Onion Creek, Barton Creek, and Pedernales River Watersheds Interim Feasibility Study Final Report

0904830950

Prepared for:
Texas Water Development Board
and U.S. Army Corps of Engineers: Fort Worth District

US Army Corps of Engineers®

October 18, 2013

Prepared By:
Halff Associates, Inc.

HALFF

On Behalf of Hays County, Texas

STATE OF TEXAS
DANIEL LEE HARRIS
104646
LICENSED
PROFESSIONAL ENGINEER

Daniel Lee Harris
10/18/2013
Firm #: 312

This document is for planning purposes only and is not intended for construction, bidding, or issuance of permits. It was prepared by or under the supervision of:

Daniel Lee Harris	104646	10/18/2013
Type or Print Name	PE#	Date

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The Onion Creek, Barton Creek and Pedernales River watersheds located in the northern half of Hays County have been the source of frequent flooding. As a result of frequent flooding and the potential for increased development in the study area, Hays County took a pro-active lead in teaming with the U.S. Army Corp of Engineers and the Texas Water Development Board (TWDB).

Hydrologic and hydraulic modeling was performed for all three watersheds in Hays County. Detailed LiDAR elevation data as well as cross-section and bridge/culvert surveys, where available, were used to enhance the accuracy of the models. The modeling resulted in updated and more accurate flows and water surface elevations for the 2, 5, 10, 25, 50, 100, 250, and 500-yr events. The resulting hydraulic data was then used to analyze various flood reduction alternatives for the City of Dripping Springs, City of Buda, and Hays County.

Several flood reduction alternatives were analyzed during the flood damage reduction analysis portion of the study. Each alternative was evaluated by cost and potential for producing a benefit-to-cost ratio greater than one. Structural alternatives were recommended for the City of Dripping Springs and City of Buda that consist of upstream detention, channel improvements, or diversion of flow. Non-structural alternatives were also considered for the City of Dripping Springs and City of Buda consisting of buyouts or relocations. Alternatives for Hays County included regional detention options along Onion Creek to relieve flooding in the Buda area. Typical standards for conveyance are that county-maintained roads should pass at least the 5-yr flow and state-maintained roads should pass at least the 25-yr flow. A ranking of stream crossings was compiled using an urgency rating calculated from maximum frequency of flow passed by the structure and average annual daily traffic counts.

1.0 Introduction and Background

The Onion Creek, Barton Creek and Pedernales River watersheds are located in the northern half of Hays County on the border of the Edwards Plateau and southern Black Prairie Regions (see Figure 1). These watersheds drain approximately 315 square miles within Hays County. The terrain varies from hilly tree-covered ranch country in the northwest to undulating grassy plains in the southeast. The study area includes several different land use types including the urban areas of Dripping Springs and Buda as well as rural subdivisions and communities in the county. The study area is experiencing an increase in development from an influx of people moving away from the City of Austin to live and work. The elevations vary from approximately 600 feet above sea level at the downstream county line to 1500 feet above sea level (North American Vertical Datum (NAVD) 1988) in the headwaters above the City of Dripping Springs. Average annual rainfall in the watershed is 33.75 inches per year.

Significant floods have recently occurred in the study area in 1998, 2002, 2004, and 2007. The 1998 and 2004 events resulted in millions of dollars in flood damages and federal disaster declarations for Hays County. These flood events not only resulted in costly structural damage, but also caused disruption to travel and emergency services due to road flooding. An example of this type of flooding, which is currently being addressed by the County, is the McGregor lane crossing at Barton Creek. Flooding of McGregor Lane during the 2007 event can be seen in Figure 2. New roadway and culverts have been designed and constructed as part of a separate project to allow for more conveyance of flood flows before the road is overtopped.

As a result of frequent flooding and the potential for increased development in the study area, Hays County took a pro-active lead in teaming with the U.S. Army Corp of Engineers for 50% project funding and applying for a Flood Protection Planning Grant from the Texas Water Development Board (TWDB) for 25% project funding, which was awarded in 2010. Hays County teamed with the Cities of Buda and Dripping Springs to provide a local match for project funding, assess the local drainage problems, and evaluate the overall flooding problems from a regional perspective. To facilitate regional input into the planning process, five public meetings were held within the project study area. Table 1 shows the date and location of each public meeting.

Table 1: Dates and locations of public meetings

Date	Location
2/16/2011	Dripping Springs City Hall
2/29/2012	Hays County Development Services Office (San Marcos)
3/8/2012	Buda City Hall
4/24/2013	Hays County Precinct 4 (Dripping Springs)
9/4/2013	Hays County Precinct 2 (Buda)

A copy of the public notices can be seen in Appendix J. These public meetings served to inform the public about the planning study and to gather information used to enhance and confirm the study results and conclusions. This study has resulted in new planning and regulatory information for use in floodplain management as well as flood reduction alternative analyses for the City of Dripping Springs, City of Buda, and Hays County.

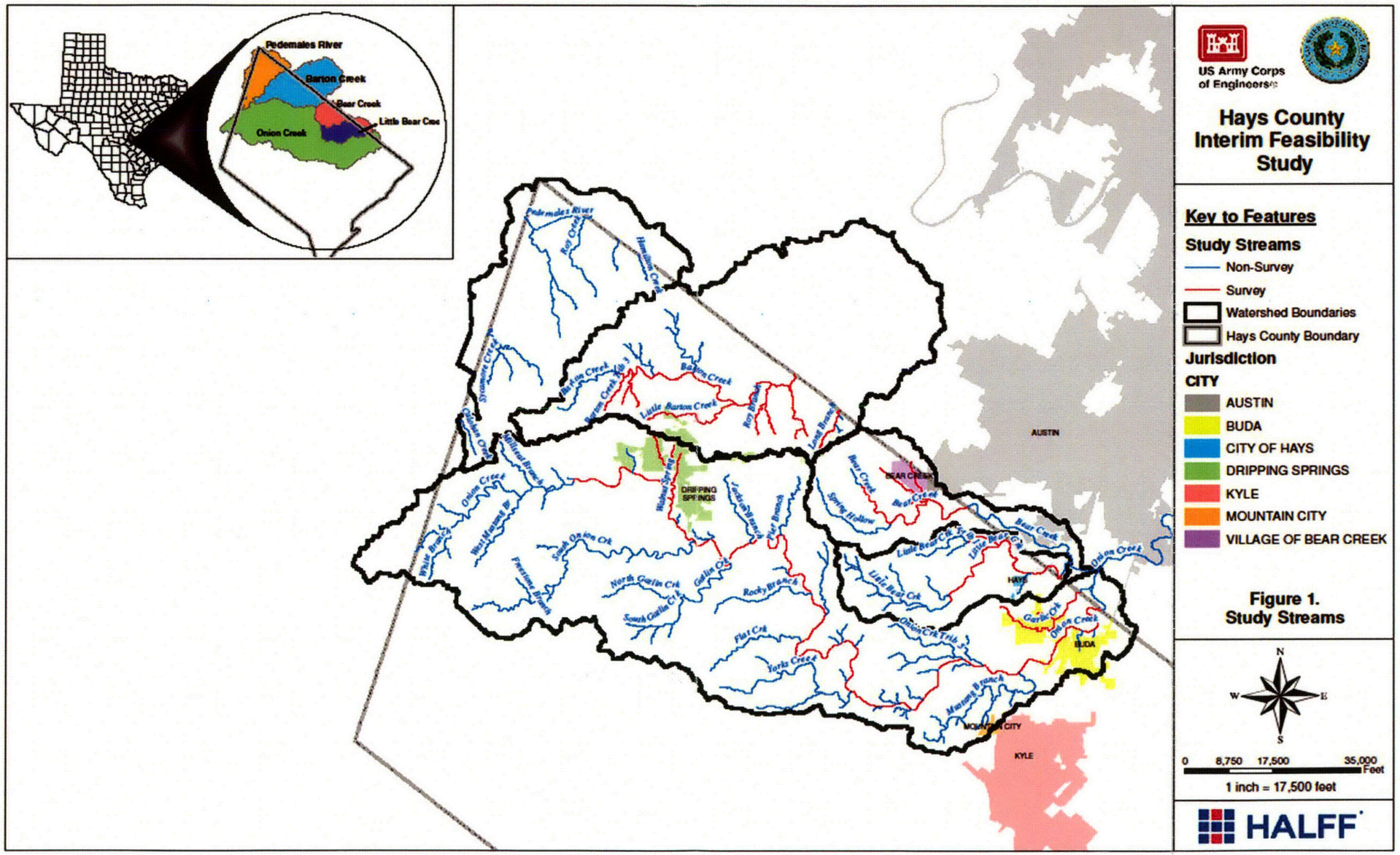

Pedernales River
Barton Creek
Bear Creek
Little Bear Cree
Onion Creek
US Army Corps of Engineers
Hays County Interim Feasibility Study
Key to Features
Study Streams
Non-Survey
Survey
Watershed Boundaries
Hays County Boundary
Jurisdiction
CITY
AUSTIN
BUDA
CITY OF HAYS
DRIPPING SPRINGS
KYLE
MOUNTAIN CITY
VILLAGE OF BEAR CREEK
Figure 1.
Study Streams
N
W
E
S
0 8,750 17,500 35,000 Feet
1 inch = 17,500 feet
HALFF
AUSTIN
DRIPPING SPRINGS
BEAR CREEK
HAYS
BUDA
MOUNTAIN CITY
KYLE

Figure 2: McGregor Lane overtopping during 2007 event

This report presents the results of hydrologic, hydraulic, and alternative analyses of the Onion Creek, Barton Creek, and Pedernales River watersheds. Halff Associates was responsible for existing and future conditions hydrologic and hydraulic models for Onion Creek, Barton Creek, Pedernales River and all designated study tributaries within Hays County. Halff Associates also performed the flood damage reduction alternative analysis for the study watersheds in Hays County. Items covered in this report include:

- Hydrologic Analysis
- Hydraulic Analysis
- Existing and Future Conditions Results
- Flood Damage Reduction Alternative Analysis
- Alternative Recommendation

2.0 Terrain

Watersheds and floodplain delineations were developed using the most recent Light Detection and Ranging (LiDAR) elevation data. The primary source of terrain data used was developed from the newly available 2006-2009 LiDAR data generated by Sanborn Map Company, Inc. The Hays County LiDAR data has an average spacing of 1.4 meters, and meets the FEMA requirements for bare earth vertical accuracy (Root Mean Square Error – RMSE) of 18.5 centimeters and horizontal accuracy (RMSE) of 1.0 meters. Hays County provided the county-wide LiDAR LAS files to FEMA. LAS files are the standard open format for storing LiDAR point records. The LAS file format (binary file format) is an alternative to proprietary systems or a generic ASCII file interchange system used by many companies that obtain LiDAR. FEMA's contractor then generated a county-wide bare earth terrain dataset using the Hays County LiDAR data. Please see Appendix A – Terrain Technical Report Notebook (TRN) provided by FEMA. Halff Associates received this bare earth terrain dataset for use in this project.

3.0 Hydrologic Analysis

Detailed hydrologic analyses were performed on the Onion and Barton Creek watersheds with the goal of providing validated base conditions models. These models were used in developing flood damage reduction alternatives and quantifying the impacts of these alternatives to the surrounding area. The hydrologic analyses were conducted with the aid of the US Army Corps of Engineers HEC-HMS software, version 3.5, and were used to develop peak flows and flow hydrographs for existing and future land use conditions 2-, 5-, 10-, 25-, 50-, 100-, 250-, and 500-year events. The Onion Creek hydrologic analysis included an update of the effective FIS hydrology model, whereas the Barton Creek hydrologic analysis was a new study. Frequency flows for the Pedernales River were derived from an existing gauge analysis and Pedernales Tributary flows were determined from the latest USGS regression equations. Further details of the Onion and Barton watershed hydrologic analyses and Pedernales watershed flow calculations can be found in the hydrology technical report notebooks in Appendix B. Sources for hydrologic methodologies are provided in the references section.

Routing hydraulic models were created for study reaches in the Onion and Barton Creek watersheds that coincided with those in the respective hydrology models. Storage-outflow tables were derived from the routing hydraulic models to be used as input for the Modified Puls routing method in the hydrology models. In many cases, structure and cross-section survey was incomplete when the routing models were finalized. Therefore, some structures were simply modeled using hand measurements made during field reconnaissance visits, which was adequate for routing purposes. However, all collected survey data was applied to the final hydraulic models. Routing level hydraulic models were not created for the Pedernales watershed since a hydrologic model was not created for this part of the study area. Further details of the Onion and Barton watershed routing hydraulic analyses can be found in the routing hydraulics technical report notebooks in Appendix C.

4.0 Hydraulic Analysis

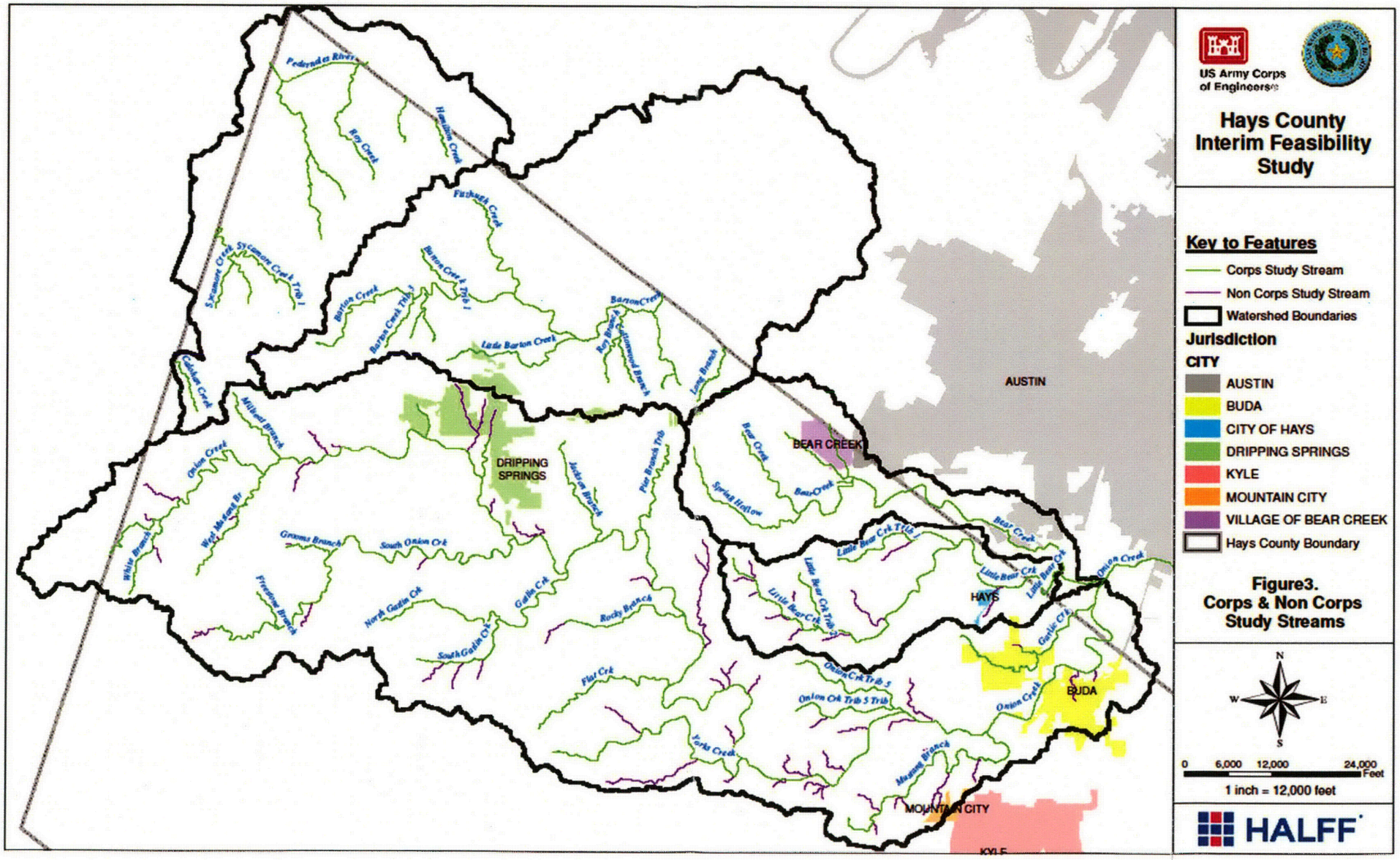
Final hydraulic analyses were performed for study streams in the Onion Creek, Barton Creek, and Pedernales River watersheds for a total study length of approximately 329 stream miles

using HEC-RAS software, version 4.1. Cross-section layouts were created for each study reach using HEC-GeoRAS tools in a Geographical Information System (GIS). Field Survey data was incorporated into the hydraulic models where available once cross-section layouts were imported into HEC-RAS 4.1. The hydraulic analysis was conducted to develop existing and future conditions peak stages for the 2-, 5-, 10-, 25-, 50-, 100-, 250-, and 500-year frequency events. Further details of the hydraulic analyses for the Onion Creek, Barton Creek, and Pedernales watersheds can be found in Appendix D. Hydraulic analyses for streams included in the Flood Protection Planning Study, but not included in the scope of the Corps of Engineers portion of the study were performed for Hays County, City of Dripping Springs, and City of Buda. Details of these extended hydraulic analyses are located in Appendices E, F, and G. Corps and non-Corps study reaches can be seen in Figure 3. Sources for hydraulic methodologies are provided in the references section.

5.0 Results of Hydrologic and Hydraulic Analyses

The hydrologic and hydraulic analyses for both existing and futures conditions resulted in validated flood hazard information that is useful for planning and regulatory purposes. Specifically, the analyses resulted in base flood elevations for the 2-, 5-, 10-, 25-, 50-, 100-, 250- and 500-year rainfall events and a floodplain for the 100-yr event throughout the Onion Creek, Barton Creek, and Pedernales River watersheds within Hays County. The resulting water surface elevations and floodplains for the 100-year frequency event are provided in the TRN workmaps included in Appendices D, E, F, and G.

The Onion and Barton Creek hydrologic models were calibrated to observed gage data from various flood events at the Driftwood and SH 71 USGS discharge gages, respectively. Regression flows for the Pedernales River watershed were adjusted to follow the trend of the calibrated Barton Creek hydrology results. Examples of calibrated hydrographs from the 1998 event for Onion Creek and 2002 event for Barton Creek are presented in Figures 4 and 5 below. Further details regarding the calibration and validation efforts for Onion and Barton Creek hydrology modeling can be found in the TRNs in Appendix B.


US Army Corps of Engineers
Hays County Interim Feasibility Study
Key to Features
Corps Study Stream
Non Corps Study Stream
Watershed Boundaries
Jurisdiction
CITY
AUSTIN
BUDA
CITY OF HAYS
DRIPPING SPRINGS
KYLE
MOUNTAIN CITY
VILLAGE OF BEAR CREEK
Hays County Boundary
Figure3.
Corps & Non Corps
Study Streams
N
W
E
S
0 6,000 12,000 24,000 Feet
1 inch = 12,000 feet
HALFF
AUSTIN
BEAR CREEK
DRIPPING SPRINGS
HAYS
BUDA
MOUNTAIN CITY
KYLE
Federnal River
Rob Creek
Hamilton Creek
Fitzhugh Creek
Sycamore Creek
Sycamore Creek Trib 1
Barton Creek
Barton Creek Trib 1
Little Barton Creek
Big Branch
Cottonwood Branch
Long Branch
Bear Creek
Spring Hollow
Little Bear Crk Trib
Little Bear Crk
Onion Creek
Garlic Crk
Onion Crk Trib 5
Onion Crk Trib 5 Trib
Caldwell Creek
Millwood Branch
Onion Creek
West Marbach Br
White Branch
Groums Branch
South Onion Crk
Freestone Branch
North Gatlin Crk
South Gatlin Crk
Gatlin Crk
Rocky Branch
Flat Crk
York Creek
Jackson Branch
Pier Branch Trib
Mearns Branch

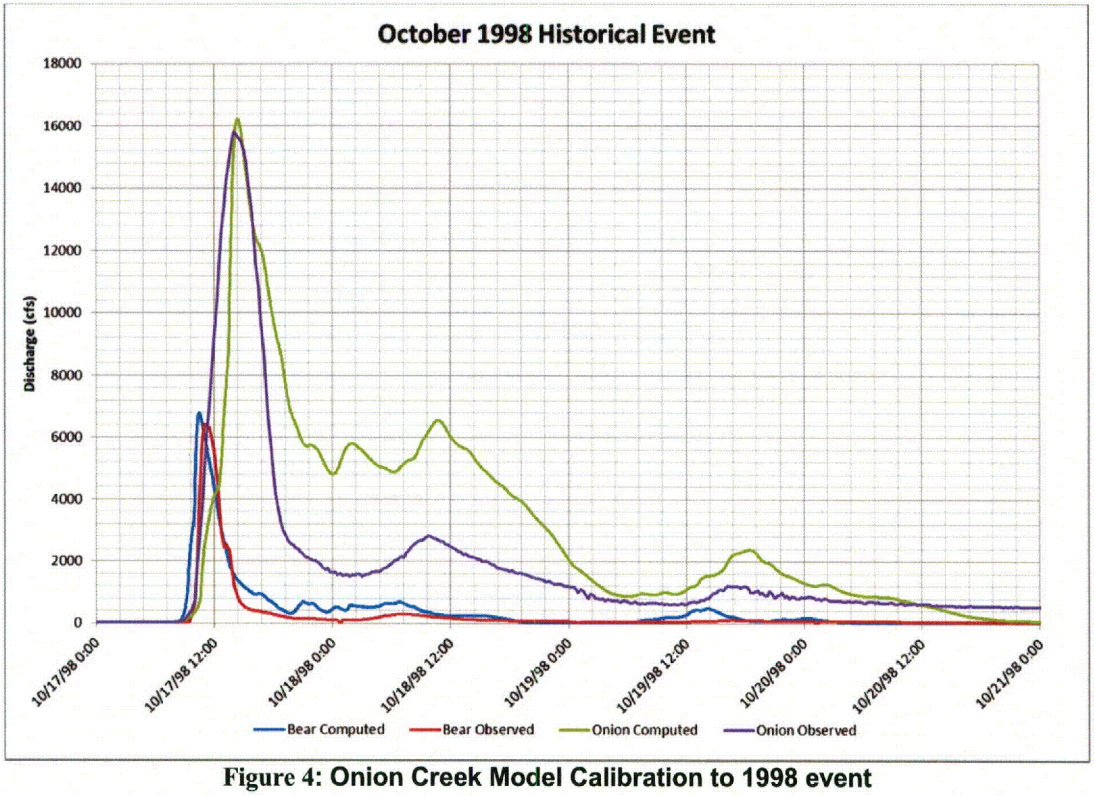


Figure 4: Onion Creek Model Calibration to 1998 event

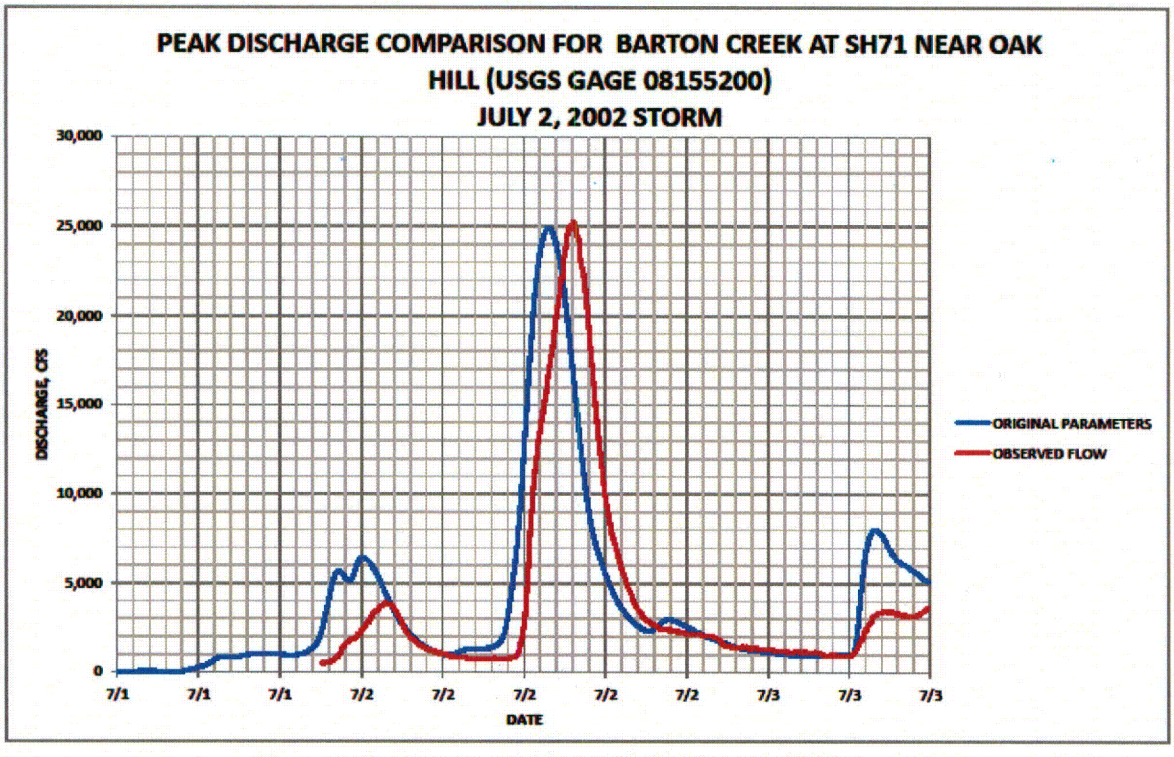


Figure 5: Barton Creek Model Calibration to 2002 event

6.0 Alternatives Analysis – City of Dripping Springs

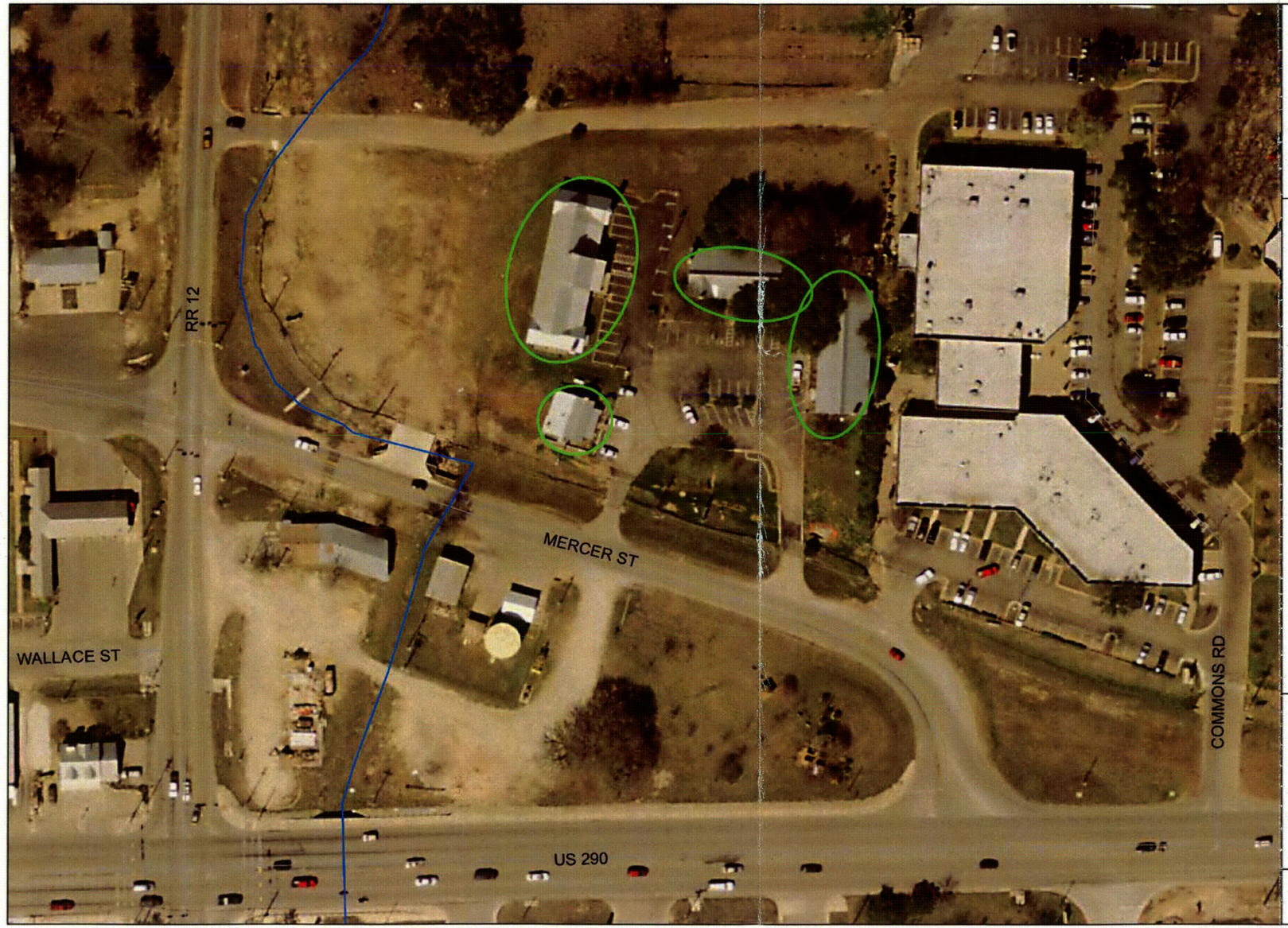
The most frequent flooding issues in the City of Dripping Springs occur upstream of US 290 on Willow Springs Creek. The limited capacity of the US 290 culvert and close proximity of upstream structures to the creek cause potentially significant flood damages upstream of US 290. The City of Dripping Springs became a participant in the Hays Flood Protection Planning Study to develop alternatives which reduce potential flood damages along Willow Springs Creek. A baseline alternative analysis was performed using hydraulic model results and impacts to existing structures.

A total of three structural alternatives and one non-structural alternative were evaluated for Willow Springs Creek. The first structural alternative involved removal of the Mercer Street crossing just upstream of US 290. According to the existing conditions hydraulic model, Mercer Street appeared to constrict the conveyance of floodwaters downstream. Analysis of the Mercer Street removal shows a minimal improvement in flood elevations limited to the area upstream of the removed crossing. However, compared to the relatively inexpensive cost of removal, the flood damage reduction benefit produces a favorable benefit-cost ratio that is greater than 1. The remaining two alternatives analyzed involve detaining or diverting flood waters from the affected area along Willow Springs Creek. Both the upstream detention pond and diversion to culverts under RR 12 are costly and have a benefit-cost ratio less than 1. However, the diversion culvert alternative produces the highest benefits essentially removing all structures upstream of US 290 from the floodplain. If benefits of this alternative resulting from increased development potential can be quantified, a more viable benefit-cost ratio may be produced. The scope of this study only involves the estimation of approximate flood damage reduction benefits as a means to compare the effectiveness of the proposed alternatives. Therefore, it is recommended that a more detailed analysis of flood reduction benefits and costs beyond that which is provided within the scope of this study be performed for the three structural alternatives. Benefit-cost ratios for the Dripping Springs alternatives are located in Table 2.

Non-structural City of Dripping Springs flood damage reduction alternatives considered include incorporation of data produced into the local floodplain ordinance and buyout of affected structures. All information produced from this study may be submitted to FEMA via the LOMR process and will be available to the City of Dripping Springs for regulation under their floodplain ordinance. A buyout option may be feasible for four buildings along the creek just north of Mercer Street (Figure 6). A benefit-cost ratio greater than one can be achieved assuming a cost equal to approximately 20% over appraised value. The results for the buyout alternative are also presented in Table 2. Further details of the alternatives analysis are located in Appendix H. A summary of environmental constraints associated with implementing the analyzed alternatives is located in Appendix I.

Table 2: Dripping Springs Benefit-Cost Ratios

Dripping Springs Alternatives					
Alternatives	**Without Project Damages**	**With Project Damages**	**Project Benefit**	**Probable Project Cost**	**Benefit to Cost Ratio**
Mercer Street Removal	$2,140,799	$1,991,630	$149,170	$90,000	1.66
Buyout	$2,140,799	$340,576	$1,800,223	$1,000,000	1.80
Detention Facility	$2,140,799	$764,604	$1,376,195	$2,300,000	0.60
Bypass Culvert	$2,140,799	$25,283	$2,115,516	$3,700,000	0.57



US Army Corps of Engineers

Hays County Interim Feasibility Study

Key to Features

- Willow Springs Creek
- Buyout Structures

Figure 6.
Dripping Springs Buyout Alternative

N
W E
S

0 20 40 80 120 160 Feet

1 inch = 80 feet

7.0 Alternative Analysis – City of Buda

The main flood damage concern for the City of Buda is associated with Buda Fire Department Station #1, located at 209 F.M. 2770. The fire station has been frequently flooded by local flow from a tributary to Onion Creek causing damage to the station and limiting emergency access. In fact, local personnel report that within the last 10 years the fire station has flooded with a minimum of 6 inches of water five times. The fire station is located on the south side of Jack C Hays Trail (F.M. 2770), approximately 700 feet west of the intersection of F.M. 2770 and Main Street. Preliminary hydraulic analysis shows the frequent flooding of the fire station is a result of insufficient existing culvert capacity at F.M. 2770 between South Austin Street and the fire station.

Three structural alternatives were analyzed to remove the fire station from the 100-yr floodplain and reduce flood damages. The structural alternatives consist of either upstream detention, improvements to the channel and culverts under FM 2770, or diversion of flood flows directly to Onion Creek upstream of the fire station. The detention alternative is the most costly as result of the large amount of excavation needed to obtain the required storage capacity. Channel modification and improvement of the culvert under FM 2770 is much less expensive, but might cause adverse impacts downstream without proper mitigation of increased flow. The diversion to Onion Creek is slightly more expensive, but has minimal downstream impacts. It is assumed that the Onion Creek channel has adequate capacity to convey the increased flows from the diversion without causing an increase in peak flows. Benefit-cost ratios for the three structural alternatives are presented in Table 3. Clearly the alternative costs outweigh the flood reduction benefits based solely on structure value. However, the benefits do not include improvements to the availability of emergency services during extreme flood events or damage to the equipment housed within the fire station. Improvement to the benefit-cost ratios could also be achieved by sizing the alternatives to prevent the fire station from flooding only during more frequent events (i.e. 2-, 5-, and 10-yr events).

Table 3: Buda Fire Station Benefit-Cost Ratios

Buda Fire Station Alternatives					
Alternatives	**Without Project Damages**	**With Project Damages**	**Project Benefit**	**Probable Project Cost**	**Benefit to Cost Ratio**
Culvert/Channel Mod.	$34,652	$0	$34,652	$776,641	0.045
Diversion to Onion	$34,652	$0	$34,652	$897,409	0.039
Upstream Detention	$34,652	$0	$34,652	$1,400,000	0.025

The non-structural solution suggested for the Buda fire station is to rebuild the station just to the southeast after adding enough fill to remove the new station from the floodplain. Further analysis will be required to ensure that adding fill to the proposed location will not cause negative downstream impacts. Further details of the alternatives analysis are located in Appendix H. A summary of environmental constraints associated with implementing the recommended alternatives is located in Appendix I.

8.0 Alternative Analysis – Hays County

There are two alternatives for Hays County to promote flood damage reduction as well as emergency accessibility. First, it is recommended that Hays County consider improving road crossings that do not effectively convey flood flows. County maintained roads should typically convey at least the 5-yr flow and State maintained roads should typically convey the 25-yr flow. A ranking scheme has been developed to determine which crossings require the most urgent attention. The ranking scheme is based on average annual daily traffic counts and frequency of flood-passed. The top three highest ranking crossing are RR 967 at Little Bear Creek, FM 1626 at Little Bear Creek, and RR 1826 at Bear Creek Tributary 1.

The second alternative is to consider one or more regional detention basins along Onion Creek to relieve flooding in the City of Buda and points further downstream. Three conceptual regional detention options were analyzed to determine their flood reduction effectiveness. The effects of detention at each location were analyzed both independently and in various combinations of simultaneous operation. When all three regional detention ponds are operated simultaneously, a 4-5 foot drop in 100-yr flood levels is experienced through the Buda area. Benefit-cost ratios of all seven regional detention alternatives are provided in Table 4. Other benefits of the regional detention ponds not accounted for in the ratios include possible water supply, recreational opportunities, and flood reduction downstream in Travis County. Further analysis is needed to quantify these additional benefits and compare them to probable project cost. Details of the structure ranking and regional detention alternatives can be found in Appendix H. A summary of environmental constraints associated with implementing the analyzed alternatives is located in Appendix I.

Table 4: Conceptual Regional Detention Benefit-Cost Ratios

Conceptual Regional Detention Alternatives					
Alternatives	**Without Project Damages**	**With Project Damages**	**Project Benefit**	**Probable Project Cost**	**Benefit to Cost Ratio**
Quarry Detention	$2,853,631	$2,609,321	$244,310	$7,184,076	0.034
Rattlesnake Detention	$2,853,631	$2,338,977	$514,654	$7,357,452	0.070
Quarry + Rattlesnake	$2,853,631	$2,288,286	$565,345	$14,541,528	0.039
Dripping Springs Detention	$2,853,631	$1,710,090	$1,143,541	$15,832,956	0.072
Quarry + Dripping Springs	$2,853,631	$1,632,925	$1,220,706	$23,017,032	0.053
Rattlesnake + Dripping Springs	$2,853,631	$1,498,477	$1,355,154	$23,190,408	0.058
Quarry +D. Springs +Rsnake	$2,853,631	$1,469,026	$1,384,605	$30,374,484	0.046

9.0 References

William Asquith and Meghan Roussel, U.S. Geological Survey, 2004, Atlas of Depth-Duration Frequency of Precipitation Annual Maxima for Texas SIR 2004-5041

Paul Rodman, U.S. Army Corps of Engineers, October 1977, Effects of urbanization on Various Frequency Peak Discharges

Thomas Nelson, U.S. Army Corps of Engineers, September 1970, Synthetic Unit Hydrograph Relationships, Trinity River Tributaries, Fort Worth-Dallas Urban Area

U.S. Army Corps of Engineers, September 1986, NUDALLAS Documentation and Supporting Appendices

William Asquith and Meghan Roussel, U.S. Geological Survey, 2009, Regression Equations for Estimation of Annual Peak-Streamflow Frequency for Undeveloped Watersheds in Texas Using an L-moment-Based, PRESS Minimized, Residual-Adjusted Approach SIR 2009-5087

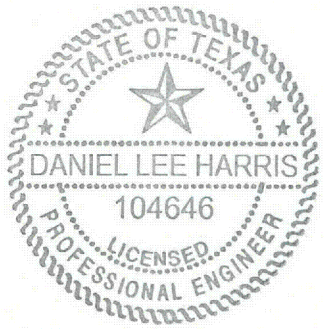
William Asquith, Raymond Slade Jr., J. L, Lanning-Rush, U.S. Geological Survey, 1996, Peak-Flow Frequency and Extreme Flood Potential for Streams in the Vicinity of the Highland Lakes, Central Texas WRIR 96-4072

US Army Corps of Engineers
Hays County, Texas
Lower Colorado River Basin
Hays County Interim Feasibility Study
Technical Report Notebook (TRN)
Appendix H
Alternatives Development and Benefit-Cost Analysis

Onion Creek, Bear Creek, Little Bear Creek, Barton Creek, and Pedernales River Watersheds

Submitted to:

US Army Corps of Engineers®



Daniel Lee Harris
10/18/2013
Firm #: 312

Prepared by:

HALFF
4030 WEST BRAKER LANE, SUITE 450
AUSTIN, TEXAS 78759

October 2013

Hays County Interim Feasibility Study
Alternative Development and Benefit-Cost Analysis

TABLE OF CONTENTS

LIST OF FIGURES

APPENDIX H.1

ALTERNATIVE DEVELOPMENT AND BENEFIT-COST ANALYSIS TECHNICAL REPORT NOTEBOOK

Overview:

The alternative identification, evaluation and recommendations for the Onion Creek, Bear Creek, Little Bear Creek, Barton Creek and Pedernales River basins in Hays County, Texas were performed by Halff Associates under contract with the U.S. Army Corps of Engineers (USACE). This study is part of the Hays County Interim Feasibility study undertaken by the U.S. Army Corps of Engineers in cooperation with Hays County, the Texas Water Development Board, and the Lower Colorado River Authority.

The Onion Creek watershed, which includes the Bear and Little Bear watersheds, is approximately 230 square miles with most of the area being located in Hays County. Detailed and limited detail hydrologic and hydraulic models have been developed for approximately 176 miles of study streams. The Barton Creek and Pedernales River watersheds within Hays County drain approximately 85 square miles. Detailed and limited detail hydrologic and hydraulic models have been developed for both Barton and Pedernales watersheds for approximately 65 miles of study streams.

The alternatives analysis task order focused on completing alternative development and evaluation for three Damage Centers in the Onion Creek watershed as follows:

Project 1 – Buda Fire Station Alternatives
Project 2 – Dripping Springs Alternatives
Project 3 – Onion Regional Detention Alternatives

The Study Area map in Figure 1 shows the location of these three primary damage centers. Development in the Barton Creek and Pedernales River watersheds is not dense and no areas with focused flood damages were defined.

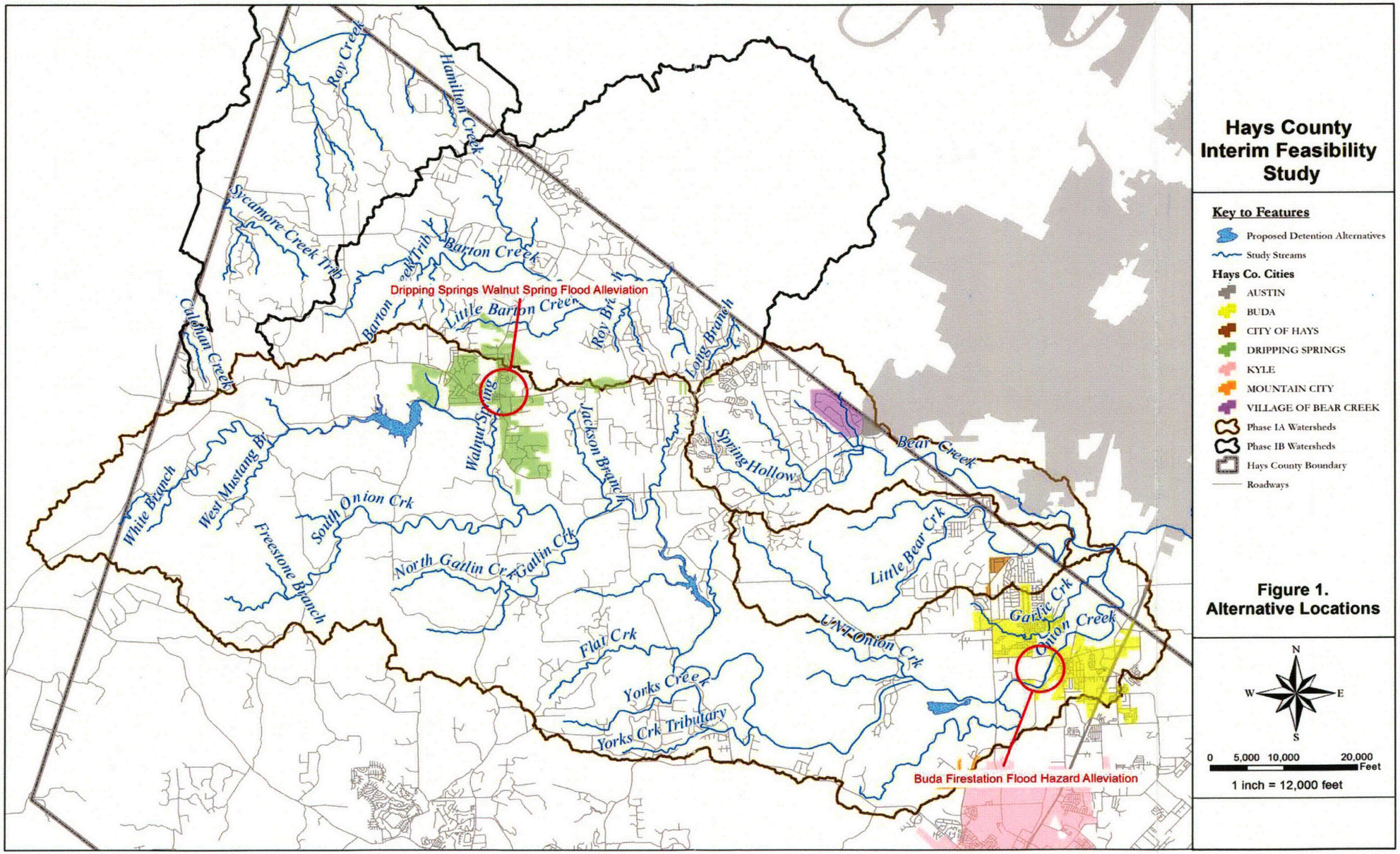
A fourth analysis is included that focuses on a "Structures Ranking" of the various roadway crossings throughout the project area relating the depth of water overtopping the roadway with the average daily traffic.

Alternatives Analysis Considerations:

The purpose of flood risk management studies is to identify and reduce the risk to people, property and the environment by identifying flood risks and bringing flood risk management projects online quickly and efficiently to realize the associated benefits to the local community.

This interim feasibility study has both existing and future condition modeling results. However, existing conditions models will be used for the alternatives analysis. The goals of this analysis are to 1) identify water resource related problems, needs and opportunities specifically related to flood risk management, 2) develop and evaluate alternative solutions to reduce flood damages, 3) use sustainable design methodologies, and 4) provide recommendations for flood reduction that the County can prioritize and implement locally to reduce flood risks to people and the environment.

Alternatives for each of the Damage Centers will be presented individually in the following sections. Each of the project locations presented a different set of hydrologic and hydraulic challenges. As potential alternatives were initially considered, some of them were intuitively


Roy Creek
Hamilton Creek
Sycamore Creek Trib
Barton Creek
Dripping Springs Walnut Spring Flood Alleviation
Little Barton Creek
Roy Branch
Long Branch
Calaban Creek
Walnut Spring
Jackson Branch
Spring Hollow
Bear Creek
White Branch
West Mustang Br
South Onion Crk
Freestone Branch
North Gatlin Cr
Gatlin Crk
Flat Crk
Yorks Creek
Yorks Crk Tributary
UNT Onion Crk
Little Bear Crk
Garlic Crk
Onion Creek
Buda Firestation Flood Hazard Alleviation
Hays County Interim Feasibility Study
Key to Features
Proposed Detention Alternatives
Study Streams
Hays Co. Cities
AUSTIN
BUDA
CITY OF HAYS
DRIPPING SPRINGS
KYLE
MOUNTAIN CITY
VILLAGE OF BEAR CREEK
Phase IA Watersheds
Phase IB Watersheds
Hays County Boundary
Roadways
Figure 1.
Alternative Locations
N
W
E
S
0 5,000 10,000 20,000 Feet
1 inch = 12,000 feet

not feasible and were not advanced. Generally, as the various alternatives were screened, plans were considered not viable if the plan would require substantial activity by others or were just not effective in solving the problem. Some alternatives could consist of phases that collectively will address a problem, but may not be able to be funded all at one time. The two main components leading toward an alternative's acceptability relate to implementation and satisfaction by the stakeholders. The proposed alternative must be doable.

The focus of this Task Order was not upon the creation of preliminary plan and profile sheets for construction projects, but instead was in the evaluation of "big-picture concepts" for each set of problems. Both structural and non-structural alternatives were examined. As the specific hydrologic and hydraulics problems at the Damage Centers were evaluated, the alternatives were held up against any environmental constraints that would affect compliance capability. Flood risk damages were identified, and general benefits were associated with each alternative (e.g., homes removed from flooding, structures removed, reduced floodplain area, minimized roadway overtopping). Conceptual design level estimates of project cost were also generated.

In an effort to determine acceptable levels of protection within each problem area, a wide range of flood events were evaluated (2-year to 500-year). Depending upon the needs of the problem area, either hydrologic, hydraulic, or both types of models were developed for specific alternatives. The models and output results for each alternative are included on the CD in Appendix H.3. Each of the subsequent project specific "mini-reports" included in Appendix H.1 contains details regarding the results of the modeling, specific maps depicting the alternatives, and opinions of probable cost for each project. Some of the project areas lend themselves to phased improvements, whereas others appear to have a single phased implementation strategy.

Benefit-Cost Analysis:

A benefit-cost (B/C) analysis was performed to determine the economic viability of the flood damage reduction alternatives in each project area. Benefit-to-cost ratios were developed on a present value basis with an estimated 50-yr project design life. Benefits for each project reflect reductions in flood damages over the "without project" condition.

Flood damages were calculated for each alternative by a simplified method using eight hydraulic profiles (2-yr, 5-yr, 10-yr, 25-yr, 50-yr, 100-yr, 250-yr, and 500-yr frequencies), appraised structure values, and approximate first floor elevations. Appraised structure values were taken from Hays County appraisal district records, and an inventory of structures within the 500-yr floodplain is included in Appendix H.2. Approximate first floor elevations were derived from slab thickness estimations collected during a windshield survey of structures along the study streams. The median slab thickness was added to a base elevation taken from LiDAR for all structures. The resulting elevation for each structure was compared to the elevations of the eight frequency profiles from the nearest model cross-section. Structure values were totaled for homes inundated by each frequency event and multiplied by the respective frequency. The resulting values for each frequency were added together resulting in an estimate of annual flood damages. An example calculation of average annual damages for the Dripping Springs "without project" condition is shown in Table 1. This process was performed for each reach affected by the flood reduction alternatives for the "without project" condition and each proposed alternative scenario.

Table 1: Annual Flood Damage Calculation Example

Recurrence Interval	Frequency	Structure Count	Appraised Value	Annual Damage
2-yr	0.5	0	$0	$0
5-yr	0.2	2	$323,630	$64,726
10-yr	0.1	2	$323,630	$32,363
25-yr	0.04	4	$598,500	$23,940
50-yr	0.02	6	$862,050	$17,241
100-yr	0.01	7	$1,005,740	$10,057
250-yr	0.004	8	$1,115,890	$4,464
500-yr	0.002	9	$1,165,510	$2,331
		Total Annual Damage		**$155,122**

Benefits for the benefit-cost ratios represent the reduction in damages provided by each flood reduction alternative. Damage reduction was determined by calculating the present value of the annual damages resulting from each scenario and subtracting the flood damage reduction results from the "without project" results. Present value for all alternatives was calculated based on a 50-yr project life and a 7% discount rate, which is the current rate prescribed in the latest update to Office of Management and Budget (OMB) circular A-94 for use in benefit-cost analysis. Benefit- cost ratios were then determined by dividing the respective flood damage reduction values by the cost associated with each scenario. Table 2 contains a summary of proposed alternatives and benefit-to-cost ratios for each of the three project areas listed.

Table 2: Summary of Proposed Alternatives

Project 1 - Buda Fire Station Alternatives					
Alternatives	**Without Project Damages**	**With Project Damages**	**Project Benefit**	**Project Cost**	**Benefit to Cost Ratio**
Culvert/Channel Mod.	$34,652	$0	$34,652	$776,641	0.045
Diversion to Onion	$34,652	$0	$34,652	$897,409	0.039
Upstream Detention	$34,652	$0	$34,652	$1,400,000	0.025
Project 2 - Dripping Springs Alternatives					
Alternatives	**Without Project Damages**	**With Project Damages**	**Project Benefit**	**Project Cost**	**Benefit to Cost Ratio**
Mercer Street Removal	$2,140,799	$1,991,630	$149,170	$90,000	1.66
Buyout	$2,140,799	$340,576	$1,800,223	$1,000,000	1.80
Detention Facility	$2,140,799	$764,604	$1,376,195	$2,300,000	0.60
Bypass Culvert	$2,140,799	$25,283	$2,115,516	$3,700,000	0.57

Project 3 - Conceptual Regional Detention					
Alternatives	**Without Project Damages**	**With Project Damages**	**Project Benefit**	**Project Cost**	**Benefit to Cost Ratio**
Quarry Detention	$2,853,631	$2,609,321	$244,310	$7,184,076	0.034
Rattlesnake Detention	$2,853,631	$2,338,977	$514,654	$7,357,452	0.070
Quarry + Rattlesnake	$2,853,631	$2,288,286	$565,345	$14,541,528	0.039
Dripping Springs Detention	$2,853,631	$1,710,090	$1,143,541	$15,832,956	0.072
Quarry + Dripping Springs	$2,853,631	$1,632,925	$1,220,706	$23,017,032	0.053
Rattlesnake + Dripping Springs	$2,853,631	$1,498,477	$1,355,154	$23,190,408	0.058
Quarry +D. Springs +Rsnake	$2,853,631	$1,469,026	$1,384,605	$30,374,484	0.046

Appendix H.1

Alternatives

HALFF

Project Area 1
Onion Creek
Buda Fire Station #1 Alternatives Analysis

Background:
The City of Buda and the United States Army Corps of Engineers (USACE) – Fort Worth District requested Halff Associates to perform an alternatives analysis to alleviate the existing flood hazard for a fire station (Buda Fire Department Station #1, 209 F.M. 2770). Local personnel report that within the last 10 years the fire station has flooded with a minimum of 6 inches of water five times. The fire station is located on the south side of Jack C Hays Trail (F.M. 2770), approximately 700 feet west of the intersection of F.M. 2770 and Main Street.

Hydraulic Analysis:
Halff Associate's preliminary hydraulic analysis shows that the frequent flooding of the fire station is a result of the capacity of the existing culverts crossing F.M. 2770 between South Austin Street and the fire station. Flood waters back up behind these culverts and continue to rise until F.M. 2770 is overtopped at a low point near Bartons Crossing (See Figure 1.1). When the flood waters begin to overtop F.M. 2770 the fire station is inundated by approximately 0.5 feet of water.

Project Description:
The proposed drainage improvement includes channelization that will redirect floodwaters upstream of the fire station underneath F.M. 2770 and discharge into Onion Creek (See Figure 1.2). The proposed channel is approximately 110 feet wide, 6 feet in depth, and 1100 feet long, with a cost of approximately $900,000 (see Table 1.1). This channel is intended to intercept floodwaters upstream of the fire station and direct them west under F.M. 2770 in three (3) 10' span by 8' rise reinforced concrete box culverts.

Summary:
The drainage improvements proposed by Halff will:

- Reduce the frequency of flooding to the fire station
- Reduces 100-year flow from 2,600 cfs to 260 cfs in the main channel
- Eliminates overtopping of F.M. 2770 during the 100-year (1% annual chance) flood
- Reduce the severity and frequency of flooding downstream of the fire station
- Provide easier mobilization of emergency vehicles from the fire station during a flood event
- Require easement acquisition to construct the channel from F.M. 2770 to Onion Creek
- May disrupt traffic along F.M. 2770 during the construction of the culverts servicing the bypass channel
- Estimated project cost of $900,000.

Table 1.1: Buda Fire Station Diversion/Channelization Alternative Opinion of Probable Cost

Buda Fire Station Alternative: Diversion/Channelization					
TxDOT ITEM NO.	DESCRIPTION OF ITEM	TOTAL QUANTITY	UNIT	UNIT PRICE	COST
502-2001	Barricades, Signs, and Traffic Handling	2	MO	$ 6,000.00	$ 12,000.00
110-2002	Channel Excavation	30,900	CY	$ 4.00	$ 123,600.00
	Soil Transport and Disposal	30,800	CY	$ 4.00	$ 123,200.00
400-2006	Cut and Restore Paving	800	SY	$ 50.00	$ 40,000.00
462-2032	Concrete Box Culvert (10 ft X 8 ft)	180	LF	$ 850.00	$ 153,000.00
466-2024	Wingwall	2	EA	$ 20,000.00	$ 40,000.00
450-2011	Guard Rail	600	LF	$ 60.00	$ 36,000.00
544-2001	Guard Rail End Treatment	4	EA	$ 2,000.00	$ 8,000.00
160-2003	Stockpiling and Placing Topsoil (4")	17,000	SY	$ 0.50	$ 8,500.00
5941-2014	Hydromulch Seeding	17,000	SY	$ 1.00	$ 17,000.00
169-2001	Soil Retention Blankets	10,200	SY	$ 1.00	$ 10,200.00
500-2001	Mobilization (10%)	1	LS	$ 57,150.00	$ 57,150.00
	Engineering Fees (10%)	1	LS	$ 61,665.00	$ 61,665.00
	SUBTOTAL				**$ 690,315.00**
	30% CONTINGENCY				**$ 207,094.50**
	TOTAL				**$ 897,409.50**

REFERENCE: Prices based on TXDoT Statewide Construction Average Low Bid Unit Price

NOTE: Exludes cost of land aquisition, environmental permitting, and the protection, relocation, and reconstruction of utilities

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater assurance as to the construction cost, he shall employ an independent cost estimator.

Other Alternatives:

In addition to the proposed channelization, Halff Associates also evaluated the feasibility of the following alternatives:

Detention

Detaining floodwater to decrease the flooding of the fire station was considered. To detain a sufficient volume of water to prevent flooding during the 100 year (1% annual chance) flood, over 400,000 cubic yards would need to be excavated. The cost of excavation alone would exceed $2,500,000. Reducing the flooding frequency of the fire station to the 25 year (4% annual chance) flood requires the excavation of approximately 210,000 cubic yards, yielding a total cost of excavation exceeding $1,400,000.

These costs do not include land acquisition, mobilization, design fees, and other costs that would be associated with the construction of a detention facility. Due to the costs associated with the excessive volume that needs to be detained, construction of a detention facility was determined not to be a feasible alternative when compared to the costs of the channelization project.

In-line channelization and culvert modification

Increasing the existing channel conveyance and adding additional culverts underneath F.M. 2770 was also considered. The preliminary conceptual project cost was calculated to be $780,000 as seen seen in Table 1.2 (approximately 15% lower than the recommended diversion channelization). However, costs for mitigating the increased downstream flooding and environmental permitting related to channelizing the existing creek are not included in the conceptual cost opinion, and these factors will likely drive the cost of in-line channelization higher than the proposed channel modification.

Table 1.2: Buda Fire Station "In-line" Channelization Alternative Opinion of Probable Cost

Buda Fire Station Alternative: "In-Line" Channelization					
TxDOT ITEM NO.	DESCRIPTION OF ITEM	TOTAL QUANTITY	UNIT	UNIT PRICE	COST
502-2001	Barricades, Signs, and Traffic Handling	2	MO	$ 6,000.00	$ 12,000.00
110-2002	Channel Excavation	7,000	CY	$ 4.00	$ 28,000.00
	Soil Transport and Disposal	6,900	CY	$ 4.00	$ 27,600.00
400-2006	Cut and Restore Paving	800	SY	$ 50.00	$ 40,000.00
462-2032	Concrete Box Culvert (10 ft X 8 ft)	390	LF	$ 850.00	$ 331,500.00
466-2024	Wingwall	2	EA	$ 25,000.00	$ 50,000.00
160-2003	Stockpiling and Placing Topsoil (4")	8,500	SY	$ 0.50	$ 4,250.00
5941-2014	Hydromulch Seeding	8,500	SY	$ 1.00	$ 8,500.00
169-2001	Soil Retention Blankets	1,800	SY	$ 1.00	$ 1,800.00
500-2001	Mobilization (10%)	1	LS	$ 50,365.00	$ 50,365.00
	Engineering Fees (10%)	1	LS	$ 55,401.50	$ 55,401.50
	SUBTOTAL				**$ 597,416.50**
	30% CONTINGENCY				**$ 179,224.95**
	TOTAL				**$ 776,641.45**

REFERENCE: Prices based on TXDoT Statewide Construction Average Low Bid Unit Price

NOTE: Exludes cost of land aquisition, environmental permitting, and the protection, relocation, and reconstruction of utilities

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater assurance as to the construction cost, he shall employ an independent cost estimator.

The non-structural solution suggested for the Buda fire station is to rebuild the station just to the southeast after adding enough fill to remove the new station from the floodplain. Further analysis will be required to ensure that adding fill to the proposed location will not cause negative downstream impacts. A probable cost estimate for adding fill and rebuilding the fire station is approximately $1,000,000. The benefit-cost ratio will be on the same order as the other alternatives.

Figure 1.1

Floodplain Exhibit

Buda Fire Station #1
Alternatives Analysis

Date Generated: August 22, 2012
AVO: 27759

N
W E
S

0 100 200 300 400
Feet

Legend

- Limits of Study
- Existing 100 Year Floodplain
- Onion Creek 100 Year Floodplain
- Proposed Diversion
- Tributary Centerline
- Proposed 100 Year Floodplain
- Fire Station

HALFF

BLUFF ST
S AUSTIN ST
BARTONS XING
S MAIN ST
COLE SPRINGS RD
FM 2770
SLOOP 4
Existing areas of expected roadway overtopping

I:\27000s\27759B\GIS\FS_Alts\MXDs\Floodplain_Exhibit11x17.mxd

Figure 1.2
Conceptual Grading Exhibit
Buda Fire Station #1
Alternatives Analysis

Date Generated: August 23, 2012
AVO: 27759

CITY OF BUDA

HALFF

Diversion Centerline Alignment

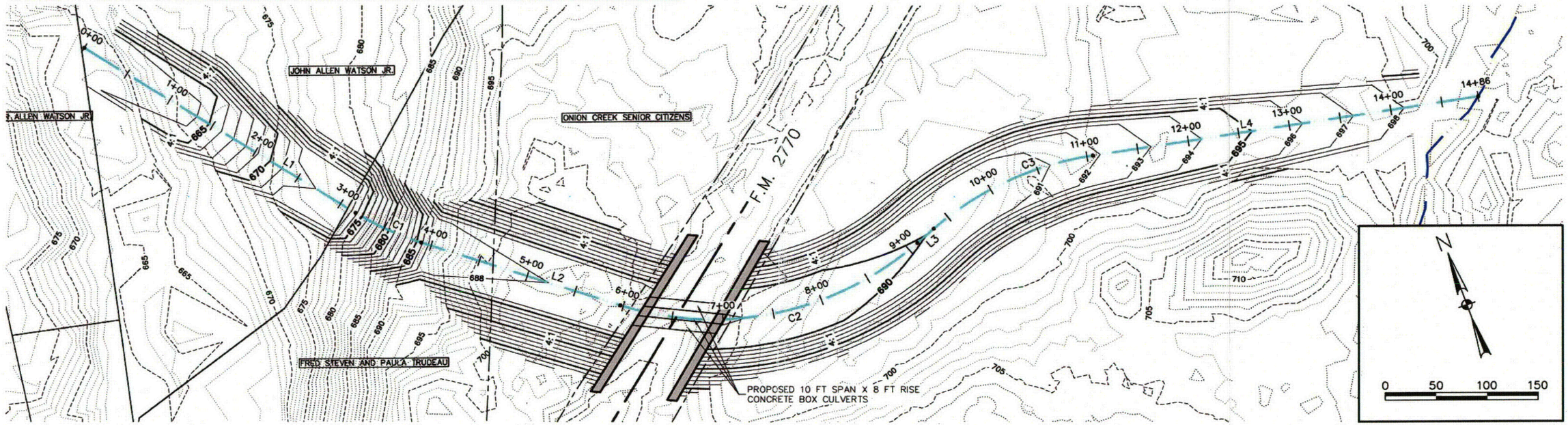
NUMBER	LENGTH	RADIUS	DELTA	LINE/CHORD BEARING	CHORD DISTANCE	START STATION	END STATION	START POINT	END POINT
L1	317.55'			S38° 58' 21"E		0+00.00	3+17.55	(2331587.56,13941308.55)	(2331787.28,13941061.67)
C1	72.07'	300.00'	13°45'52"	S45° 51' 17"E	71.90'	3+17.55	3+89.62	(2331787.28,13941061.67)	(2331838.87,13941011.60)
L2	207.35'			S52° 44' 12"E		3+89.62	5+96.96	(2331838.87,13941011.60)	(2332003.89,13940886.05)
C2	313.53'	300.00'	59°52'45"	S82° 40' 35"E	299.45'	5+96.96	9+10.49	(2332003.89,13940886.05)	(2332300.90,13940847.88)
L3	21.49'			N67° 23' 02"E		9+10.49	9+31.99	(2332300.90,13940847.88)	(2332320.74,13940856.15)
C3	173.85'	300.00'	33°12'10"	N83° 59' 07"E	171.43'	9+31.99	11+05.84	(2332320.74,13940856.15)	(2332491.22,13940874.11)
L4	380.15'			S79° 24' 48"E		11+05.84	14+85.98	(2332491.22,13940874.11)	(2332864.90,13940804.27)

LEGEND

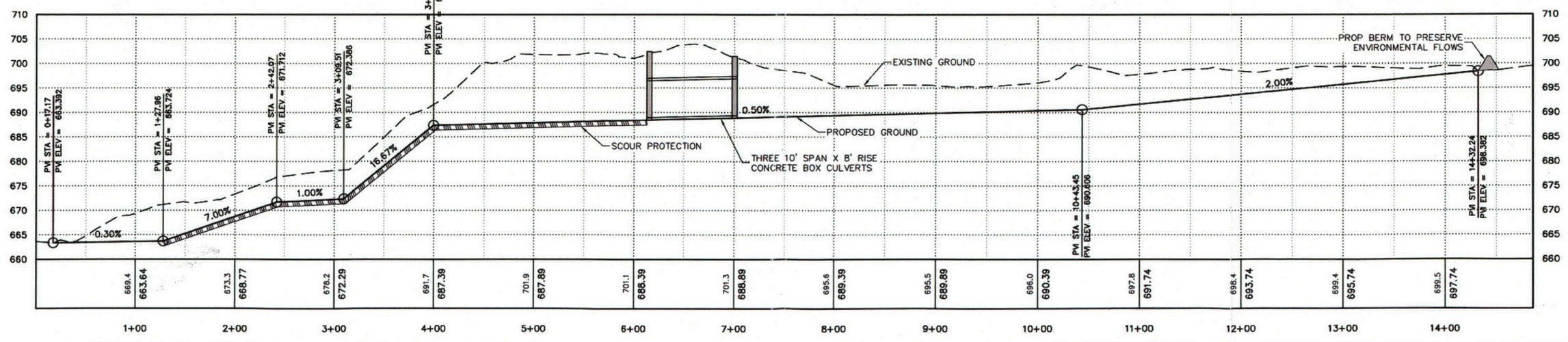
- PROPOSED DIVERSION
- EXISTING CONVEYANCE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR

EARTHWORK

CUT	FILL	NET (WASTE)
30,900 CY	100 CY	30,800 CY



Q(100) = 2,320 CFS



Project Area 2
Walnut Spring Creek
Dripping Springs Flooding Alternatives Analysis

Background:
The City of Dripping Springs and the United States Army Corps of Engineers (USACE) – Fort Worth District requested Halff Associates to perform an alternatives analysis to alleviate flooding caused by Walnut Spring near the intersection of R.M. 12 and U.S. 290. The capacity of the existing drainage infrastructure is sufficient to convey approximately the 10-year (10 percent annual chance) event without significant overtopping and property damage.

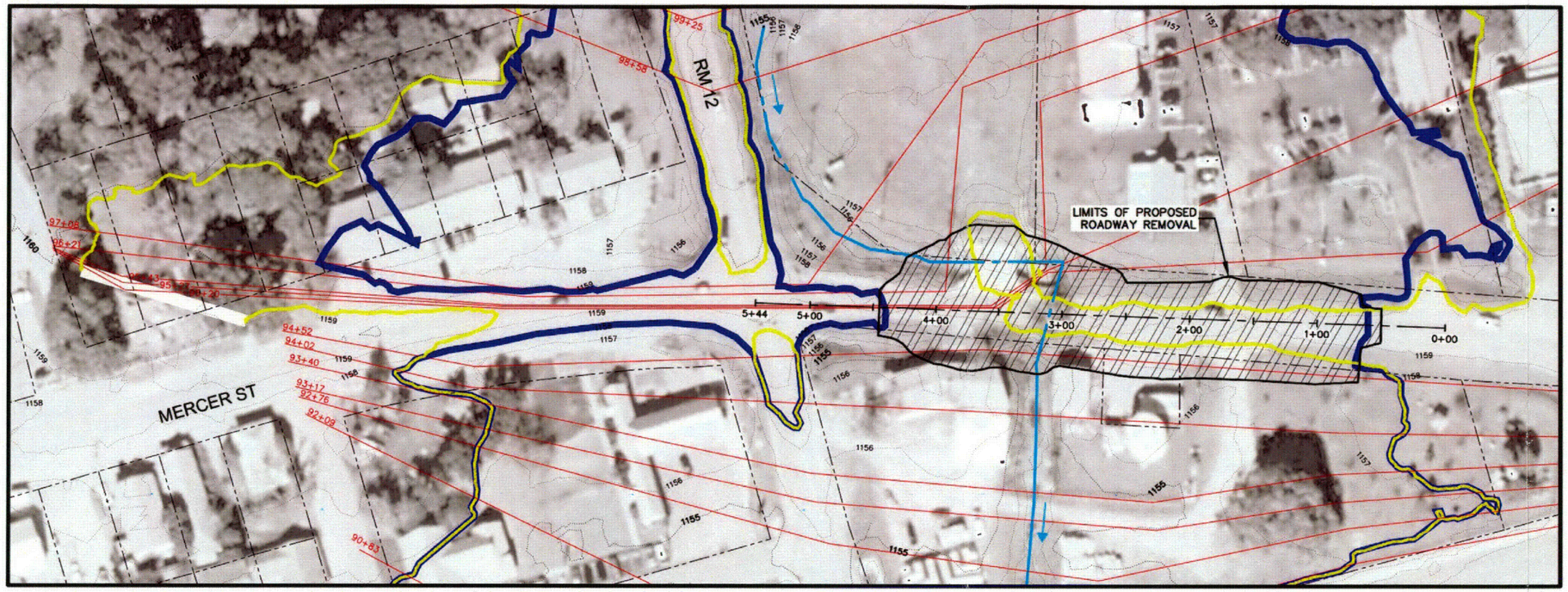
Alternatives Analysis:
Three structural and one non structural alternative were evaluated to alleviate the flooding in Dripping Springs. These alternatives are listed below.

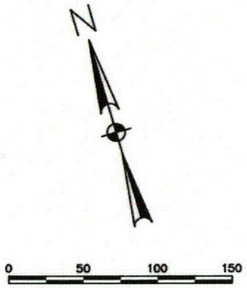
1) Removal of East Mercer Street from R.M. 12 to U.S. 290

Project Description:
Examination of the hydraulic characteristics of Walnut Spring Creek shows that Mercer Street blocks the conveyance of the 100 year event downstream. The removal of Mercer to the extents shown in Figures 2.1 and 2.2 was modeled to evaluate any impacts on the floodplain, and a summary of impacts is shown below.

Summary:
The proposed removal of East Mercer Street from R.M. 12 to U.S. 290 will:

- Remove 0 structures from the 100 year floodplain.
- Reduce the severity and frequency of flooding upstream of Mercer Street but have little or no impact downstream of Mercer Street, as shown in Figures 2.1 and 2.2.
- Reduce vehicular access to structures located in the vicinity.
- Increase the amount of right-turning traffic from Eastbound U.S. 290 onto R.M. 12 due to the inability for Mercer Street to accommodate through traffic, possibly impeding traffic on Eastbound U.S. 290.
- Have an estimated project cost of $90,000 (see Table 2.1).





LEGEND

1110	EXISTING CONTOUR
	PROPOSED 100 YEAR FLOODPLAIN
	EXISTING 100 YEAR FLOODPLAIN
84+02	HEC-RAS CROSS SECTION

EARTHWORK

CUT	FILL	NET (WASTE)
2,300 CY	100 CY	2,200 CY

HEC-RAS OUTPUT

River Sta	Existing Conditions 100 year Q Total (cfs)	Existing Conditions 100 year W.S. Elev (ft)	Post Project 100 year Q Total (cfs)	Post Project 100 year W.S. Elev (ft)	Decrease (ft)
11552	1692.01	1175.15	1692.01	1175.15	0.00
11431	1692.01	1174.17	1692.01	1174.13	0.04
11367	1692.01	1172.77	1692.01	1172.92	−0.15
11084	1692.01	1169.01	1692.01	1168.78	0.23
10648	1692.01	1162.00	1692.01	1162.21	−0.21
10063	1692.01	1161.12	1692.01	1159.75	1.37
9981	1692.01	1161.10	1692.01	1159.63	1.47
9925	1692.01	1161.10	1692.01	1159.63	1.47
9858	1692.01	1161.09	1692.01	1159.54	1.55
9708	1692.01	1161.07	1692.01	1159.35	1.72
9621	1692.01	1161.06	1692.01	1158.72	2.34
9543	1692.01	1161.05	1692.01	1158.15	2.90
9527	1692.01	1161.03	1692.01	1157.96	3.07
9520	1692.01	1161.04	1692.01	1157.94	3.10
9452	1692.01	1158.50	1692.01	1157.74	0.76
9402	1692.01	1157.36	1692.01	1157.36	0.00
9340	1692.01	1157.10	1692.01	1157.10	0.00
9317	1692.01	1157.09	1692.01	1157.09	0.00
9276	1692.01	1156.87	1692.01	1156.87	0.00
9209	1692.01	1155.96	1692.01	1155.96	0.00
9083	1692.01	1155.65	1692.01	1155.65	0.00
8929	1645.53	1154.24	1645.53	1154.24	0.00
8830	1611.13	1153.52	1611.13	1153.52	0.00
8728	1607.40	1152.91	1607.40	1152.91	0.00
8502	1607.40	1151.30	1607.40	1151.30	0.00
8494	1607.40	1151.32	1607.40	1151.32	0.00
8470	1607.40	1151.36	1607.40	1151.36	0.00
8402	1607.40	1149.17	1607.40	1149.17	0.00
8158	1607.40	1144.36	1607.40	1144.36	0.00
7910	1607.40	1135.65	1607.40	1135.65	0.00
7677	1607.40	1129.14	1607.40	1129.14	0.00

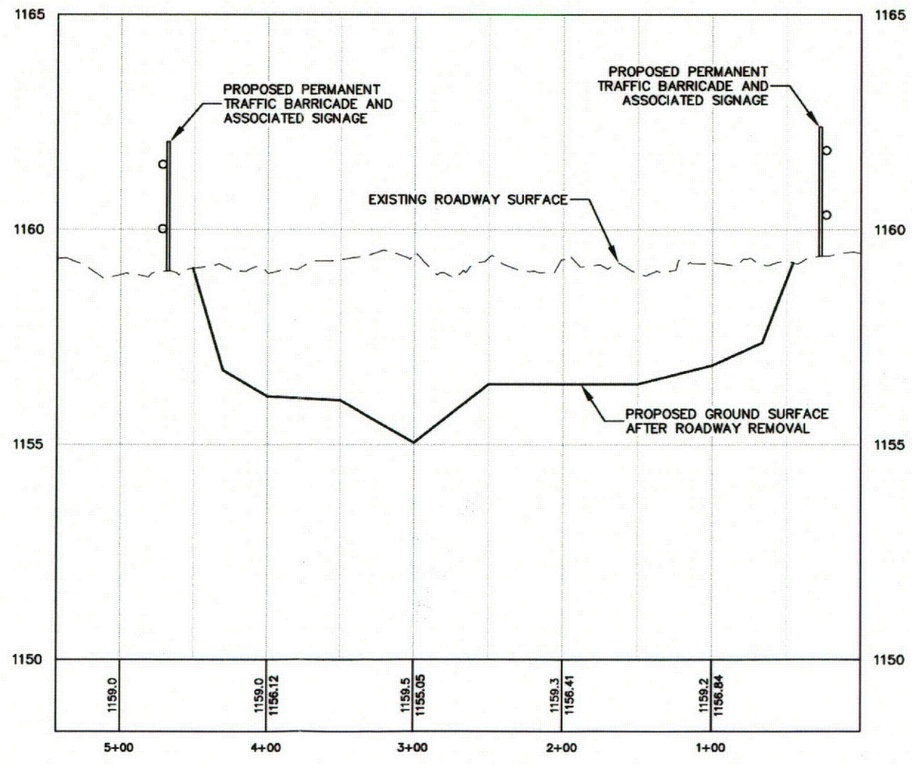


Figure 2.1

Conceptual Mercer Street Removal Analysis

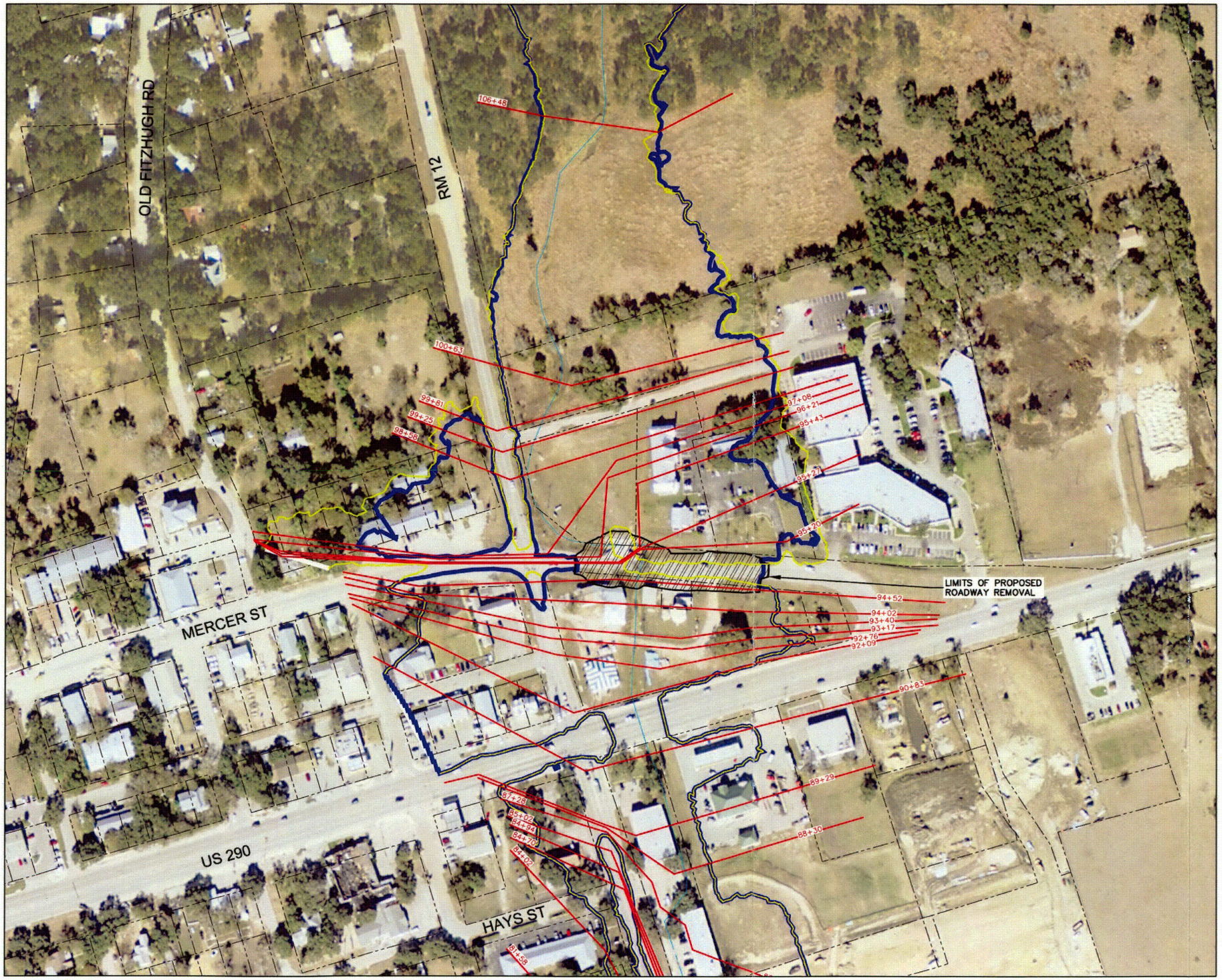
Walnut Spring
City of Dripping Springs
Alternatives Analysis

Date Generated: September 5, 2012
AVO: 27759

HALFF

N:30.194°, W:98.085°

2012.10.05 09:07 AM ch2544 i:\27000s\27759\CADD\Alternatives\DrippingSprings\Mercer...dB.dwg



N:30.194°, W:98.085°

2012.10.05 09:13 AM gh2544 I:\27000s\27759\CADD\Alternatives\DrippingSprings\Mercer_JB2.dwg

N

0 100 200 300

LEGEND

- 84+02 — HEC-RAS CROSS SECTION
- PROPOSED 100 YEAR FLOODPLAIN
- EXISTING 100 YEAR FLOODPLAIN

HEC-RAS OUTPUT

	Existing Conditions 100 year		Post Project 100 year		
River Sta	Q Total (cfs)	W.S. Elev (ft)	Q Total (cfs)	W.S. Elev (ft)	Decrease (ft)
11552	1692.01	1175.15	1692.01	1175.15	0.00
11431	1692.01	1174.17	1692.01	1174.13	0.04
11367	1692.01	1172.77	1692.01	1172.92	-0.15
11084	1692.01	1169.01	1692.01	1168.78	0.23
10648	1692.01	1162.00	1692.01	1162.21	-0.21
10063	1692.01	1161.12	1692.01	1159.75	1.37
9981	1692.01	1161.10	1692.01	1159.63	1.47
9925	1692.01	1161.10	1692.01	1159.63	1.47
9858	1692.01	1161.09	1692.01	1159.54	1.55
9708	1692.01	1161.07	1692.01	1159.35	1.72
9621	1692.01	1161.06	1692.01	1158.72	2.34
9543	1692.01	1161.05	1692.01	1158.15	2.90
9527	1692.01	1161.03	1692.01	1157.96	3.07
9520	1692.01	1161.04	1692.01	1157.94	3.10
9452	1692.01	1158.50	1692.01	1157.74	0.76
9402	1692.01	1157.36	1692.01	1157.36	0.00
9340	1692.01	1157.10	1692.01	1157.10	0.00
9317	1692.01	1157.09	1692.01	1157.09	0.00
9276	1692.01	1156.87	1692.01	1156.87	0.00
9209	1692.01	1155.96	1692.01	1155.96	0.00
9083	1692.01	1155.65	1692.01	1155.65	0.00
8929	1645.53	1154.24	1645.53	1154.24	0.00
8830	1611.13	1153.52	1611.13	1153.52	0.00
8728	1607.40	1152.91	1607.40	1152.91	0.00
8502	1607.40	1151.30	1607.40	1151.30	0.00
8494	1607.40	1151.32	1607.40	1151.32	0.00
8470	1607.40	1151.36	1607.40	1151.36	0.00
8402	1607.40	1149.17	1607.40	1149.17	0.00
8158	1607.40	1144.36	1607.40	1144.36	0.00
7910	1607.40	1135.65	1607.40	1135.65	0.00
7677	1607.40	1129.14	1607.40	1129.14	0.00

Figure 2.2

Conceptual Mercer Street Removal Analysis

Walnut Spring
City of Dripping Springs
Alternatives Analysis

Date Generated: September 5, 2012
AVO: 27759

HALFF

Table 2.1: Walnut Spring Creek Mercer Street Removal Alternative Opinion of Probable Cost

Walnut Spring Alternative Analysis: Mercer Street Demolition					
TxDOT ITEM NO.	DESCRIPTION OF ITEM	TOTAL QUANTITY	UNIT	UNIT PRICE	COST
502-2001	Barricades, Signs, and Traffic Handling	2	MO	$ 6,000.00	$ 12,000.00
105-2008	Removing Stab. Base and Asphalt Pavment	1,200	SY	$ 10.00	$ 12,000.00
110-2002	Excavation	2,300	CY	$ 4.00	$ 9,200.00
	Soil Transport and Disposal	2,200	CY	$ 4.00	$ 8,800.00
514-2016	Permanent Traffic Barrier	50	LF	$ 100.00	$ 5,000.00
160-2003	Furnishing and Placing Topsoil (4")	3,800	SY	$ 0.50	$ 1,900.00
5941-2014	Hydromulch Seeding	3,800	SY	$ 1.00	$ 3,800.00
169-2001	Soil Retention Blankets	3,800	SY	$ 1.00	$ 3,800.00
500-2001	Mobilization (10%)	1	LS	$ 5,650.00	$ 5,650.00
	Engineering Fees (10%)	1	LS	$ 6,215.00	$ 6,215.00
	SUBTOTAL				**$ 68,365.00**
	30% CONTINGENCY				**$ 20,509.50**
	TOTAL				**$ 88,874.50**

REFERENCE: Prices based on TXDoT Statewide Construction Average Low Bid Unit Price

NOTE: Exludes cost of land aquisition, environmental permitting, and the protection, relocation, and reconstruction of utilities

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater assurance as to the construction cost, he shall employ an independent cost estimator.

2) Detention North (Upstream) of Mercer Street

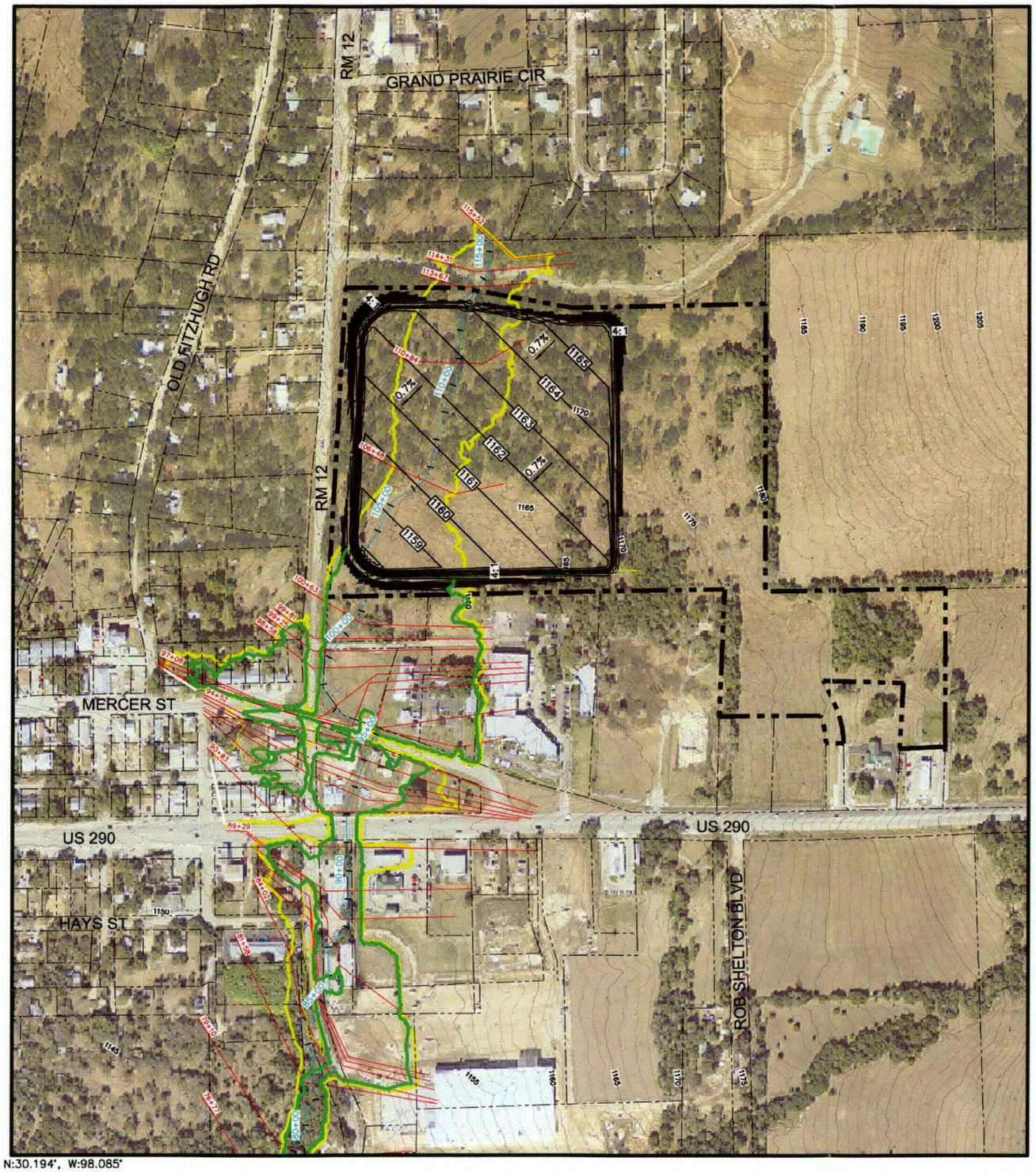
Project Description:

In an effort to more aggressively alleviate flooding through downtown Dripping Springs, a 19 acre detention facility was analyzed. The proposed detention facility is located on a private, undeveloped parcel of land approximately 140 feet north of the intersection of East Mercer and U.S. 290 (see Figure 2.3).

Summary:

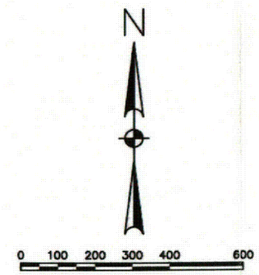
The proposed detention North of Mercer Street will:

- Remove 3 structures from the 100 year floodplain.
- Reduce the 100 year flow through downtown Dripping Springs by 60% (from 1,690 cfs to 680 cfs), reducing the severity and frequency downstream of the detention pond.
- Require the acquisition of land for the construction of the detention pond.
- Impact traffic minimally since the project does not include any roadway modifications.
- Have an estimated project cost of $2,300,000 (see Table 2.2).



N:30.194°, W:98.085°

2012.10.05 09:56 AM dh2544 I:\27000s\27759\C400\Alternatives\DrippingSprings\DrippingSpringsDetention_ITS_1_1_3424.dwg

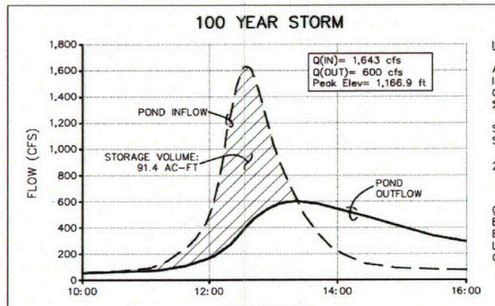


DETENTION POND VOLUME

Stage (ft)	Area (Ac)	$A_1+A_2+\sqrt{(A_1 A_2)}$	Volume (Ac-ft)	Storage (Ac-ft)
1158	0	0.000	0.000	0.000
1159	0.9193	0.919	0.306	0.306
1160	2.7623	5.275	1.758	2.065
1161	5.5410	12.216	4.072	6.137
1162	9.2358	21.930	7.310	13.447
1163	12.9552	33.130	11.043	24.490
1164	15.8747	43.171	14.390	38.880
1165	17.7828	50.459	16.820	55.700
1166	18.7299	54.763	18.254	73.954
1167	19.0511	56.671	18.890	92.845

$$\text{Volume} = \left[\frac{A_1+A_2+\sqrt{(A_1 A_2)}}{3}\right](\Delta \text{ Elevation})$$

100 YEAR STORM



INFLOW BASIN PARAMETERS:

AREA: 0.584 SQ MI
INITIAL ABSTRACTIONS: 0.50 in
CURVE NUMBER: 81
% IMPERVIOUS: 20%

SNYDER LAG: 0.56 HR
SNYDER Cp: 0.75

24 HR/100 YR STORM: 10.2 in

OUTLET ASSUMPTIONS
BROAD CRESTED WEIR
ELEVATION: 1158.0 ft
LENGTH: 7.5 ft
COEFFICIENT: 3.0

EARTHWORK

CUT	FILL	NET (WASTE)
138,500 CY	7,200 CY	131,300 CY

HEC-RAS OUTPUT

	Existing Conditions 100 year		Post Detention 100 year		
River Sta	Q Total (cfs)	W.S. Elev (ft)	Q Total (cfs)	W.S. Elev (ft)	Decrease (ft)
10063	1692	1161.12	682	1159.62	1.50
9981	1692	1161.10	682	1159.60	1.50
9925	1692	1161.10	682	1159.58	1.52
9858	1692	1161.09	682	1159.56	1.53
9708	1692	1161.07	682	1159.54	1.53
9621	1692	1161.06	682	1159.52	1.54
9543	1692	1161.05	682	1159.47	1.58
9527	1692	1161.03	682	1158.94	2.09
9520	1692	1161.04	682	1158.92	2.12
9452	1692	1158.50	682	1156.71	1.79
9402	1692	1157.36	682	1156.29	1.07
9340	1692	1157.10	682	1156.16	0.94
9317	1692	1157.09	682	1156.06	1.03
9276	1692	1156.87	682	1155.85	1.02
9209	1692	1155.96	682	1154.70	1.26
9083	1692	1155.65	682	1154.23	1.42
9082	Lat Struct		Lat Struct		
8929	1646	1154.24	682	1152.98	1.26
8830	1611	1153.52	682	1152.51	1.01
8728	1607	1152.91	682	1152.23	0.68
8502	1607	1151.30	682	1150.32	0.98
8494	1607	1151.32	682	1150.35	0.97
8470	1607	1151.36	682	1150.37	0.99
8402	1607	1149.17	682	1147.84	1.33
8158	1607	1144.36	682	1142.65	1.71
7910	1607	1135.65	682	1132.29	3.36
7677	1607	1129.14	682	1128.95	0.19

LEGEND

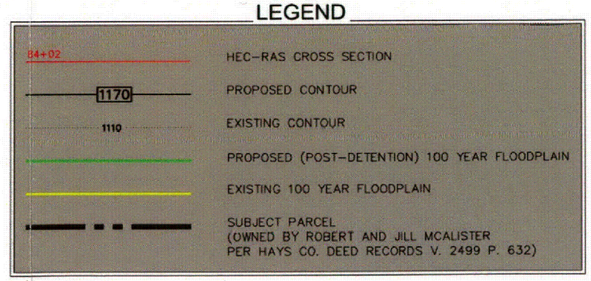


Figure 2.3

Conceptual Detention Analysis

Walnut Spring
City of Dripping Springs
Alternatives Analysis

Date Generated: August 28, 2012
AVO: 27759

HALFF

Table 2.2: Walnut Spring Creek Upstream Detention Alternative Opinion of Probable Cost

Walnut Spring Alternative Analysis: Upstream Detention Pond					
TxDOT ITEM NO.	DESCRIPTION OF ITEM	TOTAL QUANTITY	UNIT	UNIT PRICE	COST
502-2001	Barricades, Signs, and Traffic Handling	2	MO	$ 6,000.00	$ 12,000.00
2022-2003	Site Preparation and Restoration	1	EA	$ 20,000.00	$ 20,000.00
752-2024	Tree Removal (18"-24" Dia)	100	EA	$ 850.00	$ 85,000.00
110-2002	Excavation	140,000	CY	$ 4.00	$ 560,000.00
	Soil Transport and Disposal	135,000	CY	$ 4.00	$ 540,000.00
420-2011	Class 'C' Concrete Retaining Wall	140	CY	$ 700.00	$ 98,000.00
432-2066	Class 'B' Concrete Rip-Rap	3	CY	$ 350.00	$ 1,050.00
160-2003	Stockpiling and Placing Topsoil (4")	96,800	SY	$ 0.50	$ 48,400.00
5941-2014	Hydromulch Seeding	96,800	SY	$ 1.00	$ 96,800.00
169-2001	Soil Retention Blankets	10,000	SY	$ 1.00	$ 10,000.00
500-2001	Mobilization (10%)	1	LS	$ 147,125.00	$ 147,125.00
	Engineering Fees (10%)	1	LS	$ 161,837.50	$ 161,837.50
	SUBTOTAL				**$ 1,780,212.50**
	30% CONTINGENCY				**$ 534,063.75**
	TOTAL				**$ 2,314,276.25**

REFERENCE: Prices based on TXDoT Statewide Construction Average Low Bid Unit Price

NOTE: Exludes cost of land aquisition, environmental permitting, and the protection, relocation, and reconstruction of utilities

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater assurance as to the construction cost, he shall employ an independent cost estimator.

3) Bypass Culvert Under R.M. 12

Project Description:

The most beneficial but highest cost alternative analyzed was the diversion of flows from Walnut Springs Creek to culverts that extend from approximately 1,000 feet north of U.S. 290 to approximately 1,060 feet south of U.S. 290, discharging back into Walnut Spring Creek (see Figures 2.4 and 2.5). The project would also include a 1,000 foot berm located on the north side of the culverts to funnel floodwaters into the culverts.

Summary:

The proposed bypass culvert under R.M. 12 will:

- Remove 15 structures from the 100 year floodplain.
- Remove 22.6 acres along the culvert from the 100 year floodplain.
- Divert the 100-year flow to the culvert, reducing the 100-year flow through downtown Dripping Springs to that produced from local drainage.

- Require easement acquisition due to the inundation of approximately 3.5 acres north of the proposed berm.
- Disrupt traffic due to the placement of the culvert underneath R.M. 12 for approximately 1,700 feet, including the crossing of U.S. 290.
- Have an estimated project cost of $3,700,000 (See Table 2.3).

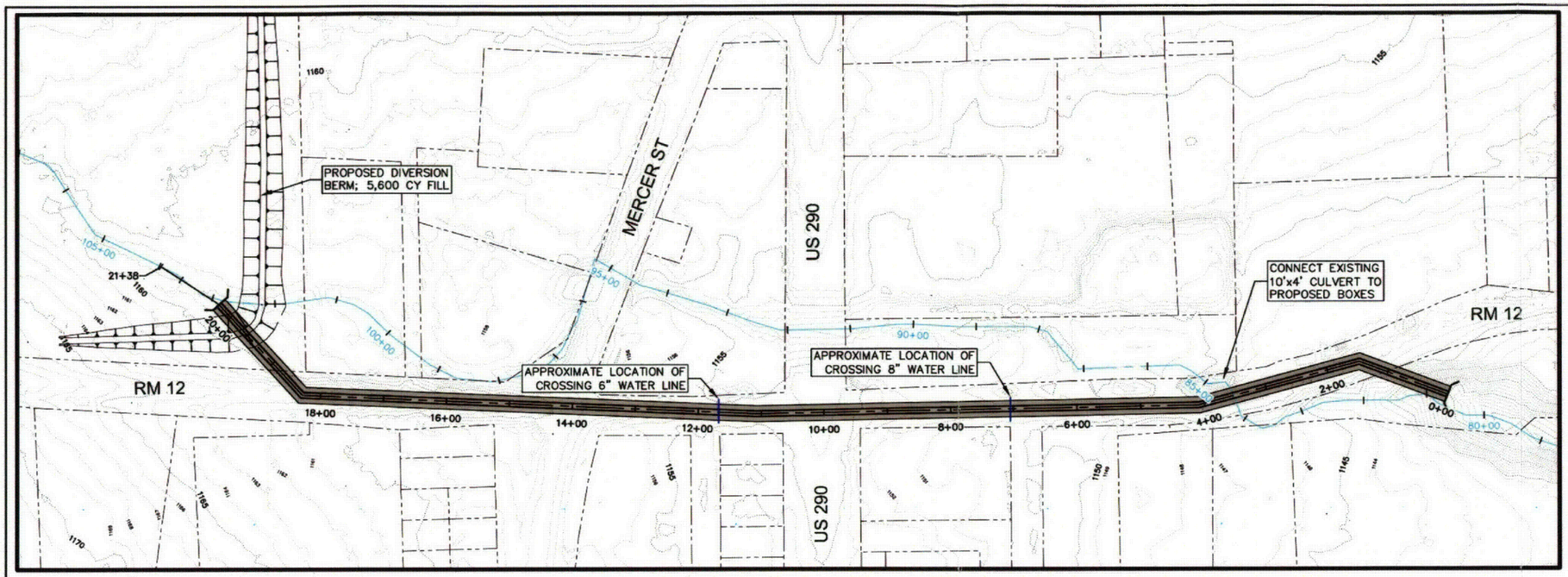
Table 2.3: Walnut Spring Creek RR 12 Bypass Culvert Alternative Opinion of Probable Cost

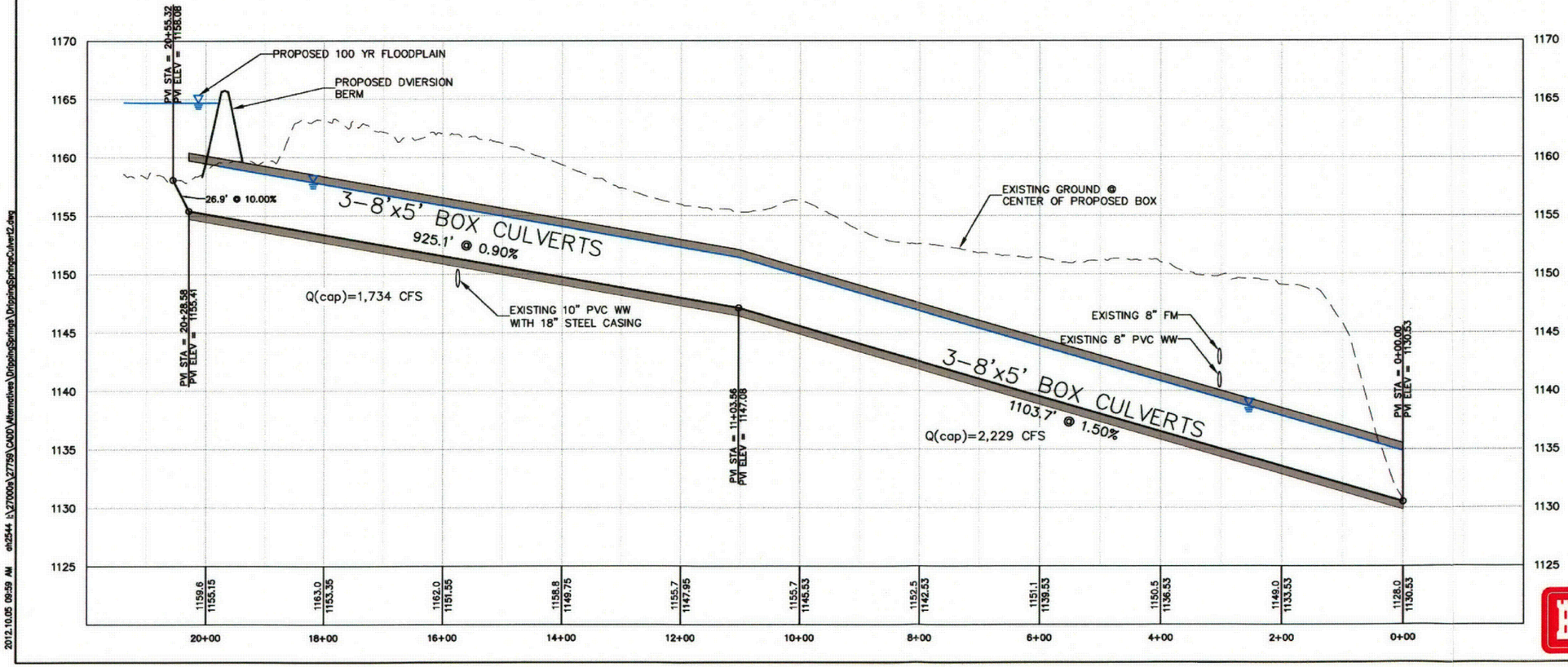
Walnut Spring Alternative Analysis: RR 12 Bypass Culvert					
TxDOT ITEM NO.	DESCRIPTION OF ITEM	TOTAL QUANTITY	UNIT	UNIT PRICE	COST
502-2001	Barricades, Signs, and Traffic Handling	9	MO	$ 12,000.00	$ 108,000.00
400-2006	Cut and Restore Paving	5,700	SY	$ 40.00	$ 228,000.00
402-2001	Trench Excavation Protection	2,000	LF	$ 10.00	$ 20,000.00
462-2020	Concrete Box Culvert (8 ft X 5 ft)	6,300	LF	$ 300.00	$ 1,890,000.00
465-2733	Junction Box	1	EA	$ 11,000.00	$ 11,000.00
5946-2159	Sewer Manhole 4' Dia (14'-16' Depth)	1	EA	$ 7,000.00	$ 7,000.00
466-2024	Wingwall	2	EA	$ 25,000.00	$ 50,000.00
132-2007	Type 'D' Embankment	4,700	CY	$ 10.00	$ 47,000.00
160-2003	Furnishing and Placing Topsoil (4")	600	SY	$ 0.50	$ 300.00
5941-2014	Hydromulch Seeding	600	SY	$ 1.00	$ 600.00
169-2001	Soil Retention Blankets	600	SY	$ 1.00	$ 600.00
500-2001	Mobilization (10%)	1	LS	$ 236,250.00	$ 236,250.00
	Engineering Fees (10%)	1	LS	$ 259,875.00	$ 259,875.00
	SUBTOTAL				**$ 2,858,625.00**
	30% CONTINGENCY				**$ 857,587.50**
	TOTAL				**$ 3,716,212.50**

REFERENCE: Prices based on TXDoT Statewide Construction Average Low Bid Unit Price

NOTE: Exludes cost of land aquisition, environmental permitting, and the protection, relocation, and reconstruction of utilities

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater assurance as to the construction cost, he shall employ an independent cost estimator.





N

0 50 100 200 300

N:30.191°, W:98.087°

NOTE:

THE PROPOSED CULVERTS WERE DESIGNED WITH A GRAVITY CAPACITY GREATER THAN THE 100 YEAR DESIGN STORM. THIS IS TO ACCOUNT FOR ANTICIPATED MINOR HYDRAULIC LOSSES. ADDITIONALLY, THE SYSTEM IS INLET CONTROLLED AND REQUIRES AN UPSTREAM BERM TO DEVELOP SUFFICIENT HEAD TO INTERCEPT THE 100 YEAR (1,600 CFS) STORM.

Figure 2.4

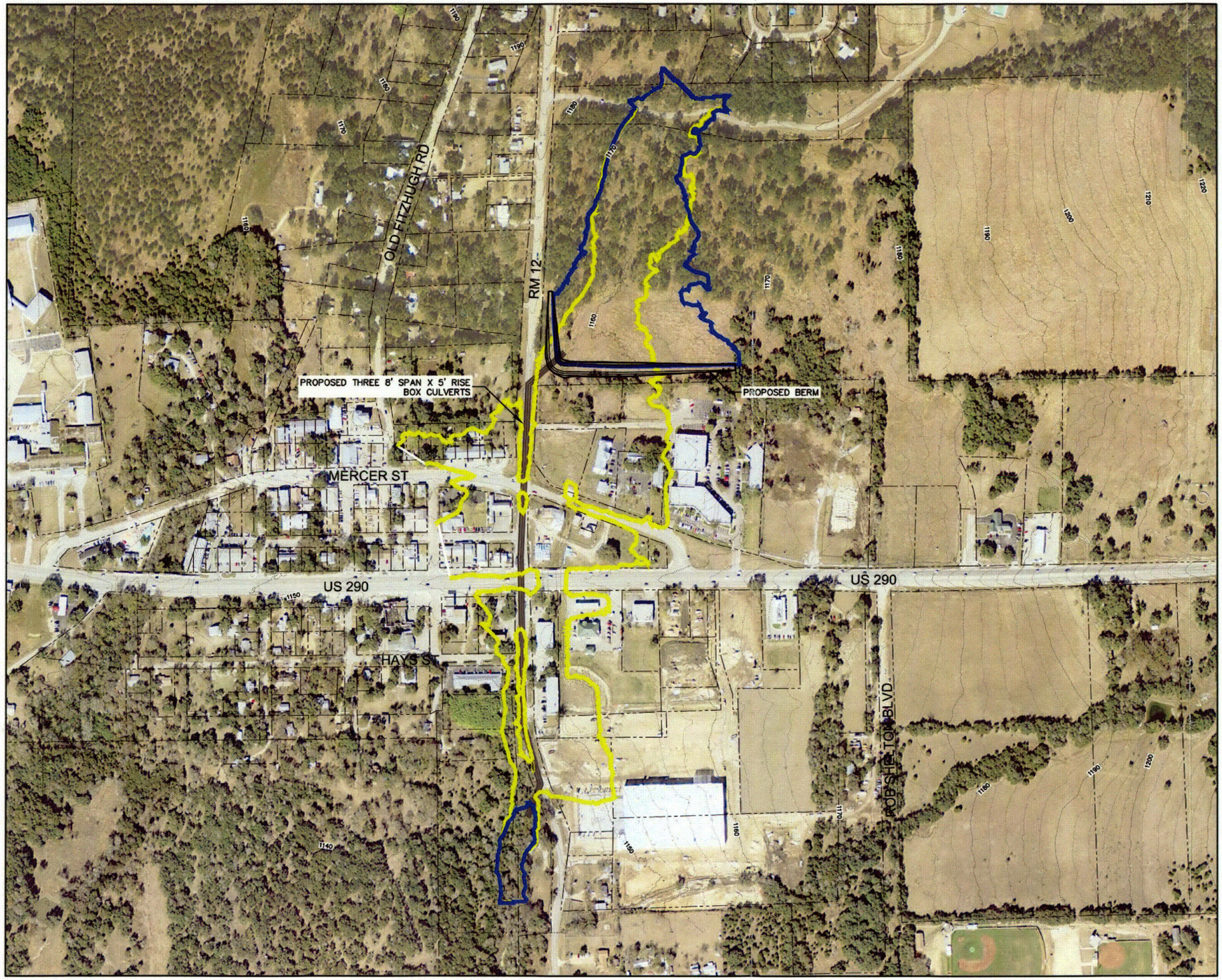
Conceptual Bypass Culvert Analysis

Walnut Spring
City of Dripping Springs
Alternatives Analysis

Date Generated: August 28, 2012
AVO: 27759

HALFF

2012.10.05 09:59 AM ch2544 I:\27000s\27759\CADD\Alternatives\DrippingSprings\DrippingSpringsCulvert2.dwg



N

0 200 400 600

LEGEND

PROPOSED 100 YEAR FLOODPLAIN

EXISTING 100 YEAR FLOODPLAIN

Number of structures/businesses/houses removed from the floodplain =	15
Area of floodplain reclaimed south of the proposed berm =	22.6 acres
Area of additional floodplain due to backwater from proposed berm =	3.5 acres

Figure 2.5

Conceptual Bypass Culvert Analysis

Walnut Spring
City of Dripping Springs
Alternatives Analysis

Date Generated: September 26, 2012
AVO: 27759

HALFF

N:30.194°, W:98.085°

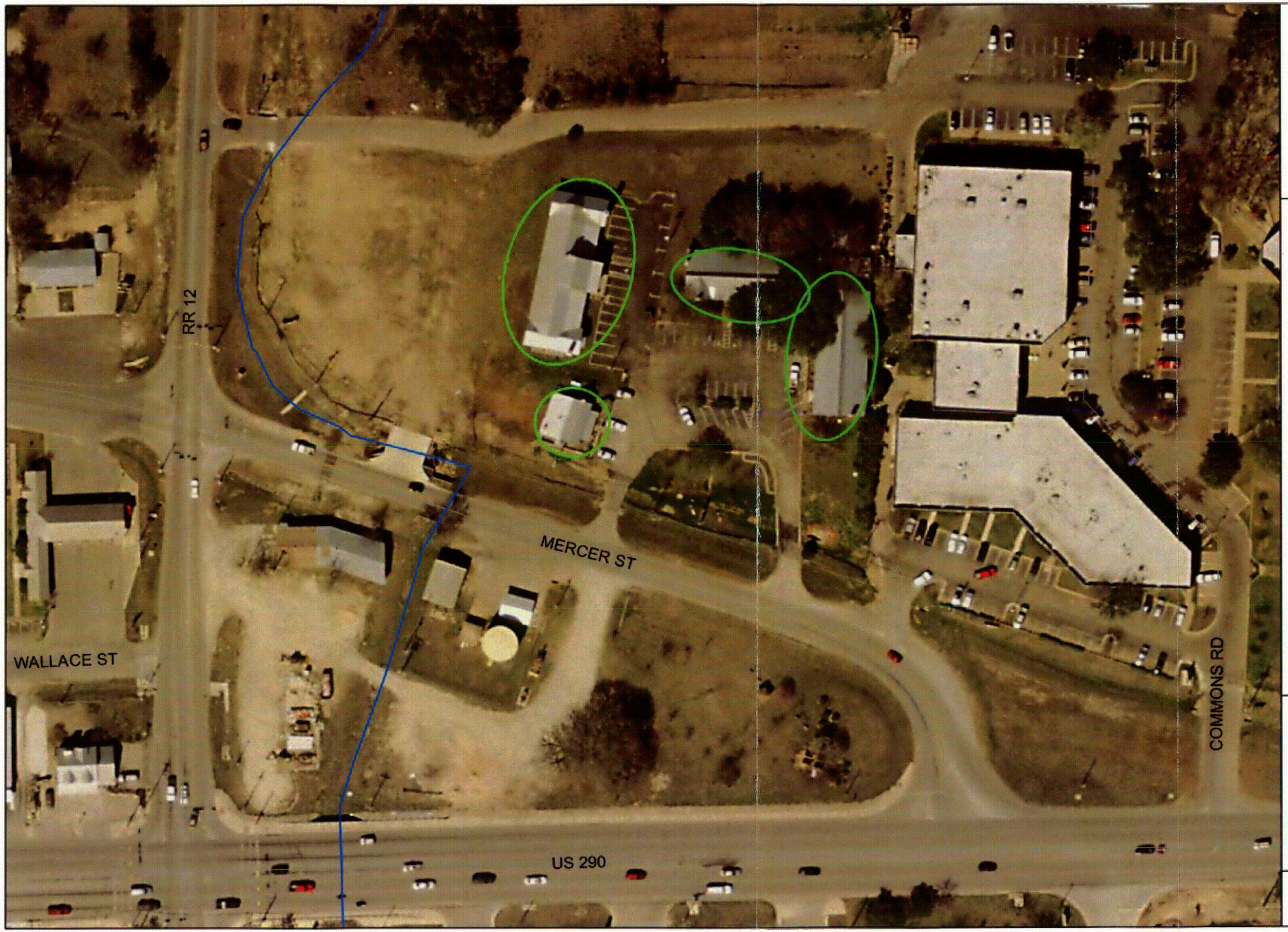
2012.10.05 10:02 AM ah2544 I:\27000s\27759\CADD\Alternatives\DrippingSprings\DrippingSpringsCulvert4.dwg

4) Buyout of Structures Upstream of Mercer Street

Project Description:
A buyout option may be feasible for four office buildings along Willow Springs Creek just north of Mercer Street (Figure 2.6). FEMA grants are available to assist communities in buying out frequently flooded structures. Further analysis may be required to determine if the structures indicated are truly at risk of frequent flood damage. A benefit-cost ratio greater than one can be achieved assuming a buyout cost of $1,000,000, which is equal to approximately 20% over appraised value.

Summary:
The buyout alternative would have the following benefits:

- Remove potentially repetitively flooded structures from floodplain
- Potential for enhancement of downtown Dripping Springs with a park or other recreational opportunity
- Potential for FEMA grant to cost share buyout.
- No disruption of traffic for construction projects



US Army Corps of Engineers®

Hays County Interim Feasibility Study

Key to Features

Willow Springs Creek

Buyout Structures

Figure 2.6.
Dripping Springs Buyout Alternative

N
W E
S

0 20 40 80 120 160 Feet

1 inch = 80 feet

Project Area 3
Onion Creek
Conceptual Regional Detention Alternatives Analysis

Background:

Hays County and the United States Army Corps of Engineers (USACE) – Fort Worth District requested Halff Associates to perform a conceptual alternatives analysis to alleviate the existing flood hazards in Onion Creek with the use of "regional detention" structures. Please note that this analysis is very conceptual in nature. Although Figures 3.1 and 3.4 depict detention structure in specific locations, the reader should note that the hydrologic and hydraulic analysis consider these to be "black box" structures generally located in the areas depicted. The one structure that is relatively fixed is the most downstream structure at the "Buda Quarry" site. The second structure (at Rattlesnake Creek) was evaluated conceptually to be in the middle of the basin. The third structure west of Dripping Springs was conceptually evaluated to be located in the upper quarter of the basin. Although specific stage-storage relations were developed for the specific identified sites, they could just as easily have been moved upstream or downstream a half mile. These sites were selected simply based on favorable geometry for temporary and longer-term water storage. The scope of this report does not include any evaluation or investigation into any local, State or Federal permitting requirements, nor does it include any evaluation of impacts to residential, commercial or infrastructure. Should this alternatives evaluation meet with a favorable review, then those activities could begin at a later date.

Hydrologic Analysis:

Halff Associates has already prepared a basin wide hydrologic model for Onion Creek. These detention structures were simply added to that model with no other alterations or modifications to the model. Seven alternatives were analyzed representing the effects of each regional detention individually as well as all combinations. A plan and profile is attached for each of the conceptual earthen dams (Figures 3.2-3.4). Again, please note that the evaluated detention site could just as easily be altered upstream or downstream of the site and the drawing would be completely different.

Upper Basin: The hydrologic goal of the upper site ("Dripping Springs") was to try to disconnect/delay the hydrograph peaks from the rest of the basin. Therefore, the only outlet through the dam was assumed to be one 10x10 box culvert (i.e. no spillway). We know that should this "regional detention" plan receive a favorable review, the PMF would need to be evaluated and some sort of emergency spillway most likely would be needed. Nevertheless, for this flood damage assessment task the focus was on the 100-year event. The assumption was that at the end of the storm event the detention basin would drain out (except for any over excavation to try and generate some long term water supply storage). This single outlet structure at the flowline of the existing streambed would allow normal sediment transport activities to the downstream reaches to remain intact. The inflow and outflow hydrographs at this site for the 100-year event is presented in the right side of the attached graphic. One can see that at this site the peak was drastically reduced and the outlet ran at a fairly constant rate for two days to drain the basin. The table presents the elevation and pool area for this particular site. The maximum pool elevation for the 100-year event is listed along with the approximate size of an "inundation easement" that would be required. The fill volume for this particular dam site is also presented (and would be different if the conceptual location were moved upstream or

downstream). At both dam sites, the volume of over excavation for possible water supply would be much larger than the volume of fill required for dam construction.

Middle Basin: The hydrologic goal of the middle basin ("Rattlesnake") was again to provide some attenuation of the peak flows generated by the intervening drainage area. The inflow-outflow graph shows that the peak was lowered and delayed about one hour. This structure was assumed to have four 10x10 box culverts through the dam in an effort to let most of the lower events pass thru unobstructed. A spillway was sized to then activate and restrict the larger storm events. Again the 100-year pool elevation, inundation area and fill volume are included.

Lower Basin: As mentioned above, this site was fixed at the existing "Quarry site." The "dam" was created by cutting a diversion channel from Onion Creek to the quarry site. This side channel was set at an elevation such that the majority of the low flow events would bypass the diversion and continue down Onion Creek. Only the larger flow events passing this site would be diverted and a hydrograph "peak shaving" would occur. After the event the flood storage volume would be released through a single 4x4 box culvert back into Onion Creek. Since this existing quarry site is much deeper than Onion Creek, there will be some stormwater remaining after the event. The inflow-outflow hydrograph reflects that only peak reduction took place with no time shifting. The 100-year pool elevation and inundated acreage is shown along with the excavation volume for the diversion channel

Performance Summary: Figure 3.5 presents five sample hydrographs from the same vantage point of the hydrologic model node west of the City of Buda. The red hydrograph shows "existing conditions" from the current hydrologic model with no dams installed (80,000 cfs peak). The three blue lines depict the effect at the City of Buda if any of the three sites were installed independently. Note the Upper Basin (Dripping Springs) hydrograph reduces the peak the most and it occurs earlier than the existing peak since the upper portion of the watershed is effectively disconnected from the rest of the then "smaller" and faster basin. The Middle Basin (Rattlesnake) hydrograph reduces the peak the least of the three individual basins but does the best at shifting the peak time. The Lower Basin (Quarry) reduces the peak flow rate almost as much as the Upper Basin but essentially does not shift the peak time. The final hydrograph is green and shows the combination of all three basins working together. It is interesting that as the three outflow hydrographs then work their way down the watershed and combine with each other that a double peaked hydrograph is generated. Please note that we have added a notation on the vertical "Flow (cfs)" axis that depicts the 25-year flow, the 50-year flow and the 100-year flow. The peak of the green "All Three" regional detention basins for the 100-year event is reduced from the current 80,000 cfs to a new "existing conditions" event of 52,000 cfs which is between the current 25-year and the 50-year event.

Hydraulic Analysis:

Halff Associates has created a hydraulic model for the Onion Creek watershed. At the "evaluation location" west of Buda, a 100-year flow reduction from 80,000 cfs to 52,000 cfs reduces the water surface elevation approximately 4 to 5 feet. A set of eight standard profiles (2, 5, 10, 25, 50, 100, 250, and 500-yr) was created for use in a simplified cost-benefit analysis of all seven alternatives. Should one of the analyzed alternatives meet with a favorable review then a more comprehensive evaluation of all the benefits along the entire Onion Creek corridor would take place that would include damage reduction downstream within Travis County as well as any other perceived benefits of the regional detention ponds.

Long-term Water Supply Opportunities:

The focus of this alternative analysis was on flood control and the temporary storage of stormwater. The fact that detention dams were involved leads to the possibility of over excavating the invert of the dam and thereby creating a long-term pool of stormwater that would not be evacuated after the storm. This pool then could have uses in various water supply scenarios in the region. A February 2011 report titled "Water and Wastewater Facilities Plan for the portion of Hays County, Texas, West of the IH-35 Corridor" included predictions of water deficits as follows (pp 4-12):

> "...water supply deficits are indicated by the Region K planners for:
> - Dripping Springs WSC - deficit by 2040 and reaching 366 ac-ft/yr by the year 2060;
> - City of Dripping Springs – deficit in 2010 and reaching 3,230 ac-ft/yr by 2060;
> - Hill Country WSC – no deficit;
> - Cimarron Park Water Company – deficit in 2010 and reaching 629 ac-ft/yr by the year 2060;
> - Mountain City - deficit in 2010 and reaching 22 ac-ft/yr by the year 2060; and
> - County-Other – deficit by 2020 and reaching 6,482 ac-ft/yr by the year 2060."

As stated above, the main focus of this alternative analysis was on flood control benefits. Nevertheless, a very rough "water balance" was prepared to examine an approximate volume of long-term water supply for an "average year" of rainfall and evaporation. It should be noted that this exercise simply looked at the volume of water generated by the watershed and accounted for the losses in the pool due to evaporation. The size of each water supply pool was estimated to fit within the confines of the "Upper Basin" or "Middle Basin" detention structures mentioned above. The size of the "Lower Basin" structure at the existing quarry is already generally set. Should the Upper or Middle locations be altered, then this estimation of long-term storage would also need to be altered. No attempt was made to explore any of the water rights issues or to perform a more robust "daily reservoir simulation" using an extended drought scenario. In an "average year" (33 inches of rain) it appears that a 5,000 AF water supply pool could be kept full in the Upper Basin. The Middle Basin could easily keep a 3,000 AF pool filled (the geometry of this reach is much narrower than in the Upper Basin so the pool volume is less). In a "drought year" with an assumed 20 inches of rainfall, the Upper Basin pool was about half the volume of the average year, but the Middle Basin could still support the average pool volume. In both scenarios there was enough "bypass flow" to supply the Lower Basin at the quarry. However, before any of these pool volumes are finalized it is highly recommended that additional discussions and investigations with all the stakeholder agencies and citizens be conducted to fully understand the unexplored facets of this water supply issue.

Project Description:

The proposed drainage improvements include the creation of earthen dams and outlet structures. Again it cannot be stressed enough that this exercise is very conceptual with generic "black box" storage-discharge structures placed at three general locations in the basin. Optimizing the location of the Middle Basin and Upper Basin could result in different cost figures than the ones presented herein. Again, the scope of this exercise did not focus on any of the local, State or Federal permitting requirements to determine if these sites are optimal at minimizing impacts. The cost of a flood control structure in the Upper Basin ("Dripping Springs") could be $9,500,000. The Middle Basin ("Rattlesnake Creek") could cost $5,700,000. The

Lower Basin ("Buda Quarry") could cost $5,400,000. Each site would also need to acquire inundation easements.

Benefits:

The drainage improvements proposed by Halff will:

- Reduce the frequency of flooding at the City of Buda and is expected to generate similar benefits along the entire Onion Creek.
- Reduce the severity and frequency of flooding downstream of the fire station.
- Provide an opportunity for long-term water supply structures.
- Will not interrupt the natural sediment transport along the corridor.
- Possible long term water supply.
- Possible recreation opportunities.

Table 3.1: Upper Basin Detention Structure ("Dripping Springs") Opinion of Probable Cost

Onion Creek Regional Detention Structures: Upper Basin ("Dripping Springs")					
TxDOT ITEM NO.	DESCRIPTION OF ITEM	TOTAL QUANTITY	UNIT	UNIT PRICE	COST
502-2001	Barricades, Signs, and Traffic Handling	6	MO	$ 6,000.00	$ 36,000
2022-2003	Site Preparation and Restoration	1	EA	$ 30,000.00	$ 30,000
752-2024	Tree Removal (18"-24" Dia)	50	EA	$ 850.00	$ 42,500
110-2002	Channel Excavation	483,000	CY	$ 5.00	$ 2,415,000
132-2002	Embankment (density-Type A)	483,000	CY	$ 5.00	$ 2,415,000
462-2034	Concrete Box Culvert (10 ft X 10 ft)	650	LF	$ 950.00	$ 617,500
466-2203	Headwall - Special	1	EA	$ 20,000.00	$ 20,000
466-2204	WIngwall - Special (energy dissipation structure)	1	EA	$ 60,000.00	$ 60,000
160-2003	Stockpiling and Placing Topsoil (4")	66,667	SY	$ 3.00	$ 200,000
5941-2014	Hydromulch Seeding	66,667	SY	$ 2.00	$ 133,333
169-2001	Soil Retention Blankets	16,667	SY	$ 6.00	$ 100,000
500-2001	Mobilization (10%)	1	LS	$ 606,933.33	$ 606,933
	Engineering Fees (10%)	1	LS	$ 656,776.67	$ 656,777
	SUBTOTAL				**$ 7,333,043**
	30% CONTINGENCY				**$ 2,199,913**
	TOTAL				**$ 9,532,956**
	Innundation Easements	420	AC	$ 15,000	**$ 6,300,000**

REFERENCE: Prices based on TXDoT Statewide Construction Average Low Bid Unit Price

NOTE: Exludes cost of land aquisition, environmental permitting, and the protection, relocation, and reconstruction of utilities

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater assurance as to the construction cost, he shall employ an independent cost estimator.

Table 3.2: Middle Basin Detention Structure ("Rattlesnake") Opinion of Probable Cost

Onion Creek Regional Detention Structures: Middle Basin ("Rattlesnake")					
TxDOT ITEM NO.	DESCRIPTION OF ITEM	TOTAL QUANTITY	UNIT	UNIT PRICE	COST
502-2001	Barricades, Signs, and Traffic Handling	6	MO	$ 6,000.00	$ 36,000
2022-2003	Site Preparation and Restoration	1	EA	$ 30,000.00	$ 30,000
752-2024	Tree Removal (18"-24" Dia)	50	EA	$ 850.00	$ 42,500
110-2002	Channel Excavation	135,000	CY	$ 5.00	$ 675,000
132-2002	Embankment (density-Type A)	135,000	CY	$ 5.00	$ 675,000
462-2034	Concrete Box Culvert (10 ft X 10 ft)	2,000	LF	$ 950.00	$ 1,900,000
466-2203	Headwall - Special	1	EA	$ 20,000.00	$ 20,000
466-2204	Wingwall - Special (energy dissipation structure)	1	EA	$ 80,000.00	$ 80,000
160-2003	Stockpiling and Placing Topsoil (4")	23,333	SY	$ 3.00	$ 70,000
5941-2014	Hydromulch Seeding	23,333	SY	$ 2.00	$ 46,667
169-2001	Soil Retention Blankets	5,833	SY	$ 6.00	$ 35,000
500-2001	Mobilization (10%)	1	LS	$ 361,016.67	$ 361,017
	Engineering Fees (10%)	1	LS	$ 386,268.33	$ 386,268
	SUBTOTAL				**$ 4,357,452**
	30% CONTINGENCY				**$ 1,307,236**
	TOTAL				**$ 5,664,687**
	Innundation Easements	200	AC	$ 15,000	**$ 3,000,000**

REFERENCE: Prices based on TXDoT Statewide Construction Average Low Bid Unit Price

NOTE: Exludes cost of land aquisition, environmental permitting, and the protection, relocation, and reconstruction of utilities

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater assurance as to the construction cost, he shall employ an independent cost estimator.

Table 3.3: Lower Basin Detention Structure ("Quarry") Opinion of Probable Cost

Onion Creek Regional Detention Structures: Lower Basin (Buda Quarry Site)					
TxDOT ITEM NO.	DESCRIPTION OF ITEM	TOTAL QUANTITY	UNIT	UNIT PRICE	COST
502-2001	Barricades, Signs, and Traffic Handling	6	MO	$ 6,000.00	$ 36,000
2022-2003	Site Preparation and Restoration	1	EA	$ 30,000.00	$ 30,000
752-2024	Tree Removal (18"-24" Dia)	20	EA	$ 850.00	$ 17,000
110-2002	Channel Excavation	426,000	CY	$ 5.00	$ 2,130,000
132-2002	Embankment (density-Type A)	0	CY	$ 5.00	$ -
462-2005	Concrete Box Culvert (4 ft x 4 ft)	2,700	LF	$ 400.00	$ 1,080,000
466-2203	Headwall - Special	1	EA	$ 10,000.00	$ 10,000
466-2204	Wingwall - Special (energy dissipation structure)	1	EA	$ 20,000.00	$ 20,000
160-2003	Stockpiling and Placing Topsoil (4")	13,333	SY	$ 3.00	$ 40,000
5941-2014	Hydromulch Seeding	13,333	SY	$ 2.00	$ 26,667
169-2001	Soil Retention Blankets	6,667	SY	$ 6.00	$ 40,000
500-2001	Mobilization (10%)	1	LS	$ 342,966.67	$ 342,967
	Engineering Fees (10%)	1	LS	$ 368,963.33	$ 368,963
	SUBTOTAL				**$ 4,141,597**
	30% CONTINGENCY				**$ 1,242,479**
	TOTAL				**$ 5,384,076**
	Innundation Easements	120	AC	$ 15,000	**$ 1,800,000**

REFERENCE: Prices based on TXDoT Statewide Construction Average Low Bid Unit Price

NOTE: Exludes cost of land aquisition, environmental permitting, and the protection, relocation, and reconstruction of utilities

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater assurance as to the construction cost, he shall employ an independent cost estimator.

Figure 3.1

Conceptual Regional Detention Locations

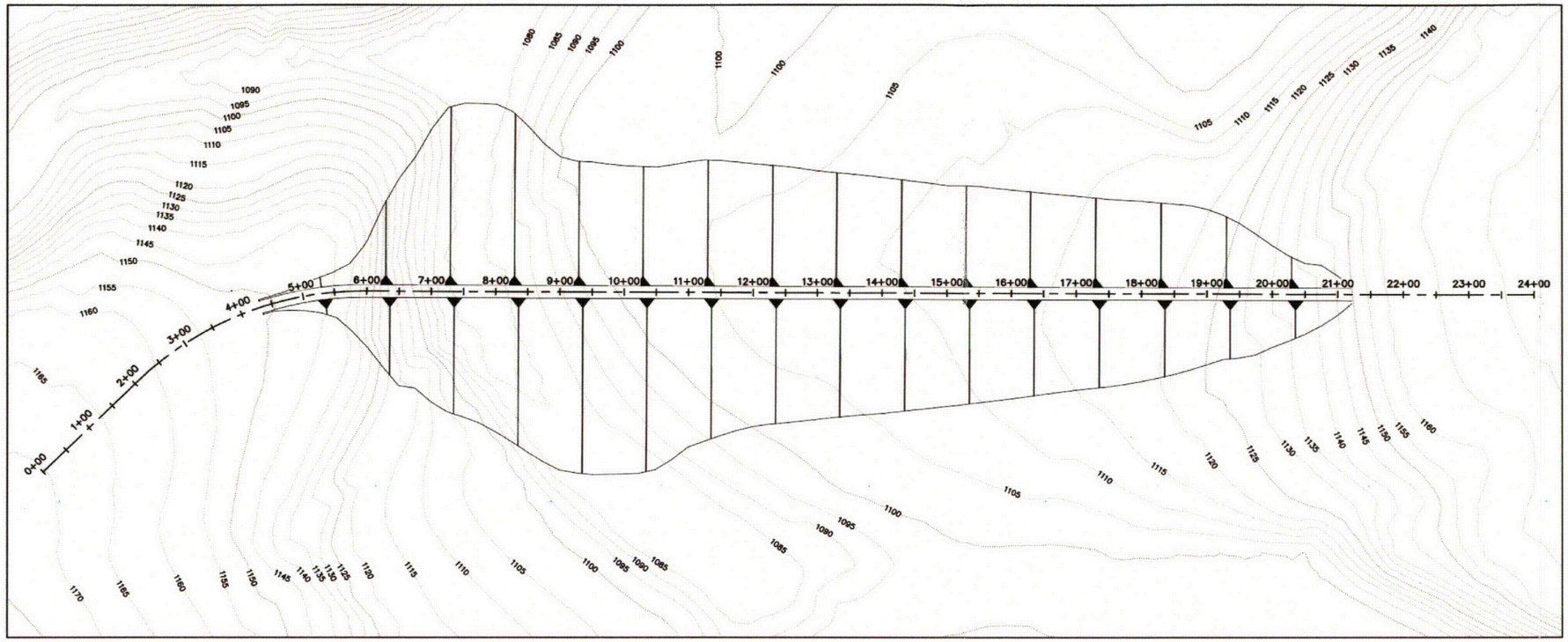
Date Generated: September 30, 2012
AVO: 27759

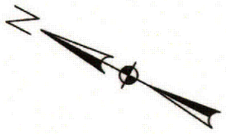
N
W E
S

0 3,000 6,000 9,000 12,000
Feet

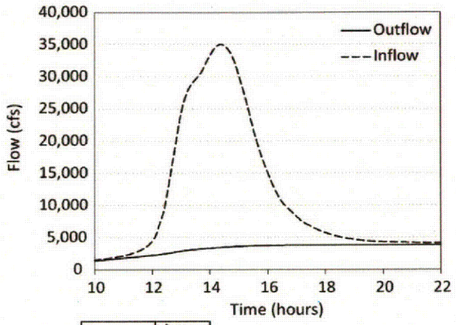
HALFF

I:\27000s\27759B\GIS\Dripping_Springs\MXDs\RDF_Exhibit.mxd





0 100 200 300



Elevation	Area (acres)
1075	0.00
1076	0.26
1077	2.02
1078	3.03
1079	4.15
1080	15.99
1081	41.43
1110	63.36
1115	90.00
1120	164.92
1125	243.22
1130	292.65
1135	336.84
1140	396.62
1145	457.24
1150	513.98
1155	568.97
1160	645.38
1165	761.29
1170	852.78

100 year WSEL = 1142.3 ft

Area inundated by 100 year flood = 420 acres

Net fill = 483,000 cu. yds.

Description of Outlet Works:

One 10 ft x 10 ft box culvert at flow line of Onion Creek

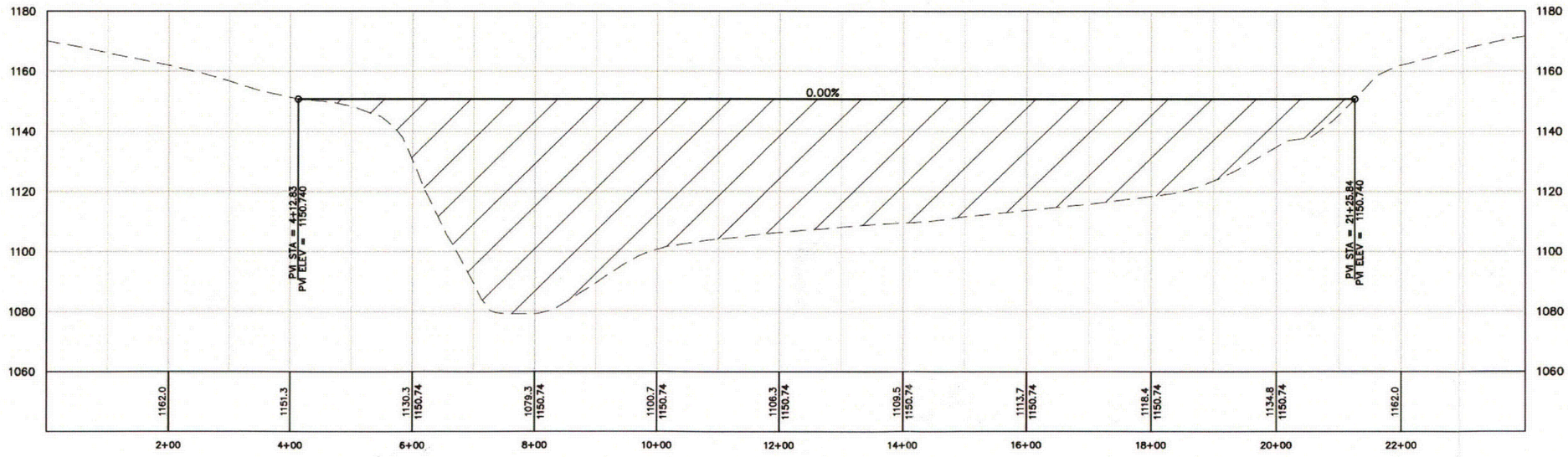


Figure 3.2

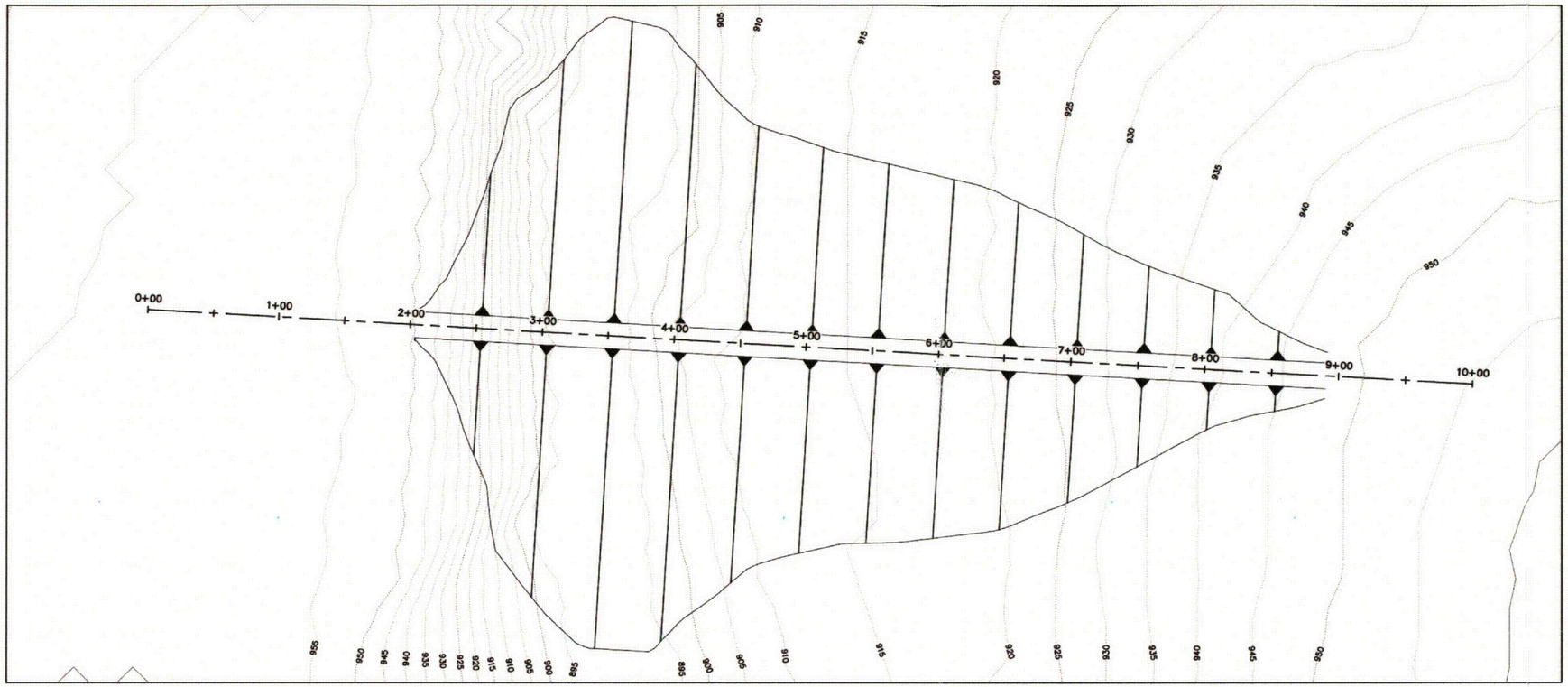
Conceptual Regional Detention Facilities: Dripping Springs

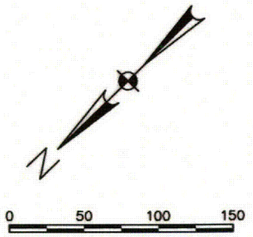
Hays County
Alternatives Analysis

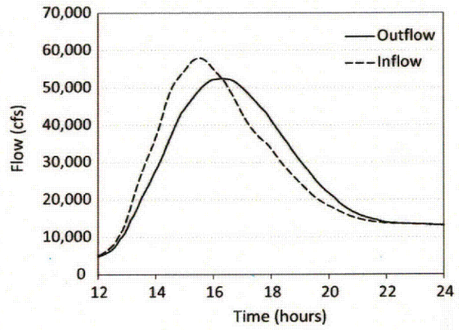
Date Generated: September 28, 2012
AVO: 27759

HALFF

2012.10.05 03:10 PM ah2544 I:\27000s\27759\CADD\Alternatives\RegionalDetention\20120926_Burnside_Working.dwg







Elevation	Area (acres)
890	0.0
895	1.4
900	2.3
905	5.0
910	8.5
915	21.0
920	50.3
925	67.5
930	83.6
935	102.1
940	194.1
945	276.5
950	341.5

100 year WSEL = 940.2 ft

Area inundated by 100 year flood = 200 acres

Net fill = 135,000 cu. yds.

Description of Outlet Works:

Four 10 ft x 10 ft box culvert at flow line of Onion Creek

70 ft weir at 905 ft

230 ft weir at 945 ft

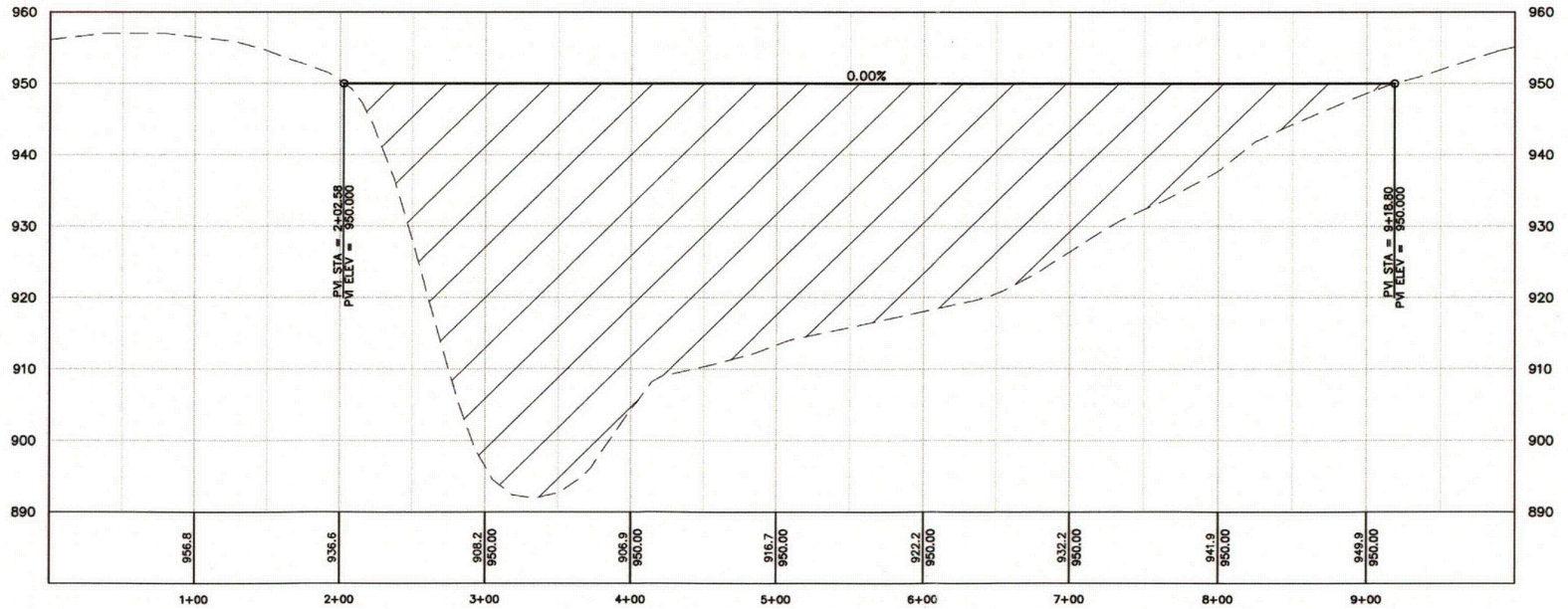


Figure 3.3

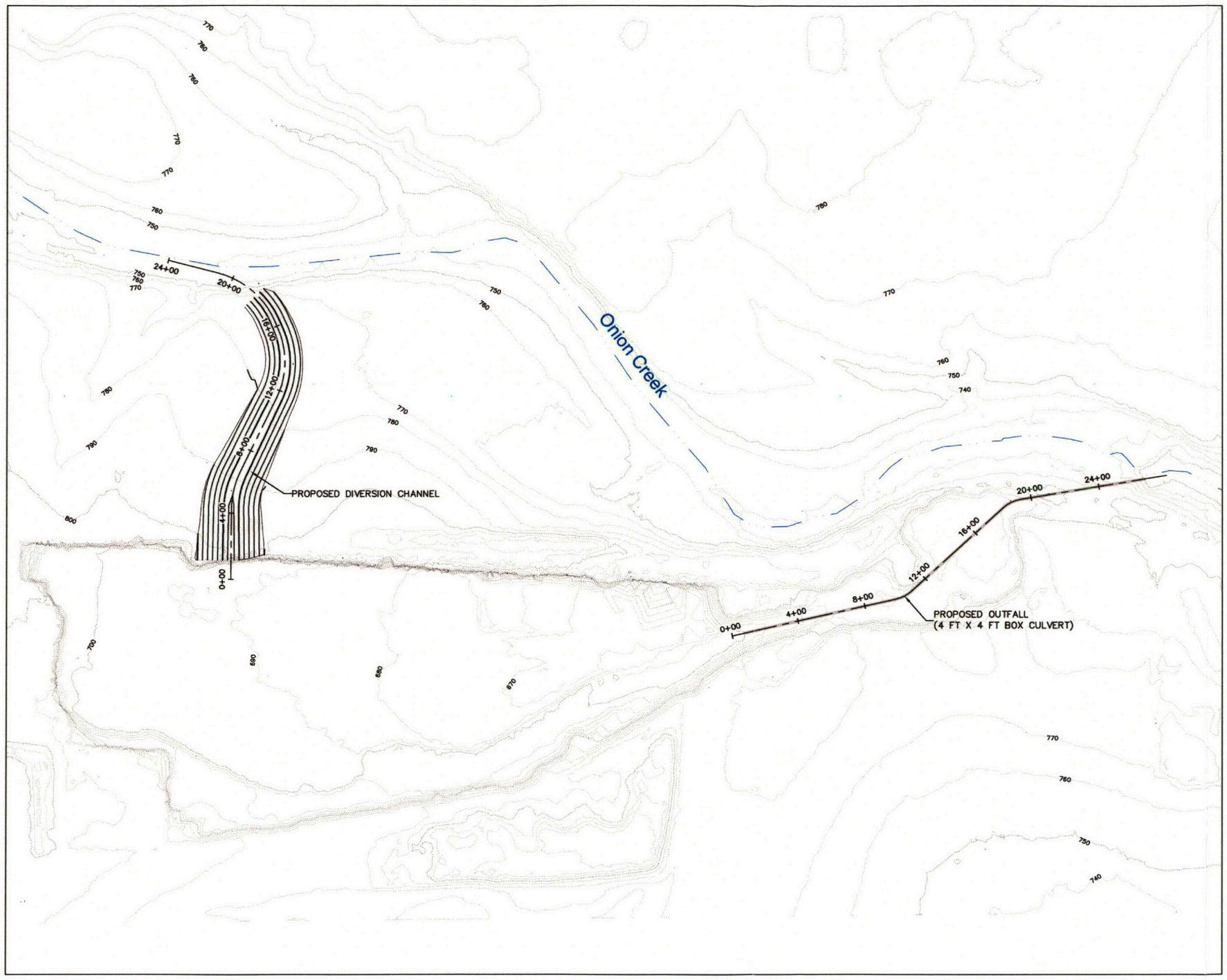
Conceptual Regional Detention Facilities: "Rattlesnake" Pond

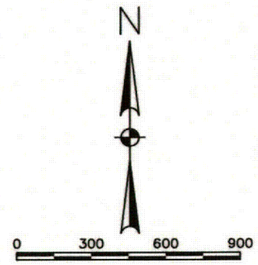
Hays County
Alternatives Analysis

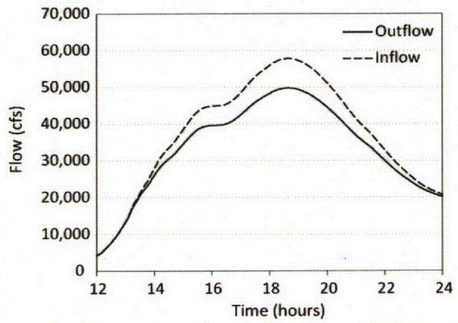
Date Generated: September 28, 2012
AVO: 27759

HALFF

2012.10.05 03:10 PM ah2544 I:\27000s\27759\CAD0\Alternatives\RegionalDetention\20120926_Burnside_Working.dwg







Elevation	Area (acres)
	0
700	85.96
705	93.49
710	99.77
715	102.67
720	105.59
725	108.84
730	111.45
735	113.67
740	126.62
745	129.55

100 year WSEL = 736.3 ft

Area inundated by 100 year flood = 120 acres

Net cut = 426,000 cu. yds.

Figure 3.4

Conceptual Regional Detention Facilities: Buda Quarry

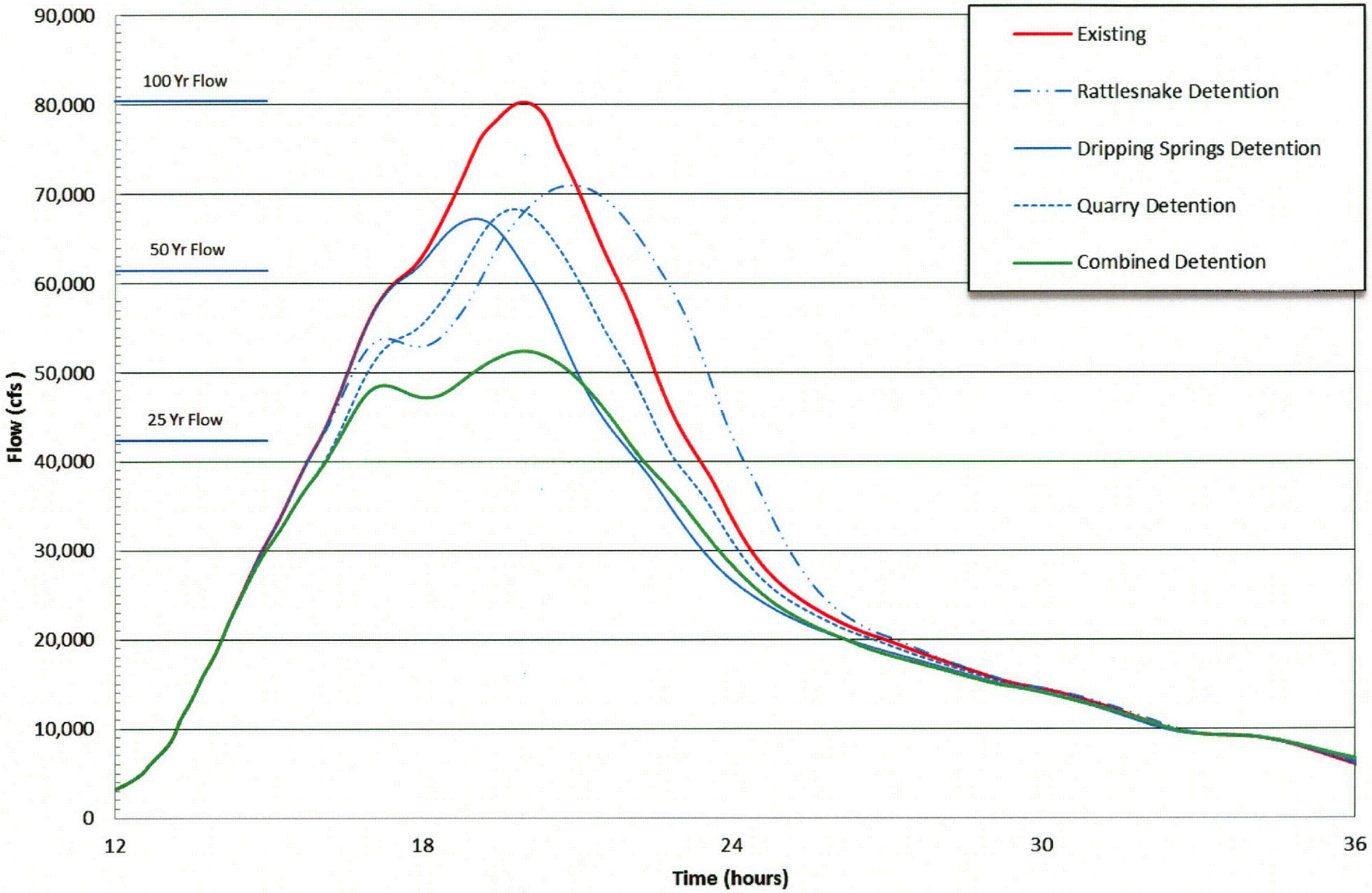
Hays County
Alternatives Analysis

Date Generated: September 28, 2012
AVO: 27759

HALFF

2012.10.03 06:11 PM ah2544 I:\27000s\27759\CAD0\Alternatives\RegionalDetention\20120928_Burnside_Working.dwg

Figure 3.5: Comparison of 100 Year Flows of Onion Creek at Hays County Line



Average decrease in 100 year floodplain is approximately 4-5 feet near Buda for Combined Detention

Project Area 4:
Analysis of Major Structures for All Studied Watersheds

Background:

Hays County and the United States Army Corps of Engineers have requested Halff Associates, as part of an alternatives analysis for the Onion, Bear, Little Bear, Barton, and Pedernales watershed in Hays County, develop a ranking system for low water crossings. This ranking is intended to provide a means for the county to prioritize the low water crossings by flooding hazard. Described below is the methodology used by Halff Associates to develop the ranking presented in Table 4.1.

Means and Methodology:

Determination of Traffic Count at Each Structure

The traffic count for each structure within the study basin was derived from traffic and saturation count data recorded by the Texas Department of Transportation (TxDOT) in 2010 and provided by the Capitol Area Metropolitan Planning Organization (CAMPO). The data was provided in a PDF map marking the data collection points. These maps were spatially referenced to political, geographical, and structural landmarks. A spatial analysis was manually performed using aerial photography, roadway networks, and the traffic count maps to determine a relative traffic pattern and an approximate Average Annual Daily Traffic (AADT) for the nearby structures within the study basin.

Information from HEC-RAS Models

Some data was harvested from the detailed hydraulic models that Halff Associates has prepared for Hays County. This data includes: stream name, structure station, road names, minimum top of road elevations, water surface elevations, flow rates, and the frequency of overtopping for different structures.

Development of "Urgency Rating"

Halff Associates developed an "Urgency Rating" for all structures within the Onion Creek, Barton Creek, and Pedernales River watersheds. The higher a structure's urgency rating, the higher the risk is for that structure. The urgency rating is the Average Annual Daily Traffic Count multiplied by the Annual Chance of Flood that overtops the roadway. A summary of the 83 structures with the urgency ratings is presented in Table 4.1 and Figure 4.1.

Summary:

The three highest ranking crossings identified by Halff Associates are listed in Table 4.2:

Table 4.2: Top Three Structures

Rank	Roadway	Stream Crossing	Urgency Rating
1	R.R. 967	Little Bear	4600
2	F.M. 1626	Little Bear	2840
3	R.R. 1826	Bear Tributary 1.1	1860

Table 4.1: Onion, Barton, and Pedernales Watersheds Urgency Ratings

Stream[1]	Structure Station[2]	Road Name[3]	Structure Type[4]	AADT Traffic Count[5]	Minimum TOR Elevation[6]	Frequency Water Surface Elevation[7] [ft]								Watershed	Annual Chance of Flooding[8]	Flowrate at Structure (Q)[9] [cfs]		Urgency Rating[10]	Precinct	Rank[11]
	[ft]			[veh/day]	[ft]	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	250-yr	500-yr			25-yr	100-yr	[veh/day/yr]		
Little Bear	64354	RR 967	Culvert	9200	928.81	929.44	930.13	930.56	931.14	931.49	931.74	932.06	932.31	Little Bear	50%	2580	4150	4600	2	1
Little Bear	12551	N FM 1626	Culvert	14200	678.01	676.73	680.43	682.51	684.9	686.46	687.64	688.96	689.96	Little Bear	20%	13220	23260	2840	2	2
Bear Trib 1.1	2146	RR 1826	Culvert	9300	881.68	877.49	881.98	883.13	883.81	884.06	884.42	884.8	885.11	Bear Creek	20%	1650	2500	1860	4	3
Onion Creek Trib 16	9254	RM 967	Culvert	9200	975.65	973.44	976.85	977.39	978.09	978.49	978.89	979.31	979.67	Onion Creek	20%	1380	2240	1840	2	4
Little Barton Creek	15423	RR 12	Culvert	8100	1127.59	1126.17	1129.55	1129.92	1130.23	1130.47	1130.71	1131.03	1131.23	Barton	20.0%	3450	4500	1620		5
Onion	246695	W RR 150	Culvert	2720	872.34	878.99	886.84	891.59	897.63	901.8	904.94	908.19	910.67	Onion Creek	50%	38600	75420	1360	4	6
Onion	250189	W RR 150	Culvert	2720	883.09	887.07	892.75	896.85	902.58	906.74	909.92	913.15	915.59	Onion Creek	50%	38570	75390	1360	4	7
Yorks Creek	7067	W RR 150	Culvert	2720	885.18	887.5	889.24	890.28	891.48	892.23	892.82	893.44	893.92	Onion Creek	50%	7750	12390	1360	4	8
Garlic Creek	12056	RM 967	Culvert	10000	707.12	704.83	705.9	707.62	709.65	710.48	711.22	711.95	712.49	Onion Creek	10%	3910	6440	1000	2	9
Little Bear	12146	Lakewood Dr	Culvert	1920	673.74	675.62	677.67	679.46	682.35	684.1	685.33	686.65	687.58	Little Bear	50.0%	13220	23260	960	2	10
Bear	66835	RR 1826	Culvert	9300	913.43	907.39	911.51	915.09	916.45	917.34	917.96	918.68	919.22	Bear Creek	10%	7250	11770	930	4	11
Little Bear	58471	RR 967	Culvert	9200	891.96	886.63	890.29	892.91	893.75	894.23	894.57	895.02	895.34	Little Bear	10.0%	5250	8670	920	2	12
Spring Hollow Creek	9175	Crystal Hill Dr	Culvert	1700	964.51	966.51	967.32	967.87	968.41	968.61	968.82	969.47	969.87	Bear Creek	50%	4600	7300	850	4	13
S Gatlin Creek	3279	Elder Hill Rd	Culvert	1680	1075.70	1076.39	1079.62	1081.44	1083.34	1084.05	1084.96	1085.44	1086.1	Onion Creek	50%	7370	12080	840	3	14
Walnut Spring	9150	US 290	Culvert	20000	1156.43	1152.93	1153.62	1154.82	1155.51	1155.85	1156.05	1156.26	1156.42	Onion Creek	4%	1190	1840	800	4	15
Fitzhugh Creek	7206	W Fitzhugh Rd.	Culvert	1430	1080.13	1082.29	1085.07	1085.94	1086.58	1087.05	1087.59	1088.28	1088.84	Barton	50.0%	8160	10970	715		16
Long Branch	28761	Carriage House Lane	Culvert	1370	1110.17	1111.24	1112.42	1112.61	1112.87	1113.08	1113.27	1113.53	1113.72	Barton	50.0%	1800	2340	685		17
Long Branch	26990	Heritage Oaks Drive	Culvert	1370	1090.44	1090.48	1091.64	1091.85	1091.98	1092.08	1092.2	1092.3	1092.71	Barton	50.0%	1800	2340	685		18
Yorks Creek Trib 2	9721	Rolling Oaks Dr	Culvert	1300	1033.50	1034.18	1034.66	1034.99	1035.38	1035.6	1035.8	1036.05	1036.25	Onion Creek	50%	860	1310	650	3	19
Barton Creek Trib. 1	7860	W Fitzhugh Rd.	Culvert	1300	1161.84	1162.59	1163.78	1164.07	1164.35	1164.54	1164.74	1165	1165.21	Barton	50.0%	1940	2550	650		20
Flat Creek	1905	W RR 150	Culvert	2720	904.23	902.33	908.28	909.86	911.4	912.33	912.98	913.93	914.67	Onion Creek	20%	8820	14420	544	4	21
Rocky Branch	10059	W RR 150	Culvert	2720	992.72	990.22	993.94	994.71	995.59	996.11	996.53	996.95	997.33	Onion Creek	20%	3880	6370	544	4	22
Barton Creek	186388	Trautwein Road	Culvert	1000	939.37	946.59	954.32	956.83	958.57	959.72	960.96	962.57	963.86	Barton	50.0%	34670	47860	500		23
Garlic Creek	26054	FM 1626	Culvert	12200	752.59	747.92	748.98	749.92	752.78	753.41	753.79	754.12	754.33	Onion Creek	4%	2610	3970	488	2	24
South Onion Creek	44574	CR 220 (Mt Gainor)	Culvert	960	1167.49	1170.12	1174.13	1175.07	1176.7	1177.95	1178.92	1180.15	1180.97	Onion Creek	50%	9210	15200	480	3	25
Onion	336713	Creek Road	Bridge	960	1075.62	1075.84	1079.76	1083.04	1087.1	1089.78	1091.68	1093.46	1094.83	Onion Creek	50%	19900	36210	480	4	26
Onion	339112	High Bluff Ln	Culvert	960	1079.11	1082.06	1087.37	1090.71	1094.74	1097.38	1099.27	1101.14	1102.66	Onion Creek	50%	19320	35000	480	4	27
Onion	340696	Creek Road	Culvert	960	1081.67	1085.21	1091.04	1094.63	1099.21	1102.17	1104.35	1106.33	1107.54	Onion Creek	50%	18930	34130	480	4	28
Pier Branch	1174	Darden Hill Road	Culvert	960	959.08	962.78	964.39	965.35	967.28	968.43	969.59	970.8	971.74	Onion Creek	50%	6170	10710	480	4	29
South Onion Creek	32908	CR 220 (Mt Gainor)	Culvert	960	1120.77	1123.23	1127.32	1129.35	1131.14	1132.13	1132.94	1133.91	1134.64	Onion Creek	50%	12740	21510	480	4	30
South Onion Creek	51645	CR 220 (Mt Gainor)	Culvert	960	1198.42	1200.09	1203.04	1205.51	1207.8	1208.74	1209.68	1210.61	1211.47	Onion Creek	50%	7940	13110	480	4	31
Jackson Branch	2950	Darden Hill Road	Culvert	880	992.55	993.92	994.99	995.51	996.12	996.48	996.85	997.58	998.07	Onion Creek	50%	6540	10290	440	4	32
South Onion Creek	7755	RR 12	Bridge	4200	1049.58	1041.84	1047.27	1050.35	1051.67	1052.42	1053.17	1054.24	1055.12	Onion Creek	10%	13200	22380	420	4	33
Sycamore Creek	6671	Sycamore Creek Dr.	Culvert	800	926.97	930.48	932.15	932.97	933.81	935.67	937	938.61	939.97	Pedernales	50.0%	10200	17860	400		34
Sycamore Creek Trib. 1	124	Sycamore Creek Dr.	Culvert	800	926.00	929.86	931.37	932.11	933.06	933.75	934.22	936.34	937.37	Pedernales	50.0%	4780	8000	400		35
Bear Trib 1	2229	RR 1826	Culvert	9300	862.78	853.52	856.5	860.08	864.24	865.11	865.74	866.39	866.85	Bear Creek	4%	3990	6370	372	4	36
Spring Hollow Creek	9469	RR 1826	Culvert	9300	972.81	966.13	968.24	969.9	974.65	975.41	975.9	976.34	976.7	Bear Creek	4%	4600	7300	372	4	37
Pedernales River Trib. 1.2	3648	Raeford Crossing	Culvert	600	981.38	982.13	983.01	983.36	983.78	984.05	984.38	984.67	984.89	Pedernales	50.0%	2020	3210	300		38
Little Barton Creek	21824	Springlake Drive	Culvert	590	1202.99	1203.48	1204.74	1205.02	1205.24	1205.4	1205.62	1205.84	1205.98	Barton	50.0%	1220	1580	295		39
Bear Trib 1	7863	N Madrone Trail	Culvert	570	906.62	908.56	909.67	910.1	910.54	910.82	911.52	912.33	912.89	Bear Creek	50%	2610	4170	285	4	40
Onion	297363	RR 150	Bridge	2600	989.64	981.1	988.97	993.45	998.27	1001.03	1003.25	1005.5	1007.17	Onion Creek	10%	35140	69510	260	4	41
Onion	160534	Garrison Rd	LWC	480	654.79	658.02	661.91	665.57	670.75	674.73	677.95	684.08	685.09	Onion Creek	50.0%	41910	80140	240	2	42
Onion	165622	RR 967	Bridge	11400	684.32	667.85	673.61	677.49	683.29	686.61	689.14	691.72	693.18	Onion Creek	2%	41910	80140	228	2	43
Barton Creek	232702	Bell Springs Road	Culvert	450	1122.10	1125.5	1128.15	1128.95	1129.43	1129.5	1129.55	1130.48	1131.48	Barton	50.0%	8840	11980	225		44
Barton Ceek Trib 2.1	4076	Bell Springs Road	Culvert	450	1216.63	1217.3	1217.84	1217.97	1218.09	1218.18	1218.28	1218.41	1218.52	Barton	50.0%	1050	1360	225		45
Barton Creek Trib 3	3785	Bell Springs Road	Culvert	450	1162.64	1164.24	1165.59	1165.88	1166.2	1166.44	1166.67	1166.99	1167.24	Barton	50.0%	2360	3080	225		46
Onion	275042	RR 1826	Bridge	5600	952.12	938.25	946.03	950.87	957.38	960.42	962.5	964.69	966.4	Onion Creek	4%	36910	72640	224	4	47
Roy Branch	11820	N Canyonwood Drive	Culvert	1040	1071.35	1067.23	1071.84	1073	1073.8	1074.32	1074.79	1075.42	1075.86	Barton	20.0%	1960	2550	208		48
Garlic Creek	25419	RM 967	Culvert	10000	750.88	744.95	746.21	747.54	749.83	751.57	752.2	752.74	753.08	Onion Creek	2%	2610	3970	200	2	49
Sycamore Creek	14232	Longview Rd.	Culvert	400	1009.27	1012.49	1014.06	1014.94	1016.02	1016.77	1017.49	1018.4	1019	Pedernales	50.0%	4150	6960	200		50
Sycamore Creek Trib. 2	3770	Longview Rd.	Culvert	400	1007.48	1009.45	1010.04	1010.61	1011.21	1011.62	1012.1	1012.77	1013.41	Pedernales	50.0%	2840	4700	200		51
Cottonwood Branch	5294	Oakwood Lane	Culvert	1000	1061.81	1057.35	1062.6	1063.39	1064.01	1064.39	1064.76	1065.19	1065.49	Barton	20.0%	2230	2890	200		52
N Gatlin Creek	1919	RR 12	Bridge	4200	1077.74	1071.15	1074.54	1075.97	1079.89	1080.87	1081.5	1082.16	1082.66	Onion Creek	4%	4530	7290	168	3	53
S Gatlin Creek	8846	RR 12	Culvert	4200	1123.00	1116.39	1120.02	1122.77	1125.57	1126.51	1127.16	1127.83	1128.33	Onion Creek	4%	5210	8520	168	4	54
Barton Creek	208034	RR 12	Bridge	7000	1030.05	1015.62	1024.75	1028.7	1029.72	1031.56	1033.24	1035.12	1036.39	Barton	2.0%	26630	35920	140		55
Pedernales River Trib. 1	14328	McGregor Ln	Culvert	200	930.02	932.97	934.37	935.18	936.2	936.59	936.82	937.14	938.67	Pedernales	50.0%	3780	6230	100		56
Pedernales River Trib. 1	11351	Norwood Rd.	Culvert	200	900.95	903.34	904.4	905.04	905.42	906.03	906.55	907.27	907.87	Pedernales	50.0%	5890	9990	100		57
Cambrian Creek	5813	Paisano Trail	Culvert	200	1003.38	1004.93	1006.31	1006.58	1006.86	1007.09	1007.37	1007.67	1007.88	Barton	50.0%	2320	2990	100		58
Cambrian Creek	2868	Pauls Valley Road	Culvert	200	964.16	966.73	969.17	969.83	970.46	970.92	971.42	972.07	972.6	Barton	50.0%	4370	5700	100		59
Cambrian Creek	7033	Red Gate Lane	Culvert	200	1018.55	1020.59	1021.95	1022.22	1022.5	1022.78	1022.97	1023.29	1023.54	Barton	50.0%	2320	2990	100		60
Onion	321070	RR 12	Bridge	4200	1049.30	1033.82	1039.86	1043.42	1047.57	1050.52	1052.09	1053.35	1054.15	Onion Creek	2%	20300	37700	84	4	61
South Onion Creek	31533	Gatlin Creek Rd	Culvert	160	1113.89	1117.14	1121.85	1123.99	1125.69	1126.72	1127.59	1128.63	1129.51	Onion Creek	50%	12740	21510	80	4	62
Little Bear	31039	Chaparral Rd	Culvert	100	750.40	751.88	754.7	756.29	758.15	759.57	760.84	762.35	763.59	Little Bear	50%	10980	19000	50	2	63
Hamiliton Creek Trib. 1	3443	Stage Coach Ranch Rd.	LWC	100	965.44	967.43	968.1	968.56	969.24	969.65	970.08	970.64	970.95	Pedernales	50.0%	2150	3450	50		64
Roy Branch	5426	Circle G Ranch Road	LWC	100	989.51	992.53	994.37	994.82	995.23	995.5	995.81	996.19	996.91	Barton	50.0%	2720	3630	50		65
Cottonwood Branch	1063	Circle G Ranch Road	LWC	100	998.12	1001.37	1003.43	1003.98	1004.82	1005.45	1006.12	1006.94	1007.5	Barton	50.0%	2740	3590	50		66
Long Branch	22592	Long Creek Road	Culvert	100	1046.50	1047.14	1049.43	1049.96	1050.39	1050.68	1050.98	1051.38	1051.66	Barton	50.0%	4290	5630	50		67
Little Bear	21674	Chaparral Rd	Culvert	200	720.28	715.76	720.44	723.42	726.07	727.44	728.49	729.63	730.53	Little Bear	20.0%	12810	22360	40	2	68
Cottonwood Branch	2445	Blue Hills Drive	Culvert	200	1025.12	1021.01	1025.5	1026.51	1027.29	1027.83	1028.32	1028.88	1029.33	Barton	20.0%	2230	2890	40		69

Cottonwood Branch	6935	Hidden Hills Drive	Culvert	200	1084.22	1083.01	1086.15	1086.46	1086.74	1086.97	1087.19	1087.45	1087.68	Barton	20.0%	2230	2890	40		70
UNT Onion Creek: Tributary	1583	Ruby Ranch Rd	Culvert	300	786.10	781.91	783.75	787.17	787.96	788.85	789.25	789.68	789.77	Onion Creek	10.0%	2870	4600	30	2	71
Mustang Branch	9818	S FM 1626	Bridge	12200	742.73	719.76	723.29	725.81	728.84	730.55	731.95	733.58	734.92	Onion Creek	0%	7040	11700	24.4	2	72
Onion	178608	South Farm to Market 1626	Bridge	12200	733.99	695.37	702.56	706.38	711.18	714.7	717.45	720.31	722.5	Onion Creek	0%	40570	78320	24.4	2	73
Little Bear	43028	Arbor Trail	Culvert	100	795.79	793.41	798.37	800.04	801.95	803.04	804.04	805.34	806.5	Little Bear	20%	9710	16730	20	2	74
Barton Creek	249825	McGregor Ln.	Culvert	1000	1239.52	1231.88	1235.38	1237.12	1239.18	1240.23	1240.93	1241.65	1242.15	Barton	2.0%	3990	5340	20		75
UNT Onion Creek: Reach 1	4762	Ruby Ranch Rd	Culvert	300	793.88	785	787.8	790.02	794.44	795.26	795.75	796.26	796.62	Onion Creek	4%	3660	5810	12	2	76
Garlic Creek Trib 1	865	Cullen Blvd	Culvert	2000	721.74	712.92	714.02	715.02	716.41	717.35	718.25	719.4	720.44	Onion Creek	0%	780	1240	4	2	77
Garlic Creek	28977	Maybrook Dr	Culvert	670	771.15	763.84	765.39	766.7	768.4	769.65	770.88	771.61	771.93	Onion Creek	0%	2610	3970	2.68	2	78
Rocky Branch	16368	La Ventana Parkway	Culvert	250	1046.71	1037.17	1039.93	1041.94	1044.5	1046.15	1047.17	1047.57	1047.85	Onion Creek	1%	2620	4180	2.5	4	79
Yorks Creek	11614	Yorks Crossing	Culvert	100	927.76	916.48	918.11	919.23	921.78	924.23	928	929.85	930.79	Onion Creek	1%	5350	8470	1	3	80
Spring Hollow Creek	20944	Cool Spring Way	Culvert	400	1087.53	1081.81	1082.62	1083.22	1084.05	1084.61	1085.12	1085.77	1086.71	Bear Creek	0.2%	730	1130	0.8	4	81
Spring Hollow Creek	18447	Cool Spring Way	Culvert	400	1064.37	1057.03	1057.91	1058.58	1059.48	1060.27	1061.1	1061.42	1062.44	Bear Creek	0.2%	730	1130	0.8	4	82
Onion	194387	Ruby Ranch Rd	Bridge	100	792.01	768.77	775.09	778.53	783.23	786.97	790.03	794.41	795.3	Onion Creek	0%	39910	77480	0.4	2	83

NOTES
1. As designated within Hec-RAS models
2. Stationing begins at the most downstream location of conveyance for the stream
3. As designated within Hec-RAS models
4. As designated within Hec-RAS models
5. Data interpreted from traffic_counts.shp
6. Minimum TOR elevation only considered for driving surface of the structure (excludes surrounding roadways on grade)
7. As determined by Hec-RAS models
8. If water elevation of 500-yr event did not exceed the structure elevation, 500-yr event indicated
9. Flowrates taken from adjacent upstream XS
10. Calculated as (AADT Traffic Count)/(Frequency of flooding storm event)
11. Relative to all other structures in the watershed
12. Minimum TOR Elevation taken app. 240' west of the structure

Structures of Concern

Vulnerability Rank

- 1-15
- 16-30
- 31-45
- 46-60
- 61-75
- 76-83

- Watershed Study Streams
- Onion Creek Watershed
- Barton Creek watershed
- Pedernales River Watershed
- Hays County

Precinct

- 1
- 2
- 3
- 4

Date: 4/22/2013

HALFF

Figure: 4.1

Stream Crossing Urgency Ratings

Onion Creek, Barton Creek, & Pedernales River Watersheds

Hays County, Texas

N

0 3 6 Miles

Appendix H.2

Structure Inventory

HALFF

Habitable Structures Inventory						
Property ID	Property Owner	Property Address	Owner Address	Improvement Value	Elevation	Elevation plus Slab
R17883	HANKS ROGER RESIDUARY TRUST	27401 RR12 DRIPPING SPRINGS, TX 78620	4100 JACKSON AVE APT 429 AUSTIN,TX 78731	124370	1159.22	1160.72
R70421	DRIPPING SPRINGS RETAIL LTD	E US 290 & RANCH RD 12 DRIPPING SPRINGS, TX 78620	1914 A WEST HOWARD LN AUSTIN,TX 78728	207800	1158.61	1160.11
R130269	ROUTT INVESTMENT LTD	104 E US 290 DRIPPING SPRINGS, TX 78620	4911 E SEVENTH ST AUSTIN,TX 78702	263000	1159.60	1161.10
R130272	DRIPPINGS INVESTMENT GROUP LLC	200 E US 290 DRIPPING SPRINGS, TX 78620	1805 LOGANS HOLLOW DR AUSTIN,TX 78746-3723	581380	1154.33	1155.83
R70421	DRIPPING SPRINGS RETAIL LTD	E US 290 & RANCH RD 12 DRIPPING SPRINGS, TX 78620	1914 A WEST HOWARD LN AUSTIN,TX 78728	159620	1155.15	1156.65
R26682	HUBBARD DANNY LLC	120 W US 290 DRIPPING SPRINGS, TX 78620	715 MEADOW OAKS DR DRIPPING SPRINGS,TX 78620	110150	1154.97	1156.47
R26683	110 HWY 290 W LTD	110 US 290 W DRIPPING SPRINGS, TX 78620-0002	P O BOX 2 DRIPPING SPRINGS,TX 78620-0002	136160	1155.86	1157.36
R26680	DRIPPING SPRINGS NATIONAL BANK	401 MERCER ST DRIPPING SPRINGS, TX 78620	P O BOX 2609 CARLSBAD,CA 92018-2609	197200	1156.81	1158.31
R130269	ROUTT INVESTMENT LTD	104 E US 290 DRIPPING SPRINGS, TX 78620	4911 E SEVENTH ST AUSTIN,TX 78702	33380	1161.88	1163.38
R70689	BROWN JACK FAMILY III LP	108 E US 290 DRIPPING SPRINGS, TX 78620	P O BOX 28159 AUSTIN,TX 78755-8159	157130	1159.32	1160.82
R127259	HOME DEPOT USA INC	260 E US 290 DRIPPING SPRINGS, TX 78620	2800 FOREST LN DALLAS,TX 75234	4396310	1156.01	1157.51
R23578	HUDSON BARBARA FAMILY TRUST	101 HAYS ST DRIPPING SPRINGS, TX 78620	P O BOX 1239 DRIPPING SPRINGS,TX 78620-1239	223040	1156.65	1158.15
R17782	BASSETT, WILLIAM C	SAN MARCOS ST DRIPPING SPRINGS, TX 78620	P O BOX 615 DRIPPING SPRINGS,TX 78620-0615	2630	1154.06	1155.56
R17976	ROSE KENNETH M & BONNIE MAE	27320 RR 12 DRIPPING SPRINGS, TX 78620	P O BOX 325 DRIPPING SPRINGS,TX 78620-0325	117260	1153.66	1155.16
R26686	A-C ACQUISITION LLC	27495 RR 12 DRIPPING SPRINGS, TX 78620	P O BOX 1159 DEERFIELD,IL 60015-6002	939470	1156.64	1158.14
R26684	100 HWY 290 W LTD	100 US 290 DRIPPING SPRINGS, TX 78620	P O BOX 2 DRIPPING SPRINGS,TX 78620-0002	179230	1154.84	1156.34
R26680	DRIPPING SPRINGS NATIONAL BANK	401 MERCER ST DRIPPING SPRINGS, TX 78620	P O BOX 2609 CARLSBAD,CA 92018-2609	120580	1155.96	1157.46
R116157	CARTER, H C	131/141 E LOOP 64 DRIPPING SPRINGS, TX 78620	P O BOX 249 DRIPPING SPRINGS,TX 78620-0249	296190	1159.05	1160.55
R116156	CARTER, H C	151 E LOOP 64 DRIPPING SPRINGS, TX 78620	P O BOX 249 DRIPPING SPRINGS,TX 78620-0249	115250	1158.03	1159.53
R116155	MP COMMONS LLC	100 COMMONS RD DRIPPING SPRINGS, TX 78620	3555 LOST CREEK BLVD AUSTIN,TX 78735-1445	2464350	1157.50	1159.00
R23566	CHASE JOHN W & PAMULLA E	222 MERCER ST DRIPPING SPRINGS, TX 78620	P O BOX 43 DRIPPING SPRINGS,TX 78620-0043	78840	1157.57	1159.07
R17803	DRIPPING SPRINGS WATER SUPPLY	134 MERCER ST DRIPPING SPRINGS, TX 78620	P O BOX 354 DRIPPING SPRINGS,TX 78620-0354	34000	1151.65	1153.15
R116157	CARTER, H C	131/141 E LOOP 64 DRIPPING SPRINGS, TX 78620	P O BOX 249 DRIPPING SPRINGS,TX 78620-0249	27440	1151.16	1152.66
R116156	CARTER, H C	151 E LOOP 64 DRIPPING SPRINGS, TX 78620	P O BOX 249 DRIPPING SPRINGS,TX 78620-0249	98240	1151.96	1153.46
R23569	ROBERTS THOMAS GENE & MARTY L	402 MERCER ST DRIPPING SPRINGS TX	P O BOX 305 DRIPPING SPRINGS,TX 78620-0305	100970	1147.35	1148.85
R23568	ROBERTS THOMAS GENE & MARTY L	MERCER ST	P O BOX 305 DRIPPING SPRINGS,TX 78620-0305	194670	1150.34	1151.84
R23570	MCAFEE WILLIAM S & PAMELA R	100 MERCER ST DRIPPING SPRINGS TX	P O BOX 1668 DRIPPING SPRINGS,TX 78620-1668	49620	1152.23	1153.73
R26692	SREE VYSHNAVI INC	200 W US 290 DRIPPING SPRINGS, TX 78620	200 W US 290 DRIPPING SPRINGS, TX 78620	143690	1146.48	1147.98
R26691	HAYDON, ALVA	222 W US 290 DRIPPING SPRINGS, TX 78620	P O BOX 5 DRIPPING SPRINGS,TX 78620-0005	55750	1136.49	1137.99
R10774	HAYS COUNTY EMERGENCY SERV DIST #8	209 JACK C HAYS TRL BUDA, TX 78610	P O BOX 782 BUDA,TX 78610-0782	156930	699.90	701.40
R10748	BUDA MILL & GRAIN CO	306 LOOP 4 BUDA, TX 78610	PO BOX 1436 BUDA,TX 78610-1436	10930	716.40	717.90
R10748	BUDA MILL & GRAIN CO	306 LOOP 4 BUDA, TX 78610	PO BOX 1436 BUDA,TX 78610-1436	11720	715.79	717.29
R10748	BUDA MILL & GRAIN CO	306 LOOP 4 BUDA, TX 78610	PO BOX 1436 BUDA,TX 78610-1436	10930	717.42	718.92
R10570	DAHLSTROM FAMILY LP	304 S AUSTIN ST BUDA TX	302 S MAIN ST BUDA,TX 78610	28320	714.89	716.39
R10698	BOWDEN B W PROPERTIES INC	105 JACK C HAYS TRL (FM 2770) BUDA, TX 78610	1503 POST RD SAN MARCOS,TX 78666	114280	716.91	718.41
R10747	BUDA MILL & GRAIN CO	302 S MAIN ST BUDA, TX 78610	PO BOX 1436 BUDA,TX 78610-1436	115330	716.86	718.36
R22313	WESTLAKE EQUIPMENT SERVICE CO INC	210 S MAIN ST BUDA, TX 78610	11307 STORMY RIDGE RD AUSTIN,TX 78739	94740	714.89	716.39
R132524	RUHLING, CHRISTOPHER	275 BLUFF ST BUDA, TX 78610	275 BLUFF ST BUDA, TX 78610	175420	696.11	697.61
R132533	SHEETS JEFFREY & SHELLY	141 WATSON CT BUDA, TX 78610	P O BOX 1667 BUDA,TX 78610-1667	191700	714.16	715.66
R111186	CLARK, MARTIN W	204 S AUSTIN ST BUDA, TX 78610	204 S AUSTIN ST BUDA, TX 78610	54900	714.11	715.61
R22311	KIMPLE, JOHN D	204 S MAIN ST BUDA, TX 78610	201 CROSS LN KYLE,TX 78640	34810	714.11	715.60
R22312	KIMPLE, JOHN D	206 S MAIN BUDA, TX 78610	P O BOX 516 BUDA,TX 78610-0516	1000	693.42	694.92
R22310	HARRIS FRASER B & LINDA CELESTA	200 S MAIN BUDA, TX 78610	P O BOX 207 BUDA,TX 78610-0207	39600	712.86	714.36
R22315	CLARK, CECIL A	200 S AUSTIN ST BUDA, TX 78610	200 S AUSTIN ST BUDA, TX 78610	84730	712.81	714.31
R22318	FRANKE, RONALD R	207 CHINA ST BUDA, TX 78610	P O BOX 456 BUDA,TX 78610-0456	83350	710.44	711.94
R22326	FIRST BAPTIST CHURCH OF BUDA	104 San Marcos Street Buda, TX 78610	P O BOX 537 BUDA,TX 78610-0537	18150	706.68	708.18
R22324	CRUMLEY LORENE J ESTATE	111 SAN MARCOS ST BUDA, TX 78610	111 SAN MARCOS ST BUDA, TX 78610	638800	713.53	715.03
R110166	MUSICK, JERRY	1212 BEAUCHAMP RD DRIPPING SPRINGS, TX 78620	1212 BEAUCHAMP RD DRIPPING SPRINGS, TX 78620	322910	1197.11	1198.61
R45417	HOWARD GERALD W & ANNA L	1801 SYCAMORE CREEK, DRIPPING SPRINGS,TX 78620	1801 SYCAMORE CREEK, DRIPPING SPRINGS,TX 78620	155100	935.49	936.99
R45396	ANDERSON, DEBORAH L	301 SYCAMORE VALLEY RD DRIPPING SPRINGS, TX 78620	P O BOX 313, DRIPPING SPRINGS,TX 78620-0313	183780	921.42	922.92
R46854	CAPPS, KYLE F	100 VISTA WEST RCHS	100 COMMONS RD STE #7-411, DRIPPING SPRINGS,TX 78620-3966	255450	1125.30	1126.80
R60563	THERIOT ROBERT H	101 HILLVIEW TRL DRIPPING SPRINGS, TX 78620	6535 COMANCHE TRL, AUSTIN,TX 78732	139360	930.60	932.10
R19876	AMINI RON	1558 CORKY COX RANCH RD ROUND MOUNTAIN, TX 78663	3508 LOST CREEK BLVD, AUSTIN,TX 78735	214210	773.54	775.04
R30279	HOGAN, STEVEN M	8 HERITAGE OAKS DR, AUSTIN, TX 78737	8 HERITAGE OAKS DR, AUSTIN, TX 78737	188790	1091.71	1093.21
R30221	NUTT STEPHEN S & KAREN N	13 HERITAGE OAKS DR, AUSTIN, TX 78737	13 HERITAGE OAKS DR, AUSTIN, TX 78737	316130	1085.77	1087.27
R30362	BLEDSOE CLINT & KELLIE	3 TALL OAKS TRL, AUSTIN, TX 78737	3 TALL OAKS TRL, AUSTIN, TX 78737	254480	1073.40	1074.90
R30340	COVINGTON, JAMES	5 LONG CREEK RD, AUSTIN, TX 78737	5 LONG CREEK RD, AUSTIN, TX 78737	267740	1047.24	1048.74
R36987	JAMES JAMES CORBY & MAURIE T	11911 OAK BRANCH DR, AUSTIN, TX 78737	11911 OAK BRANCH DR, AUSTIN, TX 78737	361640	1037.28	1038.78
R30379	O'GRADY BRIAN & MARGARET A	2 LONGWOOD RD, AUSITN, TX 78737	220 MCDONALD DR, PASCO,WA 99301	81250	1037.55	1039.05
R30379	O'GRADY BRIAN & MARGARET A	2 LONGWOOD RD, AUSITN, TX 78737	220 MCDONALD DR, PASCO,WA 99301	329900	1037.18	1038.68
R36985	MEDLIN RHONDA M & ROBERT D	11901 OAK BRANCH DR, AUSTIN,TX 78737	11901 OAK BRANCH DR, AUSTIN,TX 78737	386430	1043.67	1045.17
R12855	NELSON, LANA	14509 FITZHUGH RD, DRIPPING SPRINGS, TX 78620	14509 FITZHUGH RD, DRIPPING SPRINGS, TX 78620	360830	954.80	956.30

Habitable Structures Inventory

Property ID	Property Owner	Property Address	Owner Address	Improvement Value	Elevation	Elevation plus Slab
R37916	BOWDEN, RICHARD A	12460 PAULS VALLEY RD AUSTIN, TX 78737	12460 PAULS VALLEY RD AUSTIN, TX 78737	121720	953.77	955.27
R18295	BURTON, CHARLES R	13303 RED GATE LN, AUSTIN, TX 78737	1100 GUADALUPE, AUSTIN,TX 78701	9500	1028.31	1029.81
R18295	BURTON, CHARLES R	13303 RED GATE LN, AUSTIN, TX 78737	1100 GUADALUPE, AUSTIN,TX 78701	2500	1029.12	1030.62
R18297	LEE LLOYD & CHELESE	13431 TRAIL DRIVER CIR, AUSTIN, TX 78737	13431 TRAIL DRIVER CIR, AUSTIN, TX 78737	119550	1044.42	1045.92
R13155	BODE SUSIE A	14909 B FITZHUGH RD AUSTIN, TX 78736	14909 B FITZHUGH RD AUSTIN, TX 78736	118920	959.84	961.34
R125979	SPARKLE 5 PARTNERSHIP LP	12250 TRAUTWEIN RD, AUSTIN, TX 78737	12250 TRAUTWEIN RD, AUSTIN, TX 78737	813660	963.84	965.34
R44564	KELLEY TRISHA	1049 HIDDEN HILLS DR DRIPPING SPRINGS, TX 78620	1049 HIDDEN HILLS DR DRIPPING SPRINGS, TX 78620	164440	1089.26	1090.76
R44505	ONEY CLAUDIA & PAIGE WILLIAM C	1050 HIDDEN HILLS DR, DRIPPING SPRINGS,TX 78620-3935	1050 HIDDEN HILLS DR, DRIPPING SPRINGS,TX 78620-3935	199010	1083.40	1084.90
R45043	KINCAID, SEAN N	610 COTTONWOOD CREEK RD, DRIPPING SPRINGS, TX 78620	610 COTTONWOOD CREEK RD, DRIPPING SPRINGS, TX 78620	21780	1050.96	1052.46
R43111	BULLOCK, ESTELLINE	140 LITTLE BARTON DR DRIPPING SPRINGS, TX 78620	100 LITTLE BARTON DR, DRIPPING SPRINGS,TX 78620	174510	1222.01	1223.51
R43157	THURMAN DAVID M & PATRICE	311 BARTON MEADOWS DR, DRIPPING SPRINGS, TX 78620	311 BARTON MEADOWS DR, DRIPPING SPRINGS, TX 78620	3320	1222.98	1224.48
R43160	FISHER JONATHAN D & KUDO MIKIKO	341 BARTON MEADOW DR, DRIPPING SPRINGS, TX 78620	341 BARTON MEADOW DR, DRIPPING SPRINGS, TX 78620	12000	1233.54	1235.04
R20646	FELKEL JOSEPH R & CAROL A	386 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	386 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	208740	1025.39	1026.89
R20646	FELKEL JOSEPH R & CAROL A	386 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	386 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	43820	1024.82	1026.32
R20645	RAESZ, RONALD G	302 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	6103 OLIVER LOVING TRL, AUSTIN,TX 78749	112430	1026.54	1028.04
R20644	DRAKE TONYA B	300 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	300 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	245870	1026.07	1027.57
R20643	MORGAN BILLY JOE & LANE H	280 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	280 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	252460	1028.37	1029.87
R20642	CASSERBERG MARION A & MORTON ROBERT D	256 BARTON RANCH RD, DRIPPING SPRINGS,TX 78620	256 BARTON RANCH RD, DRIPPING SPRINGS,TX 78620	190230	1028.95	1030.45
R20642	CASSERBERG MARION A & MORTON ROBERT D	256 BARTON RANCH RD, DRIPPING SPRINGS,TX 78620	256 BARTON RANCH RD, DRIPPING SPRINGS,TX 78620	20850	1027.56	1029.06
R70569	SCOTT ANDREW M & JULIA A TRUST	206 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	206 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	257430	1030.29	1031.79
R20640	ADAMS RICHARD A & VICKI L	110 BARTON RANCH RD DRIPPING SPRINGS, TX 78620	110 BARTON RANCH RD DRIPPING SPRINGS, TX 78620	350130	1030.10	1031.60
R20657	SWIFT BRION R & MELISSA J	175 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	175 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	262140	1035.11	1036.61
R20639	CURME, ROGER W	106 BARTON RANCH RD DRIPPING SPRINGS, TX 78620	106 BARTON RANCH RD DRIPPING SPRINGS, TX 78620	152360	1031.59	1033.09
R20657	SWIFT BRION R & MELISSA J	175 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	175 BARTON RANCH RD, DRIPPING SPRINGS, TX 78620	17340	1034.22	1035.72
R20638	LITCH TIMOTHY ERNEST & RAMSEY CATHERINE ANNE	131 BARTON RANCH RD DRIPPING SPRINGS, TX 78620	131 BARTON RANCH RD DRIPPING SPRINGS, TX 78620	183970	1039.77	1041.27
R20638	LITCH TIMOTHY ERNEST & RAMSEY CATHERINE ANNE	131 BARTON RANCH RD DRIPPING SPRINGS, TX 78620	131 BARTON RANCH RD DRIPPING SPRINGS, TX 78620	10460	1039.96	1041.46
R13743	DIEGO, TAURINO	1330 W FITZHUGH RD DRIPPING SPRINGS, TX 78620	5528 WILD FOXGLOVE RD SPICEWOOD,TX 78669-6906	12940	1087.90	1089.40
R13745	HALL MILTON EST OF	1330 W FITZHUGH RD DRIPPING SPRINGS, TX 78620	1330 W FITZHUGH RD DRIPPING SPRINGS, TX 78620	80750	1090.23	1091.73
R13743	DIEGO, TAURINO	1330 W FITZHUGH RD DRIPPING SPRINGS, TX 78620	5528 WILD FOXGLOVE RD SPICEWOOD,TX 78669-6906	11600	1084.86	1086.36
R13794	TRLICA MATTHEW A & MARLA A	501 BARTON BEND, DRIPPING SPRONGS,TX 78620	501 BARTON BEND DRIPPING SPRINGS, TX 78620	50780	1072.50	1074.00
R15691	MOORE C O LP TX LTD PARTNERSHIP	3375 BELL SPRINGS RD, DRIPPING SPRINGS, TX 78620	4100 JACKSON AVE APT #525, AUSTIN,TX 78731	6520	1129.08	1130.58
R15691	MOORE C O LP TX LTD PARTNERSHIP	3375 BELL SPRINGS RD, DRIPPING SPRINGS, TX 78620	4100 JACKSON AVE APT #525, AUSTIN,TX 78731	28160	1127.66	1129.16
R16560	BREED BENNY RAY & JANIE LEE FAMILY TRUST	4755 W FITZHUGH, DRIPPING SPRINGS, TX 78620	P O BOX 550, DRIPPING SPRINGS,TX 78620-0550	255560	1190.87	1192.37
R13808	MEDLIN CREEK RANCH LTD	2201 W FITZHUGH RD, DRIPPING SPRINGS,TX 78620	2201 W FITZHUGH RD, DRIPPING SPRINGS,TX 78620	20000	1136.51	1138.01
R20260	LONGHORN RIVER RANCH LTD	3201 FM 165 DRIPPING SPRINGS, TX 78620	3144 BEE CAVES RD AUSTIN,TX 78746	37500	1378.10	1379.60
R20260	LONGHORN RIVER RANCH LTD	3201 FM 165 DRIPPING SPRINGS, TX 78620	3144 BEE CAVES RD AUSTIN,TX 78746	1000	1370.64	1372.14
R18222	MORRISON, FLORENCE R	3100 RANCH ROAD 165 DRIPPING SPRINGS, TX 78620	P O BOX 531 BLANCO,TX 78606-0531	6770	1358.96	1360.46
R18237	WHETSTONE FAMILY TRUST	2051 LOOP 165 DRIPPING SPRINGS, TX 78620	2051 LOOP 165 DRIPPING SPRINGS,TX 78620-4731	750	1336.68	1338.18
R18226	DEVERE LARRY & MARY	1835 LOOP 165 DRIPPING SPRINGS, TX 78620	1835 LOOP 165 DRIPPING SPRINGS, TX 78620	26030	1323.38	1324.88
R18226	DEVERE LARRY & MARY	1835 LOOP 165 DRIPPING SPRINGS, TX 78620	1835 LOOP 165 DRIPPING SPRINGS, TX 78620	572840	1315.34	1316.84
R18221	TREEHOUSE REALTY LLC	1717 LOOP 165 DRIPPING SPRINGS, TX 78620	1301 S INTERSTATE 35 STE #200 AUSTIN,TX 78741-1169	103900	1315.43	1316.93
R60165	GILKYSON NANCY HUNTER & POTTER DANIEL ROMEYN	1501 LOOP 165 DRIPPING SPRINGS, TX 78620	1501 LOOP 165 DRIPPING SPRINGS, TX 78620	211080	1302.80	1304.30
R60165	GILKYSON NANCY HUNTER & POTTER DANIEL ROMEYN	1501 LOOP 165 DRIPPING SPRINGS, TX 78620	1501 LOOP 165 DRIPPING SPRINGS, TX 78620	4660	1303.04	1304.54
R60165	GILKYSON NANCY HUNTER & POTTER DANIEL ROMEYN	1501 LOOP 165 DRIPPING SPRINGS, TX 78620	1501 LOOP 165 DRIPPING SPRINGS, TX 78620	36460	1304.01	1305.51
R113725	HUDSON RANCH PARTNERS LLC	1301 LOOP 165 DRIPPING SPRINGS, TX 78620	3144 BEE CAVES RD AUSTIN,TX 78746	22100	1295.19	1296.69
R10945	CLARK HARLEY R JR & PATRICIA R	5455 W US 290 DRIPPING SPRINGS, TX 78620	P O BOX 1306 DRIPPING SPRINGS,TX 78620-1306	18080	1238.29	1239.79
R13321	NATIONWIDE DG NEW WAVERLY INC	161 SPRINGS LN #2400-A DRIPPING SPRINGS, TX 78620	100 N LASALLE ST STE 1111 CHICAGO,IL 60602	320110	1308.41	1309.91
R113324	SUTHERLAND DAVID E & MYRA L	5930 W US 290 DRIPPING SPRINGS, TX 78620	P O BOX 1250 DRIPPING SPRINGS, TX 78620-1306	270840	1323.35	1324.85
R15876	WHITE MARK WELLS & LINDA GALE	CREEK RD DRIPPING SPRINGS, TX 78620	72 E BROAD OAKS DR HOUSTON,TX 77056	42830	1139.12	1140.62
R14382	MATHIS, TRAVIS ALLISON	4301 CREEK RD DRIPPING SPRINGS, TX 78620	P O BOX 1271 DRIPPING SPRINGS,TX 78620-1271	204940	1136.90	1138.40
R15859	HANCOCK/HANKS INVESTMENTS LTD	4201 CREEK RD DRIPPING SPRINGS, TX 78620	1009 W 6TH ST AUSTIN,TX 78703	154350	1136.48	1137.98
R15859	HANCOCK/HANKS INVESTMENTS LTD	4201 CREEK RD DRIPPING SPRINGS, TX 78620	1009 W 6TH ST AUSTIN,TX 78703	4000	1132.74	1134.24
R14380	HANCOCK/HANKS INVESTMENTS LTD	3801 CREEK RD DRIPPING SPRINGS, TX 78620	1009 W 6TH ST AUSTIN,TX 78703	144780	1135.86	1137.36
R14992	JOHNSON, BARBARA JEAN	2000 CREEK RD DRIPPING SPRINGS, TX 78620	2000 CREEK RD DRIPPING SPRINGS, TX 78620	250	1096.71	1098.21
R70255	CARTER, H C	1601 CREEK RD DRIPPING SPRINGS, TX 78620	P O BOX 249 DRIPPING SPRINGS,TX 78620-0249	35280	1085.41	1086.91
R36393	NEEDHAM, DONNA C	NEEDHAM RD DRIPPING SPRINGS, TX 78620	P O BOX 478 DRIPPING SPRINGS,TX 78620-0478	125770	1072.08	1073.58
R17806	CALITERRA PARTNERS LLC	26465 RR 12 DRIPPING SPRINGS, TX 78620	15400 KNOLL TRL STE #201 DALLAS,TX 75248	30310	1057.99	1059.49
R13379	RYAN PAMELA M	24710 RR 12 DRIPPING SPRINGS, TX 78620	1000 RIO GRANDE ST AUSTIN,TX 78701-2014	382740	1034.47	1035.97
R13379	RYAN PAMELA M	24710 RR 12 DRIPPING SPRINGS, TX 78620	1000 RIO GRANDE ST AUSTIN,TX 78701-2014	196380	1032.79	1034.29
R11160	CROMWELL LAURIE & ERIC	COUNTRY LN DRIPPING SPRINGS, TX 78620	404 LOOP ST BUDA,TX 78610-3304	94600	1039.50	1041.00
R13362	BLUM, LINDA JANE THIELEPAPE	24101 RR 12 DRIPPING SPRINGS, TX 78620	801 W LUBBOCK BRENHAM,TX 77833	262230	1052.35	1053.85
R13362	BLUM, LINDA JANE THIELEPAPE	24101 RR 12 DRIPPING SPRINGS, TX 78620	801 W LUBBOCK BRENHAM,TX 77833	3000	1051.67	1053.17

Habitable Structures Inventory						
Property ID	Property Owner	Property Address	Owner Address	Improvement Value	Elevation	Elevation plus Slab
R16738	SYRING JEFFREY M & KIMBERLEY	2055 MT GAINOR RD DRIPPING SPRINGS, TX 78620	2055 MT GAINOR RD DRIPPING SPRINGS, TX 78620	26740	1113.87	1115.37
R19198	LIVINGSTON, CATHERINE	3001 E MT GAINOR RD DRIPPING SPRINGS, TX 78620	10707 TWILIGHT VISTA AUSTIN,TX 78736	15270	1130.50	1132.00
R19198	LIVINGSTON, CATHERINE	3001 E MT GAINOR RD DRIPPING SPRINGS, TX 78620	10707 TWILIGHT VISTA AUSTIN,TX 78736	99100	1128.16	1129.66
R19292	WHISENANT BETTY J FAMILY TRUST	22555 RR 12 DRIPPING SPRINGS, TX 78620	206 GATLIN CREEK RD DRIPPING SPRINGS,TX 78620	2500	1133.08	1134.58
R19292	WHISENANT BETTY J FAMILY TRUST	22555 RR 12 DRIPPING SPRINGS, TX 78620	206 GATLIN CREEK RD DRIPPING SPRINGS,TX 78620	136460	1135.30	1136.80
R19210	BOWEN PARTNERS LTD	MT GAINOR RD DRIPPING SPRINGS, TX 78620	3700 MT GAINOR RD DRIPPING SPRINGS,TX 78620	1500	1150.44	1151.94
R19202	DUNNAM THOMAS & MARGARET	MT GAINOR RD DRIPPING SPRINGS, TX 78620	3200 MOUNT GAINOR RD DRIPPING SPRINGS,TX 78620	125550	1141.43	1142.93
R19202	DUNNAM THOMAS & MARGARET	MT GAINOR RD DRIPPING SPRINGS, TX 78620	3200 MOUNT GAINOR RD DRIPPING SPRINGS,TX 78620	4800	1146.98	1148.48
R13638	BOONE DAVID G & MARGARET W	4901 MT GAINER RD DRIPPING SPRINGS, TX 78620	P O BOX 1075 DRIPPING SPRINGS,TX 78620-0785	27500	1208.35	1209.85
R17496	SPENCER, WINIFRED ANN	3650 PURSLEY RD DRIPPING SPRINGS, TX 78620	3550 PURSLEY RD DRIPPING SPRINGS,TX 78620	7400	1241.30	1242.80
R115712	FREESTONE RANCH LP	3500 PURSLEY RD DRIPPING SPRINGS, TX 78620	9508 JOLLYVILLE RD STE 101 AUSTIN,TX 78759	13630	1252.75	1254.25
R115712	FREESTONE RANCH LP	3500 PURSLEY RD DRIPPING SPRINGS, TX 78620	9508 JOLLYVILLE RD STE 101 AUSTIN,TX 78759	2007010	1262.72	1267.72
R11130	WILSON R B JR (LIFE ESTATE)	20601 W FM 150 DRIFTWOOD, TX 78619	1221 S MOPAC EXPRESSWAY STE 400 AUSTIN,TX 78746-7650	133500	1008.18	1009.68
R11168	SMITH, CHARLIE J	1150 E GATLIN CREEK RD DRIFTWOOD, TX 78619	1150 E GATLIN CREEK RD DRIFTWOOD, TX 78619	38020	1032.95	1034.45
R11061	FORD, CATHERINE M	1600 E GATLIN CREEK RD DRIFTWOOD, TX 78619	1600 E GATLIN CREEK RD DRIFTWOOD, TX 78619	83240	1031.87	1033.37
R32087	FELTON, THOMAS R, Jr.	Stoney Brook Ln Driftwood, TX 78619	P O BOX 183 WIMBERLEY,TX 78676-0183	44120	1052.56	1054.06
R32079	MYERS, JEFFREY VAN	3400 ELDER HILL RD DRIFTWOOD, TX 78619	P O BOX 130 DRIFTWOOD,TX 78619-0130	73020	1056.18	1057.68
R32079	MYERS, JEFFREY VAN	3400 ELDER HILL RD DRIFTWOOD, TX 78619	P O BOX 130 DRIFTWOOD,TX 78619-0130	19000	1057.88	1059.38
R32077	TEAGUE RAYMOND F & DIANA	3500 ELDER HILL RD DRIFTWOOD, TX 78619	3500 ELDER HILL RD DRIFTWOOD, TX 78619	98840	1055.99	1057.49
R32076	HUNTER LARRY & MARY J	3600 ELDER HILL RD DRIFTWOOD, TX 78619	P O BOX 1292 EDINBURG,TX 78540-1292	144210	1057.89	1059.39
R32075	LIEGEL JEFFREY & JULIA	3700 ELDER HILL RD DRIFTWOOD, TX 78619	3700 ELDER HILL RD DRIFTWOOD, TX 78619	76250	1065.79	1067.29
R20133	SHULTS RODERICK L FAMILY TRUST	3800 ELDER HILL RD DRIFTWOOD, TX 78619	604 LITTLE OAK DR AUSTIN,TX 78753	22340	1062.53	1064.03
R19275	ROCKY LEDGE ARABIANS	301 GATLIN CREEK RD DRIPPING SPRINGS TX	614 ROCKY LEDGE DR AUSTIN,TX 78746	2000	1108.44	1109.94
R14363	STORM RANCH PARTNERSHIP LTD	GATLIN CREEK RD DRIPPING SPRINGS,TX 78620	2501 GATLIN CREEK RD DRIPPING SPRINGS,TX 78620	7900	1115.85	1117.35
R14363	STORM RANCH PARTNERSHIP LTD	GATLIN CREEK RD DRIPPING SPRINGS,TX 78620	2501 GATLIN CREEK RD DRIPPING SPRINGS,TX 78620	900	1119.20	1120.70
R14296	BEYER KENNETH R & PATRICIA	2265 GATLIN CREEK RD DRIPPING SPRINGS, TX 78620	2265 GATLIN CREEK RD DRIPPING SPRINGS, TX 78620	233390	1185.97	1187.47
R123058	DAVIS LARRY S & SUSAN F	19401 FM 150 DRIFTWOOD, TX 78619	19401 FM 150 DRIFTWOOD, TX 78619	209890	996.02	997.52
R19854	WARD JAMES T & JANET K	19301 W FM 150 DRIFTWOOD, TX 78619	19301 W FM 150 DRIFTWOOD, TX 78619	208330	997.95	999.45
R12384	CITY OF SAN MARCOS	RIVER RD SAN MARCOS, TX 78666	630 E HOPKINS ST SAN MARCOS,TX 78666	22482	994.75	996.25
R11116	DARDEN HILL LLC	406 DARDEN HILL RD DRIFTWOOD, TX 78619	3939 BEE CAVE RD BLDG C-100 AUSTIN,TX 78746	9690	999.73	1001.23
R19372	SMITH, JOHN G	703 DARDEN HILL RD DRIFTWOOD, TX 78619	703 DARDEN HILL RD DRIFTWOOD, TX 78619	138970	998.27	999.77
R11122	PORTER FAMILY TRUST	179 DARDEN HILL RD DRIPPING SPRINGS, TX 78620	2722 BARTON SKYWAY 2722 BARTON SKYWAY	80910	1028.72	1030.22
R33338	DAVIS WESLEY K & ANGELA K	912 E CREEK DR DRIPPING SPRINGS, TX 78620	912 E CREEK DR DRIPPING SPRINGS, TX 78620	283360	1125.31	1126.81
R20562	HERCZOG, DEBORAH A	19200 W FM 150 DRIFTWOOD, TX 78619	19200 W FM 150 DRIFTWOOD, TX 78619	120070	989.22	990.72
R20561	JOHNSON, BARBARA H	19050 W FM 150 DRIFTWOOD, TX 78619	2000 CREEK RD DRIPPING SPRINGS,TX 78620	7340	993.53	995.03
R20561	JOHNSON, BARBARA H	19050 W FM 150 DRIFTWOOD, TX 78619	2000 CREEK RD DRIPPING SPRINGS,TX 78620	97090	987.89	989.39
R20561	JOHNSON, BARBARA H	19050 W FM 150 DRIFTWOOD, TX 78619	2000 CREEK RD DRIPPING SPRINGS,TX 78620	5760	998.24	999.73
R20559	MORGAN DENA ELAINE	19022 W FM 150 DRIFTWOOD, TX 78619	233 TURTLE LN SEGUIN,TX 78155-3142	185480	986.05	987.55
R20557	BROWN, MITCHELL	19000 W FM 150 DRIFTWOOD, TX 78619	19000 W FM 150 DRIFTWOOD, TX 78619	134760	996.17	997.67
R19859	SHARMAN RALPH S JR & PAMELA G	1200 DARDEN HILL RD DRIFTWOOD, TX 78619	P O BOX 1260 DRIPPING SPRINGS,TX 78620-1260	270530	991.14	992.64
R20558	BROWN, MITCHELL	19000 W FM 150 DRIFTWOOD, TX 78619	19000 W FM 150 DRIFTWOOD, TX 78619	34250	986.79	988.28
R91520	COMPTON JEREMY R	431 ONION CREEK LN DRIFTWOOD, TX 78619	710 NE 3RD ST ANDREWS,TX 79714-4108	355080	990.30	991.80
R91522	PERCEVAL IDA	461 ONION CREEK LN DRIFTWOOD, TX 78619	461 ONION CREEK LN DRIFTWOOD, TX 78619	323390	991.41	992.91
R91524	JACOB CHARLES C & MARGARET J	501 ONION CREEK LN DRIFTWOOD, TX 78619	501 ONION CREEK LN DRIFTWOOD, TX 78619	281220	991.68	993.18
R26597	AULICK MICHAEL R & MCGAUGHY REBECCA A	700 CREEKWOOD DR DRIFTWOOD, TX 78619	700 CREEKWOOD DR DRIFTWOOD, TX 78619	131620	984.88	986.38
R26597	AULICK MICHAEL R & MCGAUGHY REBECCA A	700 CREEKWOOD DR DRIFTWOOD, TX 78619	700 CREEKWOOD DR DRIFTWOOD, TX 78619	13820	987.87	989.37
R70559	GRAVES, CATHERINE	1000 CREEKWOOD DR DRIFTWOOD, TX 78619	P O BOX 160970 AUSTIN,TX 78716-0970	39980	976.80	978.30
R26599	PETERSON LOIS THORLACIUS & BETZ MICHAEL RAY	900 CREEKWOOD DR DRIFTWOOD, TX 78619	900 S CREEKWOOD DR DRIFTWOOD,TX 78619-9706	115540	985.13	986.63
R26602	BRYANT JACK R & DEBRA D	903 CREEKWOOD DR DRIFTWOOD, TX 78619	168 LA GROSS WAY CHATSWORTH,CA 91311-7013	269110	979.70	981.20
R26605	WILLS JASON	719 S CREEKWOOD DR DRIFTWOOD, TX 78619	33 LONG CREEK RD AUSTIN,TX 78737-9303	174510	980.24	981.74
R26608	BRANDT PAUL J	657 S CREEKWOOD DR DRIFTWOOD, TX 78619	657 S CREEKWOOD DR DRIFTWOOD, TX 78619	151040	976.47	977.97
R26604	RAY, CHARLES E, Jr	725 CREEKWOOD DR DRIFTWOOD, TX 78619	725 CREEKWOOD DR DRIFTWOOD, TX 78619	94950	980.80	982.30
R26607	CROSSETT GREGORY L & SHERI	681 S CREEKWOOD DR DRIFTWOOD, TX 78619	681 S CREEKWOOD DR DRIFTWOOD, TX 78619	145130	978.52	980.02
R26611	HARMESON RICHARD A & ELIZABETH	601 S CREEKWOOD DR DRIFTWOOD, TX 78619	601 S CREEKWOOD DR DRIFTWOOD, TX 78619	239670	967.90	969.40
R26609	MILLER HARRY A IV	609 S CREEKWOOD DR DRIFTWOOD, TX 78619	609 S CREEKWOOD DR DRIFTWOOD, TX 78619	222820	969.29	970.79
R38031	BLATT HOWARD E & CHARLA L	303 S CREEKWOOD DR DRIFTWOOD, TX 78619	9125 MANCHACA RD AUSTIN,TX 78748	112710	976.08	977.58
R38035	GANTT, BRIAN D	1670 DARDEN HILL RD DRIFTWOOD, TX 78619	1670 DARDEN HILL RD DRIFTWOOD, TX 78619	74650	978.28	979.78
R38034	GANTT, BRIAN D	1670 DARDEN HILL RD DRIFTWOOD, TX 78619	1670 DARDEN HILL RD DRIFTWOOD, TX 78619	2280	977.66	979.16
R35499	JENSEN RICHARD M & LAUREL A	1102 QUAIL RIDGE DR DRIPPING SPRINGS, TX 78620	1102 QUAIL RIDGE DR DRIPPING SPRINGS, TX 78620	15000	1034.13	1035.63
R12573	SHERRILL PAUL K & SHERRILL DANNY JOE	18315 FM 1826 DRIFTWOOD, TX 78619	2625 OAK RIDGE DR SPICEWOOD,TX 78669-6669	329050	962.64	964.14
R12534	ROBERTS, M SCOTT	FM 1826 DRIFTWOOD, TX 78619	PO BOX 311 DRIFTWOOD,TX 78619-0311	118800	948.75	950.25
R9307	CAMP BEN MCCULLOCH INC	18301 FM 1826 DRIFTWOOD, TX 78619	P O BOX 23 DRIFTWOOD,TX 78619-0023	20000	952.85	954.35

Habitable Structures Inventory						
Property ID	Property Owner	Property Address	Owner Address	Improvement Value	Elevation	Elevation plus Slab
R12548	CARR FAMILY PARTNERSHIP LTD	15100 W FM 150 DRIFTWOOD, TX 78619	4826 HIGHWAY 71 E DEL VALLE,TX 78617-3217	319670	954.05	955.55
R12560	KANETZKY DON & MARTY	11161 FM 967 BUDA, TX 78610	11161 FM 967 BUDA, TX 78610	246700	946.08	947.58
R18371	TEMPLETON, BOBBIE	1655 ELDER HILL RD DRIFTWOOD, TX 78619	P O BOX 99 DRIFTWOOD,TX 78619-0099	22450	1058.44	1059.94
R18371	TEMPLETON, BOBBIE	1655 ELDER HILL RD DRIFTWOOD, TX 78619	P O BOX 99 DRIFTWOOD,TX 78619-0099	166910	1068.34	1069.84
R11671	CYPRESS SPRINGS RANCH LP	11159 FM 967 DRIFTWOOD, TX 78619	P O BOX 246 DRIFTWOOD,TX 78619-0246	78670	941.82	943.32
R38670	URBAN LARRY J & KAREN O	2500 S RAINBOW RANCH RD WIMBERLEY, TX 78676	2725 SWANTNER LN CORPUS CHRISTI,TX 78404	567710	1089.81	1091.31
R11669	ZIMMERMAN, FRANK W, Jr	11300 FM 150	P O BOX 229 DRIFTWOOD,TX 78619-0229	21260	909.14	910.64
R11668	SABER VENTURES & THE LAND OFFICE INC	11304 FM 150 DRIFTWOOD, TX 78619	13200 BEE CAVE PARKWAY AUSTIN,TX 78738	235880	878.54	880.04
R11668	SABER VENTURES & THE LAND OFFICE INC	11304 FM 150 DRIFTWOOD, TX 78619	13200 BEE CAVE PARKWAY AUSTIN,TX 78738	30000	886.23	887.73
R16381	HARKINS JOE TIMOTHY & CATHY GAIL	BILL KUYKENDALL RD KYLE, TX 78640	P O BOX 705 BUDA,TX 78610-0705	129030	856.40	857.90
R16380	PINTO, MARTHA L	100 BILL KUYKENDALL RD KYLE, TX 78640	100 BILL KUYKENDALL RD KYLE, TX 78640	165270	862.70	864.20
R17073	COWDEN, JAMES N	FM 150	600 CONGRESS AVE 15TH FLR #1500 AUSTIN,TX 78701	23740	886.79	888.29
R105648	SIERRA WEST SECTION I	375 BARBERRY PARK DRIFTWOOD, TX 78619	375 BARBERRY PARK DRIFTWOOD, TX 78619	22640	909.49	910.99
R71748	JONES, JILL REGA	501 YORK CREEK RD WIMBERLEY, TX 78676	501 YORK CREEK RD WIMBERLEY, TX 78676	63950	998.25	999.75
R71748	JONES, JILL REGA	501 YORK CREEK RD WIMBERLEY, TX 78676	501 YORK CREEK RD WIMBERLEY, TX 78676	32200	997.23	998.73
R40905	SPINI DONALD T & JOY A	401 YORK CREEK RD DRIFTWOOD, TX 78619	401 YORK CREEK RD DRIFTWOOD, TX 78619	5010	1002.56	1004.06
R40906	OGDEN, DARRYL RAY	301 YORK CREEK RD DRIFTWOOD, TX 78619	301 YORK CREEK RD DRIFTWOOD, TX 78619	4500	1005.02	1006.52
R40907	MULCAHY CHRISTINE E REVOCABLE TRUST	201-A YORK CREEK RD Unit A DRIFTWOOD TX 78619	196 LONELY PINE CV DRIFTWOOD,TX 78619-4353	22140	1006.16	1007.66
R41001	WALLACE, VAN R	97 YORK CREEK RD DRIFTWOOD, TX 78619	251 WIMBERLEY OAKS DR WIMBERLEY,TX 78676-4617	17880	1012.51	1014.01
R41001	WALLACE, VAN R	97 YORK CREEK RD DRIFTWOOD, TX 78619	251 WIMBERLEY OAKS DR WIMBERLEY,TX 78676-4617	1000	1017.42	1018.92
R40961	RICHEY DAVID M & FRANCIE WHITE	YORK CREEK RD DRIFTWOOD, TX 78619	86 YORK CREEK DR DRIFTWOOD, TX 78619	63230	1019.88	1021.38
R41058	STOCKTON KEITH N & DEBBY	60 YORK CREEK RD DRIFTWOOD, TX 78619	60 YORK CREEK RD DRIFTWOOD, TX 78619	57990	1038.91	1040.41
R41056	THYBERG GORDON M & KIM B	58 YORK CREEK RD WIMBERLEY, TX 78676	58 YORK CREEK RD WIMBERLEY, TX 78676	180880	1046.05	1047.55
R91044	SMITH RICHARD A	1061 CLARK CV BUDA, TX 78610	1061 CLARK CV BUDA, TX 78610	422020	804.16	805.66
R91043	BROSLAT BRUCE D & ROSE M	1041 CLARK CV BUDA, TX 78610	1041 CLARK CV BUDA, TX 78610	326160	804.76	806.26
R91042	ASHLEY, NATALIA	1021 CLARK CV BUDA, TX 78610	1021 CLARK CV BUDA, TX 78610	361620	803.88	805.38
R96832	ARDREY CATHERINE L	506 W BARTLETT DR BUDA, TX 78610	506 W BARTLETT DR BUDA, TX 78610	354710	799.90	801.40
R91031	JONES JUDITH G & LEWIS	601 CLARK CV BUDA, TX 78610	601 CLARK CV BUDA, TX 78610	374120	798.36	799.86
R96830	MCCOMB J KEITH & MICHELLE E	452 W BARTLETT DR BUDA, TX 78610	452 W BARTLETT DR BUDA, TX 78610	326910	798.29	799.79
R91029	WINTERS MEL A & LINDA M	501 CLARK CV BUDA, TX 78610	501 CLARK CV BUDA, TX 78610	333810	794.96	796.46
R91028	DICKEY, FRANK	451 CLARK CV BUDA, TX 78610	451 CLARK CV BUDA, TX 78610	490510	797.81	799.31
R91059	LEE ROBERT C III & TANJA	250 CREEKSIDE DR BUDA, TX 78610	250 CREEKSIDE DR BUDA, TX 78610	321310	799.08	800.58
R91060	PERDUE DONALD L & FLABIA	300 CREEKSIDE DR BUDA, TX 78610	300 CREEKSIDE DR BUDA, TX 78610	323470	800.54	802.04
R91049	LAYTON JEFFREY S & KIMBERLY A	600 CLARK CV BUDA, TX 78610	600 CLARK CV BUDA, TX 78610	385600	799.92	801.42
R93104	SCALLON, CHRIS	376 W BARTLETT DR BUDA, TX 78610	376 W BARTLETT DR BUDA, TX 78610	372440	791.34	792.84
R87539	ERWIN MARK E & CHARLOTTE	411 CLARK CV BUDA, TX 78610	411 CLARK CV BUDA, TX 78610	284290	796.95	798.45
R87528	WEYNANDT, JACK	401 CLARK CV BUDA, TX 78610	401 CLARK CV BUDA, TX 78610	308480	794.13	795.63
R93102	URESTI RUSTY G & MADELYN	292 W BARTLETT DR BUDA, TX 78610	2102 HAZELTINE LN AUSTIN,TX 78747	510560	789.93	791.43
R93106	MONTGOMERY ROGER & PEREZ AMY	130 RICHARDS DR BUDA, TX 78610	130 RICHARDS DR BUDA, TX 78610	383860	795.82	797.32
R93101	QUICK JIMMY B & SHERI L	238 W BARTLETT DR BUDA, TX 78610	238 W BARTLETT DR BUDA, TX 78610	239430	791.70	793.20
R87537	RUTLEDGE, BARBARA ANN	321 CLARK CV BUDA, TX 78610	321 CLARK CV BUDA, TX 78610	325270	795.35	796.85
R87536	BARKLEY CLIFTON W & MARY A	311 CLARK CV BUDA, TX 78610	311 CLARK CV BUDA, TX 78610	258840	793.48	794.98
R87535	OLMSTEAD DALE & BARBARA	301 CLARK CV BUDA, TX 78610	301 CLARK CV BUDA, TX 78610	337710	793.22	794.72
R87548	SARBA BARRY A & DEBORAH L	300 CLARK CV BUDA, TX 78652	300 CLARK CV BUDA, TX 78652	347600	796.13	797.63
R87549	AURORA LOAN SERVICES LLC	210 CLARK CV BUDA, TX 78652	PO BOX 1706 SCOTTSBLUFF,NE 69363-1706	287640	793.93	795.43
R87550	VAUGHN ROGER D & TRISHA J	200 CLARK CV BUDA, TX 78610	200 CLARK CV BUDA, TX 78610	265250	794.31	795.81
R87533	BERLIN CRAIG J & LUANNE	211 CLARK CV BUDA, TX 78610	116 CRESTVIEW RD WEST POINT,GA 31833	296820	791.77	793.27
R87532	RAINES LEE THOMAS	201 CLARK CV BUDA, TX 78610	201 CLARK CV BUDA, TX 78610	326060	789.89	791.39
R87531		121 CLARK CV BUDA, TX 78610	121 CLARK CV BUDA, TX 78610	0	786.95	788.45
R87530	RUTHERFORD, MIKE G, Jr	711 RUBY RANCH RD BUDA, TX 78610	711 RUBY RANCH RD BUDA, TX 78610	279790	791.30	792.80
R87510	CAMPO, MARY JO	120 ARMSTRONG CV BUDA, TX 78610	120 ARMSTRONG CV BUDA, TX 78610	314450	786.85	788.35
R87509	NAPER MATTHEW W & SARAH L	130 ARMSTRONG CV BUDA, TX 78610	130 ARMSTRONG CV BUDA, TX 78610	343280	786.01	787.51
R87508	AHMED MUMTAZ & AGLALA	140 ARMSTRONG CV BUDA, TX 78610	140 ARMSTRONG CV BUDA, TX 78610	272650	785.56	787.06
R87507	MOORE ARTHUR W & GOODMAN STEPHANIE	150 ARMSTRONG CV BUDA, TX 78610	150 ARMSTRONG CV BUDA, TX 78610	239770	784.72	786.22
R87506	ANDERSON CHARLES P & MARTHA A (LIFE ESTATE)	160 ARMSTRONG CV BUDA, TX 78610	160 ARMSTRONG CV BUDA, TX 78610	230240	785.43	786.93
R93151	FOLLETT SCOTT D & SALLY E	288 E BARTLETT DR BUDA, TX 78610	520 MATZIG CV BUDA,TX 78610	49110	775.75	777.25
R93151	FOLLETT SCOTT D & SALLY E	424 E BARTLETT DR BUDA, TX 78610	520 MATZIG CV BUDA,TX 78610	35200	777.14	778.64
R63273	FOLLETT SCOTT D & SALLY E	520 MATZIG CV BUDA,TX 78610	520 MATZIG CV BUDA,TX 78610	6900	778.71	780.21
R63273	FOLLETT SCOTT D & SALLY E	520 MATZIG CV BUDA,TX 78610	520 MATZIG CV BUDA,TX 78610	147560	778.54	780.04
R87504	MEYER GRAYDEN D & ELAINE DIANE	141 ARMSTRONG CV BUDA, TX 78610	141 ARMSTRONG CV BUDA, TX 78610	292730	788.17	789.67
R87518	HOWELL GLORIA E	220 HUMPHREYS BUDA, TX 78610	220 HUMPHREYS BUDA, TX 78610	254440	791.69	793.19
R87519	HOLDER KATHLEEN A & HILTON JAMES D	300 HUMPHRIES DR BUDA, TX 78610	300 HUMPHRIES DR BUDA, TX 78610	247390	793.34	794.84

Habitable Structures Inventory						
Property ID	Property Owner	Property Address	Owner Address	Improvement Value	Elevation	Elevation plus Slab
R87517	DORSETT PATRICK & KELLI	210 HUMPHREYS BUDA, TX 78610	210 HUMPHREYS BUDA, TX 78610	366390	791.98	793.48
R87522	BROWN, CHRIS	330 HUMPHREYS BUDA, TX 78610	330 HUMPHREYS BUDA, TX 78610	211510	797.00	798.50
R87523	HOLLUB MERLE J & GILBERT H	340 HUMPHREYS DR BUDA, TX 78610	340 HUMPHREYS DR BUDA, TX 78610	227960	796.51	798.01
R63269	FOLLETT SCOTT D & SALLY E	500 MATZIG CV BUDA,TX 78610	520 MATZIG CV BUDA,TX 78610	60430	782.91	784.41
R87496	WIER JAMES & CAROLYN	551 RUBY RANCH RD BUDA, TX 78610	551 RUBY RANCH RD BUDA, TX 78610	332430	785.32	786.82
R63242	MCCORD, NORMA M	500 RUBY RANCH RD BUDA, TX 78610	500 RUBY RANCH RD BUDA, TX 78610	262870	796.05	797.55
R63241	GRIZZLE DAVID R & SARA R	410 RUBY RANCH RD BUDA, TX 78610	410 RUBY RANCH RD BUDA, TX 78610	313560	797.24	798.74
R11243	POOL, THOMAS VINCENT	1769 FM 1626 BUDA, TX 78610	1769 FM 1626 BUDA, TX 78610	30270	704.42	705.92
R10051	MCADOO LINDA & WILEY	140 LITTLE POOL RD BUDA, TX 78610	140 LITTLE POOL RD BUDA, TX 78610	75180	711.88	713.38
R10051	MCADOO LINDA & WILEY	140 LITTLE POOL RD BUDA, TX 78610	140 LITTLE POOL RD BUDA, TX 78610	26080	706.50	708.00
R10139	ARTHUR KEVIN & BARBARA	141 LITTLE POOL RD BUDA, TX 78610	P O BOX 370 BUDA,TX 78610-0370	19410	712.69	714.19
R10089	LACKER KATHRYN W	1585 COLE SPRINGS RD BUDA, TX 78610	1585 COLE SPRINGS RD BUDA, TX 78610	81060	712.06	713.56
R10652	TRUDEAU FRED STEVEN & PAULA	855 COLE SPRINGS RD BUDA, TX 78610	855 COLE SPRINGS RD BUDA, TX 78610	291420	700.23	701.73
R10652	TRUDEAU FRED STEVEN & PAULA	855 COLE SPRINGS RD BUDA, TX 78610	855 COLE SPRINGS RD BUDA, TX 78610	27180	701.33	702.83
R10663	REVEDA DAN & HATTIE ESTATES OF	570 COLE SPRINGS RD BUDA, TX 78610	1730 BUNCH RD AUSTIN,TX 78721	23640	696.02	697.52
R10727	WATSON, JOHN ALLEN, Jr	BLUFF ST BUDA, TX 78610	P O BOX 740 BUDA,TX 78610-0740	26690	690.95	692.45
R10663	REVEDA DAN & HATTIE ESTATES OF	570 COLE SPRINGS RD BUDA, TX 78610	1730 BUNCH RD AUSTIN,TX 78721	16540	696.56	698.06
R10660	HAYS COUNTY OF	FM 2770 BUDA, TX 78610	302 W SAN ANTONIO ST SAN MARCOS,TX 78666	97400	698.18	699.68
R33180	ONION CREEK LTD	300 BLUFF ST BUDA, TX 78610	P O BOX 1357 ARANSAS PASS,TX 78335-1357	44360	693.30	694.80
R33180	ONION CREEK LTD	300 BLUFF ST BUDA, TX 78610	P O BOX 1357 ARANSAS PASS,TX 78335-1357	44360	694.59	696.09
R33180	ONION CREEK LTD	300 BLUFF ST BUDA, TX 78610	P O BOX 1357 ARANSAS PASS,TX 78335-1357	44360	694.86	696.36
R33180	ONION CREEK LTD	300 BLUFF ST BUDA, TX 78610	P O BOX 1357 ARANSAS PASS,TX 78335-1357	44360	694.35	695.85
R33180	ONION CREEK LTD	300 BLUFF ST BUDA, TX 78610	P O BOX 1357 ARANSAS PASS,TX 78335-1357	44360	695.55	697.05
R33180	ONION CREEK LTD	300 BLUFF ST BUDA, TX 78610	P O BOX 1357 ARANSAS PASS,TX 78335-1357	44360	695.06	696.56
R33180	ONION CREEK LTD	300 BLUFF ST BUDA, TX 78610	P O BOX 1357 ARANSAS PASS,TX 78335-1357	44360	696.33	697.83
R33180	ONION CREEK LTD	300 BLUFF ST BUDA, TX 78610	P O BOX 1357 ARANSAS PASS,TX 78335-1357	44360	696.19	697.69
R33180	ONION CREEK LTD	300 BLUFF ST BUDA, TX 78610	P O BOX 1357 ARANSAS PASS,TX 78335-1357	44360	696.46	697.96
R10683	ROMERO, LUCIA	406 BARTON'S CROSSING BUDA, TX 78610	P O BOX 565 BUDA,TX 78610-0565	41440	690.04	691.54
R10681	RODRIGUEZ, ONESIMO	404 BARTON'S CROSSING (OFF 2770) BUDA, TX 78610	404 BARTON'S CROSSING (OFF 2770) BUDA, TX 78610	59750	695.65	697.15
R10712	BRINKLEY MARK A & NANCY L	410 JACK C HAYS TRL (FM 2770) BUDA, TX 78610	P O BOX 1343 BUDA,TX 78610-1343	113290	697.05	698.55
R10721	ROACH, CLYDE	204 BLUFF ST BUDA, TX 78610	P O BOX 338 BUDA,TX 78610-0338	121520	691.30	692.80
R36418	GOOD SHEPHERD LUTHERN BRETHERN CHURCH OF BUDA	401 FM 967 BUDA, TX 78610	P O BOX 665 BUDA,TX 78610-0665	0	685.48	686.98
R10793	BUDA MAN LTD	111 OLD BLACK COLONY RD BUDA, TX 78610	P O BOX 1620 BUDA,TX 78610-1620	75600	692.82	694.32
R106367	BUDA ELEMENTARY SCHOOL	LIVE OAK BUDA, TX 78610	300 FM 967 BUDA,TX 78610	0	684.33	685.83
R10732	COLLINS, LYDIA Y	314 SAN ANTONIO ST BUDA, TX 78610	P O BOX 770 BUDA,TX 78610-0770	12450	688.77	690.27
R70018	MARKS, KEITH W	190 MARKS OVER LOOK BUDA, TX 78610	190 MARKS OVER LOOK BUDA, TX 78610	92390	676.29	677.79
R10740	BURRON KIMBERLEY	901 GARISON BUDA, TX 78610	400 HOSMER BLVD WINNIPEG, MANITOBA CANADA,R3P0H7	20830	678.51	680.01
R60054	GOEBLER, TIM A	102 N NIGHTHAWK CIR BUDA, TX 78610	P O BOX 112 BUDA,TX 78610-0112	187180	674.55	676.05
R92663	BROWN BEN R & TERRI D	701 JERRYS LN BUDA, TX 78610	701 JERRY'S LN BUDA,TX 78610	121030	773.40	774.90
R92663	BROWN BEN R & TERRI D	701 JERRY'S LN BUDA,TX 78610	701 JERRY'S LN BUDA,TX 78610	4500	773.20	774.70
R32609	ANDERSON STEPHEN P & DEBORA P	620 MAYBROOK DR BUDA, TX 78610	620 MAYBROOK DR BUDA, TX 78610	181320	770.66	772.16
R32608	KOTLINSKI WALTER J JR & SHIRLEY A	610 MAYBROOK DR BUDA, TX 78610	610 MAYBROOK DR BUDA, TX 78610	4430	769.66	771.16
R32607	HAYES DONALD T & JENNIFER S	600 MAYBROOK BUDA, TX 78610	600 MAYBROOK BUDA, TX 78610	174570	769.19	770.69
R32603	NELSON JOHN G & ESPERANZA	430 MAYBROOK DR BUDA, TX 78610	430 MAYBROOK DR BUDA, TX 78610	7810	769.22	770.72
R32602	GARLOCK CHAUKY & JENNIFER	420 MAYBROOK DR BUDA, TX 78610	420 MAYBROOK DR BUDA, TX 78610	163610	768.94	770.44
R32592	SAN LUIS RAMON & JERRIE DENISE	311 DRYDEN LN BUDA, TX 78610	311 DRYDEN LN BUDA, TX 78610	172050	770.66	772.16
R32593	PEREZ DELFINO V & BERNABE C	305 DRYDEN LN BUDA, TX 78610	305 DRYDEN LN BUDA, TX 78610	190360	769.84	771.34
R32594	PERKINS CLIFFORD M & VIRGINIA L	301 DRYDEN LN BUDA, TX 78610	301 DRYDEN LN BUDA, TX 78610	173630	770.20	771.70
R32595	TORRES PAUL R & CAROLYN L	209 DRYDEN LN BUDA, TX 78610	209 DRYDEN LN BUDA, TX 78610	140780	769.83	771.33
R32600	SMITH, CHERYL RENEE	400 MAYBROOK DR BUDA, TX 78610	400 MAYBROOK DR BUDA, TX 78610	188620	768.51	770.01
R32596	VANNATTER MARTIN W & JULIA J	205 DRYDEN LN BUDA, TX 78610	205 DRYDEN LN BUDA, TX 78610	178460	769.45	770.95
R32597	LONG MATTHEW	201 DRYDEN LN BUDA, TX 78610	201 DRYDEN LN BUDA, TX 78610	171940	768.89	770.39
R32598	PARTIN BOBBY JR & PATRIZIA	105 DRYDEN LN BUDA, TX 78610	105 DRYDEN LN BUDA, TX 78610	149580	768.78	770.28
R32599	ALDRIDGE CHRISTOPHER C & JEAN N	101 DRYDEN LN BUDA, TX 78610	101 DRYDEN LN BUDA, TX 78610	164340	769.11	770.61
R11382	HAYS COUNTY	101 LAKEWOOD DR BUDA, TX 78610	111 E SAN ANTONIO ST SAN MARCOS,TX 78666-5534	158280	681.91	683.41
R23608	JONES BOBBY J & JOAN L	2005 CHAPARRAL RD MANCHACA, TX 78652	2005 CHAPARRAL RD MANCHACA, TX 78652	277000	727.46	728.96
R23606	REEVES LINDA REV LIVING TRUST	2000 CHAPARRAL RD MANCHACA, TX 78652	P O BOX 507 MANCHACA,TX 78652-0507	138360	724.15	725.65
R70732	TRINKAUS CLIFFORD J & KIM M	13400 COPPER HILLS DR MANCHACA, TX 78652	13400 COPPER HILLS DR MANCHACA, TX 78652	237860	735.79	737.29
R70731	YOUNG ALAN & VERONICA	13402 COPPER HILLS DR MANCHACA, TX 78652	13402 COPPER HILLS DR MANCHACA, TX 78652	277000	736.45	737.95
R70730	HUSSEY JAMES H & BEVERLY A	13404 COPPER HILLS DR MANCHACA, TX 78652	13404 COPPER HILLS DR MANCHACA, TX 78652	243980	735.71	737.21
R71729	KIMBRELL, CHARLES D	13406 COPPER HILLS DR MANCHACA, TX 78652	13406 COPPER HILLS DR MANCHACA, TX 78652	216450	738.70	740.20
R24837	WOOLVERTON AARON & NATALIE L	13408 COPPER HILLS DR MANCHACA, TX 78652	13408 COPPER HILLS DR MANCHACA, TX 78652	231030	737.53	739.03

Habitable Structures Inventory						
Property ID	Property Owner	Property Address	Owner Address	Improvement Value	Elevation	Elevation plus Slab
R24836	AKER CHRIS C & DEBORAH	13410 COPPER HILLS DR MANCHACA, TX 78652	13410 COPPER HILLS DR MANCHACA, TX 78652	186690	738.20	739.70
R24835	CROUCH, SI T	13412 COPPER HILLS MANCHACA, TX 78652	13412 COPPER HILLS MANCHACA, TX 78652	195710	738.54	740.04
R24834	CANTU PAMELA	13414 COPPER HILLS DR MANCHACA, TX 78625	13414 COPPER HILLS DR MANCHACA, TX 78625	241330	737.84	739.34
R24833	JAMES RANDALL & TERRY	13416 COPPER HILLS DR MANCHACA, TX 78652	13416 COPPER HILLS DR MANCHACA, TX 78652	197340	737.77	739.27
R70728	COBURN JOHN M & ROBIN	13418 COPPER HILLS MANCHACA, TX 78652	13418 COPPER HILLS MANCHACA, TX 78652	173420	739.51	741.01
R70727	LUBINA, THOMAS J	13500 COPPER HILLS DR MANCHACA, TX 78652	9300 S IH 35 STE A-500 AUSTIN,TX 78748	168800	739.31	740.81
R70726	STIRTON, MICHAEL GREGORY	13502 COPPER HILLS DR MANCHACA, TX 78652	13502 COPPER HILLS DR MANCHACA, TX 78652	169720	739.89	741.39
R70725	GERGEN, JOSEPH P	13504 COPPER HILLS DR MANCHACA, TX 78652	13504 COPPER HILLS DR MANCHACA, TX 78652	205810	742.86	744.36
R42756	ZOCH JULIE M & MCELFRESH GEORGE D	3903 CATTLEMAN DR MANCHACA TX	3903 CATTLEMAN DR MANCHACA TX	141270	743.33	744.83
R42759	SHEPPARD-SANDERS ANDREA RENEE & SANDERS STACY GENE	3911 CATTLEMAN DR MANCHACA, TX 78652	3911 CATTLEMAN DR MANCHACA, TX 78652	156970	745.45	746.95
R42760	ALBIN RITA C & NORBERT J	3913 CATTLEMAN DR MANCHACA, TX 78652	3913 CATTLEMAN DR MANCHACA, TX 78652	179470	744.32	745.82
R42758	GARCIA RICHARD C & CHRISTINE C	3909 CATTLEMAN MANCHACA, TX 78652	1N535 CENTER AVE WEST CHICAGO,IL 60185	149290	743.19	744.69
R42757	WOLFGRAMM STORMEE ELISE & MAURER JEFFREY	3905 CATTLEMAN MANCHACA, TX 78652	3905 CATTLEMAN MANCHACA, TX 78652	131740	741.68	743.18
R23807	POOL DIANA K & DE LA TORRE JORGE A	2800 ROBIN RD MANCHACA, TX 78652	2800 ROBIN RD MANCHACA, TX 78652	185010	756.37	757.87
R23806	MADEN, THERESA	2802 ROBIN RD MANCHACA, TX 78652	2802 ROBIN RD MANCHACA, TX 78652	134650	757.92	759.42
R23805	MCLAUGHLIN PHILLIP & KATHLEEN	2804 ROBIN RD MANCHACA, TX 78652	2804 ROBIN RD MANCHACA, TX 78652	170100	756.91	758.41
R20344	GURLEY GREGORY E & KELLY M	2900 HUMMINGBIRD RD MANCHACA, TX 78652	2900 HUMMINGBIRD RD MANCHACA, TX 78652	135990	761.00	762.50
R20356	DENSON-KRATZER SCOT D &	1001 LIVE OAK DR MANCHACA, TX 78652	1001 LIVE OAK DR MANCHACA, TX 78652	187920	756.78	758.28
R20343	NORTHEAST HAYS COUNTY FIRE CONTROL DISTRICT	CHAPARRAL RD MANCHACA, TX 78652	P O BOX 782 BUDA,TX 78610-0782	19540	763.33	764.83
R20372	PFLUGER DUANE & DEBORAH	3001 CHAPARRAL RD MANCHACA, TX 78652	3001 CHAPARRAL RD MANCHACA, TX 78652	110650	762.59	764.09
R20371	SVRCEK DAVID & ELZNER HEATHER	1003 SPANISH OAK TRL MANCHACA, TX 78652	1003 SPANISH OAK TRL MANCHACA, TX 78652	164860	762.86	764.36
R20354	JANKE LLOYD N & REBECCA	1005 LIVE OAK DR MANCHACA, TX 78652	1005 LIVE OAK DR MANCHACA, TX 78652	180560	759.54	761.04
R20364	ARMENTA RICHARD R & KATHLEEN F	1004 LIVE OAK DR MANCHACA, TX 78652	1004 LIVE OAK DR MANCHACA, TX 78652	131420	762.60	764.10
R20366	OLSEN ERIK K	1002 POST OAK PATH MANCHACA, TX 78652	100 MISTI LN DRIFTWOOD,TX 78619-5114	121500	766.37	767.87
R20352	WEAVER JAMES D & ANNA M	1009 LIVE OAK DR MANCHACA, TX 78652	1009 LIVE OAK DR MANCHACA, TX 78652	166440	762.00	763.50
R20351	KNOWLTON BRIDGET E & CLINT E	1101 LIVE OAK DR MANCHACA, TX 78652	4100 W SLAUGHTER LN APT #6205 AUSTIN,TX 78749-3894	207810	759.76	761.26
R20350	WORLDS JEREMIN	2001 LIVE OAK DR MANCHACA, TX 78652	2001 LIVE OAK DR MANCHACA, TX 78652	245190	760.60	762.10
R30038	DILLON DAVID M & MARY KELLY	1000 LIVE OAK LOOP BUDA, TX 78610	1000 LIVE OAK LOOP BUDA, TX 78610	205920	793.82	795.32
R30020	FLORES ADAM E & ESMERALDA G	1101 OAK ARBOR TRL BUDA, TX 78610	1101 OAK ARBOR TRL BUDA, TX 78610	14660	790.63	792.13
R29969	HALL DAVID L & DOROTHY J	1001 LIVE OAK LP BUDA TX 78610	1001 LIVE OAK LP BUDA TX 78610	189820	795.52	797.02
R30035	HALLORAN RANDAL G & JESSICA L & KATHLEEN B	1100 LIVE OAK LP BUDA TX 78610	1100 LIVE OAK LP BUDA TX 78610	237660	797.71	799.21
R30034	SMITH VAUGHN & BRENDA	1104 LIVE OAK LP BUDA TX 78610	1104 LIVE OAK LP BUDA TX 78610	197720	798.70	800.20
R30036	GROSS LARRY & ANNE	1008 LIVE OAK LOOP BUDA, TX 78610	1008 LIVE OAK LOOP BUDA, TX 78610	215590	795.30	796.80
R29968	JOHNSON REVOCABLE LIVING TRUST	16101 OAK GROVE RD BUDA, TX 78610	16101 OAK GROVE RD BUDA, TX 78610	161470	796.02	797.52
R30033	HAMILTON JAMES E & BARBARA G	1108 LIVE OAK LP BUDA TX 78610	1108 LIVE OAK LP BUDA TX 78610	137430	799.42	800.92
R30032	BANISH ROBERT & PAT	1112 LIVE OAK LP BUDA TX 78610	1112 LIVE OAK LP BUDA TX 78610	249350	802.28	803.78
R30030	HOLT MARK & BRENDA	1120 LIVE OAK LP BUDA TX 78610	1120 LIVE OAK LP BUDA TX 78610	296130	804.24	805.74
R30026	TAYLOR, SEAN M	16023 ARBOR TRL BUDA, TX 78610	16023 ARBOR TRL BUDA, TX 78610	138770	800.28	801.78
R30025	HODGES JANET S	16019 ARBOR TRL BUDA, TX 78610	16019 ARBOR TRL BUDA, TX 78610	201900	799.74	801.24
R30028	ROWLEY J M JR & MARTHA	16031 ARBOR TRL BUDA, TX 78610	16031 ARBOR TRL BUDA, TX 78610	239410	800.72	802.22
R30013	GADDY GARY & LORI	LIVE OAK LP BUDA TX 78610	16038 ARBOR TRL BUDA,TX 78610-9379	198550	803.18	804.68
R30012	HANDSEL LINDA R	1132 LIVE OAK LP BUDA TX 78610	1132 LIVE OAK LP BUDA TX 78610	155780	807.07	808.57
R29990	GASPARD STACY SULIK & WALTER JR	1120 RED OAK DR BUDA, TX 78610	1120 RED OAK DR BUDA, TX 78610	287980	809.42	810.92
R30011	ARENZ, TERRY	1136 LIVE OAK LP BUDA TX 78610	1136 LIVE OAK LP BUDA TX 78610	200380	808.51	810.01
R30010	CULLEN MICHAEL J & STACEY L	1138 LIVE OAK LP BUDA TX 78610	1138 LIVE OAK LP BUDA TX 78610	143440	808.63	810.13
R30006	AGUIRRE, RONALD R	1144 LIVE OAK LP BUDA TX 78610	1144 LIVE OAK LP BUDA TX 78610	218280	813.99	815.49
R20591	WHITWORTH WILBUR E & SUSAN M FELDKAMP	4907 TIS AUTUMN CT MANCHACA, TX 78652	4907 TIS AUTUMN CT MANCHACA, TX 78652	178610	747.23	748.73
R20589	MANNING MICHAEL JAMES & EUGENE ROBERT JR	4007 SEPTEMBER SONG DR MANCHACA, TX 78652	13306 RAMROD DR MANCHACA,TX 78652	333240	750.89	752.39
R17611	R BAR C LLC	12707 FM 1826 AUSTIN, TX 78737	8226 BEE CAVES RD STE 200 AUSTIN,TX 78746	4750	829.94	831.44
R94603	GORMAN JOHN J IV & TAMRA I	12707 FM 1826 AUSTIN, TX 78737	8226 BEE CAVES RD STE 200 AUSTIN,TX 78746	172260	840.06	841.56
R94603	GORMAN JOHN J IV & TAMRA I	12707 FM 1826 AUSTIN, TX 78737	8226 BEE CAVES RD STE 200 AUSTIN,TX 78746	439730	840.35	841.85
R17611	R BAR C LLC	12707 FM 1826 AUSTIN, TX 78737	8226 BEE CAVES RD STE 200 AUSTIN,TX 78746	44100	835.45	836.95
R15169	OAKHAVEN, PARTNERS LTD	12711 FM 1826 AUSTIN,TX 78737	12711 FM 1826 AUSTIN,TX 78737	227610	849.20	850.70
R15169	OAKHAVEN, PARTNERS LTD	12711 FM 1826 AUSTIN,TX 78737	12711 FM 1826 AUSTIN,TX 78737	40470	855.19	856.69
R15203	SKAGGS, HAROLD, JR	13600 FM 1826 AUSTIN, TX 78737	13600 FM 1826 AUSTIN, TX 78737	202690	862.88	864.38
R15203	SKAGGS, HAROLD, JR	13600 FM 1826 AUSTIN, TX 78737	13600 FM 1826 AUSTIN, TX 78737	232680	860.90	862.40
R12404	COBB SAM E & DANA L	13751 FM 1826 AUSTIN, TX 78737	13751 FM 1826 AUSTIN, TX 78737	19140	886.74	888.24
R12404	COBB SAM E & DANA L	13751 FM 1826 AUSTIN, TX 78737	13751 FM 1826 AUSTIN, TX 78737	326720	883.22	884.72
R20765	RICHARDSON, PATRICE K	14715 BEAR CREEK PASS AUSTIN, TX 78737	14715 BEAR CREEK PASS AUSTIN, TX 78737	742950	882.55	884.05
R20766	MATTHEWS BRIAN & LESLEE	14705 BEAR CREEK PASS AUSTIN, TX 78737	14705 BEAR CREEK PASS AUSTIN, TX 78737	246940	883.58	885.08
R20765	RICHARDSON, PATRICE K	14715 BEAR CREEK PASS AUSTIN, TX 78737	14715 BEAR CREEK PASS AUSTIN, TX 78737	96000	886.12	887.62
R20769	BOYD ALSTON & BARBARA	14607 BEAR CREEK PASS AUSTIN, TX 78737	14607 BEAR CREEK PASS AUSTIN, TX 78737	7560	883.15	884.65

Habitable Structures Inventory						
Property ID	Property Owner	Property Address	Owner Address	Improvement Value	Elevation	Elevation plus Slab
R27489	STEINMAN CHARLES E & DEVINCENT PATRICIA K	13140 FIELDSTONE LP AUSTIN TX 78737	13140 FIELDSTONE LP AUSTIN TX 78737	304300	1035.09	1036.59
R27491	TILTON PETER & NANCY	13160 FIELDSTONE LP AUSTIN TX 78737	13160 FIELDSTONE LP AUSTIN TX 78737	166870	1037.40	1038.90
R27488	TURNEY, KATHY D	13130 FIELDSTONE LP AUSTIN TX 78737-9631	13130 FIELDSTONE LP AUSTIN TX 78737-9631	165100	1027.90	1029.40
R20836	FRECHETTE, JAMES	8504 BEAR CREEK DR AUSTIN TX	8504 BEAR CREEK DR AUSTIN TX	175800	865.02	866.52
R20943	COX, RICHARD W	12710 FM 1826 AUSTIN, TX 78737	12710 FM 1826 AUSTIN, TX 78737	233380	867.15	868.65
R20938	DESPAIN JOEL & ROBIN	8105 N MADRONE TRL AUSTIN, TX 78737	8105 N MADRONE TRL AUSTIN, TX 78737	13824	879.40	880.90
R20916	PRESTON THOMAS R & SCHAEFFER ELIZABETH A	8700 N MADRONE TRL AUSTIN, TX 78737	8700 N MADRONE TRL AUSTIN, TX 78737	446480	917.46	918.96
R113862	THE AUSTIN PET RANCH INC	14425 FM 1826 AUSTIN,TX 78737	14425 FM 1826 AUSTIN,TX 78737	170760	907.93	909.43
R12420	FRIENDSHIP BAPTIST CHURCH INC	14455 FM 1826 AUSTIN, TX 78737	14455 FM 1826 AUSTIN, TX 78737	0	911.23	912.73
R15215	KINNEY, OWEN T	14100 NUTTY BROWN RD AUSTIN, TX 78737	14100 NUTTY BROWN RD AUSTIN, TX 78737	12600	954.49	955.99
R11614	STEARNS, JOEL CLAYTON	13900 NUTTY BROWN RD DRIPPING SPRINGS, TX 78620	10400 WILDWOOD HILLS LN AUSTIN,TX 78737-9203	5000	970.12	971.62
R10683	ROMERO, LUCIA	406 BARTON'S CROSSING BUDA, TX 78610	P O BOX 565 BUDA,TX 78610-0565	24280	694.31	695.81
R70018	MARKS, KEITH W	190 MARKS OVER LOOK BUDA, TX 78610	190 MARKS OVER LOOK BUDA, TX 78610	43900	674.83	676.33
R70018	MARKS, KEITH W	190 MARKS OVER LOOK BUDA, TX 78610	190 MARKS OVER LOOK BUDA, TX 78610	43900	676.27	677.77
R60054	GOEBLER, TIM A	102 N NIGHTHAWK CIR BUDA, TX 78610	P O BOX 112 BUDA,TX 78610-0112	21550	675.64	677.14
R20769	BOYD ALSTON & BARBARA	14607 BEAR CREEK PASS AUSTIN, TX 78737	14607 BEAR CREEK PASS AUSTIN, TX 78737	28160	884.75	886.25
R106359	BOYD ALSTON & BARBARA	14607 BEAR CREEK PASS AUSTIN, TX 78737	14607 BEAR CREEK PASS AUSTIN, TX 78737	69960	885.88	887.38
R106360	BOYD ALSTON & BARBARA	14607 BEAR CREEK PASS AUSTIN, TX 78737	14607 BEAR CREEK PASS AUSTIN, TX 78737	9070	886.13	887.63

Appendix H.3

Digital Data

HALFF

LOWER COLORADO RIVER BASIN (LCRB), HAYS COUNTY INTERIM FEASIBILITY STUDY
ENVIRONMENTAL APPENDIX

The Lower Colorado River Basin (LCRB), Hays County study area (study area) is generally confined to Northern Hays County, Texas. This portion of the county drains to the Colorado River. More specifically, the study investigations are focused within the Pedernales, Barton Creek, Onion Creek, Bear Creek, and Little Bear Creek watersheds (Figure 1). Existing environmental conditions were defined within the 500-year floodplain of the major streams located within the study watersheds. It was assumed that as the study progresses in identifying water resources related problems, potential alternatives to reduce flood damages or other multipurpose uses would be located within and affect the 500-year floodplain. The 500-year floodplain boundaries were established through hydraulic and hydrologic studies and floodplain mapping throughout the study watersheds. At the time of preparation of this appendix, the hydraulic and hydrologic studies had not been completed for the Pedernales and Barton Creek watersheds. For the Pedernales watershed, a 500-foot buffer around the Federal Emergency Management Agency (FEMA) approximate 100-year floodplain boundaries was used as the study area boundaries, since the 500-year floodplain was not available. For the Barton Creek watershed, detailed FEMA 500-year data was available and used as the study area boundary. As alternatives are formulated, the study area would be further refined.

Existing Conditions

Land Use

According to the 2006 North American Land Cover data (Fry et al, 2011), existing land use within the 500-year floodplain study area are broken down into the following categories: open water; developed, open space; developed, low intensity; developed, medium intensity; developed, high intensity; barren land; deciduous forest; evergreen forest; scrub/shrub; herbaceous; hay/pasture; cultivated crops; and woody wetlands. Figures 2a, 2b, and 2c show the study area land use. For land use discussion purposes, several of these categories are combined as one common land use type. All developed categories, including open space, low intensity, medium intensity, and high intensity are combined to form one urban developed category. All forest categories, which include deciduous forest and evergreen forest, are combined into one woodland category, and hay/pasture and cultivated crops are combined to form one agriculture category. Table 1 provides acreages and percentages of land use within the study area.

Table 1: Land use by acreage and percent of total use within the study area.

Land Use Type	Acreage (ac)	Percent of Total Study Area (%)
Open water	206.58	1%
Urban developed	471.28	3%
Barren land	55.21	<1%
Woodlands	8,792.35	49%
Scrub/shrub	4,459.17	25%
Herbaceous	3,694.34	21%
Agriculture	36.51	<1%
Woody wetland	267.55	1%
Total	**17,982.99 ac**	

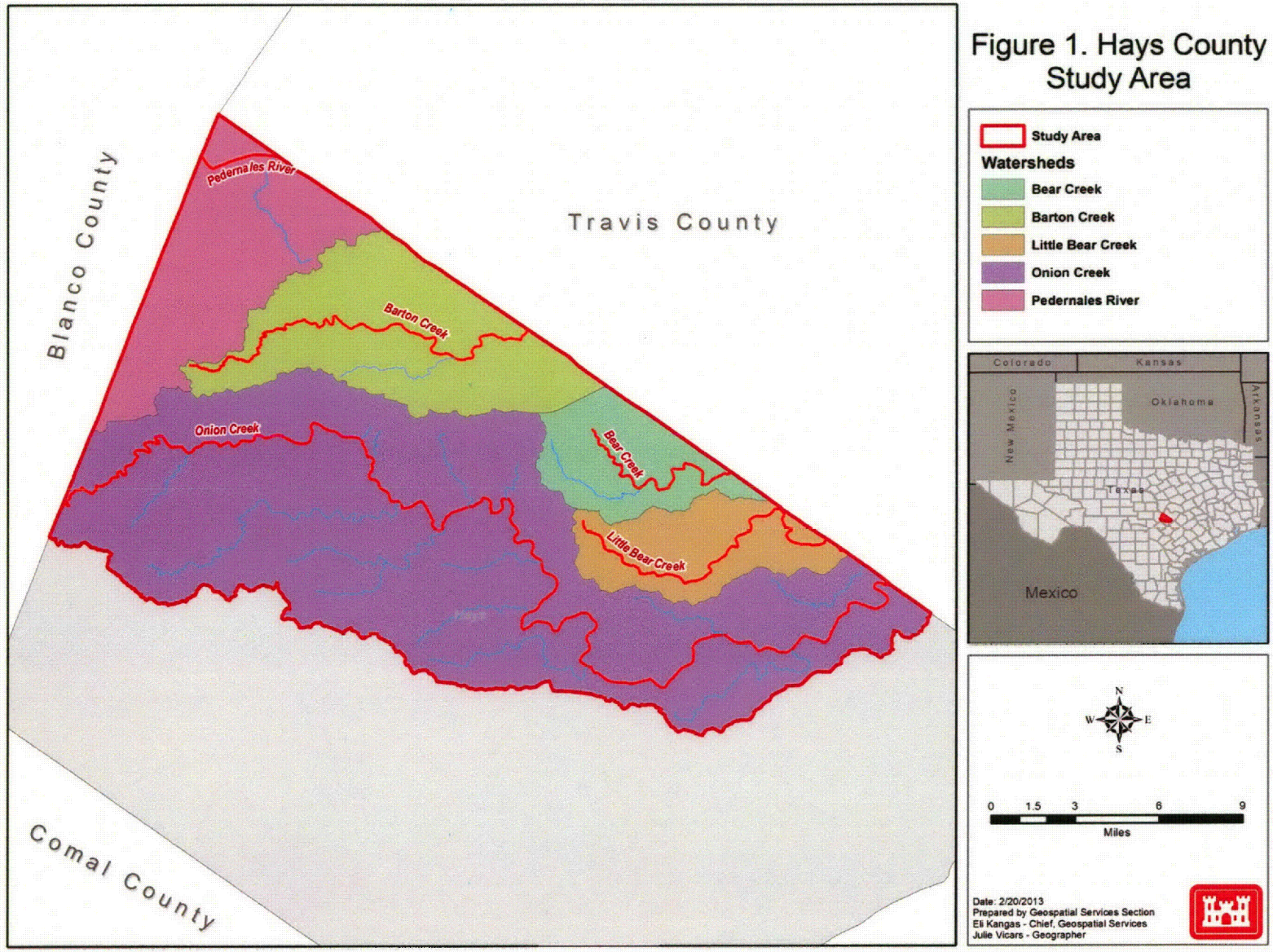


Figure 1. Hays County Study Area

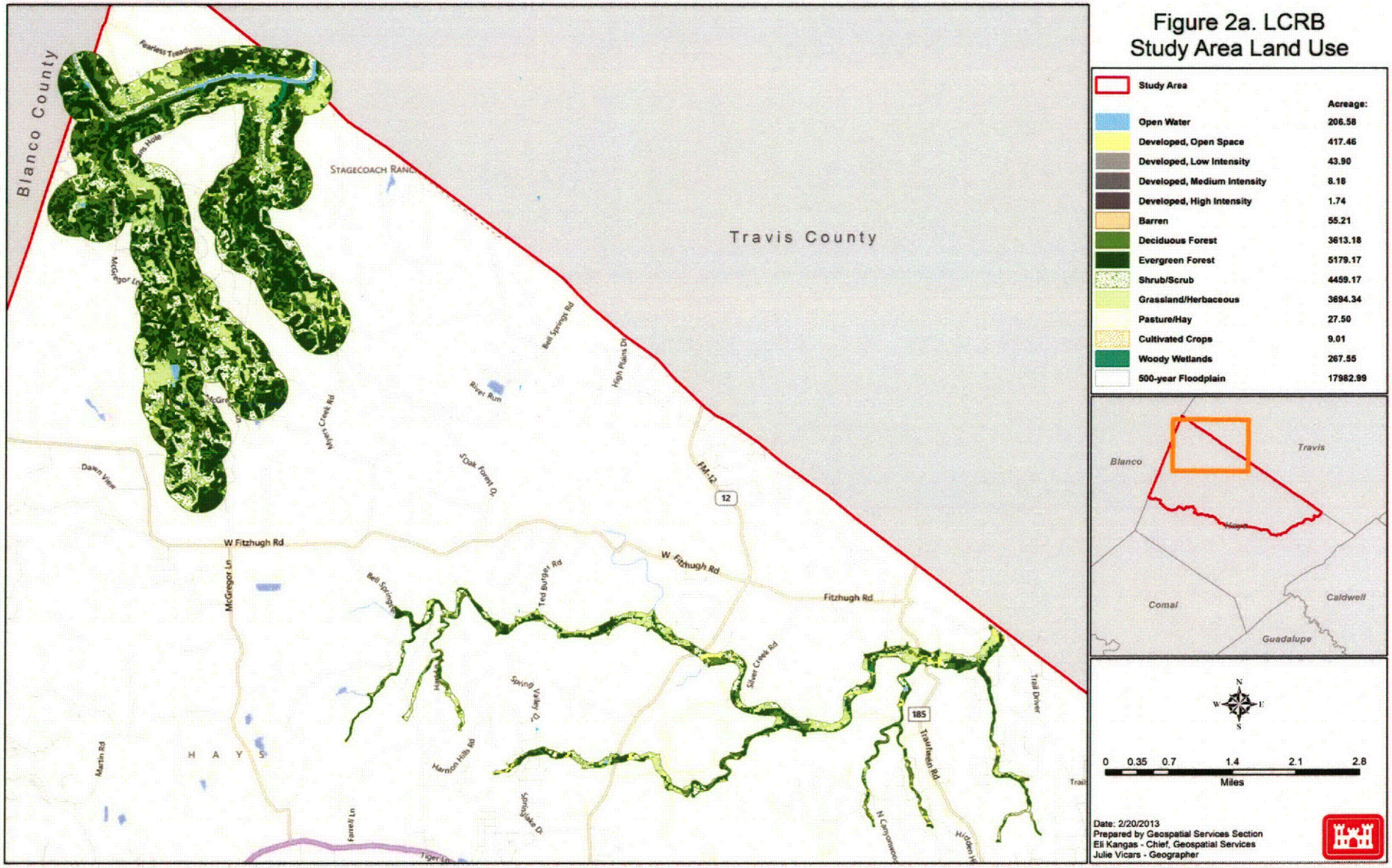


Figure 2a. LCRB Study Area Land Use

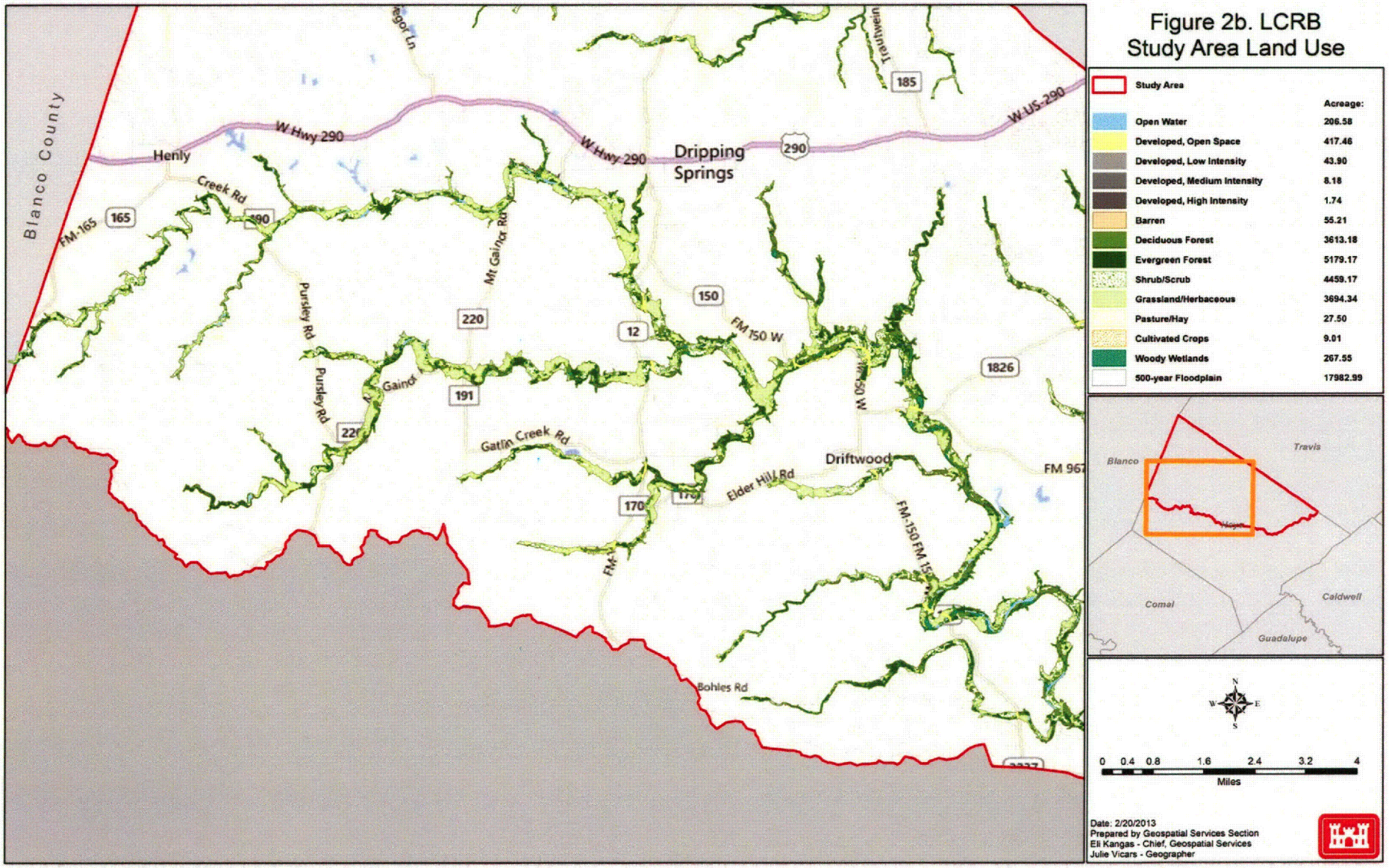


Figure 2b. LCRB
Study Area Land Use
Study Area
Acreage:
Open Water 206.58
Developed, Open Space 417.46
Developed, Low Intensity 43.90
Developed, Medium Intensity 8.18
Developed, High Intensity 1.74
Barren 55.21
Deciduous Forest 3613.18
Evergreen Forest 5179.17
Shrub/Scrub 4459.17
Grassland/Herbaceous 3694.34
Pasture/Hay 27.50
Cultivated Crops 9.01
Woody Wetlands 267.55
500-year Floodplain 17982.99
Blanco County
W Hwy 290
Henly
Creek Rd
FM 165
165
190
Dripping Springs
290
W US 290
185
Mt Gainor Rd
Pursley Rd
220
150
12
FM 150 W
1826
Gaind
191
Gatlin Creek Rd
Driftwood
Elder Hill Rd
170
FM 967
Bohles Rd
Travis
Blanco
Comal
Caldwell
Guadalupe
0 0.4 0.8 1.6 2.4 3.2 4
Miles
Date: 2/20/2013
Prepared by Geospatial Services Section
Eli Kangas - Chief, Geospatial Services
Julie Vicars - Geographer

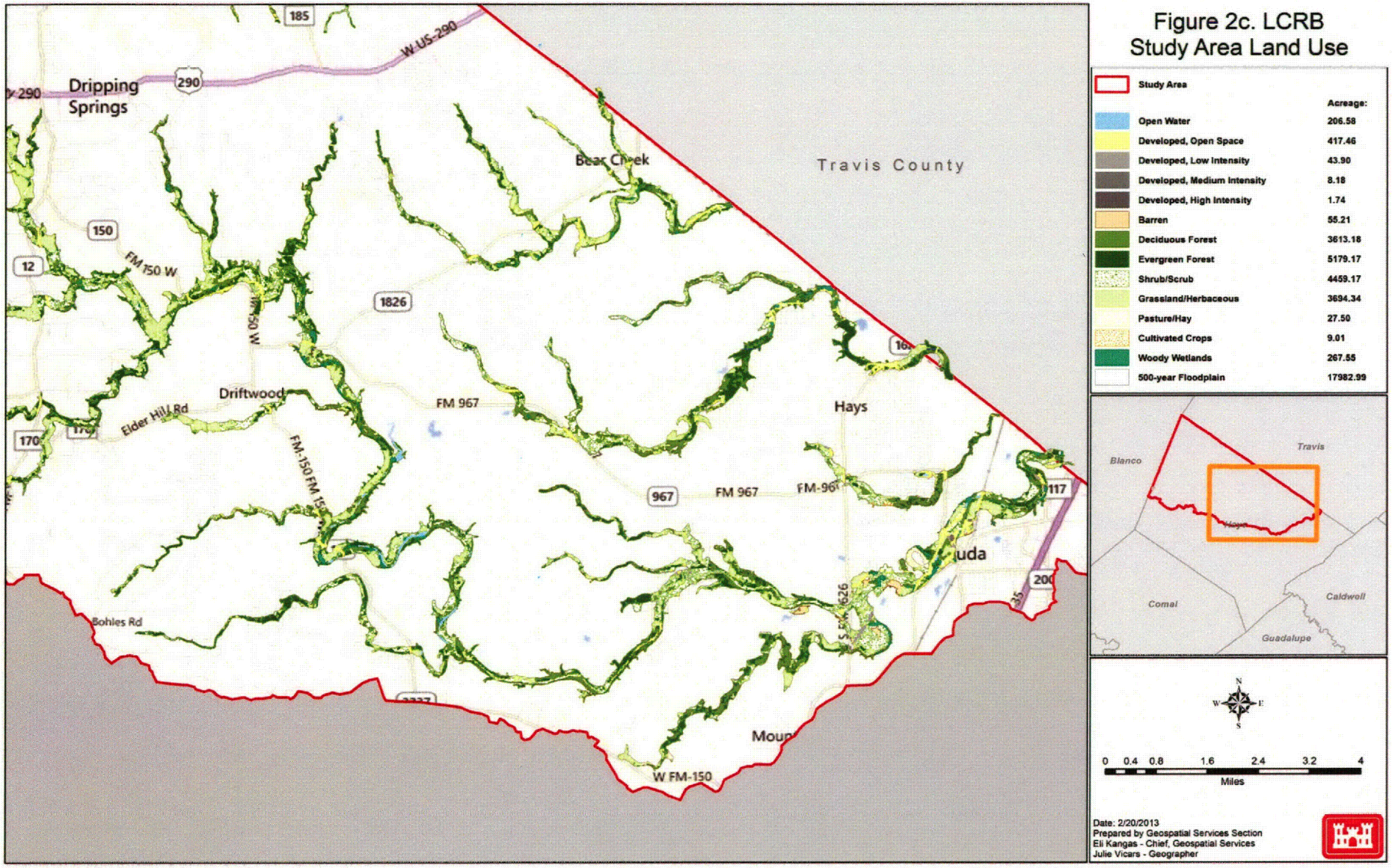


Figure 2c. LCRB
Study Area Land Use
Study Area
Acreage:
Open Water 206.58
Developed, Open Space 417.46
Developed, Low Intensity 43.90
Developed, Medium Intensity 8.18
Developed, High Intensity 1.74
Barren 55.21
Deciduous Forest 3613.18
Evergreen Forest 5179.17
Shrub/Scrub 4459.17
Grassland/Herbaceous 3694.34
Pasture/Hay 27.50
Cultivated Crops 9.01
Woody Wetlands 267.55
500-year Floodplain 17982.99
Travis County
Dripping Springs
Driftwood
Hays
Bear Creek
W US-290
FM 967
FM 150 W
Elder Hill Rd
Bohles Rd
W FM-150
Blanco
Travis
Comal
Caldwell
Guadalupe
0 0.4 0.8 1.6 2.4 3.2 4
Miles
Date: 2/20/2013
Prepared by Geospatial Services Section
Eli Kangas - Chief, Geospatial Services
Julie Vicars - Geographer

Only three percent of the study area is considered developed. Even though the study area is restricted to the 500-year year floodplain, the rural nature of the study area is indicative of areas outside the floodplain within this part of Hays County. Almost half of the study area is woodlands, while almost the entire remaining half of the study area is scrub/shrub and herbaceous. Herbaceous and scrub/shrub land uses will likely be used as rangeland within this region. Since this area of the state is not known for timber sales, the woodlands can be used as rangelands as well. All rangeland areas will likely provide wildlife habitat values and numerous recreational uses, such as hunting and wildlife viewing. The remaining land uses, open water, barren land, agriculture, and woody wetlands, exist within small portions of the entire study area.

Air Quality

The Environmental Protection Agency (EPA) uses six "criteria pollutants" as indicators of air quality, and has established for each of them a maximum concentration above which adverse effects on human health may occur. The six pollutants are Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Ozone (O_3), Lead (Pb), Particulates (PM 10 and PM 2.5), and Sulfur Dioxide ($S0_2$). These threshold concentrations are called National Ambient Air Quality Standards (NAAQS). Areas of the country where air pollution levels persistently exceed the NAAQS may be designated as nonattainment areas. Conversely, areas of the country that do not persistently exceed the NAAQS are designated as attainment areas.

The General Conformity Rule (GCR) was promulgated by the EPA. The GCR rule mandates that the Federal government not engage in, support, or provide financial assistance for licensing or permitting, or approving any activity not conforming to an approved State Implementation Plan. In Texas, the applicable plan is the Texas State Implementation Plan (SIP), an EPA-approved plan for the regulation and enforcement of the NAAQS in each air quality region within the state (TCEQ 2010). The General Conformity Rule is applicable only to non-attainment and maintenance areas (TCEQ 2010). The study area is located in Hays County which is designated as an attainment area. As alternatives are developed for the study, the attainment status of the study area would need to be verified. If attainment status is current, no further air quality studies would be required for the General Conformity Rule.

Noise

Due to the primarily rural nature of the study area, the majority of the study area has noise levels consistent with those in a rural, scarcely populated setting. Areas near municipalities located within the study area would have more elevated noise levels related to more urban settings. Sources of noise would include those from vehicles, construction, aircraft and other human activities.

The municipalities within the study area will likely have municipal codes relating to noise restrictions within the city limits. Sensitive receptors, such as but not limited to schools, hospitals, and nursing homes would be determined as needed based upon alternatives development.

Climate

Texas climate varies widely, from arid in the west to humid in the east. There are several distinct regions within the state which have varying climates. Generally, the eastern half of Texas is

humid subtropical, while the western half is semi-arid (with some arid regions). Texas lies within both cool and warm parts of the Temperate Zone of the Northern Hemisphere. Texas has three major climatic types which are classified as Continental, Mountain, and Modified Marine (Larkin and Bomar 1983).

The study area has a Modified Marine climate which is classified and named "Subtropical" (Larkin and Bomar 1983). A marine climate is caused by the predominant onshore flow of tropical maritime air from the Gulf of Mexico. The onshore flow is modified by a decrease in moisture content from east to west and by intermittent seasonal intrusions of continental air. Typical conditions within the study area is split between the Subtropical Humid climate that is most noted for warm summers and the Subtropical Subhumid climate characterized by hot summers and dry winters. Rainfall within the study area averages 33.75 inches per year, which contributes to maintaining stream flows through runoff and recharge of the Edwards Aquifer as described in the next section.

Geology

The study area is centered on the Balcones Fault Zone, a geologic feature and extends to the Edwards Plateau to the west and the lower Blacklands Prairie to the east. The Balcones Fault Zone is a major geologic boundary separating coastal and inland regions and marks a transition from limestone soils of the Balcones Escarpment to sands and clays further east. The Edwards Plateau region comprises an area of central Texas commonly known as the Texas Hill Country (Correll and Johnston 1996). It is a region pockmarked with caves, springs, and sinkholes and studded with stony hills and steep canyons. Elevations range from more than 3,000 feet above mean sea level (amsl) to slightly less than 1,000 feet amsl. The Blacklands Prairie has a gently rolling to nearly level topography with well-dissected, rapid surface drainages (Correll and Johnston 1996). Elevations in the Blacklands Prairie region range from 300 feet to 800 feet amsl.

The Edwards Aquifer underlies the southeastern portion of the Edwards Plateau. There are three surface zones that cover the aquifer region: the aquifer contributing zone, the aquifer recharge zone, and the aquifer transition zone (Figure 3) (Edwards Aquifer Authority [EAA] 2012). The aquifer-contributing zone is where impermeable rock layers cap the aquifer, and rainfall runs along the land surface. This area is the largest portion overlying the aquifer and covers an area of approximately 1,800 square miles. The aquifer recharge zone covers approximately 1,500 square miles and contains caves, sinkholes, and karst features that allow surface water to run underground and reach the Edwards Aquifer. The aquifer transition zone, also referred to as the discharge or artesian zone, covers approximately 200 square miles. In the artesian zone, underground water is pushed out of the Edwards Aquifer through faults and other flow paths, and the water emerges as springs (EAA 2012) such as Barton Springs in Austin.

Because of the ecological sensitivity of the karst ecosystem and the water quality concerns related to drinking water supply quality from communities dependent on the Edwards Aquifer, the Edwards Aquifer rules were developed (Title 30 Texas Administrative Code Chapter 213). The TCEQ regulates development in the eight counties, including Hays County, protected by the Edwards Aquifer rules. Any alternative developed as a result of the LCRB study would be required to comply with these rules.

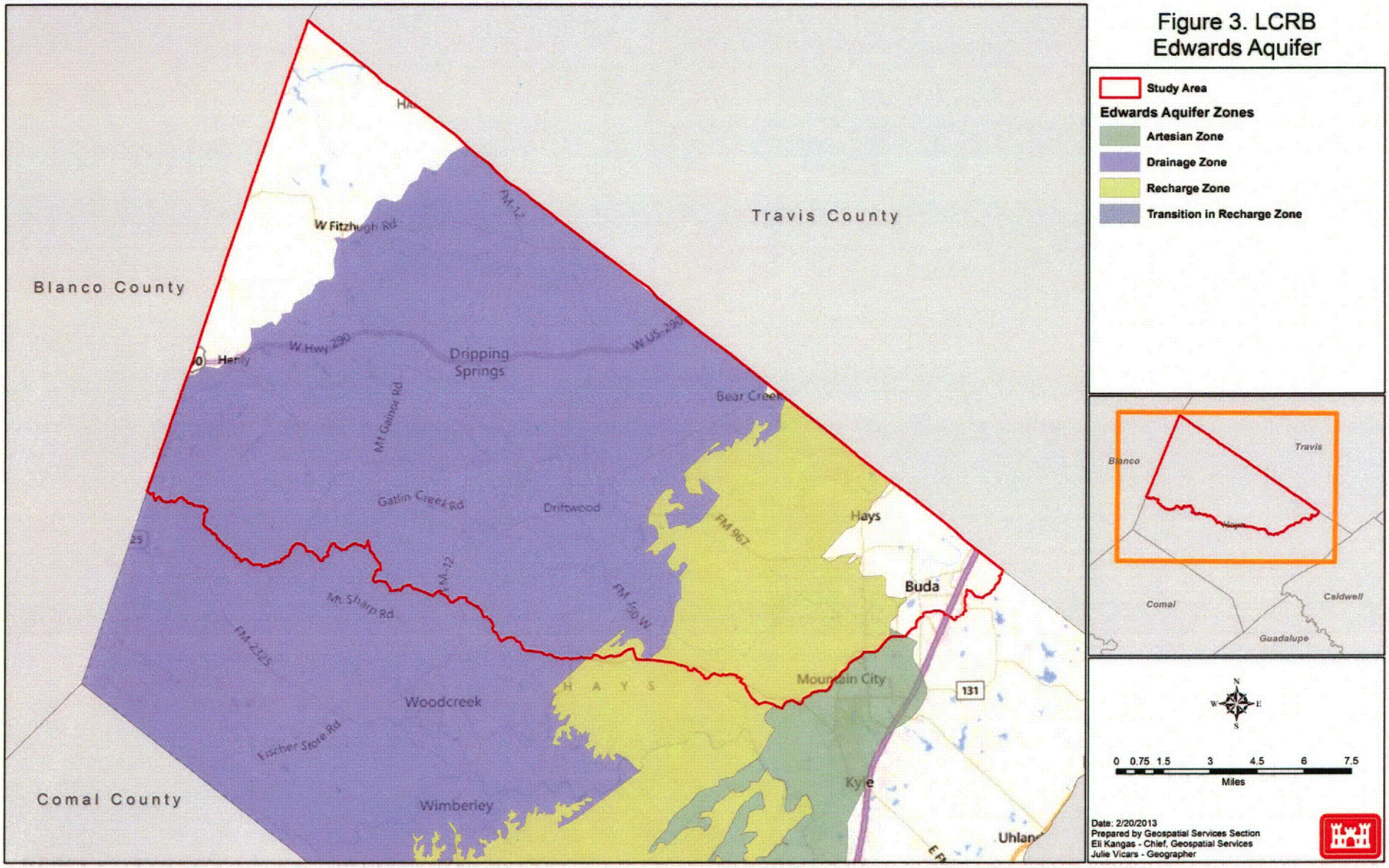


Figure 3. LCRB
Edwards Aquifer
Study Area
Edwards Aquifer Zones
Artesian Zone
Drainage Zone
Recharge Zone
Transition in Recharge Zone
Travis County
Blanco County
Comal County
Hays
W Fitzhugh Rd
FM 12
W Hwy 290
W US 290
Dripping Springs
Henly
Mt Gainer Rd
Bear Creek
Gatlin Creek Rd
Driftwood
FM 967
Buda
Mt Sharp Rd
FM 150 W
FM 2325
Woodcreek
Mountain City
131
Fischer Store Rd
Wimberley
Kyle
Uhland
Blanco
Travis
Comal
Caldwell
Guadalupe
N
W
E
S
0 0.75 1.5 3 4.5 6 7.5
Miles
Date: 2/20/2013
Prepared by Geospatial Services Section
Eli Kangas - Chief, Geospatial Services
Julie Vicars - Geographer

Soils

General soil map units show broad areas that have distinctive patterns of soils and are typically unique to a natural landscape. Generally, map units consist of one or more major soils and some minor soils. Since the environmental study area for this project consists of the 500-year floodplain, the map units consist of soils typically found within floodplains, drainages and stream terraces. Likely soil map units found within the LCRB, Hays County study area are as follows: Lewisville-Gruene-Krum, Branyon-Krum, and Krum-Medlin-Eckrant (USDA, 1984). The Lewisville-Gruene-Krum map unit is dominantly a well drained soil found on low terraces along rivers and large creeks. The Branyon-Krum map unit is predominately found on ancient, high terraces along rivers and large creeks. The areas are broad and smooth and are widely dissected by small drainage ways. The Krum-Medlin-Eckrant map unit is typically found on low hills and valleys.

Prime Farmland

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks. Its soils are permeable to water and air. Prime farmland is not excessively eroded or saturated with water for long periods of time, and it either does not flood frequently during the growing season or is protected from flooding.

Soils classified as prime farmlands exist within the study area. Adversely impacting this area or changing the function of the land would require coordination with the Natural Resources Conservation Service (NRCS) in accordance with the Farmland Protection and Policy Act of 1981.

AQUATIC RESOURCES

Surface waters

The Barton Creek, Bear Creek, Little Bear Creek, Onion Creek, and Pedernales River watersheds are the focus of this report and the principal streams of the study area within northern Hays County. These streams meander through the Edwards Plateau ecoregion and are fed by numerous springs and spring-fed tributaries. The gravel, cobble, and bedrock substrate provide habitat for greenthroat darters (*Etheostome lepidum*), orangethroat darters (*Etheostoma spectabile*), spotted sunfish (*Lepomis punctatus*), redear sunfish (*Lepomis microlophus*), roundnose minnows (*Dionda episcopa*), Texas shiners (*Notropis amabilis*), and largemouth bass (*Micropterus salmoides*), and many other fish species common in central Texas streams.

Water Quality

The streams of the study area originate in the northwestern Hays County and flow east through northern Hays County eventually terminating in the Colorado River outside of the study county.

Existing water quality in the study streams is affected by rainfall and associated stormwater flows originating from rangeland, cropland, and pastureland in the rural areas and residential and industrial non-point sources in more urban environments near municipalities. The State of Texas List of Impaired Water Bodies, also known as the Clean Water Act (CWA) Section 303(d) List, identifies: 1) water bodies that do not meet the standards set for their use, or are expected not to meet their use in the near future; 2) which pollutants are responsible for the failure of a water body to meet standards; and 3) water bodies that are targeted for clean-up activities within the next two state fiscal years. The development of a Total Maximum Daily Load (TMDL) is required for those pollutants that exceed established water quality standards. A TMDL is an estimate of the maximum amount of pollution a body of water can receive and still meet water quality standards set for its use. The major parameters that are measured to determine whether a water body meets the standard for its use are metals, organics, fecal coliform bacteria, dissolved oxygen, and dissolved solids.

The classified segments of streams located within the study area are as follows: Segment 1414 – Pedernales River, Segment 1427 – Onion Creek, and Segment 1430 – Barton Creek. According to the 2010 Texas Integrated Report – Texas 303(d) List (TCEQ, 2011), no impaired segments were identified in the study area.

Waters of the United States Including Wetlands

According to the EPA and USACE, wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soils. According to the USFWS National Wetlands Inventory (NWI) maps, numerous jurisdictional wetlands, including freshwater emergent, freshwater forested/shrub, freshwater ponds, streams, and lakes, are located within the study area. Further investigation may be required at a later date to delineate waters of the United States including wetlands.

Section 10

USACE is directed by Congress under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) to regulate *all work or structures in or affecting the course, condition or capacity of navigable waters of the Unites States*. No navigable waters subject to Section 10 are located within the study area (USACE, 1999).

Section 404

Congress directed USACE under Section 404 of the Clean Water Act (33 USC 1344) *to regulate the discharge of dredged and fill material into all waters of the United States including wetlands*. As such, activities that result in a discharge of dredged or fill material into waters of the United States would be regulated activities under Section 404 of the Clean Water Act. Furthermore, regulated activities under Section 404 of the Clean Water Act may be permitted by General Permit (such as Nationwide General Permits, Regional General Permits, or Programmatic General Permits) or Individual Permit (such as Standard 'Individual Permits or Letters of Permission). Further investigation would be required to determine the impacts to waters of the United States. It is expected that USACE would need to prepare a 404(b)(1) analysis to comply with the Clean Water Act (33 USC 1344).

Ecologically Significant Stream Segments

As a result of the passage of Senate Bill 1 in 1997, water planning in Texas became the responsibility of regional planning groups rather than the Texas Water Development Board (TWDB). Regional planning groups may recommend for the designation of ecologically unique river and stream segments in their adopted regional water plan. Designation criteria are in accordance with TWDB rules and include the following categories: biological function, hydrologic function, riparian conservation areas, high water quality/exceptional aquatic life/high aesthetic value, and threatened or endangered species/unique communities.
The Texas legislature may designate a river or stream segment of unique ecological value following the recommendations of a regional water planning group. As per 16.051 (f) of the Texas Water Code, this designation solely means that a state agency or political subdivision of the State may not finance the actual construction of a reservoir in a specific river or stream segment designated by the legislature under this subsection.

Designated ecologically significant stream segments located within the study area are as follows (TPWD 2012):

- Barton Creek
  The designated segment extends from the confluence with Town Lake in Austin in Travis County upstream to Farm-to-Market (FM) 12 in Hays County. The ecologically significant designation is based upon high water quality, a diverse benthic macroinvertebrate community, and the segment is the only known location of the Barton Springs salamander, a Federal and State-listed endangered species.
- Onion Creek
  The designated segment extends from the confluence with the Colorado River in Travis County to the most upstream crossing of FM 165 in Blanco County. The entire portion of the stream within the study area is designated as ecologically significant. The designation is based upon a riparian conservation area located outside of the study area, high water quality, and a diverse benthic macroinvertebrate community.
- Pedernales River
  The designated segment extends from a point immediately upstream of the confluence of Fall Creek in Travis County to FM 385 in Kimble County. The entire portion of the stream within the study area is designated as ecologically significant. The designation is based upon four riparian conservation areas located outside of the study area and exceptional aesthetic value. Additionally, the Pedernales River is a National Wild and Scenic Rivers System nominee for remarkable wildlife values and significant natural areas.

TERRESTRIAL RESOURCES

Vegetation

The study area lies within the Texan and Balconian biotic provinces per (Figure 4) and the Edwards Plateau, Blackland Prairies, and Oak Woods and Prairies ecological regions of Texas (Figure 5). The Texas Ecological Systems Classification Project further sub-classifies the ecological regions into ecological systems. The upstream study area is dominated by vegetation types within the Edwards Plateau ecological system and transitions into vegetation types characteristic of the Southeastern Great Plains ecological systems downstream of the Balcones

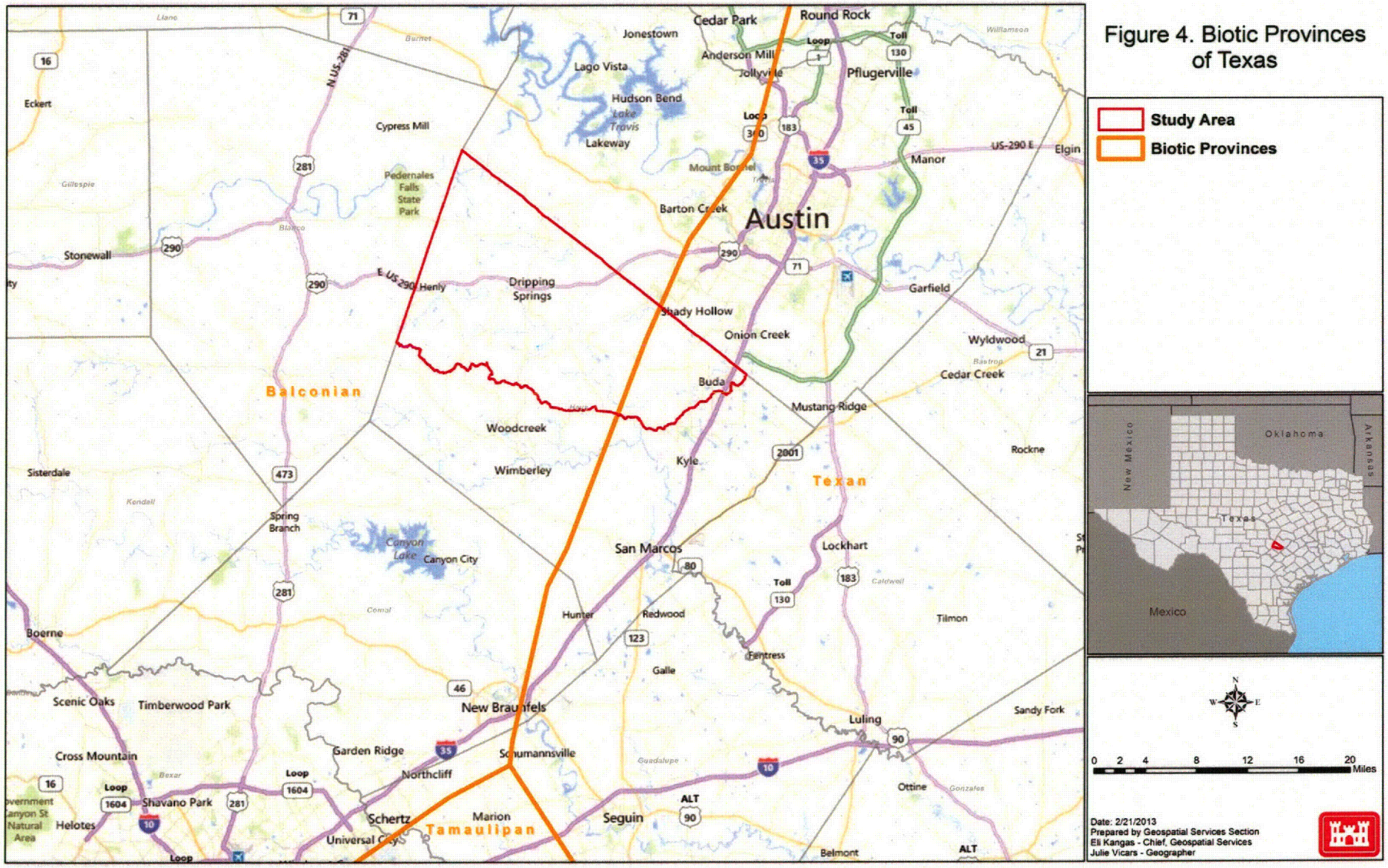


Figure 4. Biotic Provinces of Texas
Study Area
Biotic Provinces
Austin
Round Rock
Cedar Park
Pflugerville
Manor
Jonestown
Lago Vista
Anderson Mill
Hudson Bend
Lake Travis
Lakeway
Cypress Mill
Pedernales Falls State Park
Barton Creek
Dripping Springs
Henly
Stonewall
Eckert
Shady Hollow
Onion Creek
Garfield
Wyldwood
Cedar Creek
Buda
Mustang Ridge
Rockne
Balconian
Woodcreek
Wimberley
Kyle
Texan
Sisterdale
Spring Branch
Canyon Lake
Canyon City
San Marcos
Lockhart
Tilmon
Hunter
Redwood
Fentress
Galle
Boerne
Scenic Oaks
Timberwood Park
New Braunfels
Sandy Fork
Luling
Cross Mountain
Garden Ridge
Schumannsville
Northcliff
Shavano Park
Helotes
Schertz
Marion
Universal City
Tamaulipan
Seguin
Ottine
Belmont
Oklahoma
Arkansas
New Mexico
Texas
Mexico
0 2 4 8 12 16 20
Miles
Date: 2/21/2013
Prepared by Geospatial Services Section
Eli Kangas - Chief, Geospatial Services
Julie Vicars - Geographer

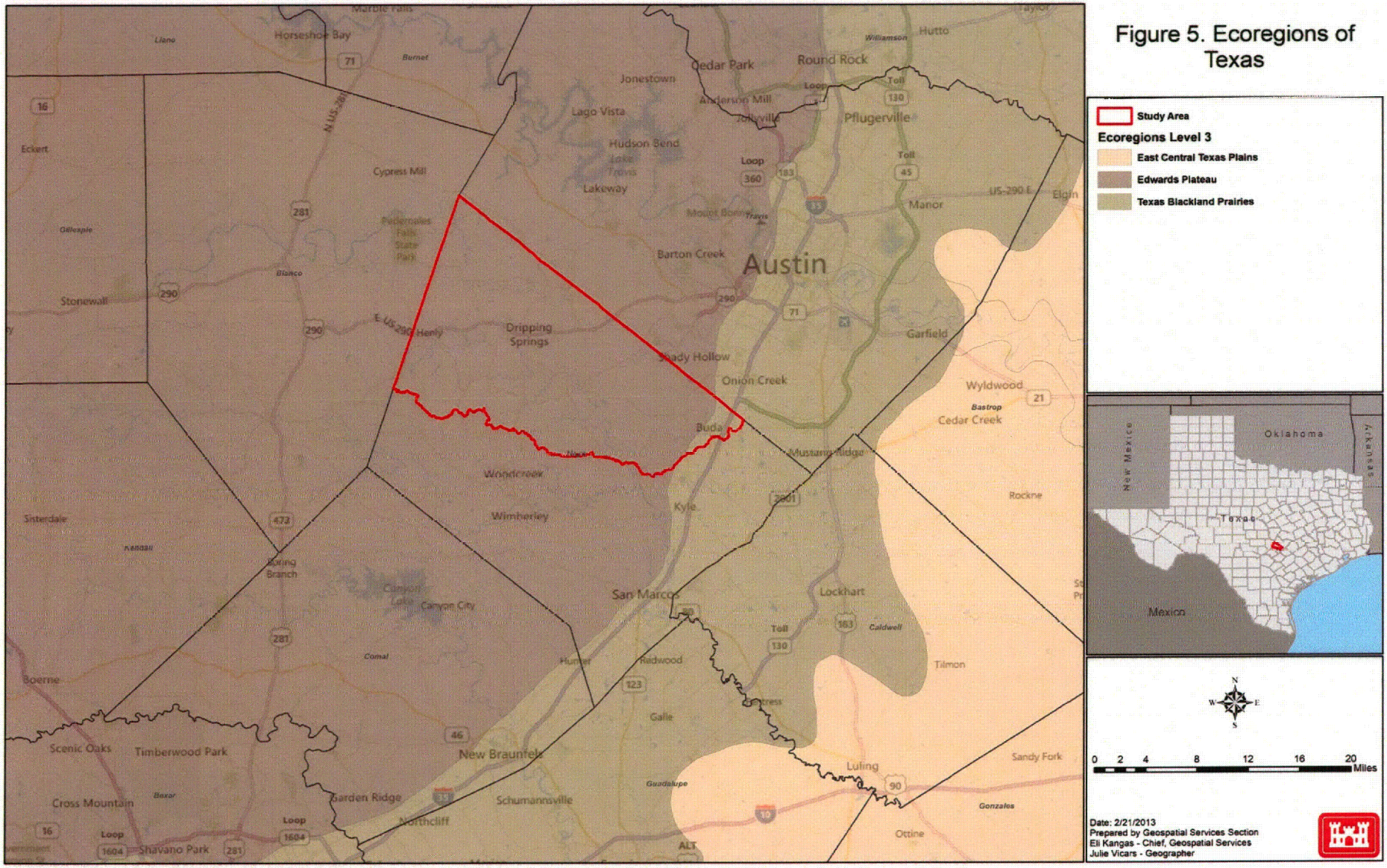


Figure 5. Ecoregions of Texas

Fault area. The vegetation associated with each of the ecological systems is described in more detail below (TPWD, 2010).

Study Area Vegetation

Edwards Plateau Floodplain Terrace

Woodland vegetation in the floodplain areas of the Edwards Plateau communities is dominated by pecan (*Carya illinoinensis*), cedar elm (*Ulmus crassifolia*), American elm (*Ulmus americana*), sugar hackberry (*Celtis laevigata*), netleaf hackberry (*Celtis laevigata* var. *reticulata*), and/or plateau live oak (*Quercus fusiformis*). Other overstory species include Texas ash (*Fraxinus texensis*), green ash (*Fraxinus pennsylvanica*), Arizona walnut (*Juglans major*), bur oak (*Quercus macrocarpa*), Texas oak (*Quercus buckleyi*), boxelder (*Acer negundo*), western soapberry (*Sapindus saponaria* var. *drummondii*), wafer-ash (*Ptelea trifoliata*), Ashe juniper (*Juniperus ashei*), mesquite (*Prosopis glandulosa*), and American sycamore (*Platanus occidentalis*).

Woody species in the subcanopy include gum bumelia (*Sideroxylum lanuginosum*), roughleaf dogwood (*Cornus drummondii*), red mulberry (*Morus rubra*), Texas persimmon (*Diospyros texana*), Virginia creeper (*Parthenocissus quinquefolia*), grape (*Vitis* spp.), greenbrier (*Smilax bona-nox*), roosevelt-weed (*Baccharis neglecta*), Turk's cap (*Malvaviscus arboreus* var. *drummondii*), Ashe juniper, and/or possumhaw (*Ilex decidua*). The herbaceous layer in the Edwards Plateau Floodplain Terrace can range from a continuous canopy to relatively sparse or patchy.

Herbaceous species may include Virginia wildrye (*Elymus virginicus*), inland seaoats (*Chasmanthium latifolium*), Texas wintergrass (*Nassella leucotricha*), frostweed (*Verbesina virginica*), and caric sedge (*Carex* spp.).

Shrublands in the Edwards Plateau Floodplain Terraces are dominated by mesquite, huisache (*Acacia farnesiana*), western soapberry, little walnut (*Juglans microcarpa*), agarito (*Mahonia trifoliata*), and/or common buttonbush (*Cephalanthus occidentalis*).

Grassland sites are often dominated by non-native species such as Bermuda grass (*Cynodon dactylon*) and King Ranch bluestem (*Bothriochloa ischaemum* var. *songarica*). Native species include switchgrass (*Panicum virgatum*), bushy bluestem (*Andropogon glomeratus*), Virginia wildrye, Texas wintergrass, little barley (*Hordeum pusillum*), eastern gamagrass (*Tripsacum dactyloides*), Lindheimer's muhly (*Muhlenbergia linheimeri*), carix sedges, and/or spikerushes (*Eleocharis* spp.).

Edwards Plateau Riparian

Riparian vegetation in the Edwards Plateau may be dominated by plateau live oak, American sycamore, bald cypress (*Taxodium distichum*), green ash, Texas ash, cedar elm, sugar hackberry, netleaf hackberry, boxelder, mesquite, Texas oak, Ashe juniper, black willow (*Salix nigra*), and/or western soapberry.

Understory species in the woodland habitats include little walnut, false willow (*Bacharis* spp.), black willow, Ashe juniper, western soapberry, roughleaf dogwood, Texas mountain-laurel

(*Sophora secundiflora*), gum bumelia, Texas persimmon, Mexican buckeye (*Ungnadia speciosa*), mesquite, common buttonbush, and/or whitebrush (*Aloysia gratissima*).

The herbaceous layer may be comprised of bushy bluestem, switchgrass, sawgrass (*Cladium mariscus* var. *jamaicense*), eastern gamagrass, southwestern bristlegrass (*Setaria scheelei*), Texas wintergrass, spikerush, bricjellbush (*Brickellia* spp.), American water-willow (*Justicia americana*), water penny (*Hydrocotyle* spp.), and/or Lindheimer muhly. Non-native herbaceous species such as Bermuda grass, King Ranch bluestem, and Johnsongrass (*Sorghum halepense*) are also frequently present.

Southeastern Great Plains Floodplain Forest

The overstory canopy of the Southeastern Great Plains Floodplain Forests include pecan, white ash (*Fraxinus americana*), water oak (*Quercus nigra*), cedar elm, sugar hackberry, American elm, plateau or coastal live oak (*Quercus virginiana*), American sycamore, boxelder, bur oak, red mulberry, green ash, and/or western soapberry.

Shrub species include American beautyberry (*Callicarpa americana*), possumhaw, yaupon (*Ilex vomitoria*), gum bumelia, eastern persimmon (*Diospyros virginiana*), farkleberry (*Vaccinium arboreum*), eastern redcedar (*Juniperus virginiana*), roughleaf dogwood, and/or rusty blackhaw (*Viburnum rufidulum*). Vine species include grape (*Vitis* spp.), Alabama supplejack (*Berchemia scandens*), common trumpetcreeper (*Campsis radicans*), Virginia creeper, and/or peppervine (*Ampelopsis arborea*).

Herbaceous species may include Virginia wildrye, frostweed, inland seaoats, narrowleaf woodoats (*Chasmanthium sessiliflorum*), eastern gamagrass, Drummond's aster (*Symphyotrichum drummondii* var. *texanum*), white avens (*Geum canadense*), Canada snakeroot (*Sanicula canadensis*), switchgrass, bedstraw (*Galium* spp.), and caric sedges. Non-native herbaceous species such as Bermuda grass and Johnson grass may also be prevalent.

Southeastern Great Plains Riparian Forest

The overstory canopy of the Southeastern Great Plains Riparian Forest include sugar hackberry, cedar elm, American sycamore, eastern cottonwood (*Populus deltoides*), Arizona walnut, plateau live oak, water oak, willow oak (*Quercus phellos*), western soapberry, black willow, white ash, green ash, common honeylocust (*Gleditsia triacanthos*), and/or pecan.

Shrub species include indigobush (*Amorpha fruticosa*), swamp privet (*Forestiera acuminata*), possumhaw, yaupon, gum bumelia, eastern redcedar, eastern persimmon, roughleaf dogwood, and/or rusty blackhaw.

Herbaceous cover includes Virginia wildrye, frostweed, inland seaoats, narrowleaf woodoats, eastern gamagrass, Drummond's aster, white avens, Canada snakeroot, switchgrass, bedstraw, and/or caric sedges. Bermuda grass and Johnsongrass are frequent non-native herbacoues species that may occur in the herbaceous community.

Wildlife

Because the study area traverses through the semiarid climates of the Edwards Plateau to the more mesic habitats to the east, the wildlife community in the study area is relatively diverse. The wildlife populations throughout much of the study area are typical of Texas pastoral wildlife and include mammalian species such as white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), nine-banded armadillo (*Dasypus novemcinctus*), cottontail rabbit (*Sylvilagus floridanus*), swamp rabbit (*Sylvilagus aquaticus*), and black-tailed jackrabbit (*Lepus californicus*), gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*), American beaver (*Castor canadensis*), Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitus mephitus*), eastern spotted skunk (*Spilogale putorius*), and several species of rodents and bats.

Reptiles and amphibians in the study area are even more diverse as the karst geology of the Edwards Plateau provides unique habitat and springs that support several endemic amphibians and the streams and rivers of the study area provide habitat for numerous species frogs, turtles, and snakes. Common turtles in the study area include the common snapping turtle (*Chelydra serpentina*), western chicken turtle (*Deirochelys reticularia miaria*), red-eared slider (*Trachemys scripta elegans*), the Guadalupe spiny soft-shelled turtle (*Aplone spiniferus guadalupensis*), and eastern box turtle (*Terrapene carolina*). Common amphibians in the study area include Woodhouse's toad (*Bufo woodhousii woodhousii*), Gulf Coast toad (*Bufo valliceps valliceps*), green treefrog (*Hyla cinerea*), gray treefrog (*Hyla versicolor*), upland chorus frog (*Pseudacris feriarum feriarum*), American bullfrog (*Rana catesneiana*), southern leopard frog (*Rana sphenocephala*), Hurter's spadefoot toad (*Scaphiopus hurterii*), and the eastern tiger salamander (*Ambystoma tigrinum tigrinum*).

Texas snakes that could be found in the study area include the eastern yellow-bellied racer (*Coluber constrictor flaviventris*), Texas rat snake (*Elaphe obsolete lindheimeri*), eastern hog-nosed snake (*Heterodon platirhinos*), prairie kingsnake (*Lampropeltis calligaster calligaster*), western coachwhip (*Masticophis flagellum testaceus*), blotched water snake (*Nerodia erythrogaster transversa*), broad-banded water snake (*Nerodia fasciata confluens*), diamond-backed water snake (*Nerodia rhombifer rhombifer*), rough green snake (*Opheodrys aestivus*), Texas brown snake (*Storeria dekayi texana*), flat-headed snake (*Tantilla gracilis*), checkered garter snake (*Thamnophis marcianus marcianus*), rough earth snake (*Virginia striatula*), Texas coral snake (*Micrurus tener*), broad-banded copperhead (*Agkistrodon contortrix laticinctus*), and the western cottonmouth (*Agkistrodon piscivorus leucostoma*).

Threatened and Endangered Species

The Edwards Plateau and the associated karst geology of the study area provide unique habitats for wildlife which is reflected in a diverse endemic biota, many of which are considered rare, threatened, or endangered by the Texas Parks and Wildlife Department (TPWD) and the U.S. Fish and Wildlife Service (USFWS). The Edwards Plateau portion of the study area provides habitat for the Golden-cheeked Warbler (*Setophaga chrysoparia*) and Black-capped Vireo (*Vireo atricapilla*), as well as many rare, threatened, and endangered karst dependent amphibians, fish, and invertebrates. On October 6, 2011, the USFWS placed five mussel species on the endangered species list. Four of these mussels, Texas fatmucket (*Lampsilis bracteata*), Texas fawnsfoot (*Truncilla macrodon*), smooth pimpleback (*Quadrula houstonensis*), and Texas

pimpleback (*Quadrula petrina*), are known to occur, or have a known historical range within the study area. Table 2 lists the State and Federal rare, threatened, and endangered species by county for the study area. The highlighted cells in the Federal and State columns indicate known occurrence records for the species adjacent or within the study area.

Table 2: State and Federal rare, threatened, and endangered species for Hays County.

Common Name	Scientific Name	Federal	State
Amphibians			
Austin blind salamander	*Eurycea waterlooensis*	C	
Eurycea salamander	*Eurycea sosorum*	E/T	E/T
Blanco blind salamander	*Eurycea robusta*		T
Blanco River springs salamander	*Eurycea pterophila*		R
Texas blind salamander	*Eurycea rathbuni*	E	E
Arachnids			
Bandit Cave spider	*Cicurina bandida*		R
Birds			
American Peregrine Falcon	*Falco peregrinus anatum*		T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*		R
Bald Eagle	*Haliaeetus leucocephalus*		T
Black-capped Vireo	*Vireo atricapilla*	E	E
Golden-cheeked Warbler	*Setophaga chrysoparia*	E	E
Mountain Plover	*Charadrius montanus*		R
Sprague's Pipit	*Anthus spragueii*		R
Western Burrowing Owl	*Athene cunicularia hypugaea*		R
Whooping Crane	*Grus americana*	E	E
Zone-tailed Hawk	*Buteo albonotatus*		T
Crustaceans			
A cave obligate crustacean	*Monodella texana*		R
Balcones Cave amphipod	*Stygobromus balconies*		R
Ezell's cave amphipod	*Stygobromus flagellatus*		R
Peck's cave amphipod	*Stygobromus pecki*	E	
Texas cave shrimp	*Palaemonetes antrorum*		R
Texas troglobitic water slater	*Lirceolus smithii*		R
Fishes			
Fountain darter	*Etheostoma fonticola*	E	E
Guadalupe bass	*Micropterus treculii*		R
Guadalupe darter	*Percina sciera apristis*		R
Ironcolor shiner	*Notropis chalybaeus*		R
San Marcos gambusia	*Gambusia georgei*	E	E
Insects			
A mayfly	*Procloeon distinctum*		R
Comal Springs dryopid beetle	*Stygoparnus comalensis*	E	E
Comal Springs riffle beetle	*Heterelmis comalensis*	E	E
Edwards Aquifer diving beetle	*Haideoporus texanus*		R

Common Name	Scientific Name	Federal	State
Flint's net-spinning caddisfly	*Cheumatopsyche flinti*		R
Leonora's dancer damselfly	*Argia leonorae*		R
Rawson's metalmark	*Calephelis rawsoni*		R
San Marcos saddle-case caddisfly	*Protoptila arca*		R
Texas austrotinodes caddisfly	*Austrotinodes texensis*		R
Mammals			
Cave myotis	*Myotis velifer*		R
Plains spotted skunk	*Spilogale putorius interrupta*		R
Red Wolf	*Canis rufus*		E
Mollusks			
Creeper	*Strophitus undulatus*		R
False spike mussel	*Quadrula mitchelli*		T
Golden orb	*Quadrula aurea*		T
Texas fatmucket	*Lampsilis bracteata*		T
Texas pimpleback	*Quadrula petrina*		T
Reptiles			
Cagle's map turtle	*Graptemys caglei*		T
Spot-tailed earless lizard	*Holbrookia lacerata*		R
Texas garter snake	*Thamnophis sirtalis annectens*		R
Texas horned lizard	*Phyrnosoma cornutum*		T
Plants			
Bracted twistflower	*Streptanthus bracteatus*		R
Hill Country wild-mercury	*Argythamnia aphoroides*		R
Texas wild-rice	*Zizania texana*	E	E
Warnock's coral-root	*Hexalectris warnockii*		R

USFWS, 2013 and TPWD, 2012
E=Endangered; T=Threatened; R=Rare (State Species of Concern), C=Federal candidate species

***Eurycea* spp.**

The *Eurycea* spp. populations in northern Hays and southern Travis Counties between San Marcos Springs and Barton Springs share genetic similarity with the San Marcos salamander (*Eurycea nana*); however, they are morphologically similar to the Barton Springs salamander (*Eurycea sosorum*). Although this species is not currently addressed by the Endangered Species Act or TPWD, it is anticipated that this species will be included as range extensions to wither the federally endangered Barton Springs or the federally threatened San Marcos salamander. The salamander's habitat consists of spring openings and rocky substrates where the water quality provides cool, clear, and clean flowing water. Known localities for the *Eurycea* salamander include Stuart Springs on Little Bear Creek and Spillar Ranch Springs in Hays County.

Black-capped Vireo

The Black-capped Vireo prefers heterogeous scrub habitat consisting of a patchy distribution of shrubs and thickets with scattered trees and dense, low, deciduous vegetation from the ground level to approximately 10 feet. The low vegetation provides nesting and foraging habitat and

provides protective cover from adverse weather and predators. Typical vireo habitat consists of plateau live oak, shin oak, and sumacs (*Rhus* spp.). Canopy cover of the vireos habitats ranges between 30 and 60 percent and is primarily comprised of deciduous shrubs.

Golden-cheeked Warbler

The Golden-cheeked Warbler nests in old-growth or mature regrowth Ashe juniper-oak woodlands within the Edwards Plateau, utilizing the peeling bark of the Ashe juniper for nest construction. The warblers prefer habitats along steep slopes, canyon heads, draws, and adjacent ridgetops. Golden-cheeked Warblers prefer moderate to dense forest and woodland habitat with a high percent canopy cover in the middle and upper layers. Optimal total tree cover averages 70 percent at 10 feet and 74 percent at 16 feet, and 70 percent above 18 feet, with an average canopy height of 22 feet.

Balcones Cave Amphipod

The Balcones Cave amphipod is a blind, straw-colored amphipod approximately 12 mm in length. The amphipod is known from four localities, two of which are located in Hays County (Autumn Woods Well and Boyett's Cave). The other two are localities are Ireland's Cave and Whirlpool Cave in adjacent Travis County.

Texas Garter Snake

The Texas garter snake is found in a wide range of habitats; it prefers moist areas such as the margins of streams, ponds, rivers, wetlands, and lakes. The garter snake prefers habitats dominated by grass, forbs, and brushy riparian vegetation.

HABITAT EVALUATION

Consideration of methods to evaluate impacts or benefits to terrestrial and aquatic resources will be developed as this study moves forward. Initial information indicates that methods to address riparian resources including stream, streamside shrubs, grasslands, forests, and wetlands will have to be addressed. In addition, model selection will be dependent on refinement of planning objectives including whether or not the study will be limited to flood risk management alternatives or if ecosystem improvement alternatives will also be considered. Appropriate certified models will be selected that quantify existing habitat conditions and enable estimation of future conditions for with and without the project conditions for both terrestrial and aquatic resources if available. It appears that uses of the Fish and Wildlife Service's Habitat Evaluation Procedures would be appropriate for evaluating existing and future project riparian habitats conditions except for the habitat associated with flowing waters in the streams. If existing certified or approved models for use in this study area are not appropriate to meet study objectives additional effort including model development may be required at increased cost and time due to the stringent requirements for new model development.

RECREATION

Areas within this part of the state are popular to many different types of recreationists, including many areas within the study area. The streams and rivers within the study area often incur heavy recreational use such as fishing, swimming, kayaking, canoeing, and tubing. The riparian corridors and other habitats are often used by recreationists for camping, hiking, wildlife viewing, photography, and hunting.

Parks

Four municipal parks, including the Buda Sportsplex, Cullen Country Club, Buda City Park, and Stagecoach Park, are located within the study area near Buda. Figures 6a and 6b shows the parks within or adjacent to the study area.

Future Without Project Condition

Due to the areal extent of the overall study area, future without project conditions are highly variable depending on where potential alternatives would be located. In general, potential alternatives in rural areas could have greater natural resource effects in comparison to potential alternatives near the more urbanized areas of northern Hays County. The future without project conditions in this appendix, with the exception of climate change drivers, is based on current general population and development trends of the study area.

Land Use

Population size within the northern and eastern portions of the study area has been steadily increasing, especially along the transportation corridors along I-35 through Buda and Kyle and US 290 through Dripping Springs. These communities provide residential opportunities to the expanding Austin metropolitan area. As Austin and the surrounding communities continue to grow, land uses surrounding these communities will continue to shift from rural conditions to more suburban uses. Table 3 provides future population projections for the communities within the study area.

Table 3: Population Projections for Communities within the LCRB Study Area.

City	Projections by Year						
	2000	2010	2020	2030	2040	2050	2060
Buda	2,404	9,338	13,971	17,341	20,728	24,797	27,997
Dripping Springs	1,548	5,325	9,308	11,651	14,005	16,834	19,058
Kyle	5,314	21,457	31,126	33,613	35,203	39,197	41,850
Mountain City	671	1,019	1,187	1,361	1,536	1,746	1,911

2012. TWDB. City Population Projections in Texas. Excel data file.
http://www.twdb.state.tx.us/waterplanning/data/projections/2012/popproj.asp

Air Quality

Hays County is a member of the Early Action Compact Task Force established in December 2002 to address ozone pollution under the EPA's 8-hour NAAQS. The Task Force's goal is to reduce local air pollution to ensure the region maintains Clean Air Act health standards. Although the region's population is increasing, the development of cleaner burning fuels, more efficient vehicles, and other air quality measures should result in continued compliance with the NAAQS.

Noise

As urban and suburban areas continue to expand in the Austin metropolitan area, noise levels would increase to level typical of those observed in more residential and commercial areas.

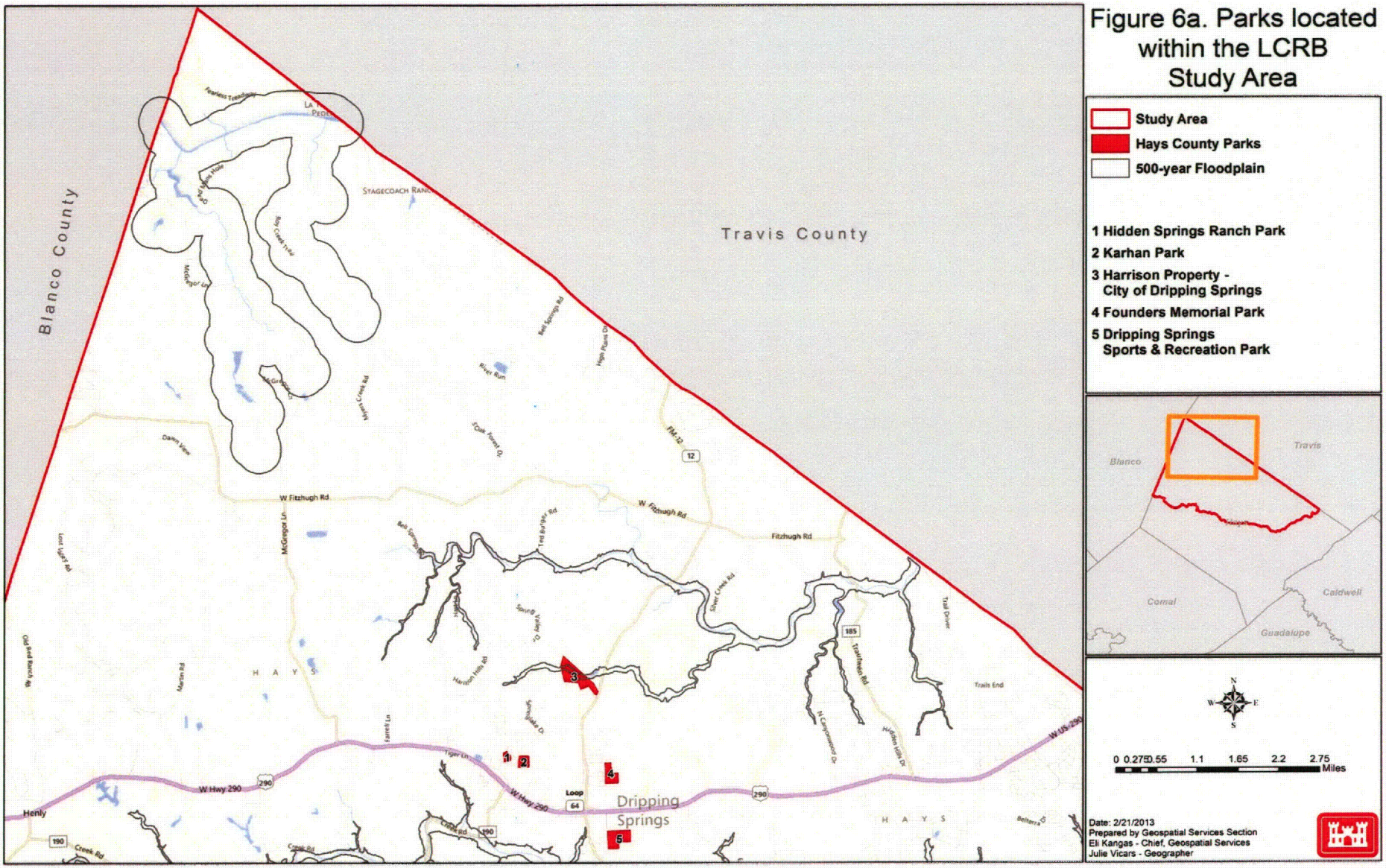


Figure 6a. Parks located within the LCRB Study Area

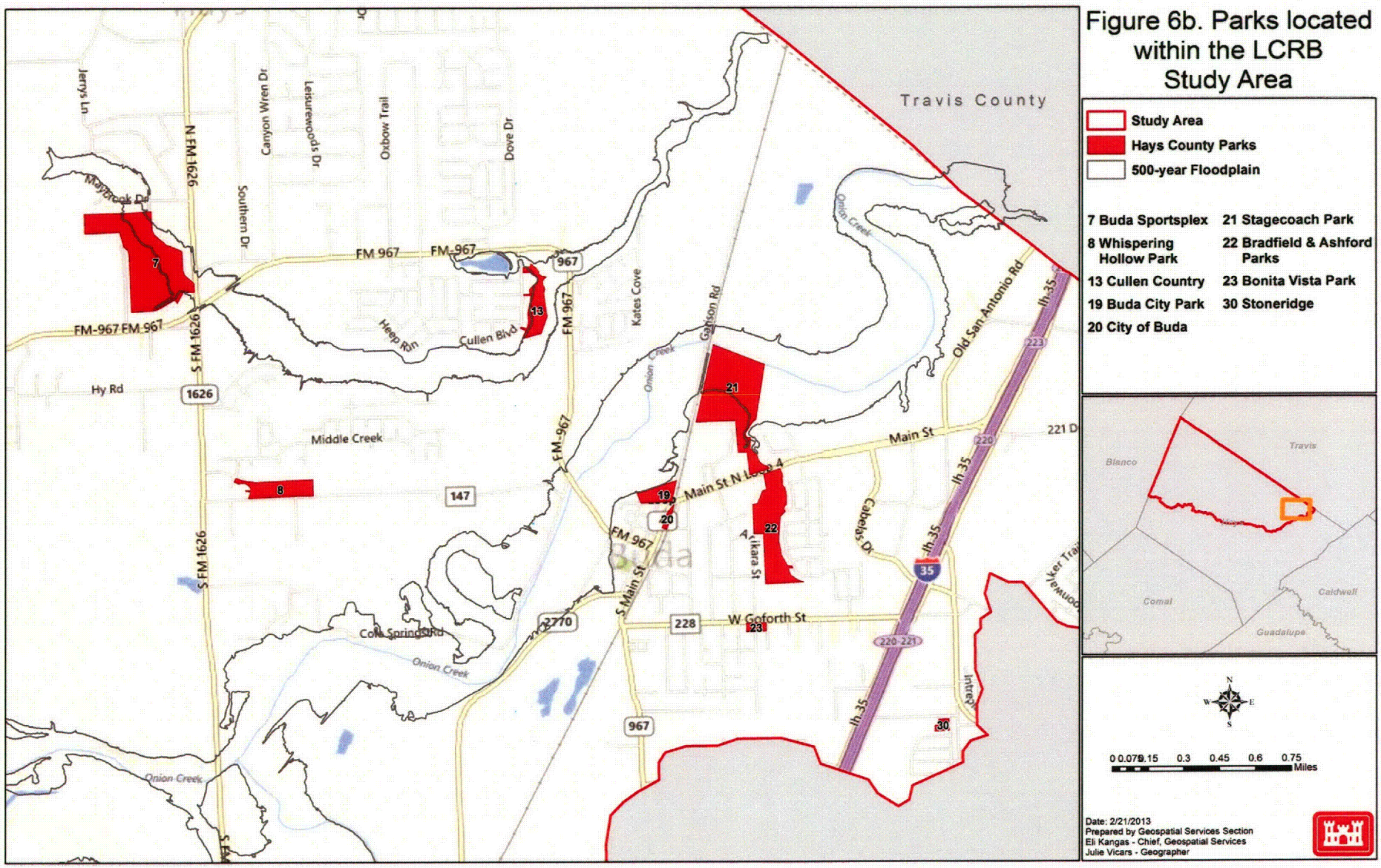


Figure 6b. Parks located within the LCRB Study Area

Climate

Climate change estimates for Texas include an increase of 5.4° F (±1.8° F) by the end of the century (Schmidt and North, 2011). The shift in temperatures would lead to an expansion of the tropical zone resulting in more tropical weather patterns extending farther into the spring and fall. Although precipitation projections are more variable and less predictable, most models indicate a decrease in rainfall and with higher temperatures and corresponding increase in evaporation rates. The decrease in recharge to the aquifer and the increase future water supply demands place further stresses on aquatic systems in the study area.

Natural Resources

Future conditions for aquatic and terrestrial natural resources could change in areas where land use shifts from natural and rural conditions to developed suburban and urban areas. Most of these changes would occur near the population centers of Buda, Kyle, and Dripping Springs. Near these communities, native vegetation could be converted to non-native landscaping and there could be increased pressure on the ecosystem from the introduction of invasive vegetative species. Wildlife communities in the areas around future development would shift to species tolerant of urban and suburban pressures. Furthermore, future development in the upper portions of the study area watershed would lead to indirect effects in the aquatic and riparian systems downstream of the impacted areas.

References

Correll, D.S., and M.C. Johnston. 1996. Manual of the Vascular Plants of Texas. Fourth Printing. The University of Texas at Dallas, Richardson, Texas.

EAA. 2012. Hydrogeology of the Edwards Aquifer. Retrieved November, 8 2012. From http://www.edwardsaquifer.org/display_science_research_m.php?pg=geology

Fry, J, G Xian, S Jin, J Dewitz, C Homer, L Yang, C Barnes, N Herold and J Wickham. 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States. PE&RS 77(9):858-864.

Larkin, Thomas J. and George W. Bomar. December 1983. Climatic Atlas of Texas. Texas Department of Water Resources. P.O. Box 13087, Austin, Texas 78711.

Schmandt, J, GR North, and J Clarkson. 2011. The Impact of Global Warming on Texas. University of Texas Press, Austin, TX. 318 pp.

TCEQ. Updated February 11, 2013. 2010 Texas Water Quality Integrated Report. Retrieved December 5, 2012. From http://www.tceq.texas.gov/waterquality/assessment/305_303.html

TCEQ. Updated June 24, 2010. Understanding General Conformity in Texas. Retrieved November 8, 2012. From http://www.tceq.texas.gov/implementation/air/sip/gc.html
TCEQ. Updated October 22, 2010. Texas State Implementation Plan. Retrieved November 8, 2012. From http://www.tceq.texas.gov/implementation/air/sip/texas-sip

TPWD. 2010. Texas Ecological Systems: Phase 1 Interpretive Booklet. TPWD Report. 110 pp.

TPWD. 2012. Annotated County List of Rare Species for Hays County. Retrieved January 10, 2013. From http://www.tpwd.state.tx.us/gis/ris/es/ES_Reports.aspx?county=Hays Revised 10/2/2012. 3 pp.

TPWD. 2012a. "Ecologically Significant Stream Segments." Retrieved November 8, 2012. From http://www.tpwd.state.tx.us/landwater/water/environconcerns/water_quality/sigsegs/

USACE. March 20, 1999. Navigable Waters of the United States in the Fort Worth, Albuquerque, and Tulsa Districts Within the State of Texas. Retrieved November 8, 2012. From http://media.swf.usace.army.mil/pubdata/environ/regulatory/jurisdiction/navlist.pdf

U.S. Department of Agriculture. 1984. Soil Survey of Comal and Hays Counties, Texas.

USFWS. 2013. Endangered Species List for Hays County. Retrieved February 14, 2013. From http://www.fws.gov/southwest/es/ES_ListSpecies.cfm

NEWS RELEASE

U.S. ARMY CORPS OF ENGINEERS

BUILDING STRONG®

For Immediate Release: NR11-015
February 3, 2011

Contact: Clay Church, 817-886-1314
clayton.a.church@usace.army.mil

Corps of Engineers and Hays County to conduct Flood Plain Management public workshop

FORT WORTH, TEXAS - The U.S. Army Corps of Engineers will conduct a public workshop to inform residents of northern Hays County about a new Flood Risk Management Study for the area. The meeting will be held February 16, from 6:30 to 8:30 p.m. at Dripping Springs City Hall, 511 Mercer Street, Dripping Springs, Texas.

The workshop will provide an opportunity to explain the study, allow for public input and scoping under the National Environmental Policy Act and for residents to ask questions and voice concerns, as well as to learn how the study will be conducted and what it involves. Surveyors will visually collect information by driving through neighborhoods and rural areas as well as by walking river and creek banks.

The study, requested by Hays County to address flood plain management concerns and the potential for human and economic losses due to flooding in the rapidly growing county, is funded in part by Hays County and a grant from the Texas Water Development Board. The Lower Colorado River Authority facilitated the project under its Feasibility Study Cost Sharing Agreement with the U.S. Army Corps of Engineers. Study alternatives may include flood mitigation through structural and nonstructural methods, with an early 2013 date for existing conditions, future without project forecasted conditions, ideas on how to move forward and input from stakeholders. Over the next several years other parts of Hays County are expected to be re-surveyed for flood risk management needs.

For more information about the Flood Risk Management Study, please contact Stacy Gray, USACE project manager, at (817) 886-1787, email at stacy.l.gray@usace.army.mil or Betty Lambright, Hays County, at 512-393-2143, email at betty.lambright@co.hays.tx.us.

-30-

About the Fort Worth District: The Fort Worth District, U.S. Army Corps of Engineers was established in 1950. The District is responsible for water resources development in two-thirds of Texas, and design and construction at military installations in Texas and parts of Louisiana and New Mexico. Visit the Fort Worth District Web site at: www.swf.usace.army.mil.

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

REPLY TO
ATTENTION OF:

February 15, 2012

PUBLIC MEETING NOTICE
LOWER COLORADO RIVER BASIN, HAYS COUNTY INTERIM FEASIBILITY STUDY

The U.S. Army Corps of Engineers (USACE) Fort Worth District, in partnership with the Lower Colorado River Authority (LCRA) and Hays County with additional funding from the Texas Water Development Board (TWDB), intends to perform an Interim Feasibility Study identifying and investigating water resource related problems within Northern Hays County, Texas (Enclosure 1). More specifically, water resource related problems will be investigated within the Pedernales, Barton Creek, Onion Creek, Bear Creek, and Little Bear Creek watersheds. The Interim Feasibility Study will (1) identify water resource related problems, needs, and opportunities (2) develop and evaluate alternatives to reduce flood damages, (3) explore possibilities for multipurpose use (i.e. ecosystem restoration, recreation), and (4) provide a recommendation for possible project implementation. Preliminary Hydraulic and Hydrologic studies have been performed and the environmental and economic studies are being initiated for the Lower Colorado River Basin, Hays County Interim Feasibility Study.

The study authority to perform the Lower Colorado River Basin, Hays County Interim Feasibility Study includes a Resolution by the Committee on Commerce, U.S. Senate, adopted August 4, 1936; the River and Harbor Act approved August 26, 1937; the Rivers and Harbors Act, approved March 2, 1945; and a specific authority for Onion Creek adopted, May 6, 1998, with a Resolution by the Committee on Transportation and Infrastructure, U.S. House of Representatives for improvements to the Onion Creek watershed. The LCRB, Hays County Interim Feasibility Study is cost shared in accordance with the Water Resources Development Act of 1986, Section 105(a), Public Law 99-662 (33 U.S.C. 2215) as amended December 29, 2000.

We would like to invite you to a public meeting addressing the preliminary Hydraulic and Hydrologic results (Onion Creek, Bear Creek, and Little Bear Creek watersheds) of our studies and initiation of the environmental and economic analysis. The public meeting will occur at 7:00 p.m. on February 29, 2012 and will be held at the following location:

Hays County Development Services Office
2171 Yarrington Road
San Marcos, TX 78666

We look forward to receiving your comments as we move forward. Please address any comments to Mrs. Mandy McGuire, CESWF-PER-EE, P.O. Box 17300, Fort Worth, Texas 76102-0300 or by email at amanda.mcguire@usace.army.mil. Thank you for your interest and cooperation.

Eric Verwers
Chief, Planning, Environmental, and
Regulatory Division

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

REPLY TO
ATTENTION OF

February 27, 2012

PUBLIC MEETING NOTICE
LOWER COLORADO RIVER BASIN, HAYS COUNTY INTERIM FEASIBILITY STUDY

The U.S. Army Corps of Engineers (USACE) Fort Worth District, in partnership with the Lower Colorado River Authority (LCRA) and Hays County with additional funding from the Texas Water Development Board (TWDB), intends to perform an Interim Feasibility Study identifying and investigating water resource related problems within Northern Hays County, Texas (Enclosure 1). More specifically, water resource related problems will be investigated within the Pedernales, Barton Creek, Onion Creek, Bear Creek, and Little Bear Creek watersheds. The Interim Feasibility Study will (1) identify water resource related problems, needs, and opportunities (2) develop and evaluate alternatives to reduce flood damages, (3) explore possibilities for multipurpose use (i.e. ecosystem restoration, recreation), and (4) provide a recommendation for possible project implementation. Preliminary Hydraulic and Hydrologic studies have been performed and the environmental and economic studies are being initiated for the Lower Colorado River Basin, Hays County Interim Feasibility Study.

The study authority to perform the Lower Colorado River Basin, Hays County Interim Feasibility Study includes a Resolution by the Committee on Commerce, U.S. Senate, adopted August 4, 1936; the River and Harbor Act approved August 26, 1937; the Rivers and Harbors Act, approved March 2, 1945; and a specific authority for Onion Creek adopted, May 6, 1998, with a Resolution by the Committee on Transportation and Infrastructure, U.S. House of Representatives for improvements to the Onion Creek watershed. The LCRB, Hays County Interim Feasibility Study is cost shared in accordance with the Water Resources Development Act of 1986, Section 105(a), Public Law 99-662 (33 U.S.C. 2215) as amended December 29, 2000.

We would like to invite you to a public meeting addressing the preliminary Hydraulic and Hydrologic results (Onion Creek, Bear Creek, and Little Bear Creek watersheds) of our studies and initiation of the environmental and economic analysis. The public meeting will occur at 6:30 p.m. on March 8, 2012 and will be held at the following location:

City of Buda, City Hall
City Council Chambers
121 Main Street
Buda, TX 78610

We look forward to receiving your comments as we move forward. Please address any comments to Mrs. Mandy McGuire, CESWF-PER-EE, P.O. Box 17300, Fort Worth, Texas 76102-0300 or by email at amanda.mcguire@usace.army.mil. Thank you for your interest and cooperation.

Eric Verwers
Chief, Planning, Environmental, and
Regulatory Division

Dripping Springs The News-Dispatch, Volume XXXI No. 29, Thursday, April 18, 2013

April 24

Floodplain meeting at DS Pct. 4 office

COUNTY — The public is invited to learn more about floodplain-related issues within Northern Hays County watersheds at a public meeting hosted by the U.S. Army Corps of Engineers Wednesday, April 24, at the Hays County Precinct 4 building, 195 Roger Hanks Parkway, Dripping Springs. The meeting will begin at 6:30 p.m.

The Corps and its contractor, Halff Associates, will discuss the preliminary hydraulic and hydrologic study results for the Barton Creek and Pedernales River basins, as well as other basins in the area.

The study, requested by Hays County to address floodplain

See County pg .2

County.....*from page one*

management concerns and the potential for human and economic losses due to flooding in the rapidly growing county, is funded in part by Hays County and a grant from the Texas Water Development Board. The Lower Colorado River Authority facilitated the project under its Feasibility Study Cost Sharing Agreement with the U.S. Army Corps of Engineers.

For additional information, contact Jeff Hauff, Hays County Grants Administrator, at 512-393-2211 or Marie Vanderpool, U.S. Army Corps of Engineers, at 817-886-1424.

Hays County, Texas

www.co.hays.tx.us

Follow us at www.twitter.com/hayscountygov

Visit us at www.facebook.com/hayscountytexas

Information for the News Media

Aug. 19, 2013

Hays County Sets Public Meeting to Discuss Northern Hays County Floodplain Study Results

Hays County Courthouse, San Marcos, TX – Floodplain-related issues in Northern Hays County watersheds is the topic of a public meeting hosted by the U.S. Army Corps of Engineers on Wednesday, September 4, at the Hays County Precinct 2 office.

The Corps and its contractor, Halff Associates, will discuss the study results for those drainage basins in northern Hays County that empty into the Colorado River, as well as provide recommendations for drainage improvements in specific areas.

The study, requested by Hays County to address floodplain management concerns and the potential for human and economic losses due to flooding in the rapidly growing county, is funded in part by Hays County and a grant from the Texas Water Development Board. The Lower Colorado River Authority facilitated the project under its Feasibility Study Cost Sharing Agreement with the U.S. Army Corps of Engineers.

The September 4 meeting will begin at 6:30 p.m. at the Precinct 2 building, 5458 FM 2770. For additional information, contact Jeff Hauff, Hays County Grants Administrator, at 512-393-2211 or Clint Garza, Hays County Development and Community Services Director at 512-393-2150.

###