPC335	218 LUBBOCK ST E	15800	6240		\$ 29,296
SPC336	219 LUBBOCK ST E	29400	6200		\$ 48,290
SPC337	220 LUBBOCK ST E	39900	6200		\$ 62,990
SPC338	221 LUBBOCK ST E	14700	6200		\$ 27,710
SPC339	222 LUBBOCK ST E	21400	6200		\$ 37,090
SPC340	223 LUBBOCK ST E	14800	6200		\$ 27,850
SPC341	224 LUBBOCK ST E	11600	6200		\$ 23,370
SPC342	225 LUBBOCK ST E	7000	6200		\$ 16,930
SPC343	226 LUBBOCK ST E	14400	6200		\$ 27,290
SPC344	228 LUBBOCK ST E	9100	6200		\$ 19,870
SPC345	230 LUBBOCK ST E	19600	6300		\$ 34,685
SPC346	231 LUBBOCK ST E	15700	6200		\$ 29,110
SPC347	233 LUBBOCK ST E	21700	6200		\$ 37,510
SPC348	2600 FLORES ST S	59900	160100		\$ 267,975
SPC306	111 LUBBOCK ST E	20500	7300		\$ 37,095
SPC308	121 BAYLOR ST E	23400	6700		\$ 40,465
SPC310	128 BAYLOR ST E	21900	6900		\$ 38,595
SPC311	132 BAYLOR ST E	35800	6900		\$ 58,055
SPC326	203 LUBBOCK ST E	54500	6700		\$ 84,005
SPC349	2800 FLORES ST S	10300	60000		\$ 83,420
SPC350	2804 FLORES ST S	11800	17500		\$ 36,645
SPC351	2805 FLORES ST S	79400	34300		\$ 150,605
SPC352	2806 FLORES ST S	7500	18000		\$ 31,200
SPC353	2900 FLORES ST S	132000	33000		\$ 222,750
Number of Structures		47			

<b>Total</b>	<b>\$</b>	<b>2,614,862</b>
<b>Annualized PV Cost</b>	<b>\$</b>	<b>157,280</b>

**HDR Computation****HDR**

Project	FDMA Phase II	Computer	MWJ	Date	7/21/2005
Subject	SPC13	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	1	Of	1
	Planning Period, years		50		
	Discount Rate		5.625		

**100-yr Structures****Perm. Relocation**

Struc_Nan	Street	Struc Val	Land Val	Notes	Value
SPC361	115 FLATO ST	25300	6100		\$ 42,435
SPC365	121 FLATO ST	17300	5400		\$ 30,430
SPC366	123 FLATO ST	17400	5200		\$ 30,340
SPC367	124 FLATO ST	12800	5200		\$ 23,900
SPC368	125 FLATO ST	13000	5100		\$ 24,065
SPC371	127 FLATO ST	11700	4800		\$ 21,900
SPC372	128 FLATO ST	9300	5200		\$ 19,000
SPC373	129 FLATO ST	12500	4700		\$ 22,905
Number of Structures		8			

<b>Total</b>	<b>\$</b>	<b>214,975</b>
<b>Annualized PV Cost</b>	<b>\$</b>	<b>12,930</b>

**100-yr and 500-yr Structures****Perm. Relocation**

Struc_Nan	Street	Struc Val	Land Val	Notes	Value
SPC361	115 FLATO ST	25300	6100		\$ 37,635
SPC365	121 FLATO ST	17300	5400		\$ 27,455
SPC366	123 FLATO ST	17400	5200		\$ 27,290
SPC367	124 FLATO ST	12800	5200		\$ 22,000
SPC368	125 FLATO ST	13000	5100		\$ 22,090
SPC371	127 FLATO ST	11700	4800		\$ 20,175
SPC372	128 FLATO ST	9300	5200		\$ 17,975
SPC373	129 FLATO ST	12500	4700		\$ 20,955
SPC354	107 MC ASKILL	27700	5100		\$ 38,995
SPC355	107 RIVER VIEW DR	8300	6200		\$ 18,225
SPC356	109 FLATO ST	14000	5200		\$ 23,380
SPC357	111 FLATO ST	12500	5200		\$ 21,655
SPC358	111 RIVER VIEW DR	49200	6100		\$ 65,120
SPC359	113 FLATO ST	20000	5200		\$ 30,280
SPC360	114 ODIS ST	13400	5900		\$ 23,670
SPC362	115 RIVER VIEW DR	25200	5800		\$ 37,100
SPC363	118 ODIS ST	18100	5900		\$ 29,075
SPC364	119 FLATO ST	11700	5200		\$ 20,735
SPC369	126 FLATO ST	14600	5200		\$ 24,070
SPC370	126 ODIS ST	43900	6700		\$ 59,865
SPC374	1410 PROBANDT ST	20700	6000		\$ 32,205
SPC375	1415 PROBANDT ST	23300	6600		\$ 36,035
SPC376	204 ODIS ST	18900	6300		\$ 30,555
SPC377	212 ODIS ST	19000	6200		\$ 30,530
SPC378	214 ODIS ST	21700	6200		\$ 33,635
SPC379	218 ODIS ST	36000	7700		\$ 52,180
SPC380	310 ODIS ST	790000	64297		\$ 998,516
SPC381	435 CONNER ST	18500	6100		\$ 29,815
SPC382	437 CONNER ST	16800	5300		\$ 26,740
SPC383	626 MITCHELL ST W	21200	5500		\$ 32,080
SPC384	630 MITCHELL ST W	17300	5100		\$ 27,035
SPC385	631 MITCHELL ST W	29600	5800		\$ 42,160
Number of Structures		32			

<b>Total</b>	<b>\$</b>	<b>1,959,231</b>
<b>Annualized PV Cost</b>	<b>\$</b>	<b>117,845</b>



# HDR Computation



Project	SARA FDMA Phase II	Compute	MWJ	Date	7/21/2005
Subject	SPC14	Checked		Date	
Task	Real Estate Cost Estimate - Perm. Relocation	Sheet	2	Of	1

Planning Period, years 50  
Discount Rate 5.625

## 100-yr Structures

Struc_Nr: Street	Struc Val	Land Val	Notes	Perm. Relocation Value
SPC390 401 FRANCISCAN E	19500	5900		\$
SPC391 403 FRANCISCAN E	20900	5900		\$ 36,045
SPC392 407 FRANCISCAN E	29600	5600		\$ 47,880
SPC393 410 FRANCISCAN E	35800	5900		\$ 56,905
SPC394 411 FRANCISCAN E	12800	5300		\$ 24,015
SPC395 415 FRANCISCAN E	16000	5400		\$ 28,610
SPC396 420 FRANCISCAN E	13000	5300		\$ 24,295
SPC397 422 FRANCISCAN E	17000	5000		\$ 29,550
Number of Structures	7			

**Total** \$ **247,300**  
**Annualized PV Cost** \$ **14,875**

## 100-yr and 500-yr Structures

Struc_Nr: Street	Struc Val	Land Val	Notes	Perm. Relocation Value
SPC390 401 FRANCISCAN E	19500	5900		\$ 30,685
SPC391 403 FRANCISCAN E	20900	5900		\$ 32,295
SPC392 407 FRANCISCAN E	29600	5600		\$ 41,880
SPC393 410 FRANCISCAN E	35800	5900		\$ 49,430
SPC394 411 FRANCISCAN E	12800	5300		\$ 22,140
SPC395 415 FRANCISCAN E	16000	5400		\$ 25,960
SPC396 420 FRANCISCAN E	13000	5300		\$ 22,370
SPC397 422 FRANCISCAN E	17000	5000		\$ 26,550
SPC386 101 REGENT ST	24300	5900		\$ 36,205
SPC387 3028 FLORES ST S	27400	7800		\$ 42,430
SPC388 3106 FLORES ST S	42300	31700		\$ 93,025
SPC389 3126 FLORES ST S	51100	77300		\$ 166,985
SPC398 427 GLENN AV E	22900	5900		\$ 34,595
SPC399 501 GLENN AV E	33500	5800		\$ 46,645
Number of Structures	14			

**Total** \$ **671,195**  
**Annualized PV Cost** \$ **40,371**

Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Pedro Creek Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	SPC14 500yr Perm. Relocation		SPC13 500yr Perm. Relocation		SPC12 500yr Perm. Relocation		SPC11 500yr Perm. Relocation		SPC10 500yr Perm. Relocation		SPC09 500yr Perm. Relocation		SPC08 500yr Perm. Relocation		SPC07 500yr Perm. Relocation	
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
2	Public safety	4	1	4	1	4	1	4	1	4	1	4	2	8	1	4	1	4
3	Benefit/Cost Ratio Project B/C Ratio	4	3	12	1	4	1	4	1	4	1	4	4	16	1	4	1	4
			1.21		0.41		0.31		0.41		0.04		3.25		0.26		0.28	
4	Element of a comprehensive watershed plan	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
5	Dependency on other projects	2	3	6	3	6	3	6	3	6	3	6	3	6	3	6	3	6
6	Mobility or effects on transportation system	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	3	6	3	6	3	6	3	6	3	6	3	6	3	6	3	6
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	3	6	3	6	3	6	3	6	3	6	3	6	3	6	3	6
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4
10	/redevelopment potential	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	Time to implement or construct	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
14	Permitting resistance or difficulty	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
15	Environmental or habitat enhancement	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Total Project Score			63		55		55		55		55		71		55		55	
Check Items That Apply:																		
1	Recharge enhancement																	
2	No specific or pending litigation																	
3	Agency has administration and/or staff capable of operation & maintenance																	

Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Pedro Creek Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	SPC06 500yr Perm. Relocation		SPC05 500yr Perm. Relocation		SPC04 500yr Perm. Relocation		SPC03 500yr Perm. Relocation		SPC02 500yr Perm. Relocation		SPC01 500yr Perm. Relocation		SPC14 100yr Perm. Relocation		SPC13 100yr Perm. Relocation	
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
2	Public safety	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
3	Benefit/Cost Ratio Project B/C Ratio	4	1	4	1	4	1	4	1	4	1	4	1	4	3	12	3	12
			0.13		0.23		0.03		0.03		0.64		0.07		3.3		3.79	
4	Element of a comprehensive watershed plan	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
5	Dependency on other projects	2	3	6	3	6	3	6	3	6	3	6	3	6	3	6	3	6
6	Mobility or effects on transportation system	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	3	6	3	6	3	6	3	6	3	6	3	6	3	6	3	6
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	3	6	3	6	3	6	3	6	3	6	3	6	3	6	3	6
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4
10	/redevelopment potential	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	Time to implement or construct	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
14	Permitting resistance or difficulty	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
15	Environmental or habitat enhancement	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Total Project Score			55		55		55		55		55		55		63		63	
Check Items That Apply:																		
1	Recharge enhancement																	
2	No specific or pending litigation																	
3	Agency has administration and/or staff capable of operation & maintenance																	

Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Pedro Creek Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	SPC12 100yr Perm. Relocation		SPC11 100yr Perm. Relocation		SPC10 100yr Perm. Relocation		SPC09 100yr Perm. Relocation		SPC08 100yr Perm. Relocation		SPC07 100yr Perm. Relocation		SPC06 100yr Perm. Relocation	
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
2	Public safety	4	1	4	1	4	2	8	1	4	1	4	1	4	1	4
3	Benefit/Cost Ratio Project B/C Ratio	4	1	4	3	12	1	4	3	12	3	12	1	4	3	12
			0.39		1.15		0.04		3.25		1.96		0.28		2.19	
4	Element of a comprehensive watershed plan	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
5	Dependency on other projects	2	3	6	3	6	3	6	3	6	3	6	3	6	3	6
6	Mobility or effects on transportation system	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	3	6	3	6	3	6	3	6	3	6	3	6	3	6
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	3	6	3	6	3	6	3	6	3	6	3	6	3	6
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	2	4	2	4	2	4	2	4	2	4	2	4	2	4
10	/redevelopment potential	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	Time to implement or construct	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3
14	Permitting resistance or difficulty	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3
15	Environmental or habitat enhancement	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Total Project Score				55		63		59		63		63		55		63
Check Items That Apply:																
1	Recharge enhancement															
2	No specific or pending litigation															
3	Agency has administration and/or staff capable of operation & maintenance															



Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Pedro Creek Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	SPC05 100yr Perm. Relocation		SPC04 100yr Perm. Relocation		SPC01 100yr Perm. Relocation		Probandt to Mitchell Channel Modification		Mitchell to Flores Channel Modification		Alamo to Guadalupe Channel Modification		Probandt to Nogalitos Channel Modification		Flores to Nogalitos Channel Modification		Nogalitos to Furnish Channel Modification			
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	1	4	1	4	1	4	3	12	3	12	3	12	3	12	3	12	3	12	3	12
2	Public safety	4	2	8	1	4	1	4	2	8	2	8	2	8	2	8	2	8	2	8	2	8
3	Benefit/Cost Ratio Project B/C Ratio	4	3	12	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
			1		0.11			0.13	0.18		0.04		0.003		0.03		0.007		0.004			
4	Element of a comprehensive watershed plan	4	1	4	1	4	1	4	2	8	2	8	2	8	2	8	2	8	2	8	2	8
5	Dependency on other projects	2	3	6	3	6	3	6	2	4	2	4	2	4	2	4	2	4	2	4	2	4
6	Mobility or effects on transportation system	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	3	6	3	6	3	6	1	2	1	2	1	2	1	2	1	2	1	2	1	2
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	3	6	3	6	3	6	3	6	3	6	3	6	3	6	3	6	3	6	3	6
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	2	4	2	4	2	4	1	2	1	2	1	2	1	2	1	2	1	2	1	2
10	/redevelopment potential	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	Time to implement or construct	1	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	Permitting resistance or difficulty	1	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	Environmental or habitat enhancement	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Project Score			67		55		55		56		56		56		56		56		56		56	
Check Items That Apply:																						
1	Recharge enhancement																					
2	No specific or pending litigation																					
3	Agency has administration and/or staff capable of operation & maintenance																					

Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Pedro Creek Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	Nogalitos to RR Channel Modification		RR to Alamo Channel Modification		Cypress to Fredericksburg Channel Modification		SPC14 & SPC13 Floodwall		SPC14, SPC13 & SPC12 Floodwall		SPC11 Floodwall		SPC14, SPC13 & SPC12 Floodwall	
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	3	12	3	12	3	12	3	12	3	12	3	12	3	12
2	Public safety	4	2	8	2	8	2	8	2	8	2	8	2	8	2	8
3	Benefit/Cost Ratio Project B/C Ratio	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
4	Element of a comprehensive watershed plan	4	2	8	2	8	2	8	1	4	1	4	1	4	1	4
5	Dependency on other projects	2	2	4	2	4	2	4	1	2	1	2	1	2	1	2
6	Mobility or effects on transportation system	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	3	6	3	6	3	6	2	4	2	4	2	4	2	4
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
10	/redevelopment potential	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	Time to implement or construct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	Permitting resistance or difficulty	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	Environmental or habitat enhancement	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Project Score				56		56		56		48		48		48		48
Check Items That Apply:																
1	Recharge enhancement															
2	No specific or pending litigation															
3	Agency has administration and/or staff capable of operation & maintenance															

Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Pedro Creek Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	SPC11 Floodwall		SPC10 Floodwall		SPC09 Floodwall		SPC08 Floodwall		SPC07 Floodwall		SPC06 Floodwall		SPC05 Floodwall		SPC04 Floodwall	
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	3	12	3	12	3	12	3	12	3	12	3	12	3	12	3	12
2	Public safety	4	2	8	2	8	2	8	2	8	2	8	2	8	2	8	2	8
3	Benefit/Cost Ratio Project B/C Ratio	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
4	Element of a comprehensive watershed plan	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
5	Dependency on other projects	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
6	Mobility or effects on transportation system	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
10	/redevelopment potential	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	Time to implement or construct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	Permitting resistance or difficulty	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	Environmental or habitat enhancement	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Project Score			48		48		48		48		48		48		48		48	
Check Items That Apply:																		
1	Recharge enhancement																	
2	No specific or pending litigation																	
3	Agency has administration and/or staff capable of operation & maintenance																	

Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Pedro Creek Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	SPC01 Floodwall		Probandt Bridge Improvement		Mitchell Bridge Improvement		Probandt and Mitchell Bridge Improvements		Probandt, Mitchell & Flores Bridge Improvements		Flores Bridge Improvement		Nogalitos Bridge Improvement		Furnish Bridge Improvement		Probandt, Mitchell, Flores, & Nogalitos Bridge Improvement			
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	3	12	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
2	Public safety	4	2	8	3	12	3	12	3	12	3	12	3	12	3	12	3	12	3	12	3	12
3	Benefit/Cost Ratio Project B/C Ratio	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
4	Element of a comprehensive watershed plan	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
5	Dependency on other projects	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
6	Mobility or effects on transportation system	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
10	/redevelopment potential	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	Time to implement or construct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	Permitting resistance or difficulty	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	Environmental or habitat enhancement	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Project Score				48		44		44		44		44		44		44		44		44		44
Check Items That Apply:																						
1	Recharge enhancement																					
2	No specific or pending litigation																					
3	Agency has administration and/or staff capable of operation & maintenance																					



Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Pedro Creek Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	Probandt, Mitchell, Flores, Nogalitos & Furnish Bridge Improvements		Cevallos Bridge Improvement		Probandt, Mitchell, Flores, Nogalitos, Furnish & Cevallos Bridge Improvements		Detention Pond	
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	1	4	1	4	1	4	1	4
2	Public safety	4	3	12	3	12	3	12	3	12
3	Benefit/Cost Ratio Project B/C Ratio	4	1	4	1	4	1	4	1	4
4	Element of a comprehensive watershed plan	4	1	4	1	4	1	4	1	4
5	Dependency on other projects	2	1	2	1	2	1	2	2	4
6	Mobility or effects on transportation system	2	1	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	1	2	1	2	1	2	1	2
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	2	4	2	4	2	4	2	4
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	1	2	1	2	1	2	1	2
10	/redevelopment potential	2	1	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1	1	1
13	Time to implement or construct	1	1	1	1	1	1	1	1	1
14	Permitting resistance or difficulty	1	1	1	1	1	1	1	1	1
15	Environmental or habitat enhancement	1	1	1	1	1	1	1	1	1
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	1	1	1	1	1	1	3	3
Total Project Score				44		44		44		48
Check Items That Apply:										
1	Recharge enhancement									
2	No specific or pending litigation									
3	Agency has administration and/or staff capable of operation & maintenance									

Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Antonio River Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	SAR20 500yr Perm. Relocation		SAR19 500yr Perm. Relocation		SAR13 500yr Perm. Relocation		SAR11 500yr Perm. Relocation		SAR10 500yr Perm. Relocation	
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	1	4	1	4	1	4	1	4	1	4
2	Public safety	4	1	4	1	4	1	4	1	4	1	4
3	Benefit/Cost Ratio Project B/C Ratio	4	1	4	1	4	1	4	1	4	1	4
4	Element of a comprehensive watershed plan	4	1	4	1	4	1	4	1	4	1	4
5	Dependency on other projects Projects that can be completed independently of other projects or can provide their intended benefit without another project being completed are preferable. If a project is part of a master planned series of projects and it is correctly sequenced or phase	2	3	6	3	6	3	6	3	6	3	6
6	Mobility or effects on transportation system	2	1	2	1	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	3	6	1	2	3	6	1	2	3	6
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	3	6	1	2	3	6	1	2	3	6
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	2	4	2	4	2	4	2	4	2	4
10	/redevelopment potential	2	1	2	1	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1	1	1	1	1
13	Time to implement or construct	1	3	3	3	3	3	3	3	3	3	3
14	Permitting resistance or difficulty	1	3	3	3	3	3	3	3	3	3	3
15	Environmental or habitat enhancement	1	2	2	2	2	2	2	2	2	2	2
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	3	3	3	3	3	3	3	3	3	3
Total Project Score			55		47		55		47		55	
Check Items That Apply:												
1	Recharge enhancement											
2	No specific or pending litigation											
3	Agency has administration and/or staff capable of operation & maintenance											

Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Antonio River Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	SAR09 500yr Perm. Relocation		SAR08 500yr Perm. Relocation		SAR07 500yr Perm. Relocation		SAR06 500yr Perm. Relocation		SAR05 500yr Perm. Relocation	
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	1	4	1	4	1	4	1	4	1	4
2	Public safety	4	1	4	1	4	1	4	1	4	1	4
3	Benefit/Cost Ratio Project B/C Ratio	4	1	4	1	4	1	4	1	4	1	4
4	Element of a comprehensive watershed plan	4	1	4	1	4	1	4	1	4	1	4
5	Dependency on other projects Projects that can be completed independently of other projects or can provide their intended benefit without another project being completed are preferable. If a project is part of a master planned series of projects and it is correctly sequenced or phase	2	3	6	3	6	3	6	3	6	3	6
6	Mobility or effects on transportation system	2	1	2	1	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	1	2	3	6	1	2	3	6	1	2
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	1	2	3	6	1	2	3	6	1	2
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	2	4	2	4	2	4	2	4	2	4
10	/redevelopment potential	2	1	2	1	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1	1	1	1	1
13	Time to implement or construct	1	3	3	3	3	3	3	3	3	3	3
14	Permitting resistance or difficulty	1	3	3	3	3	3	3	3	3	3	3
15	Environmental or habitat enhancement	1	2	2	2	2	2	2	2	2	2	2
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	3	3	3	3	3	3	3	3	3	3
Total Project Score			47		55		47		55		47	
Check Items That Apply:												
1	Recharge enhancement											
2	No specific or pending litigation											
3	Agency has administration and/or staff capable of operation & maintenance											

Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Antonio River Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	SAR03 500yr Perm. Relocation		SAR19 100yr Perm. Relocation		SAR13 100yr Perm. Relocation		SAR11 100yr Perm. Relocation		SAR10 100yr Perm. Relocation	
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	1	4	1	4	1	4	1	4	1	4
2	Public safety	4	1	4	1	4	1	4	1	4	1	4
3	Benefit/Cost Ratio Project B/C Ratio	4	1	4	1	4	1	4	1	4	1	4
4	Element of a comprehensive watershed plan	4	1	4	1	4	1	4	1	4	1	4
5	Dependency on other projects Projects that can be completed independently of other projects or can provide their intended benefit without another project being completed are preferable. If a project is part of a master planned series of projects and it is correctly sequenced or phase	2	3	6	3	6	3	6	3	6	3	6
6	Mobility or effects on transportation system	2	1	2	1	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	3	6	1	2	3	6	1	2	3	6
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	3	6	1	2	3	6	1	2	3	6
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	2	4	2	4	2	4	2	4	2	4
10	/redevelopment potential	2	1	2	1	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1	1	1	1	1
13	Time to implement or construct	1	3	3	3	3	3	3	3	3	3	3
14	Permitting resistance or difficulty	1	3	3	3	3	3	3	3	3	3	3
15	Environmental or habitat enhancement	1	2	2	2	2	2	2	2	2	2	2
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	3	3	3	3	3	3	3	3	3	3
Total Project Score			55		47		55		47		55	
Check Items That Apply:												
1	Recharge enhancement											
2	No specific or pending litigation											
3	Agency has administration and/or staff capable of operation & maintenance											



Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Antonio River Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	SAR09 100yr Perm. Relocation		SAR08 100yr Perm. Relocation		SAR07 100yr Perm. Relocation		SAR06 100yr Perm. Relocation		SAR03 100yr Perm. Relocation	
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	1	4	1	4	1	4	1	4	1	4
2	Public safety	4	1	4	1	4	1	4	1	4	1	4
3	Benefit/Cost Ratio Project B/C Ratio	4	1	4	1	4	1	4	1	4	1	4
4	Element of a comprehensive watershed plan	4	1	4	1	4	1	4	1	4	1	4
5	Dependency on other projects Projects that can be completed independently of other projects or can provide their intended benefit without another project being completed are preferable. If a project is part of a master planned series of projects and it is correctly sequenced or phase	2	3	6	3	6	3	6	3	6	3	6
6	Mobility or effects on transportation system	2	1	2	1	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	1	2	3	6	1	2	3	6	1	2
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	1	2	3	6	1	2	3	6	1	2
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	2	4	2	4	2	4	2	4	2	4
10	/redevelopment potential	2	1	2	1	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1	1	1	1	1
13	Time to implement or construct	1	3	3	3	3	3	3	3	3	3	3
14	Permitting resistance or difficulty	1	3	3	3	3	3	3	3	3	3	3
15	Environmental or habitat enhancement	1	2	2	2	2	2	2	2	2	2	2
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	3	3	3	3	3	3	3	3	3	3
Total Project Score				47		55		47		55		47
Check Items That Apply:												
1	Recharge enhancement											
2	No specific or pending litigation											
3	Agency has administration and/or staff capable of operation & maintenance											

Project Scoring Sheet For  
Storm Water Related Capital Improvement Projects  
San Antonio River Watershed

Item #	Potential Prioritization Ranking Factors	Ranking Factor Weight	SARIP		SAR05 Floodwall		SAR04, SAR03 Floodwall	
			Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score	Project Specific Score	Project Specific Weighted Score
1	Hydraulic/hydrologic significance or impact	4	1	4	3	12	3	12
2	Public safety	4	1	4	2	8	2	8
3	Benefit/Cost Ratio Project B/C Ratio	4	1	4	1	4	1	4
4	Element of a comprehensive watershed plan	4	1	4	1	4	1	4
5	Dependency on other projects Projects that can be completed independently of other projects or can provide their intended benefit without another project being completed are preferable. If a project is part of a master planned series of projects and it is correctly sequenced or phase	2	3	6	2	4	2	4
6	Mobility or effects on transportation system	2	1	2	1	2	1	2
7	Sustainability or low operations & maintenance cost	2	3	6	1	2	1	2
8	Level of protection provided (i.e. 25 year, 50 year or 100 year flood)	2	3	6	3	6	3	6
9	Funding sources (leverage of participants available funds) Promote orderly development or improve economic development	2	2	4	1	2	1	2
10	/redevelopment potential	2	1	2	1	2	1	2
11	Beneficial neighborhood impacts	1	1	1	1	1	1	1
12	Water quality enhancement	1	1	1	1	1	1	1
13	Time to implement or construct	1	3	3	1	1	1	1
14	Permitting resistance or difficulty	1	3	3	1	1	1	1
15	Environmental or habitat enhancement	1	2	2	1	1	1	1
16	Potential for Recreation/Open Space/Connectivity for linear parks	1	3	3	1	1	1	1
Total Project Score				55		52		52
Check Items That Apply:								
1	Recharge enhancement							
2	No specific or pending litigation							
3	Agency has administration and/or staff capable of operation & maintenance							

	Draft Report Comments	HDR Response
	<b>Nefi Garza, P.E.</b>	
	<b>San Antonio River Authority</b>	
	<b>15-Aug-05</b>	
1	On cover sheet please remove the BC, COSA & SARA logo, only use the Bexar Regional Watershed management (BRWM) & TWDB logo's	Correction made
2	Please use the current Pape-Dawson Logo.	Correction made
3	On all Footers please remove San Antonio River Authority and replace with Bexar Regional Watershed Management (BRWM).	Correction made
4	Executive Summary – Add Paragraph explaining that this study is funded by SARA, COSA, and Bexar County & through a TWDB grant for regional flood mitigation work, etc.	Text Added
5	Page 6 – Please correct typo” that are experience flooding” to experiencing flooding	Correction made
6	Page 8 – “survey data” second line remove the word “by fremt Geodetix, inc.”	Text removed
7	Page 9 – SARA <del>right-of-way</del> personnel	Text removed
8	Page 9 – Hydrology, please remove “and the Catalpa Pershing Channel (unit 8-5-2)”	Text removed
9	Page 9 – Hydrology, (last line of paragraph) question: the LMMP hydrology is a HEC-1 model, why do you mention a HEC-HMS model, what is that model?	Correction made
10	Page 15 – Mitigation Option (second to the last line of the end of the Paragraph) replace “flood prone property acquisition” to Permanent Relocation.	Correction made
11	Page 18 – Permanent Relocation, (first line) after permanent relocation add”, Buyouts”	Text Added
12	Page 21 – And all figures replace aerial photo with black and white photo, it may be easier to see the flood structures, too much color.	We feel the aerial photos aid in the presentation of the material presented in the figures.
13	How many structures are flooded in less then a 100 year (50 year, 25 year) please quantify.	See attached document
14	Appendix C – why is this portion of the PBS&J report in here? , this is not the SARA, BC, COSA inter-local agreement.	Documents have been removed
15	Please work with us to help score and rank the overall projects.	HDR has sent the scoring matrix to SAFRA for use in discussions with the City and County for prioritizing CIP projects.
16	Please provide a plan of construction of projects, with your recommendation on the first to last project to be constructed.	The nature of the flooding problems associated with the projects with a B/C greater than one result in localized flood reduction benefits and could be completed independent of one another as funding became available.
	<b>End of Comment</b>	

<b>San Pedro Creek</b>					
	Number Structures	Total Value	Annualized Value	Total Damage	Annualized Damage
25-year storm	50	\$ 12,895,000	\$ 775,614	\$ 1,730,123	\$ 104,064
50-year storm	71	\$ 14,561,000	\$ 875,821	\$ 1,916,583	\$ 115,279

<b>San Antonio River</b>					
	Number Structures	Total Value	Annualized Value	Total Damage	Annualized Damage
25-year storm	20	\$ 9,089,000	\$ 546,689	\$ 3,297,201	\$ 198,321
50-year storm	29	\$ 19,438,000	\$ 1,169,165	\$ 3,571,905	\$ 214,844



		HDR Response
<b>Jacquelyn Thomas, P.E.</b>		
<b>Bexar County</b>		
<b>12-Sep-05</b>		
1	Need contents for Appendices	Contents added.
2	Page 9, 3rd paragraph, "TWDB ranking matrix"? Shouldn't this be "BRWM ranking matrix".	Correction made.
3	Page 15, 2nd paragraph from bottom, should be "stage-damage" not "damage-stage".	Correction made.
4	Page 16, 3rd paragraph, Flood Mitigation Measures: this paragraph only talks about several channel modification options, but entire section is about all types of flood mitigation options. This paragraph should include general discussion about additional options considered including (detention, floodwalls, bridge modification and buyouts).	
5	Page 19, 2nd to last paragraph, last sentence should read "...remove structures from the floodplain that would be damaged during a flood event."	Text added.
6	The last comment I have is related to the extensive problems that exist with the LMMP floodplain mapping. The HDR report points out many problem areas with regard to the maps. This is helpful from a review standpoint, but you may want to ask them to present it differently in final report form, for public consumption.	Correction made.  The references to the mapping issues were left in the report since they impacted our analysis in our study reaches. In conversations with SARA it was decided to leave this information in the report but that it was not necessary to include in public presentations.
<b>End of Comment</b>		

Gilbert Ward Texas Water Development Board	HDR Engineering, Inc. Response
18-Oct-05	
1 Hydrology and Hydraulics—This report focuses on mitigation plans. Hydrology and hydraulics modeling was developed by a separate study and utilized for this analyses and mitigation assessment. The description of the hydrological and hydraulic methods is very brief and the hydrological or hydraulic study results are not provided. Report should provide sufficient detail to be repeatable; however, there is little explanation and few references for how the hydrologic analytical models were modified/developed for the purposed of this study.	The hydrology and hydraulic data used for this project was developed during the Limited Mapping Maintenance Project (LMMP). For the LMMP, HDR Engineering, Inc was retained by the USACE to perform a quality control review and calibration on the hydrologic and hydraulic models for the San Antonio River and its tributaries. The primary goal of the LMMP was to update the models through calibration with the data from the October 1998 flood. The LMMP reports and models are included on the LMMP DVD in Section 1 of the Appendices. The hydrologic model was not modified for this study. The hydraulic model was modified during the mitigation option analysis. The modified hydraulic models are included on the HDR CD in Section 10 of the Appendices.
2 Cost / Benefit Analysis—Alternative SPC01 has the highest B/C, which means great flood prevention benefit, but ranks a very low, even the lowest priority rank. So too for SAR05, SAR03 and SAR04. Is the B/C being considered adequately in the ranking system?	The BRWM CIP scoring matrix was reviewed and the project specific score assigned to the SPC01 Floodwall, SAR05 Floodwall, and the SAR03 and SAR04 Floodwall projects was increased to reflect the score assigned to B/C >1.
3 Table of Contents needs Listing of Appendices	Text Added.
4 The scope of work under project scope of work of TWDB contract Task 5.1 states that appendix 8 will be provided to include Hydrologic and Hydraulic Calculations. This was also identified in the HDR project scope of work but not included in draft report.	The baseline hydrologic and hydraulic models are included in Section 1 of the Appendices. The modified hydraulic model that includes the various mitigation options analyzed for this study are included in HDR CD in Section 10 of the Appendices.
5 TWDB is switched around differently each time used (sometimes TDWB, TWBD). Do a search to make sure it is correct each time used.	Correction Made.
6 Neither report adequately identifies the specific study area and appears to be an overlap between the areas studied. Also, there are no typical cross sections of river locations associated with the numbered 'Plans' for either study report.	An exhibit was added to the final report to identify and distinguish the study areas of HDR and Carter & Burgess. A typical cross-section is included in the "Mitigation Options" section of the report.
7 There seems to be two specific inconsistencies noted between the reports. HDR used an interest rate of 5.625% for EAD while C&B uses 5.675%. Also, HDR uses 2024 as study year, while C&B says nothing about base year of study. Both reports have an inadequate discussion of the B/C analyses. It doesn't appear that the same procedures were followed in the two studies but it's difficult to tell for sure.	Both HDR and CB used an interest rate of 5.625% in the HEC-FDA analysis. For the B/C ratio calculations, the value used for the benefit was the Equivalent Annual Damage Reduced calculated by HEC-FDA. HEC-FDA calculated the Equivalent Annual Damage Reduced using an interest rate of 5.625% and an analysis period of 50 years. The costs of the projects were annualized for an analysis period of 50 years using an interest rate of 5.625%.
8 Little information on design flows is actually presented in either report as specified for Task 3.2 of the applications scope of work.	See Response to Comment 1.
9 Each study prioritizes separately the projects, but were the alternatives of both prioritized together?	No, the alternatives of both were not prioritized together. HDR and CB ranked the projects using the BRWM CIP scoring matrix.
10 It is suggested that to tie the two reports together, add a paragraph to the "Background" section of each report that details the purpose of the study, what each study team was contracted to perform, and the study area along with a watershed map detailing the study limits for each consulting team.	An executive summary and an overall study exhibit were added to the final report. The executive summary outlines the project purpose, project objectives, and project area by study team.
11 It has been determined from our review that the proposed project is located within communities that participate in the National Flood Insurance Program (NFIP). As a result, any work would require permitting by the local jurisdiction by virtue of its participation in the NFIP, and in accordance with Section 16.236 (d) (3&4) of the Texas Water Code. If the City or County has not already done so, they should insure that the proposed construction is documented and permitted in accordance with their Flood Hazard Prevention Ordinance or Court Order. Any changes to the current flood boundaries should be submitted by the local jurisdiction to the Federal Emergency Management Agency to obtain a Letter of Map Revision (LOMR) for the affected panels of the appropriate Flood Insurance Rate Maps.	Noted.
12 The plans identify a prioritized schedule of potential improvements that include construction of detention ponds, channel improvements, floodwalls, and bridge improvements; and relocations from the floodplain. All are eligible activities for TWDB financing through the Texas Water Development Fund. The Board rules that address application procedures, as well as required engineering and environmental reviews, are contained in Title 31 Texas Administrative Code Chapter 363 subchapters A and D.	Noted.
<b>End of Comment</b>	