where quality meets life

PFLUGERVILLE
TEXAS

DRAINAGE MASTER PLAN

Prepared by:

HALFF

TBPE Firm No. 312

HALFF ASSOCIATES, INC.

13620 Briarwick Drive, Suite 100

Austin, Texas 78729

August 2022

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August 5, 2022 AVO 41938

Ms. Patricia Davis, M.S.C.E., P.E.
City Engineer
City of Pflugerville
P.O. Box 589
Pflugerville, Texas 78691

RE: City of Pflugerville Drainage Master Plan including Drainage Utility Fee Feasibility Study Report

Dear Ms. Davis:

Halff Associates, Inc. presents the *City of Pflugerville Drainage Master Plan* including the *Drainage Utility Fee Feasibility Study* report. This report presents a prioritized drainage CIP project list and operation and maintenance items for the City of Pflugerville to adopt that will aid in reducing flooding throughout the city. Also included is Drainage Utility Fee Feasibility Study performed by NewGen Strategies and Solutions, LLC for the City to consider implementing as a funding source for operating and maintaining drainage infrastructure around the city and funding the drainage CIP projects.

It has been a privilege for Halff Associates, Inc. to prepare this important document for the City of Pflugerville. Halff and NewGen are especially appreciative of the cooperation of the members of the City Staff who assisted in developing this report

We are pleased to continue assisting the City of Pflugerville. Do not hesitate to contact us if you have any questions or comments regarding future implementation of this plan.

Sincerely,

Paul Morales, P.E., CFM, CPESC
Project Advisor
Halff Associates, Inc.

Mark Lewis, P.E., CFM
Project Manager
Halff Associates, Inc.

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List of Acronyms and Abbreviations

ACE	Annual Chance of Exceedance
CIP	Capital Improvement Plan
City	City of Pflugerville
DEM	Digital Elevation Model
DMP	Drainage Master Plan
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
H&H	Hydrologic and Hydraulic
HEC	Hydrologic Engineering Center
HMS	Hydrologic Modeling System
LiDAR	Light Detection and Ranging
NOAA	National Oceanic and Atmospheric Administration
RAS	River Analysis System
USGS	US Geological Survey

1.0 INTRODUCTION

The City of Pflugerville (City) has experienced significant growth and development over the last 12 years. Pflugerville's population has grown from 46,936 to approximately 73,000, a 57% increase during that span. As a result of this population boom and expected continued growth, development and urbanization have greatly increased, thus changing what was once undeveloped open space, into a developed urbanized condition. This rapid growth is largely attributed to Pflugerville bordering other fast-growing cities like Austin to the south and Round Rock to the north. With urbanization comes an increased risk of flooding from streams, channels and storm drainage systems, presenting hazards to residents and the general public.

In addition to urbanization the city is experiencing, the National Oceanic and Atmospheric Administration (NOAA) recently released a new rainfall study in September 2018, NOAA Atlas 14 which was adopted into the City's drainage criteria in 2021. This new rainfall data includes an additional 20 years of rainfall data not accounted for in the previous rainfall study conducted by USGS in 2004. Generally, rainfall totals are higher using NOAA Atlas 14 versus the older USGS rainfall data. An increase in rainfall equates to more runoff volume, increased flood elevations, and wider floodplains.

Considering the rise in population and changes to rainfall data, Pflugerville is taking proactive measures to effectively manage stormwater infrastructure. The City selected Halff Associates, Inc. (Halff) to prepare the City of Pflugerville Drainage Master Plan (DMP).

The purpose and goal of the Drainage Master Plan is to:

1) Conduct a comprehensive evaluation of the existing drainage conditions throughout the City to develop an accurate and current understanding of the drainage infrastructure,

2) Develop conceptual engineering solutions to mitigate flooding risk by developing a drainage Capital Improvement Plan (CIP), and

3) Provide a drainage utility fee feasibility study for the City to consider as a funding source to implement the drainage CIP projects.

This assessment includes compiling a comprehensive inventory of existing data, performing hydrologic and hydraulic watershed model simulations, identifying flooding problem areas, and developing flood mitigation solutions. The results of this assessment will include recommendations for a city-wide drainage utility fee structure.

The Pflugerville Drainage Master Plan is a planning level document for the City of Pflugerville to aid in the development of drainage improvements for the city. Designing and building these projects are dependent on funding and available resources. As these projects advance, design elements and cost estimates will change.

2.0 DATA COLLECTION

Halff obtained and reviewed data from a variety of sources to provide information for an comprehensive understanding of flooding issues throughout the City. **Table 2-1** below provides all relevant data and their respective sources.

Table 2-1: Data Collection

Data	Source	Notes
GIS data	Various	Various
Terrain	TNRIS	2012 & 2017
Soils	NRCS	SSURGO data
FEMA Floodplain	FEMA	Travis County Effective 1/22/20; Williamson County Effective 12/20/19
Nixle Messages	City of Pflugerville	Road closure messages due to flooding
Gilleland Creek Watershed Study	City of Austin	Hydrology – August 2008 Hydraulics – June 2009
Kelly Ln Phase II Plans	City of Pflugerville	January 2021
Village on Legacy Subdivision Plans	City of Pflugerville	February 2017
E. Pfennig Ln and E Pecan St Improvements	City of Pflugerville	March 2020
Weiss Ln Improvements	City of Pflugerville	January 2017
Pecan St East Improvements	City of Pflugerville	September 2007

GIS data included storm drain networks, water and wastewater networks, terrain (LiDAR) data, land use/zoning, FEMA floodplains, political boundaries, development and subdivisions, aerials, and parcel information.

Halff also collected and considered current City of Pflugerville Master plans including:

- 2030 Comprehensive Plan
- Parks and Open Space Master Plan
- Trails Master Plan & Parks Development
- Transportation Master Plan
- Water Master Plan
- Wastewater Master Plan

In addition to the above-mentioned data, other items were used in development of the Drainage Master Plan, including feedback from a virtual public meeting, the recently completed Wilbarger Creek watershed study, Gilleland Creek watershed study, and field reconnaissance.

2.1 Public Outreach – Virtual Meeting

A virtual public meeting was conducted from April 21 to May 21, 2021. This virtual meeting provided information to the City of Pflugerville residents about the Drainage Master Plan and Drainage Utility Fee Feasibility Study. Residents navigated through several boards to learn about a drainage master plan and Pflugerville's efforts to help mitigate flooding throughout the city. Residents also had the opportunity to provide feedback in the form of two (2) surveys. The surveys asked residents to share details about flooding and their opinion on a drainage utility fee. Results from these surveys were compiled and used as input for the Drainage Master Plan. **Appendix A** provides the survey questionnaires and responses from citizens.

2.2 Riverine Watershed Studies

The City of Pflugerville participated in Bastrop County's Texas Water Development Board Flood Protection Planning grant study for Wilbarger Creek. This study conducted hydrologic, hydraulic, and mitigation analyses for the Wilbarger Creek watershed using NOAA Atlas 14 rainfall data. As one of two major watersheds within the City of Pflugerville, the Wilbarger Creek Watershed Study provided the best available data, including existing conditions and proposed mitigation projects, for use in this Drainage Master Plan.

The 2008 FEMA effective Gilleland Creek Watershed Study H&H models were leveraged as part the DMP. As part of the Drainage Master Plan, these models were updated to account for the newer Atlas 14 rainfall data, updated 2017 LiDAR terrain data, and development within the watershed since the original study. Further discussion on updating this watershed study is included below.

2.3 Pfield Reconnaissance

Halff conducted site visits to the identified flood problem areas with available access from public right-of-way (ROW) and to verify bridge measurements for the Northeast Metro Park Road where it crosses Gilleland Creek. For each visit, existing conditions including conveyance restrictions, erosion, and maintenance were observed and documented. The viability and constraints for mitigation solutions were also evaluated.

3.0 DRAINAGE PROBLEM IDENTIFICATION

To identify drainage problems, two (2) hydraulic analyses were conducted; 1) updating the Gilleland Creek watershed study with NOAA Atlas 14 rainfall data and 2) developing a 2D hydraulic rapid assessment model of Pflugerville's urban core area to better understand local drainage patterns.

3.1 Gilleland Creek Watershed Study Update

Halff leveraged the FEMA effective 2008 Gilleland Creek Watershed Study prepared for the City of Austin to identify riverine flood risk. The limits for this update include the mainstem of Gilleland Creek, Gilleland Creek Tributary 2, and Gilleland Creek Tributary 3 upstream of the confluence of Gilleland Creek mainstem and Gilleland Creek Tributary 2.

3.1.1 Hydrology

The FEMA Effective hydrologic model, prepared as part of the 2008 Gilleland Creek Watershed Study, was used as the base model to develop hydrologic updates for Gilleland Creek. The 2008 Gilleland Creek study utilized the U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center – Hydrologic Modeling System (HEC-HMS) version 3.0.1 software for the hydrologic model. For this Gilleland Creek hydrologic update, HEC-HMS version 4.3 was used.

Rainfall Data

This study updated the 2008 Gilleland Creek rainfall data with NOAA Atlas 14 rainfall data. Atlas 14 Rainfall Depths were obtained from the City of Pflugerville Engineering Design Manual - November 2014 Edition (revised in 2019). The rainfall depths are summarized in **Table 3-1**.

Table 3-1: City of Pflugerville Atlas 14 Rainfall Depths

Frequency-Depth-Duration (Inches)							
Duration	2-yr (50% ACE)	5-yr (20% ACE)	10-yr (10% ACE)	25-yr (4% ACE)	50-yr (2% ACE)	100-yr (1% ACE)	500-yr (0.2% ACE)
5 min	0.52	0.66	0.77	0.94	1.08	1.23	1.59
15 min	1.05	1.31	1.54	1.88	2.15	2.44	3.16
1 hr	1.94	2.43	2.86	3.49	4.00	4.55	6.03
2 hr	2.38	3.04	3.65	4.55	5.32	6.16	8.52
3 hr	2.64	3.41	4.15	5.25	6.20	7.27	10.28
6 hr	3.09	4.05	4.98	6.40	7.63	9.04	13.07
12 hr	3.55	4.67	5.75	7.40	8.84	10.49	15.31
24 hr	4.03	5.31	6.53	8.38	9.98	11.82	17.22

Hydrologic Parameters

The time of concentration and impervious cover were updated to reflect current land use and zoning. No other changes were made to hydrologic parameters such as subbasin delineations, curve numbers, or routing reaches.

Hydrologic Results

Peak flows were determined for 2-, 5-, 10-, 25-, 50-, and 100-year storm events (50%, 20%, 10%, 4%, 2%, and 1% annual chance exceedance (ACE) respectively) for this updated hydrologic analysis. The 500-year storm event hydrologic model failed to run because routing reaches from the effective FEMA model were not extended which this effort was not part of the drainage master plan scope. However, this drainage master plan focused on the 100-year storm event to comply with City of Pflugerville drainage criteria.

Table 3-2 summarizes the effective FEMA 100-and 500-year peak flows that are based on USGS rainfall and the 100-year peak flows based on Atlas 14 rainfall at major road crossings and study stream confluences. The location of the HMS nodes and subbasins are shown in **Exhibit 2**. At all locations, the Atlas 14 100-year peak flows are greater than the USGS 100-year peak flows and close to or even higher than the USGS 500-year peak flows.

Table 3-2: Gilleland Creek Hydrological Peak Flow Comparison

HMS Node Name	Location	Peak Flows (cfs)		
		FEMA Effective		Atlas 14
		100-yr	500-yr	100-yr
Gilleland Creek				
J40	I-35	1390	1850	2160
J50_T3-60	Confluence with Gilleland Creek Trib 3	3460	4380	4580
SpringBrook 2	Springbrook Regional Pond 2	2420	4180	4100
SpringBrook 3	Picadilly Dr/Springbrook Regional Pond 3	3160	5220	4710
J160_200	Grand Ave Pkwy	6220	8410	8730
J300	N Heatherwilde Blvd	9240	13000	12600
J350	Swenson Farms Blvd	10200	14500	13700
J430	N Railroad Ave	11500	16500	15500
J480	Dessau Rd	12100	17300	16200
J660_670	Cameron Rd	13400	19100	18300
J770_T2-460	Confluence with Gilleland Creek Trib 2	17800	25800	24600
Gilleland Creek Tributary 2				
JT2-420_430	Harris Branch Pkwy	10000	14700	12000
JT2-140	Immanuel Rd	5820	8100	7000
Gilleland Creek Tributary 3				
JT3-50	IH-35	1580	2010	1900

3.1.2 Hydraulics

The FEMA effective hydraulic models for the upper Gilleland Creek, Gilleland Creek Tributary 2, and Gilleland Creek Tributary 3 were utilized. The hydraulic models used the USACE Hydrologic Engineering Center – River Analysis System (HEC-RAS) version 5.0.7 computer program.

Cross Section Revisions

As part of this Gilleland Creek watershed study update, cross section geometries were not updated. The only change to the cross section layout was to account for the newly constructed Northeast Metro Park Road bridge where it crosses Gilleland Creek. These new cross sections

were cut with 2012 terrain data, and the structure information was based on field reconnaissance conducted in June 2021.

Hydraulic Results

The 100-year floodplain was generated using the HEC-RAS model results. The floodplain extents, stream centerlines, and hydraulic cross sections are displayed in **Exhibit 3.**

3.2 Local 2D Rapid Assessment

An existing conditions 2D rapid assessment was conducted to identify local drainage patterns and problems areas. The assessment focused on overland flow for the 25-year and 100-year Atlas 14 storm events and did not incorporate storm drains into the analysis. HEC-RAS version 5.0.7 was utilized for the 2D rapid assessment.

The fully 2D hydraulic model focused on the City's urban core. The 2D area included Gilleland Creek from North Heatherwilde Boulevard to Dessau Road and two unnamed tributaries to Gilleland Creek. The central unnamed tributary runs from behind Pflugerville High School along a drainage channel that flows through residential areas and outfalls at Dessau Road. The southern unnamed tributary flows from Antique Heritage Drive through residential areas and outfalls at East Wells Branch Parkway. **Figure 3-1** shows the extents of the 2D hydraulic model.

Figure 3-1: 2D Study Area

3.2.1 2D Hydrologic Methodology

Gilleland Creek and the unnamed drainage channel just upstream of East Black Locust Drive were modeled with inflow hydrographs accounting for the cumulative drainage upstream of the 2D study area. Inflow hydrographs were taken from the Gilleland Creek HEC-HMS model updated with Atlas 14 rainfall as part of the Pflugerville Drainage Master Plan. The unnamed tributaries within the 2D zone are for localized runoff and therefore no hydrographs are needed to model the flow through the study area.

The 2D study area was modeled with direct rainfall onto the 2D surface that allows excess runoff within the project area to flow on the terrain surface. Rainfall was applied uniformly across the 2D study area extents. Normal depth boundary conditions were placed at the downstream ends of Gilleland Creek and the unnamed tributaries. The normal depth slopes were based on the slope of the channel at the boundary of the 2D area. Additional normal depth boundary conditions were placed wherever there was enough flow to leave the system. These normal depth slopes were based on the terrain's slope away from the 2D area at each location.

3.2.2 2D Hydraulic Methodology

<u>2D Surface</u>

The 2D surface or mesh was developed using 2017 LiDAR data. Inputs for the 2D surface are described below:

- **Maximum/Minimum Triangle Areas** – The standard triangle area set for the 2D surface was 95 square feet. Each mesh cell was assigned an elevation from the 2017 LiDAR and a Manning's n roughness value based on the land use and potential depth of flows. Break lines were placed on Gilleland Creek and the two unnamed tributaries and a minimum area of 40 square feet was enforced to ensure greater detail where there are topological changes of significance.
- **Roughness Zones** – A roughness zone shapefile was created in GIS and imported into HEC-RAS. Manning's n-values were set using the Gilleland Creek landuse shapefile and supplemented with recent studies Halff has conducted in the area. The n-values utilized can be found in **Table 3-3**. A higher n-value on a cell represents high roughness conditions and is correlated with less flow entering or leaving that cell. Homes and structures (Building Footprints in **Table 3-3**) were simulated using a higher n-value instead of using voids.

Table 3-3: 2D Rapid Assessment Manning's n-values

Land Use	Manning's n-value
ROW	0.03
Channel	0.045
Crops	0.06
Developed Open Space and Parks	0.07
Development and Residential	0.12
Building Footprints	5

- **Break lines** – Break lines were added to better define the 2D surface within HEC-RAS RASMapper. Break lines are placed on features to represent where conveyance does or does not occur. Breaklines were added to represent the top of road, large drainage ditches, culvert inlets and outlets, and creek flowlines. Break lines were also placed on berms where ponding can occur.

3.2.3 2D Model Results

The existing 25-year and 100-year Atlas 14 inundation depths, extents, and flow directions were calculated and compared to observations recorded by residents in the surveys and from the City of Pflugerville Nixle message system. The 25-year and 100-year results are shown on **Exhibit 4**.

The water surface elevations and flood extents of the existing 25-year and 100-year frequency events were compared to the location of neighborhood homes and other pertinent locations. There were eight (8) areas identified with lot or street flooding. These areas were used to help locate the flooding "hot spots."

3.3 Flood Problem Areas

Halff reviewed all relevant data including the Wilbarger Creek Watershed Study, the Gilleland Creek Watershed Study Atlas 14 Update, 2D hydraulic rapid assessment, Nixle road closure messages due to flooding, Pflugerville resident feedback from the Drainage Master Plan virtual public meeting, and input provided by City of Pflugerville staff. All these data points were mapped, and point clusters were identified as flood problem area "hot spots." These "hot spots" included:

- Local flooding: street and subdivision flooding
- Riverine flooding: road overtopping and building flooding

In total, approximately 30 flood problem area “hot spots” around the City of Pflugerville were identified. The “hot spots’ are shown on **Exhibit 5**.

4.0 DRAINAGE SOLUTIONS

Nine (9) flood problem areas throughout the City of Pflugerville were developed into drainage Capital Improvement Plan (CIP) projects. Two (2) mitigation projects identified in the Wilbarger Creek Watershed Study were also included as drainage CIP projects. **Table 4-1** provides a list of all the drainage CIP projects and **Exhibit 6** shows the location for each drainage CIP project. For each project a one-page project summary sheet was prepared with a project description, benefits and challenges, figure showing the project area, opinion of probable cost estimates, and a project score. Project summary sheets are provided in **Appendix B**.

Additionally, three (3) operation and maintenance (O&M) projects were identified. These O&M projects include reviewing the City's drainage criteria, performing CCTV of existing storm drains, and developing a creek maintenance plan. **Table 4-2** provides a list of the O&M projects. A summary sheet like the drainage CIP projects was prepared for the O&M projects, including an opinion of probable cost estimate but no project score was assigned. Project summary sheets are provided in **Appendix B**.

4.1 Conceptual Mitigation Solutions

Conceptual mitigation solutions were developed to provide the City with cost estimating, ranking, and prioritization for the drainage CIP projects. Hydrologic and hydraulic (H&H) models from the Wilbarger Creek Watershed Study and the Gilleland Creek Watershed Study Atlas 14 Update were utilized to develop the conceptual mitigation solutions. Additional H&H models were developed to analyze drainage CIP projects not affected by riverine flooding.

Mitigation solutions vary as each type of drainage CIP project varies. Mitigation solutions for inundated roadways were developed to increase the level of service of the roadway to meet the City's criteria where possible. Mitigation solutions for inundated structures were developed to either remove structures from the 100-year floodplain or reduce the number of structures inundated if not able to remove from 100-year floodplain. Mitigation solutions are provided in the project description on each project summary sheet.

4.2 Opinion of Probable Cost Estimates

An opinion of probable cost was prepared for each of the identified drainage CIP projects and O&M projects. Local and regional TxDOT average bid unit costs provided a basis for estimating unit costs. A 30% contingency was applied to the project subtotal to account for uncertainties in the conceptual design development. Anticipated engineering design and environmental permitting costs were added as a percentage of the base total. The total project costs are shown on each project summary sheet and detailed cost estimates are provided in **Appendix B**.

4.3 Ranking

After development of conceptual mitigation solutions and associated opinion of probable cost estimates, each drainage CIP project was scored and subsequently ranked, not including the O&M projects. To score each project, a scoring matrix with categories was established and agreed upon by City of Pflugerville staff. The scoring matrix includes four (4) major categories including Public Safety, Economic, Project Timing, and Social with each major category assigned a weighting factor. Each category was then broken into subcategories and a weighting factor was assigned to each subcategory. Projects are scored between 0 – 3 for each subcategory and then multiplied by the weighting factor to produce a subcategory score. The subcategory scores are then added together for the total project score. The highest possible project score is 100. **Table 4-1** shows the total project score for each of the eleven projects and ranks them from highest to lowest. The scoring matrix is provided in **Appendix C** and each project score is included in the respective project summary sheets.

Table 4-1: Drainage CIP Project Ranking

Ranking	Project ID	Project Name	Project Score
1	GC-05	Immanuel Road/Pecan Park at Upper Gilleland Creek	81.7
2	WC-01	Weiss Lane at Wilbarger Creek	76.7
3	GC-01	Caldwell Elementary at Upper Gilleland Creek	75.0
4	WC-02	Hidden Lake Drive at Wilbarger Creek Tributary 200	74.0
5	GC-06	Pfennig Lane/East Pecan Street Intersection	73.3
6	WC-03	Vilamoura Street and Kelly Lane at Wilbarger Tributary 200	71.0
7	GC-03	Swenson Farms at Upper Gilleland Creek	70.0
8	GC-02	North Heatherwilde at Upper Gilleland Creek	66.7
8	GC-04	Railroad Avenue at Upper Gilleland Creek	66.7
10	WC-05	FM 685/East Pflugerville Pkwy at Wilbarger Creek Tributary 200	59.3
11	WC-04	Kennemer Drive at Wilbarger Creek Tributary 200	56.3

Table 4-2: Operation and Maintenance Projects

Project ID	Project Name
Pf-01	Drainage Criteria Update
Pf-02	Creek Maintenance Plan
Pf-03	Storm Drain CCTV Evaluation

4.4 Other Considerations

Technical Drainage/Water Resources Reviewer - Aside from the drainage CIP projects, it is recommended for the City of Pflugerville to hire a technical drainage/water resources reviewer as a member of its staff. Currently, the City does not have available internal staff to adequately perform quality control engineering analyses without relying on third party consultants. A technical drainage/water resources reviewer can provide in-house expertise and can also provide an at-will service for city staff and council.

Project Manager – In addition to a technical reviewer, it is recommended for the City of Pflugerville to hire a new project manager as a member of its staff. After adoption of the DMP the current city staff will not have capacity to manage the drainage CIP projects. A new project manager will focus on constructing the drainage CIP projects and ensure operation and maintenance of the City's drainage infrastructure is executed.

5.0 DRAINAGE UTILITY FEE FEASIBILITY STUDY

Establishing a drainage or stormwater utility is a viable strategy for local governments to respond to the challenge of generating reliable revenue to support stormwater management activities. Setting up a drainage utility allows a community to establish a user fee based on the demands property owners place on the drainage system. A stormwater utility provides the means to fund and maintain the large stormwater capital improvements identified in this DMP report and fund ongoing operation and maintenance operations related to drainage.

NewGen Strategies, a sub-consultant to Halff, was tasked with conducting a feasibility study to implement a drainage utility for the City of Pflugerville. The report prepared by NewGen Strategies entitled "Drainage Utility Fee Feasibility Study" serves as a companion report to the DMP and is provided in **Appendix D**.

Exhibits

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City of Pflugerville Drainage Master Plan

- Stream Centerline
- Pflugerville ETJ
- City Boundary
- County Boundary

FEMA Effective Floodplains

- Floodway
- Zone A, Approximate
- Zone AE, Detailed

Exhibit 1
Overview

N

0 4,500 9,000 Feet

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WILLIAMSON
TRAVIS
Turtle Creek
Brushy Creek
Wilbarger Creek
Gilleland Creek
Wells Branch
Harris Branch
Walnut Creek
City of Pflugerville
45
130
685
1825
275
734
973
PFLUGERVILLE PKWY
PICADILLY DR
HEATHERWILDE BLVD
SPEIDEL DR
KELLY LN
MEIBER LN
ENGERMAN RD
E PFLUGERVILLE PKWY
JESSE BOHLS RD
WELLS BRANCH PKWY
METRIC BLVD
HOWARD LN
IMMANUEL RD
KILLINGSWORTH LN
DESSAU RD
E DESSAU RD
W BRAKER LN
CAMERON RD
FUCHS GROVE RD
STIEGER RD
NEW SWEDEN GIN RD
NEW SWEDEN CHURCH RD

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City of Pflugerville Drainage Master Plan

- HMS Node
- Stream Centerline
- Contour - 10'
- City Boundary
- County Boundary
- Subbasin Boundary

Panel 1 of 2

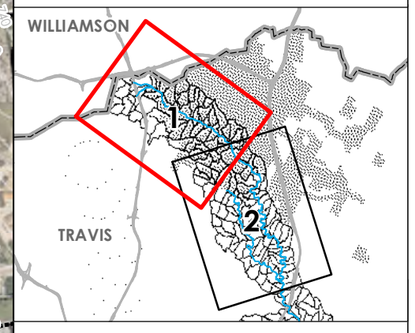

Exhibit 2
Gilleland Hydrology

N

0 2,000 4,000 Feet

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City of Pflugerville Drainage Master Plan

- HMS Node
- Stream Centerline
- Contour - 10'
- City Boundary
- County Boundary
- Subbasin Boundary

Panel 2 of 2

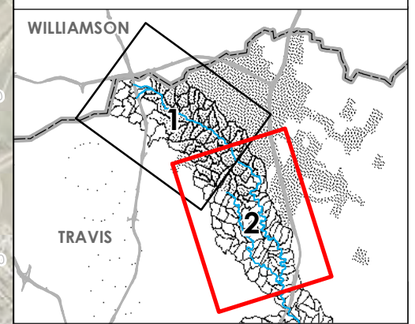

Exhibit 2
Gilleland Hydrology

N

0 2,000 4,000 Feet

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City of Pflugerville
PFLUGERVILLE
WEISS
CAMERON
IMPACT
HELIOS
BILTMORE
PECAN
130
OLD AUSTIN HUTTO
APPLEWOOD
FM 685
RAILROAD
OXFORD
IMMANUEL
WELLS BRANCH
DESSAU
SETTLERS VALLEY
10TH
OLYMPIC
Gilleland Creek
Gilleland Creek Tributary 2
J480
J660_670
J770_T2-460
JT2-140
JT2-420_430

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City of Pflugerville Drainage Master Plan

- Stream Centerline
- Cross Section
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

Panel 1 of 14

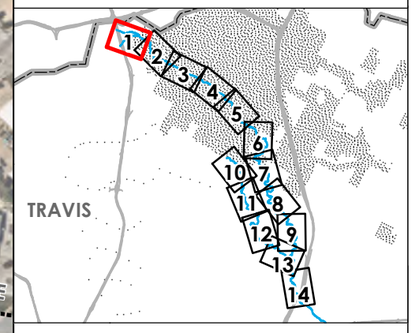

Exhibit 3
Gilleland Hydraulics

N

0 400 800 Feet

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Gilleland Creek

Gilleland Creek Tributary 3

City of Pflugerville

PFLUGERVILLE

IRON RAIL

GIBBONS

PRESTON BRAID

SPLIT DIAMOND

JOE BARBEE

CAILPY

RADHOLME

CENTRAL COMMERCE

PICADILLY

GREENLAWN

IH 35

160044 159947 159552 159491 159284 159042 158816 158490 158224 157912 157663 157515 157477 157343 157188 156870 156547 156216 155821 155326 155037 154882 154751 154649 154230 153700 153116

367 759 1156 1194 1235 1731 2074 2432 2852 3043 3390 3806 3896 3941 4002 4155

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City of Pflugerville Drainage Master Plan

- Stream Centerline
- Cross Section
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

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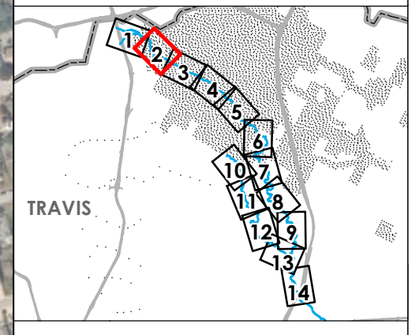

Exhibit 3
Gilleland Hydraulics

N

0 400 800 Feet

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City of Pflugerville Drainage Master Plan

- Stream Centerline
- Cross Section
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

Panel 3 of 14

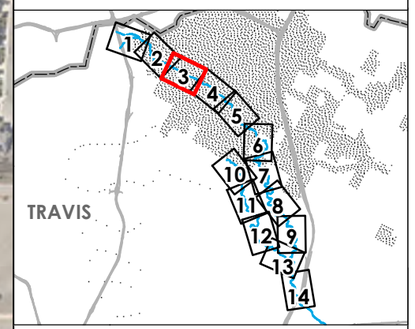


Exhibit 3
Gilleland Hydraulics

N

0 400 800 Feet

HALFF

148167 148054 147744 147324 146818 146689 146358 145968 145451 145068 145018 145000 144917 144418 143805 143510 143256 143211 143058 142708 142240 141875 141569

GRAND AVENUE
DISRAELI
BISHOPSGATE
NORTHAVENS
VALLEY GLEN
VILLAGE GLEN
BLACK LOCUST
ARDISIA
SIMSBROOK
DASHWOOD CREEK
HEATHERWILDE
ACANTHUS
WILD ORCHARD
HUGHMONT
SILENE
MAYAPPLE
BLACK WILLOW
SWEETWOOD SONG
GAZANIA
THACKERY
COLUMBINE
LANGLAND
GOWER
THACKERAY
GRAVESEND
BLACKTHORN
ISLE OF MAN
CACTUS BLOSSOM
LAURELLEAF
PFENNIG
Gilleland Creek
AUTUMN MIST
RAMBLE CREEK
YORK CASTLE
PITCAIRN
FRAMINGHAM
BATAVIA
CRESSWELL
IVYBRIDGE
ESSEX
BATES
KNOTTINGHAM
MALDEN
BELLEMEADE
PARKWAY
MILL CREEK
NORWELL
WINDERMERE
EDGEMERE
EL MALINO
YELLOW SAGE
City of Pflugerville
GREEN MEADOWS
ALLEY
RHETORIC
HOMILY
EPIPHANY
ADAGE
PARABLE

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

- Stream Centerline
- Cross Section
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

Panel 4 of 14

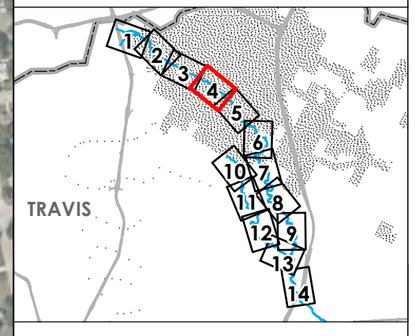


Exhibit 3
Gilleland Hydraulics

N

0 400 800 Feet

HALFF

LAUREL OAK
MAYAPPLE
TROPICANA
PARKCREST
BREWER BLACKBIRD
BROOKHOLLOW
GREENBROOK
GREENHILL DR
WILLOWWICK
RAILROAD
PALMWOOD
TIMBER BEND
SPLIT OAK
REDWOOD
BEECHTREE
ASPEN GROVE
LEGACY
WARM SPRINGS
PEAR
RIVER BIRCH
CANYON MAPLE
PFENNIG
HOUSE WREN
CREEKBEND
SUNNY OAKS
SETTING SUN
YORKSHIRE
PARKWAY
PARKVIEW
Gilleland Creek
LANDON SAMUEL
SWENSON FARMS
KADEN PRINCE
BROGAN
AMERICAN ROBIN
RED TAILED HAWK
PLEASANT VALLEY
EVENING GROSBEAK
VALLEY MEADOW
SOPHIE
CAMILLE
CITY PARK
WILBARGER
3RD
City of Pflugerville
ROLLING MEADOW
COOPERS HAWK
GRANT
OAKDALE
WALNUT
MAIN
4TH
ADAGE
RHETORIC
EPIPHANY
HOMILY
LINCOLN
ALLEY
RUSSELL
CALDWELLS
TAYLOR
REX KERWIN
MEADOW
10TH
PECAN
5TH
HALL
141569
141191
140832
140668
140584
140122
139804
139409
139044
138877
138831
138771
138377
138040
137976
137853
137379
137123
137028
136857
136579
136443
135954
135366
141875

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

- Stream Centerline
- Cross Section
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

Panel 5 of 14

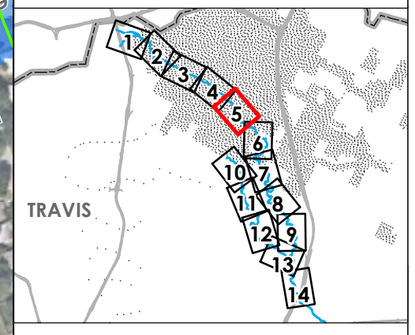


Exhibit 3
Gilleland Hydraulics

N

0 400 800 Feet

HALFF

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

- Stream Centerline
- Cross Section
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

Panel 6 of 14

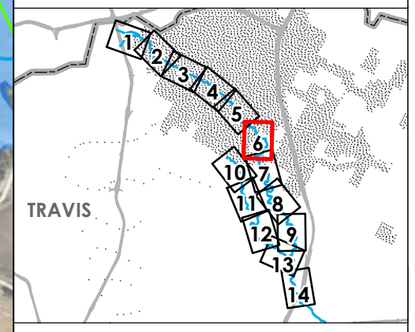


Exhibit 3
Gilleland Hydraulics

N

0 400 800 Feet

HALFF

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

- Stream Centerline
- Cross Section
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

Panel 7 of 14

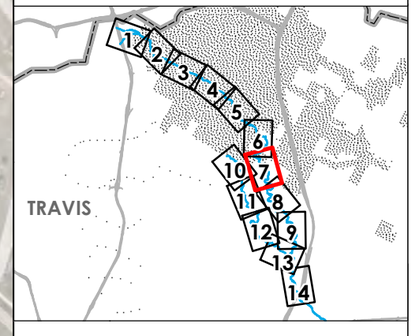


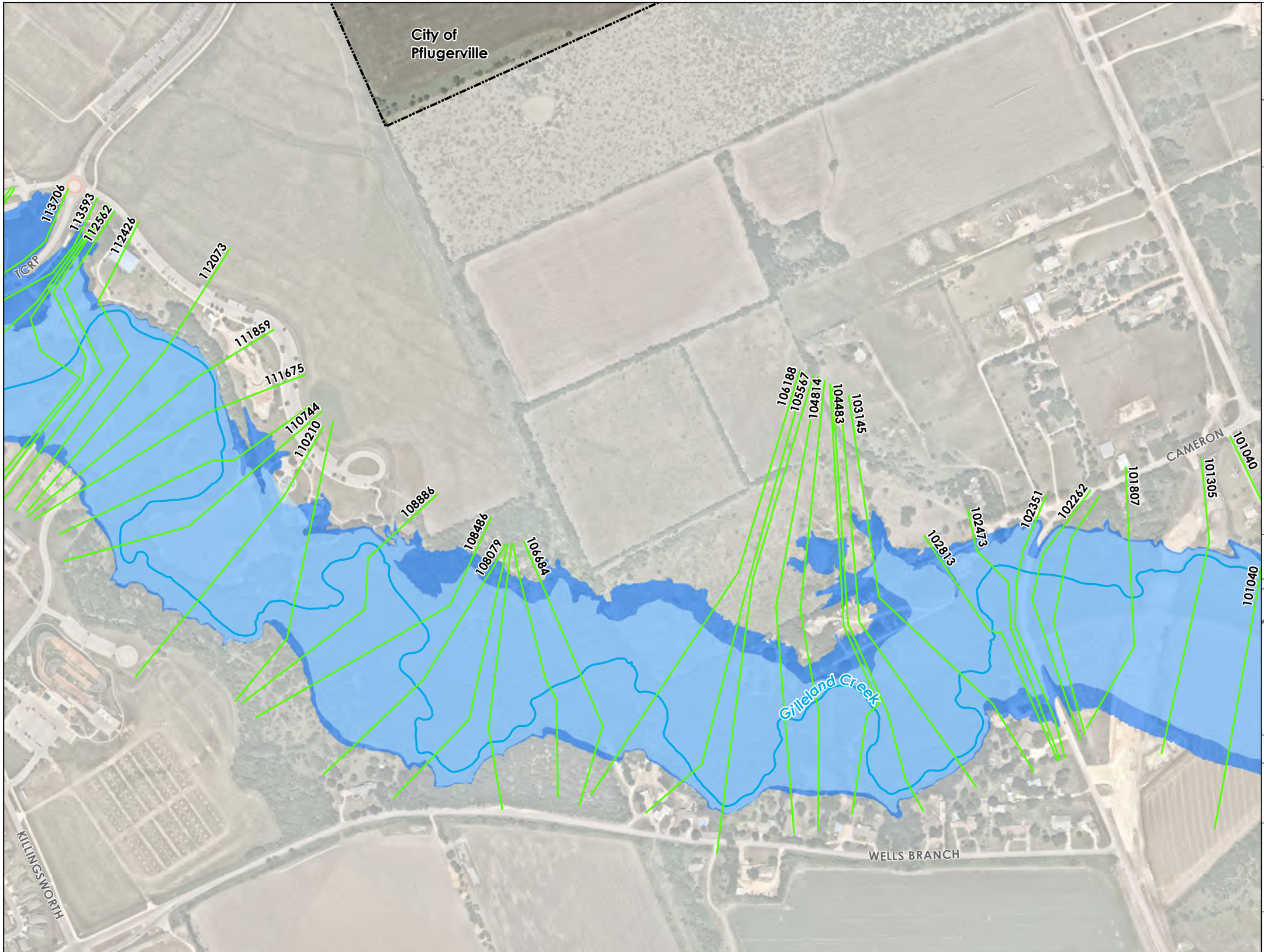
Exhibit 3
Gilleland Hydraulics

N

0 400 800 Feet

HALFF

123185
122839
122397
120936
119283
118023
117660
117473
117159
116780
116302
115723
115478
115098
114810
114567
113706
113351
112562
112426
112073
111859
TCRP
Gilleland Creek
BOUNDER
TIMBERCREST
COPPER
KILLINGSWORTH
RIVER ROCK
ROCKY
STONE CREST
CANYON
MILE RIDGE
STONE HILL
City of Pflugerville
ALANA FALLS
PFENNIG
PURPLE MARTIN
BITHAL
GRAND LEEANNE
CARVIN



where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

- Stream Centerline
- Cross Section
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

Panel 8 of 14

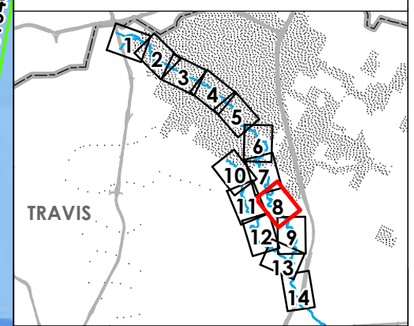


Exhibit 3
Gilleland Hydraulics

N

0 400 800
Feet

HALFF

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

- Stream Centerline
- Cross Section
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

Panel 9 of 14

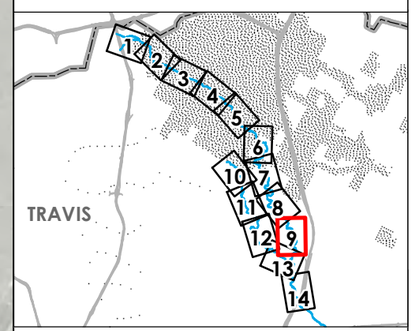


Exhibit 3
Gilleland Hydraulics

N

0 400 800 Feet

HALFF

Gilleland Creek

CAMERON

98597 98257 97786 97174 96710 96489 96092 95609 95231 94800 94599 93834 93197 92002 91558 91347 90929 90552

100482 99914 99090

101040 101305 101807

102150 102351 102813 103145

4764 4516 4257

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

- Stream Centerline
- Cross Section
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

Panel 10 of 14

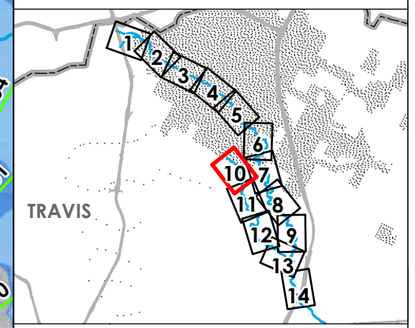


Exhibit 3
Gilleland Hydraulics

N

0 400 800 Feet

HALFF

City of Pflugerville

WELLS BRANCH

KILLINGSWORTH

PFENNIG

BITHAL

GRAND LEEANNE

OLLIE BRIAR

CARVIN

STONE HILL

BOULDER CANYON

Gilleland Creek Tributary 2

IMMANUEL

RENDOVA

BUMBLEBEE

PARKO

CHICADEE

BUTTERCUP

SOMOA

AZORES

MAGIC HILL

30920 30775 30868 30603 30300 29867 29649 29113 28610 28537 28203 27909 27512 27158 26821 26343 25880 25501 25109 24730 24294 24006 23408 23104 22801 22390

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

- Stream Centerline
- Cross Section
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

KILLINGSWORTH

WELLS BRANCH

Gilleland Creek Tributary 2

24006
23700
23408
23104
22801
22390
21995
21646
21366
20896
20096
20326
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19161
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18432
17883
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Panel 11 of 14

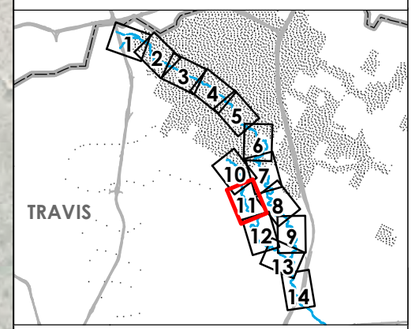


Exhibit 3
Gilleland Hydraulics

N

0 400 800 Feet

HALFF

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville
Drainage Master Plan

- Stream Centerline
- Cross Section
- Limit of Study
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

Panel 12 of 14

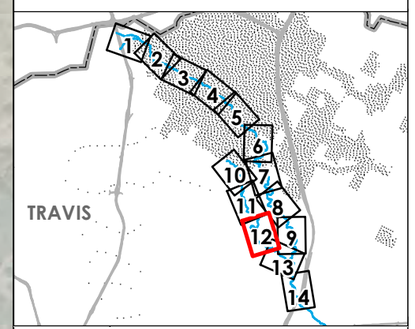
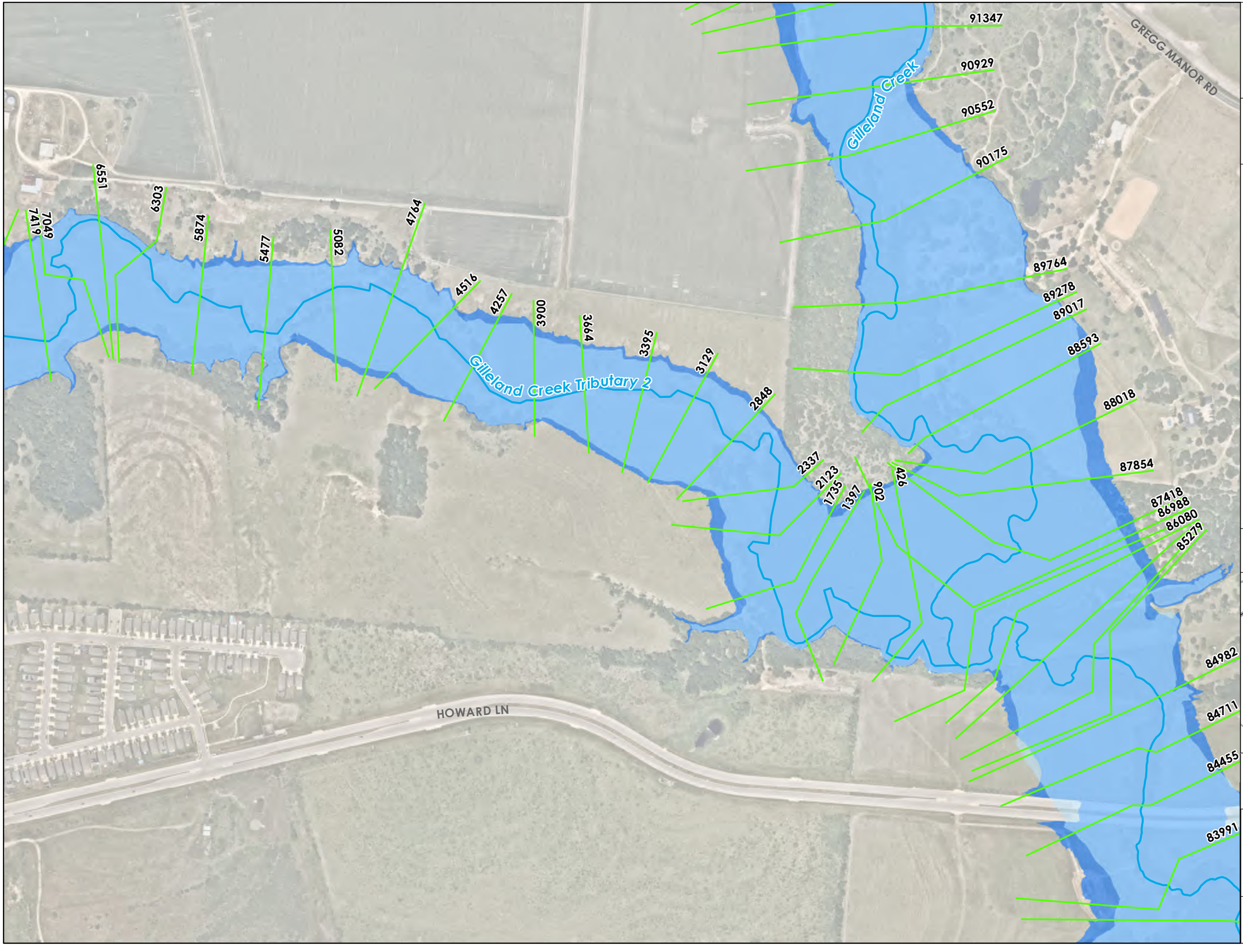


Exhibit 3
Gilleland Hydraulics

N

0 400 800
Feet

HALFF



where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

- Stream Centerline
- Cross Section
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

Panel 13 of 14

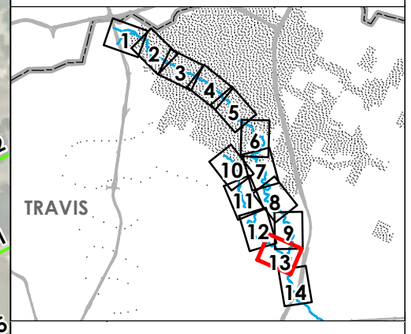


Exhibit 3
Gilleland Hydraulics

N

0 400 800
Feet

HALFF

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville
Drainage Master Plan

- Stream Centerline
- Cross Section
- Limit of Study
- FEMA Effective 100-Year Floodplain
- Atlas 14 100-Year Floodplain

Panel 14 of 14

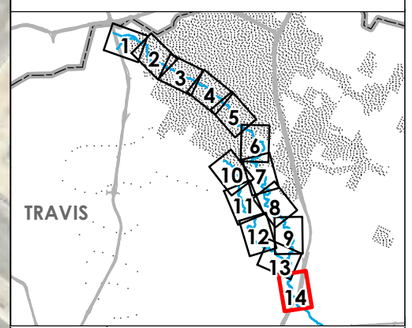


Exhibit 3
Gilleland Hydraulics

N

0 400 800 Feet

HALFF

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

Stream Centerline

2D Study Zone

City Boundary

25-Year Flood Depth (feet)

High : 15.7

Low : 0.5

Exhibit 4A
25-Year
2D Rapid Assessment Results

N

0 1,500 3,000 Feet

HALFF

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

Stream Centerline

2D Study Zone

City Boundary

100-Year Flood Depth (feet)

High : 17.1

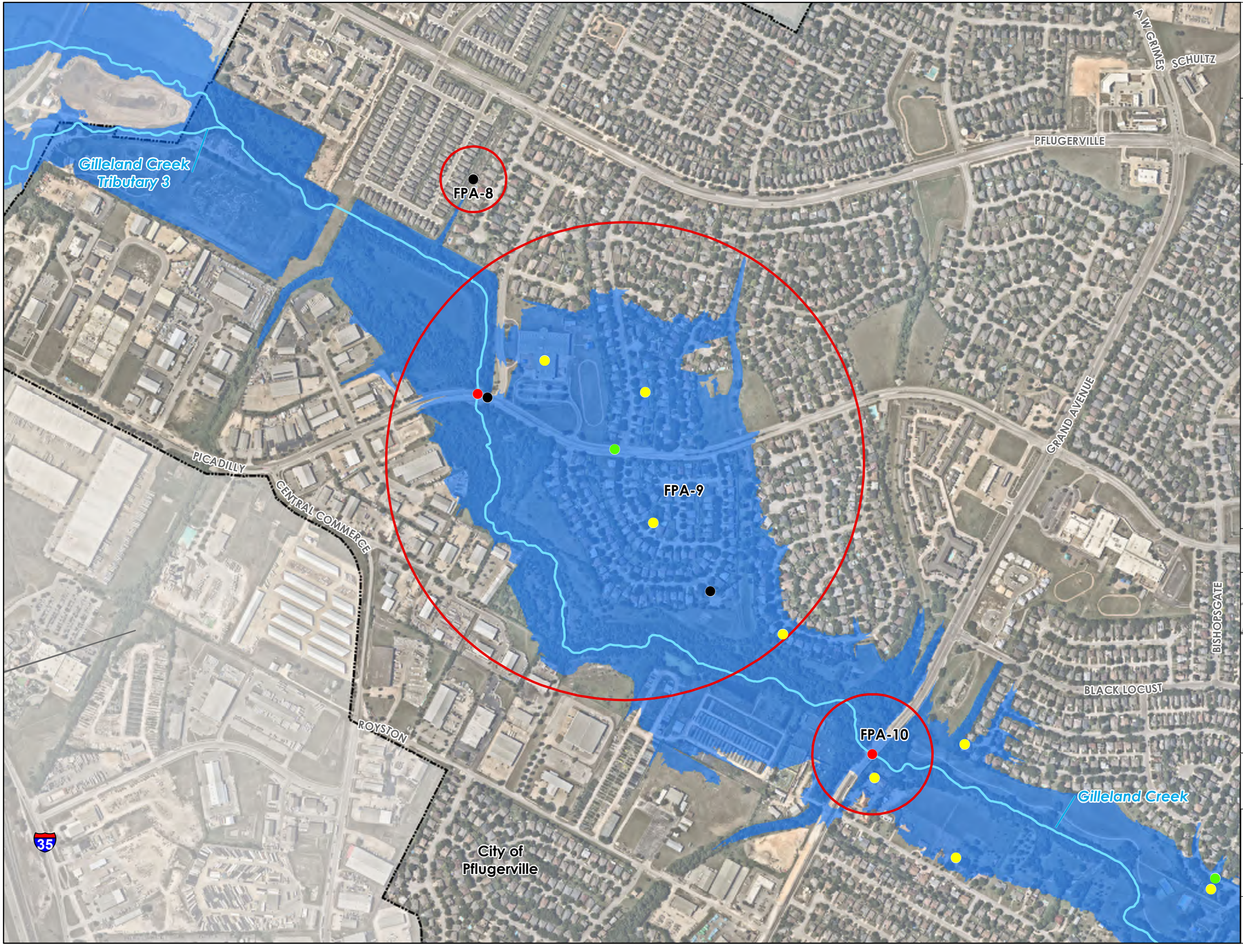
Low : 0.5

Exhibit 4B
100-Year
2D Rapid Assessment Results

N

0 1,500 3,000 Feet

HALFF



where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

Flood Hot Spot

- Flooded Structure
- CoPf Input
- Nixle Message
- Virtual Meeting
- Structure Overtopping
- Street Flooding
- Stream Centerline
- Flood Problem Area
- 25-Year Overland Flooding
- Atlas 14 100-Year Floodplain
- City Boundary

Panel 1 of 10

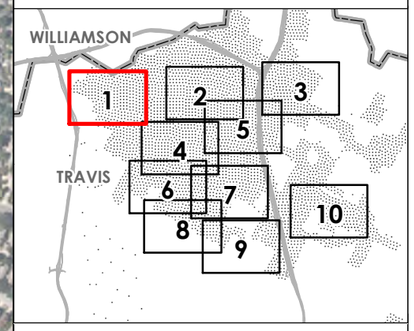
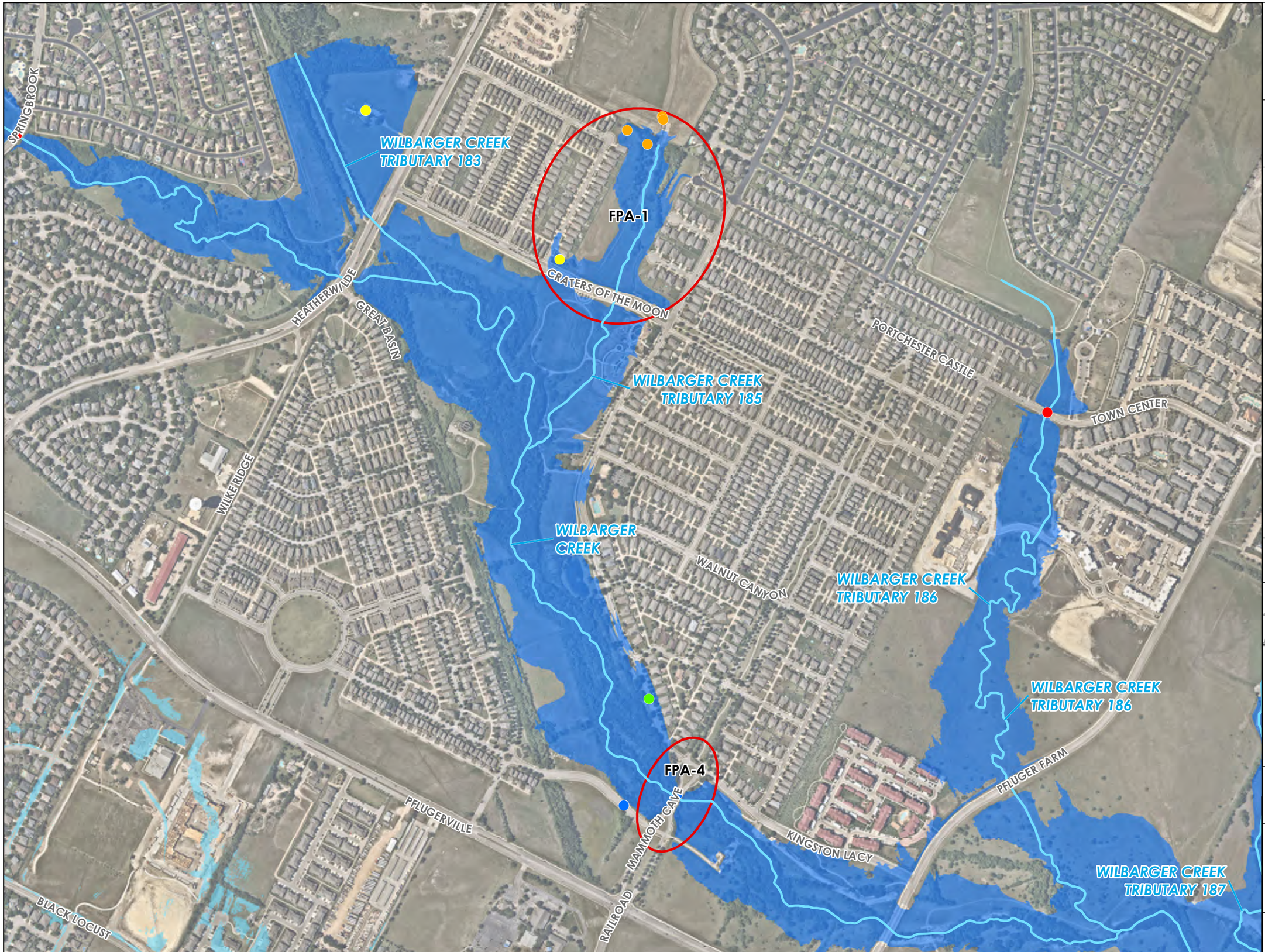


Exhibit 5
Flood Problem Areas

N

0 600 1,200 Feet

HALFF



where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

Flood Hot Spot

- Flooded Structure
- CoPf Input
- Nixle Message
- Virtual Meeting
- Structure Overtopping
- Street Flooding
- Stream Centerline
- Flood Problem Area
- 25-Year Overland Flooding
- Atlas 14 100-Year Floodplain
- City Boundary

Panel 2 of 10

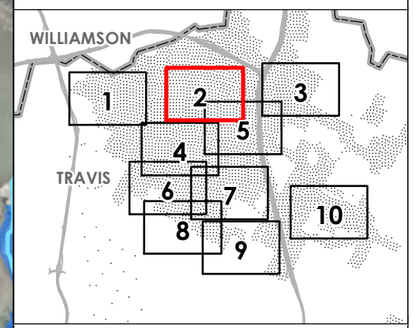


Exhibit 5
Flood Problem Areas

N

0 600 1,200 Feet

HALFF

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

Flood Hot Spot

- Flooded Structure
- CoPf Input
- Nixle Message
- Virtual Meeting
- Structure Overtopping
- Street Flooding
- Stream Centerline
- Flood Problem Area
- 25-Year Overland Flooding
- Atlas 14 100-Year Floodplain
- City Boundary

Panel 3 of 10

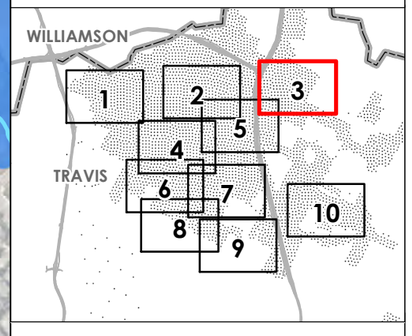


Exhibit 5
Flood Problem Areas

N

0 600 1,200 Feet

HALFF

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

Flood Hot Spot

- Flooded Structure
- CoPf Input
- Nixle Message
- Virtual Meeting
- Structure Overtopping
- Street Flooding

Stream Centerline
Flood Problem Area
25-Year Overland Flooding
Atlas 14 100-Year Floodplain
City Boundary

Panel 4 of 10

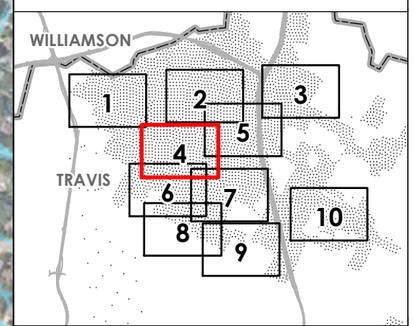
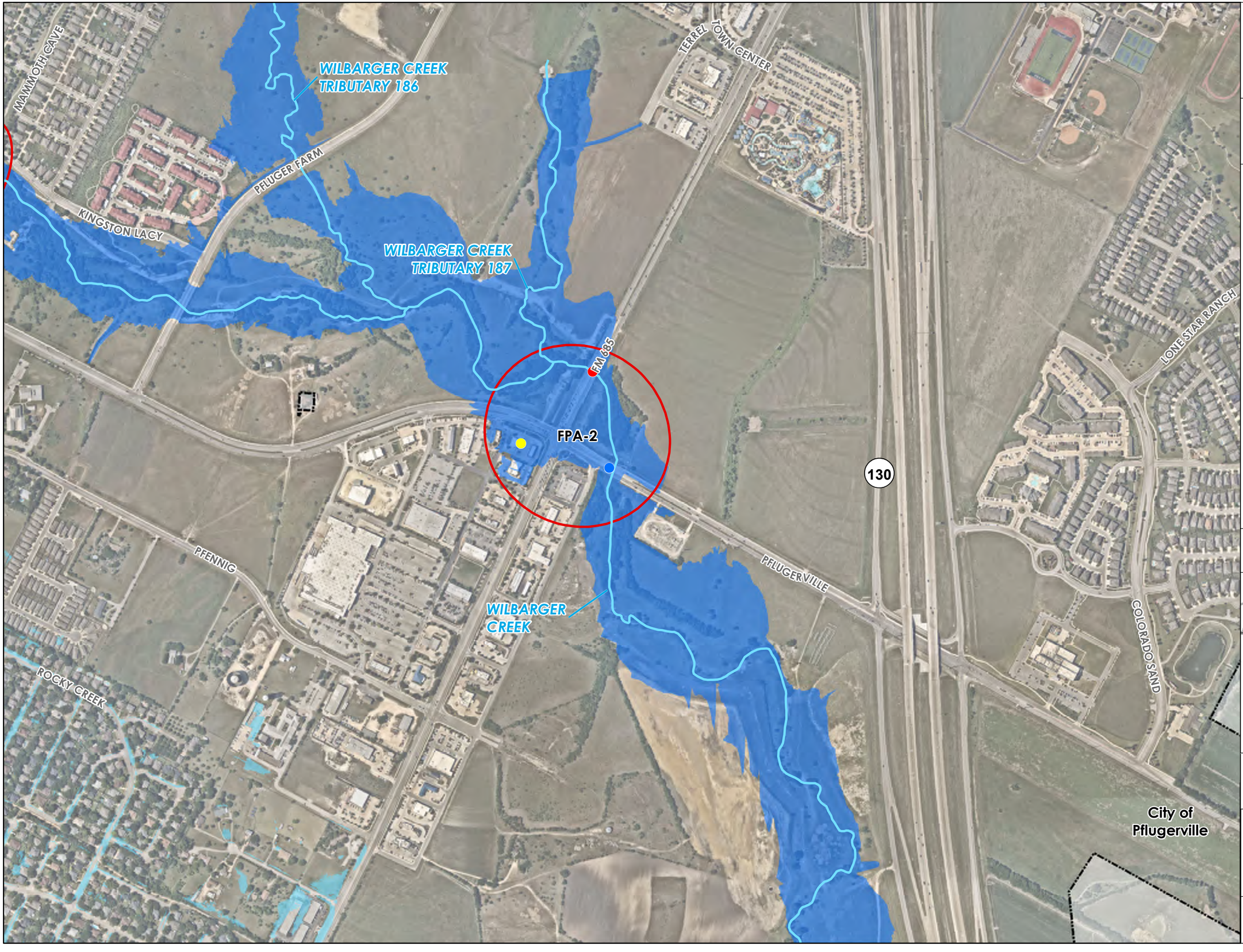


Exhibit 5
Flood Problem Areas

N
0 600 1,200 Feet

HALFF



where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

Flood Hot Spot
- Flooded Structure
- CoPf Input
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- Virtual Meeting
- Structure Overtopping
- Street Flooding

- Stream Centerline
- Flood Problem Area
- 25-Year Overland Flooding
- Atlas 14 100-Year Floodplain
- City Boundary

Panel 5 of 10

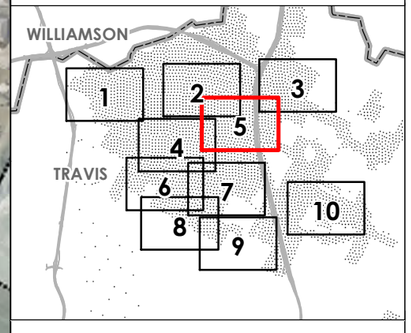

Exhibit 5
Flood Problem Areas

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where quality meets life
PFLUGERVILLE
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City of Pflugerville Drainage Master Plan

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Panel 6 of 10

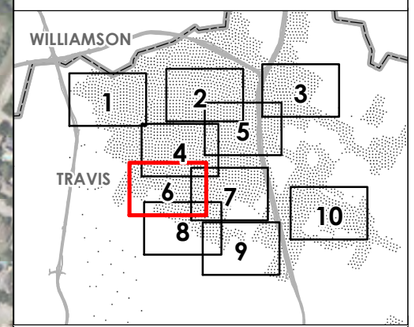

Exhibit 5
Flood Problem Areas

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where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

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Panel 7 of 10

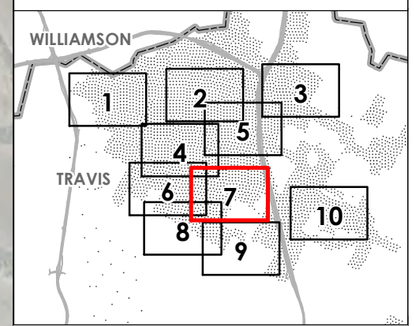

Exhibit 5
Flood Problem Areas

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where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

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Panel 8 of 10

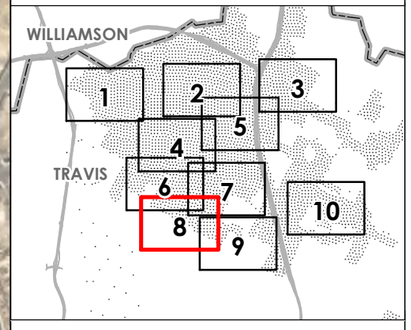
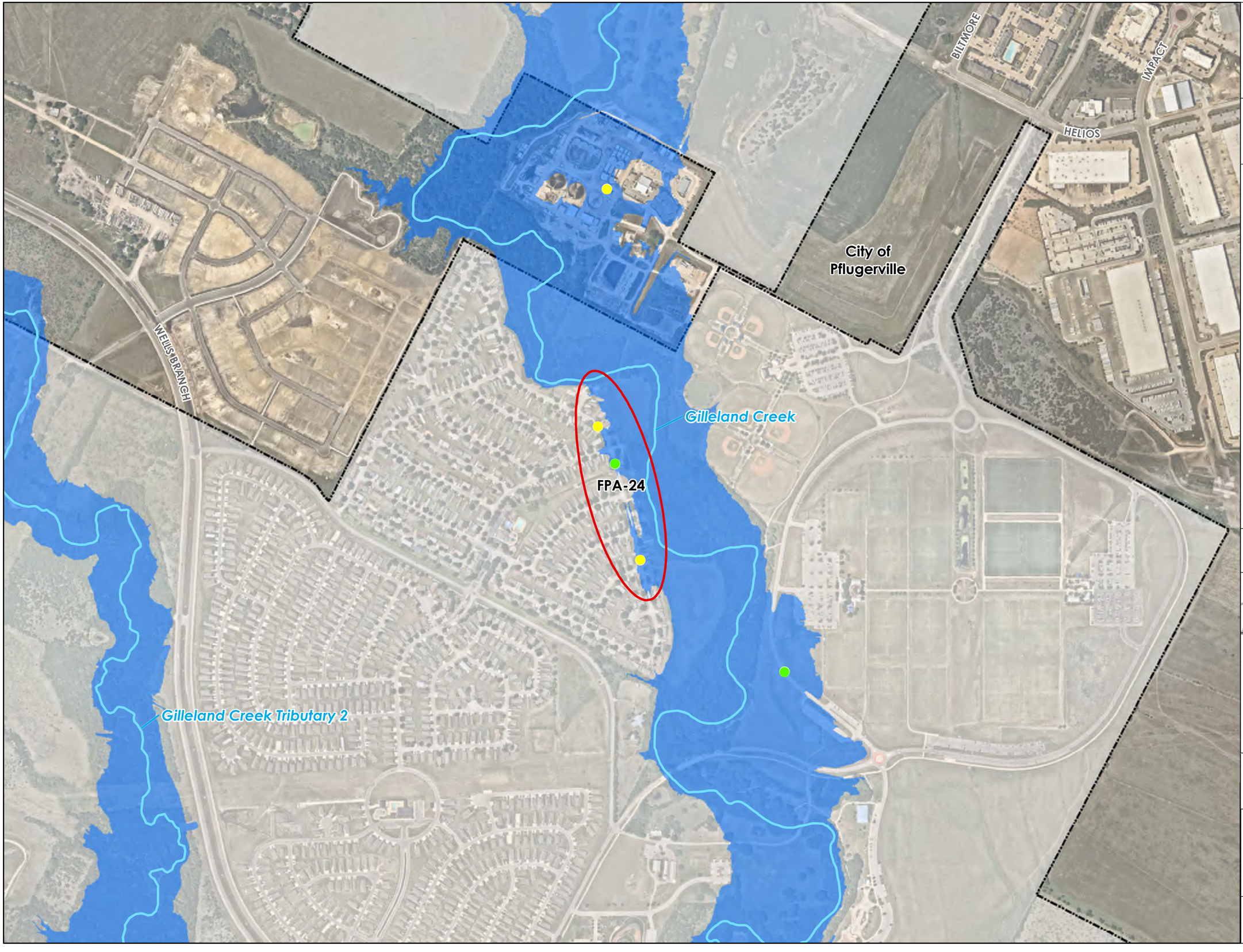


Exhibit 5
Flood Problem Areas

N

0 600 1,200 Feet

HALFF



where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville Drainage Master Plan

Flood Hot Spot
- Flooded Structure
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Panel 9 of 10

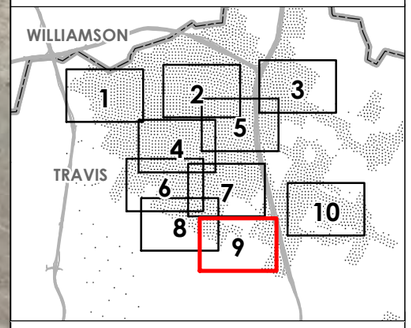

Exhibit 5
Flood Problem Areas

N

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HALFF

where quality meets life
PFLUGERVILLE
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Panel 10 of 10

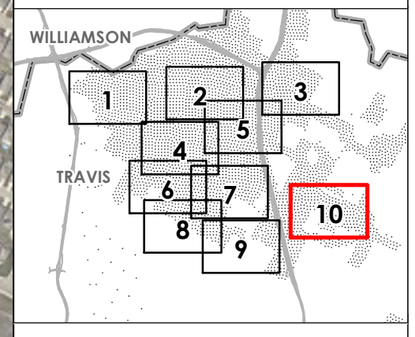
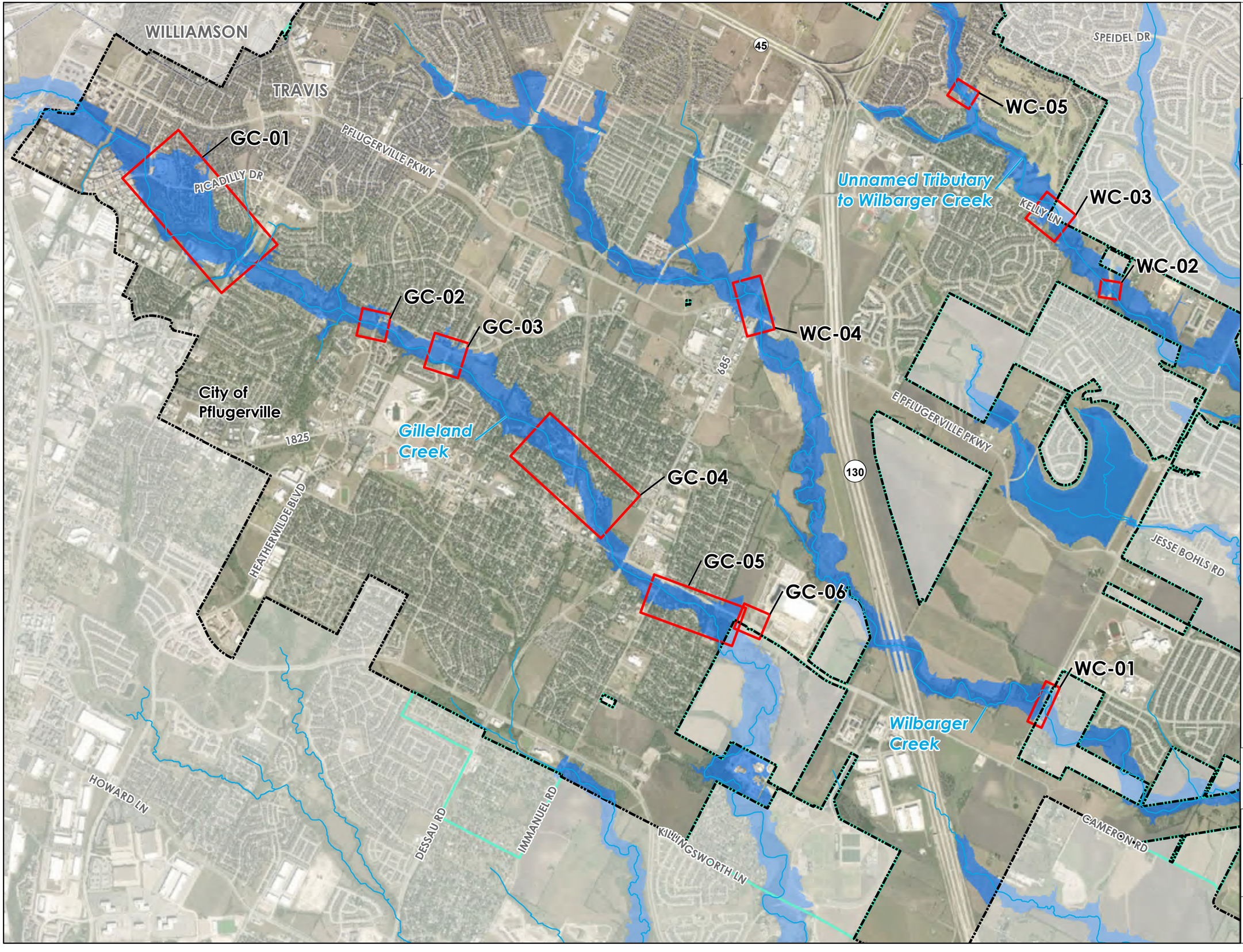


Exhibit 5
Flood Problem Areas

N

0 600 1,200 Feet

HALFF



where quality meets life
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TEXAS

City of Pflugerville Drainage Master Plan

- Stream Centerline
- Drainage CIP Project
- Atlas 14 100-Year Floodplain
- Pflugerville ETJ
- City Boundary
- County Boundary

Exhibit 6
Project Locations

N

0 2,500 5,000 Feet

HALFF

Appendix A
Virtual Public Meeting Responses

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Q1 Please enter your contact information below.

Answered: 7 Skipped: 3

ANSWER CHOICES	RESPONSES	
Name	100.00%	7
Company	0.00%	0
Address	100.00%	7
Phone/Email	100.00%	7
City/Town	0.00%	0
Texas	0.00%	0
ZIP/Postal Code	0.00%	0
Country	0.00%	0
Email Address	0.00%	0
Phone Number	0.00%	0

#	NAME	DATE
[redacted]		

#	COMPANY	DATE
	There are no responses.	

#	ADDRESS	DATE
[redacted]		

#	PHONE/EMAIL	DATE
[redacted]		

[redacted]

#	CITY/TOWN	DATE
	There are no responses.	

#	TEXAS	DATE
	There are no responses.	

#	ZIP/POSTAL CODE	DATE
	There are no responses.	

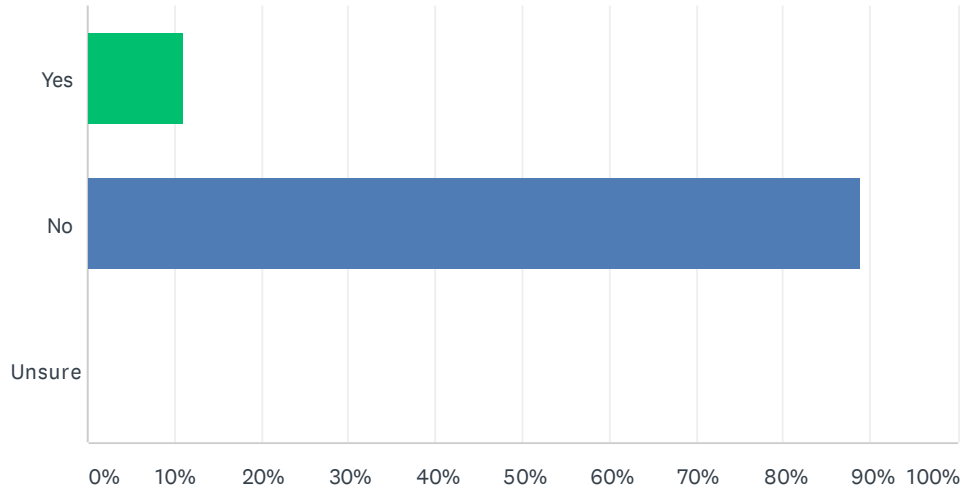
#	COUNTRY	DATE
	There are no responses.	

#	EMAIL ADDRESS	DATE
	There are no responses.	

#	PHONE NUMBER	DATE
	There are no responses.	

Q2 Is your residence within the FEMA regulated floodplain? Use this interactive map to see if you residence is in the floodplain.

Answered: 9 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	11.11%	1
No	88.89%	8
Unsure	0.00%	0
TOTAL		9

Q3 Please indicate to the best of your knowledge the dates, depths and location of flooding that has occurred at your address.

Answered: 3 Skipped: 7

ANSWER CHOICES	RESPONSES	
Occurrence 1	100.00%	3
Occurrence 2	66.67%	2
Occurrence 3	33.33%	1
Occurrence 4	33.33%	1
Occurrence 5	33.33%	1

#	OCCURRENCE 1	DATE
1	Saturday, May 1. Several inches?	5/7/2021 2:53 PM
2	2018 june, to my knee	5/1/2021 8:55 PM
3	None	4/23/2021 1:04 PM
#	**OCCURRENCE 2**	**DATE**
1	May 2021	5/1/2021 8:55 PM
2	None	4/23/2021 1:04 PM
#	**OCCURRENCE 3**	**DATE**
1	None	4/23/2021 1:04 PM
#	**OCCURRENCE 4**	**DATE**
1	None	4/23/2021 1:04 PM
#	**OCCURRENCE 5**	**DATE**
1	None	4/23/2021 1:04 PM

Q4 Please provide any other observations or comments you have relating to flooding or general storm drainage issues in your area.

Answered: 5 Skipped: 5

#	RESPONSES	DATE
1	The flatness of the lots leads to poor drainage of rainwater along the rear and east side of the lot. The fences seem to hold back drainage in these areas. There has been no flooding in the house. The house was built in 1994. Does current city code address lot drainage through requirements for slope of the land front to back or side to side or with drainage easements.? If not, can improvements to the code address lot drainage through lot slope, drainage ditch to retention ponds or both?	5/7/2021 4:25 PM
2	There is a low area between our house and the park which always holds water in a storm. It takes a day or two to drain out.	5/7/2021 2:53 PM
3	Please do NOT get rid of the sidewalks and trails that go under Railroad Avenue (by Brookhollow and Gilleland Creek). Even if they flood a few times a year they are an incredibly safe and accessible way for kids to get across Railroad without having to walk on the street.	5/2/2021 7:29 PM
4	Too much for this text box. You can call. I have tons of pictures and video. Current issue with today’s rain and development in floodplain	5/1/2021 8:55 PM
5	My house is in a pretty good area. When we moved into our house 20 years ago, we checked out where the floodplain. It's good to know that 20 years later, we are still in a solid location.	4/23/2021 1:04 PM

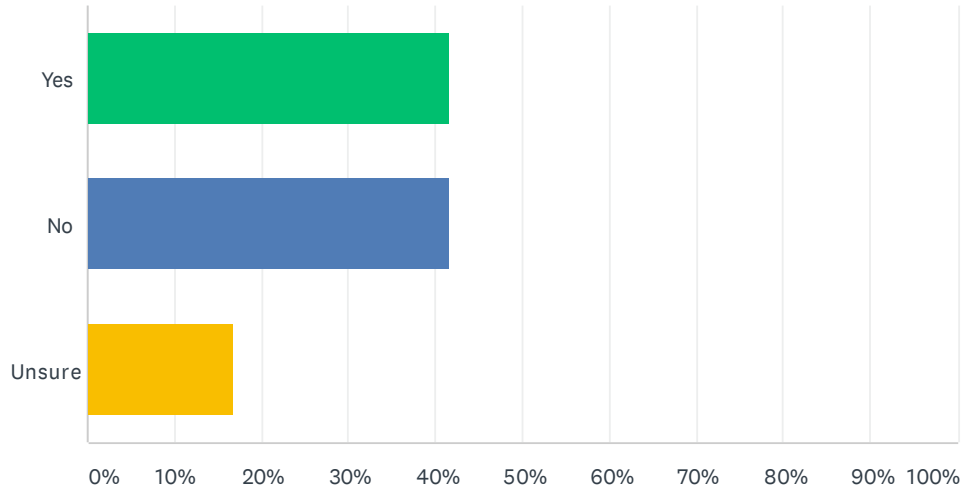
Q5 Photos are also helpful. Do you have photos or videos from the flooding you would like to provide? Please upload your photos and videos below. You can also send them to Mark Lewis by email at mlewis@halff.com.

Answered: 1 Skipped: 9

#	FILE NAME	FILE SIZE	DATE
1	DFF1858E-A1DA-4BD5-B747-E05B7B3F5387.jpeg	5.4MB	5/1/2021 8:55 PM

Q1 Do you think the City needs to fund Stormwater and Drainage activities?

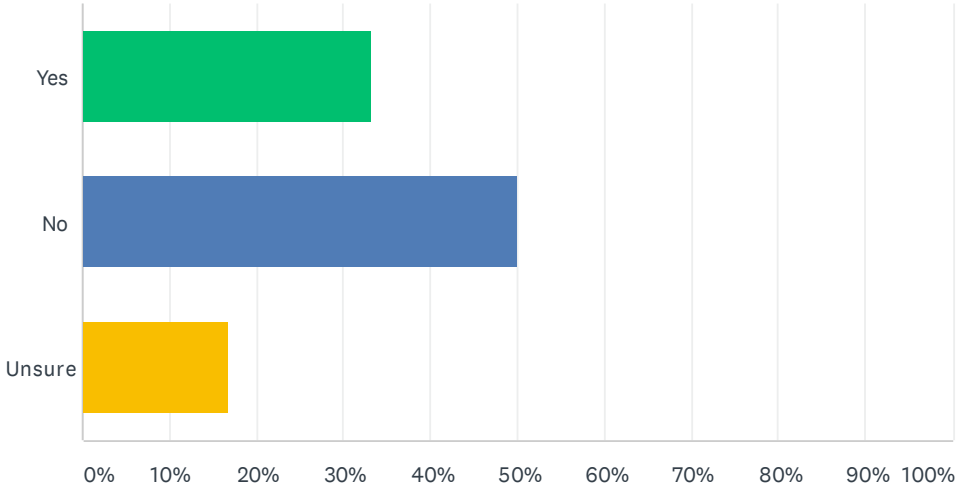
Answered: 12 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	41.67%	5
No	41.67%	5
Unsure	16.67%	2
TOTAL		12

Q2 Do you agree in principle, that a user fee that relates runoff to a drainage fee is a good way for the City to fund or partially fund stormwater and drainage infrastructure?

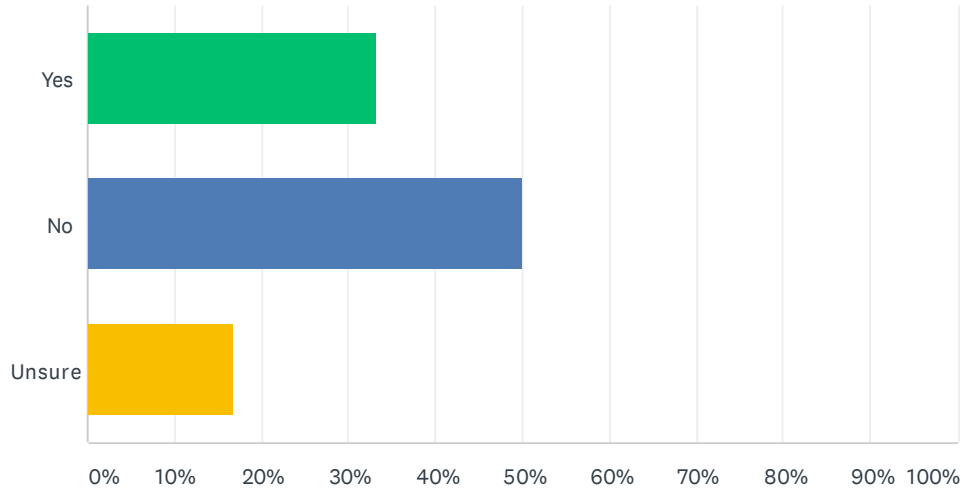
Answered: 12 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	33.33%	4
No	50.00%	6
Unsure	16.67%	2
TOTAL		12

Q3 Would you favor additional property taxes as the primary means to fund or partially fund stormwater and drainage infrastructure?

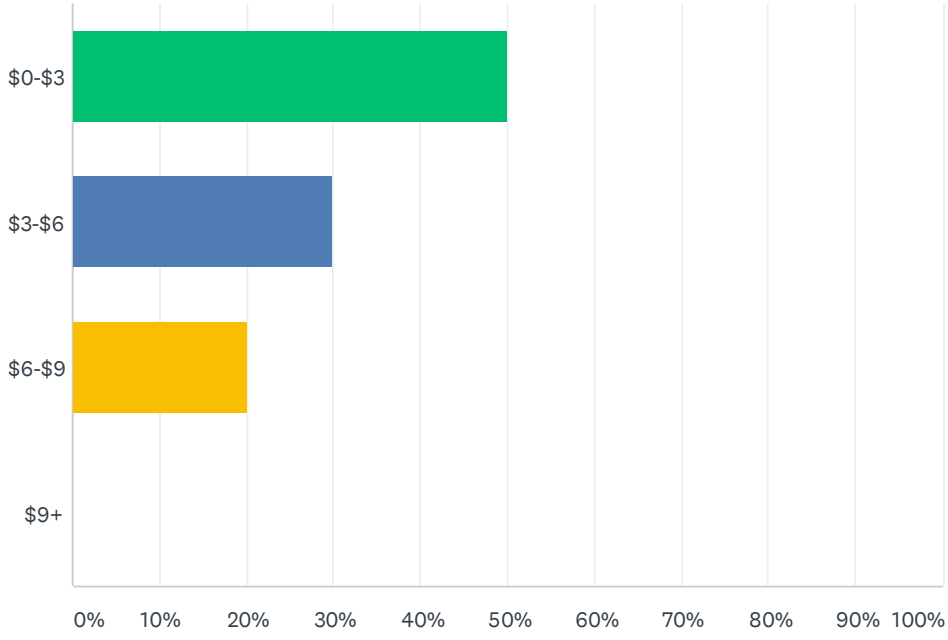
Answered: 12 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	33.33%	4
No	50.00%	6
Unsure	16.67%	2
TOTAL		12

Q4 What do you consider a reasonable cost for a stormwater fee knowing the average fee for comparison communities is approximately $5.50 per month and after determining the cost of the City's stormwater program, $10 per month may be required?

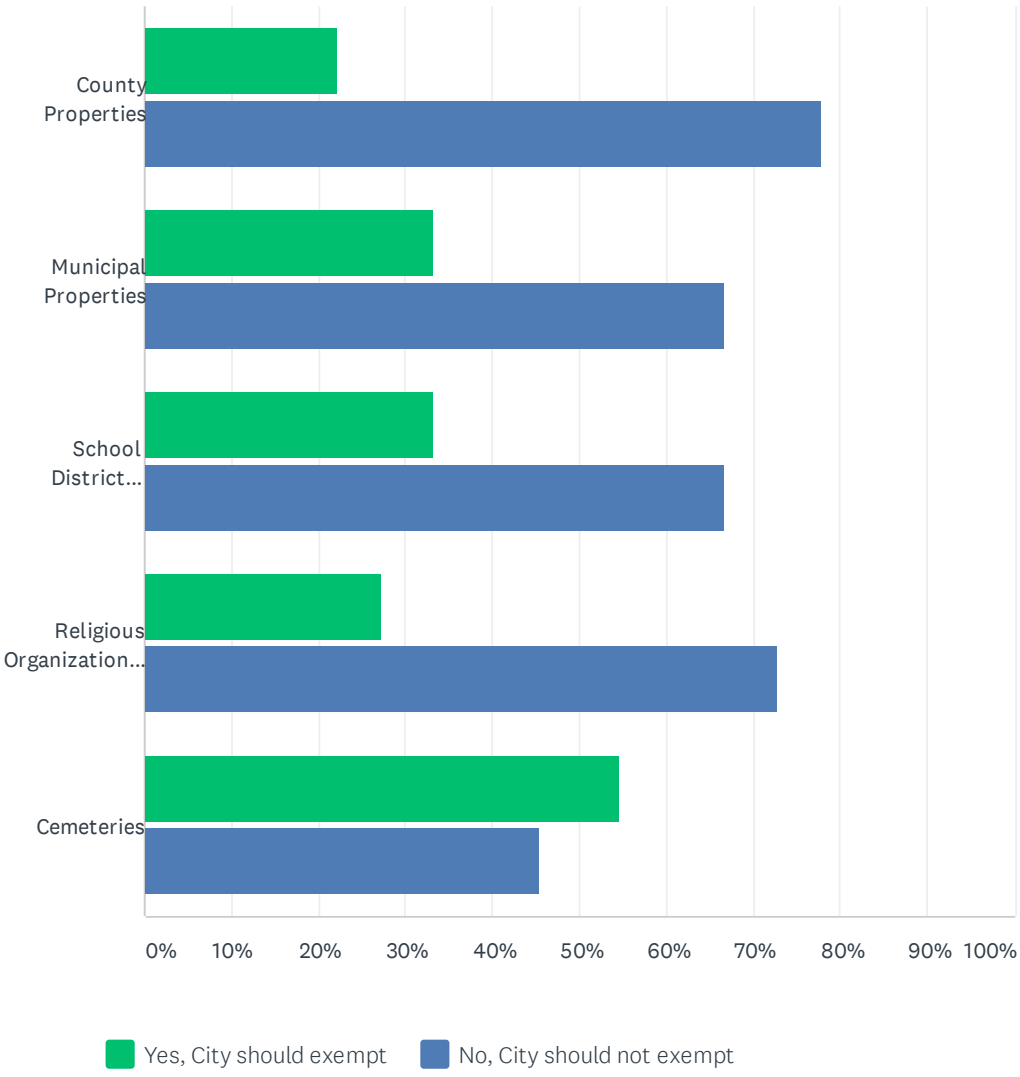
Answered: 10 Skipped: 2



ANSWER CHOICES	RESPONSES	
$0-$3	50.00%	5
$3-$6	30.00%	3
$6-$9	20.00%	2
$9+	0.00%	0
TOTAL		10

Q5 Per state statute, the City may elect to exempt county, municipal, school district, religious organizations, and cemetery properties from the drainage utility fee. If billed, the county and school district(s) would pay for drainage similar to others within the city limits, and they would be able to recover the needed revenue from properties within and also outside of the city. With this background information, do you think the City should exempt these?

Answered: 11 Skipped: 1



	YES, CITY SHOULD EXEMPT	NO, CITY SHOULD NOT EXEMPT	TOTAL
County Properties	22.22% 2	77.78% 7	9
Municipal Properties	33.33% 3	66.67% 6	9
School District Properties	33.33% 3	66.67% 6	9
Religious Organization Properties	27.27% 3	72.73% 8	11
Cemeteries	54.55% 6	45.45% 5	11

Appendix B

Drainage CIP Project Summary Sheets & Probable Cost Estimate

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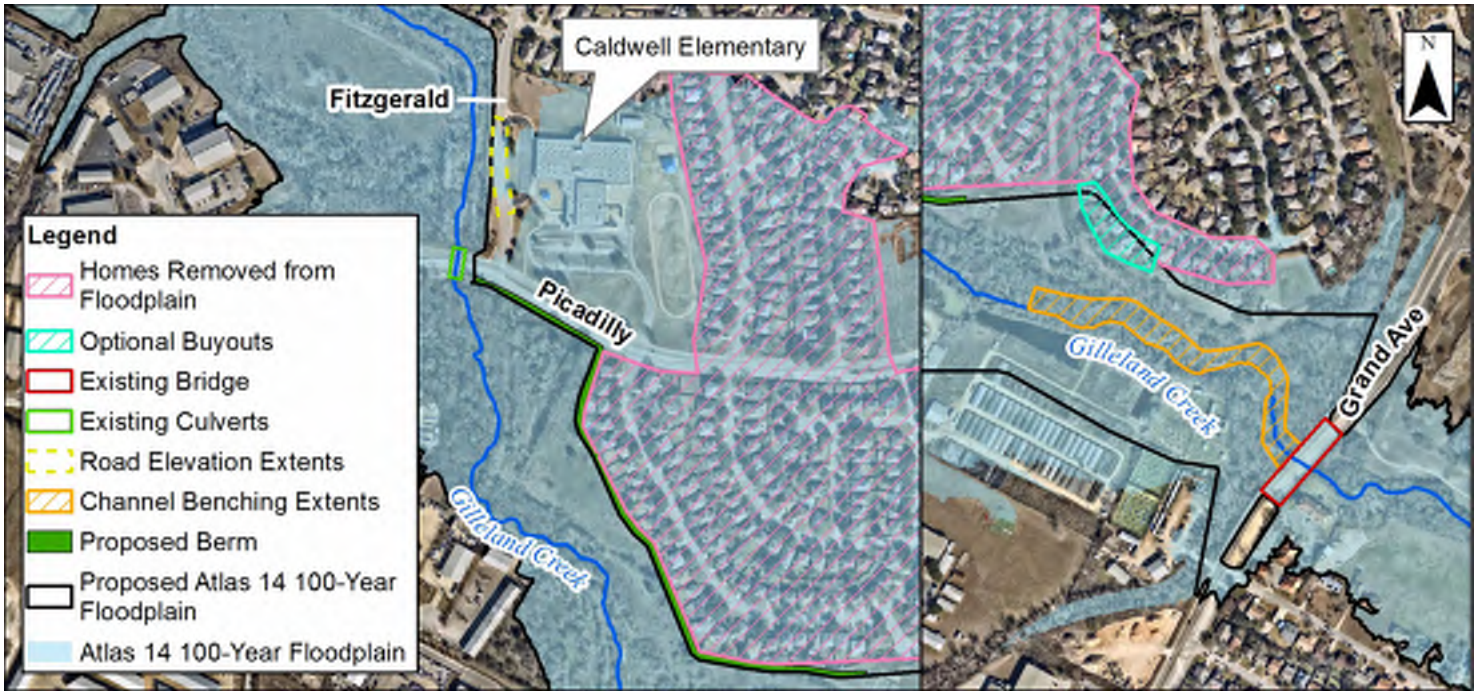
CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

GC-01 Caldwell Elementary at Gilleland Creek



PROJECT DESCRIPTION:

Caldwell Elementary becomes flooded by Gilleland Creek during the 100-year storm event. Proposed improvements include raising the Fitzgerald Ln profile to an elevation of 777 feet, 1,270 linear feet of channel improvements, and a 2,280-foot berm on the eastern border of Gilleland Creek.

The design removes Caldwell Elementary from the 100-year floodplain, prevents Fitzgerald Ln from overtopping during the 100-year storm event, and removes 205 homes from the floodplain.

BENEFITS

- Removes Caldwell Elementary from 100-year floodplain
- Removes 205 homes from 100-year floodplain
- Prevents Fitzgerald Ln from overtopping during 100-year storm event

CHALLENGES

- Channel excavation in heavily wooded area
- Berm along western edge of subdivision
- Optional buyouts of remaining properties that cannot be removed from floodplain

QUICK PfACTS:

- Project Score: **75.0**
- **205** homes removed from floodplain
- **2,280** ft berm; **1,270** ft channel improvements
- **350** feet of roadway profile adjustment

PROJECT COST ESTIMATE (2022):

Road Improvements:	**$ 896,000**
Channel Improvements:	**$ 630,000**
Other Costs:	**$ 954,000**
Optional Buyouts:	**$ 7.20 M**
Project Total:	**$ 9.68 M**

Project: GC-01 Caldwell Elementary

Stream: Gilleland Creek

Engineer's Estimate of Probable Construction Cost

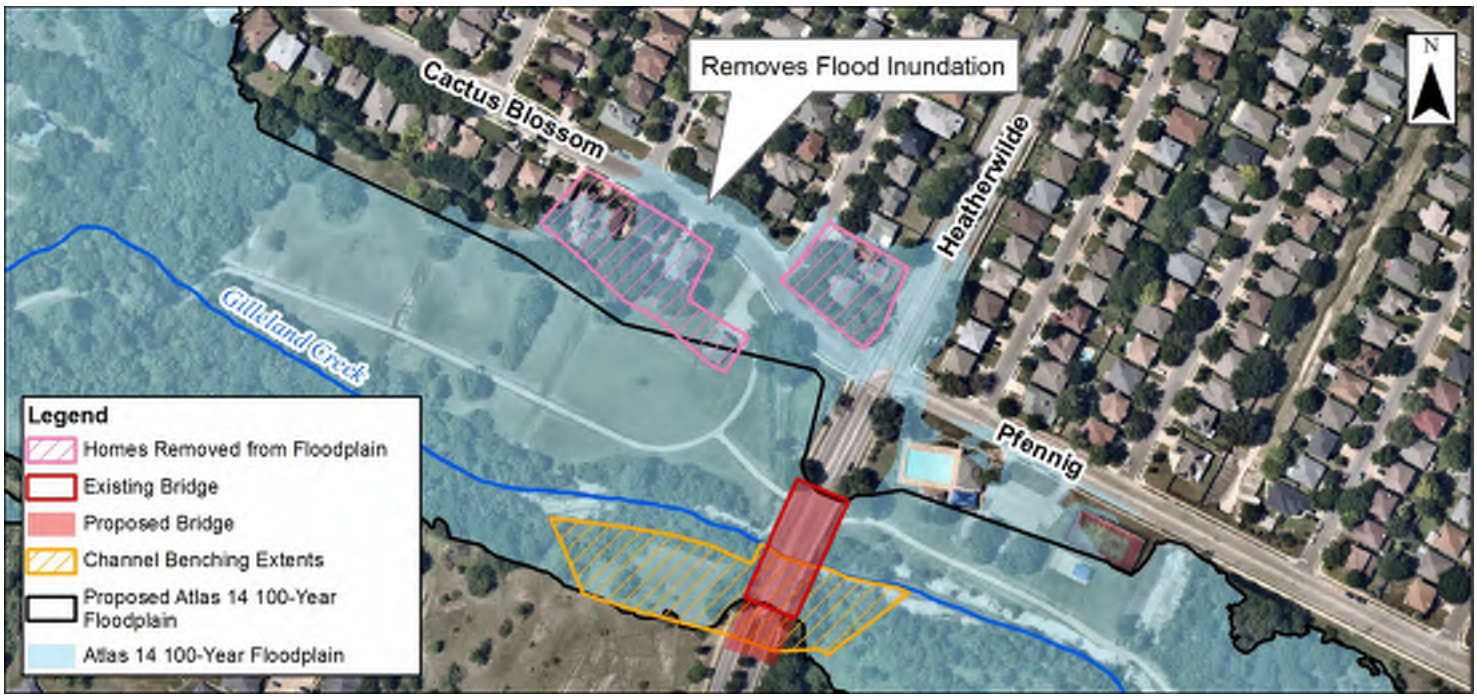
Date: May 24, 2022

PAY ITEM NO	DESCRIPTION	UNITS	UNIT PRICE	QTY	TOTALS
1	PREPARING ROW	LS	$30,000	1	$30,000
2	REMOVING CONC (CURB AND GUTTER)	LF	$10	700	$7,000
3	REMOVING CONC (SIDEWALK)	SY	$12	625	$7,500
4	EXCAVATION (CHANNEL)	CY	$35	13,850	$484,750
5	EMBANKMENT	CY	$40	6,710	$268,400
6	CUT & RESTORING PAVEMENT (base and HMAC)	SY	$130	2,615	$339,950
7	INLET (5FT)	EA	$5,500	2	$11,000
8	CONC CURB & GUTTER (TY II)	LF	$30	700	$21,000
9	CONC SIDEWALKS (4")	SY	$55	625	$34,375
10	TRAFFIC CONTROL (1%)	LS	$12,000	1	$12,000
11	EROSION AND SEDIMENT CONTROL (10%)	LS	$121,600	1	$121,600
12	MOBILIZATION (10%)	LS	$133,800	1	$133,800
13	UTILITY RELOCATION (10%)	LS	$147,100	1	$147,100
				PROJECT SUBTOTAL	**$1,618,500**
				30% CONTINGENCY	$485,600
				BASE TOTAL	$2,104,100
				Optional Buyouts (Property Value x 3)	$7,200,174
				Environmental Permitting (5%)	$63,200
				Engineering Design (15%)	$315,700
				PROJECT TOTAL	**$9,683,174**

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be held liable to Owner or third party for any failure to accurately estimate the cost of the project, or any part thereof. Unit prices are in current dollars and should be adjusted as required when letting schedule for project is determined.

CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

GC-02 N Heatherwilde at Gilleland Creek



PROJECT DESCRIPTION:

N Heatherwilde Blvd is flooded during the 50-year storm event. Proposed improvements include extending the N Heatherwilde bridge opening by 80 feet in the southern direction and 500 feet of channel improvements, including channel benching upstream and downstream of the N Heatherwilde Blvd bridge.

The design allows N Heatherwilde Blvd to pass the 100-year storm event, removes 8 homes from the floodplain, and relieves flooding on Cactus Blossom Dr.

BENEFITS

- Removes 8 homes from 100-year floodplain
- Relieves flooding on Cactus Blossom Dr, Heatherwilde Blvd, and Pfennig Ln
- N Heatherwilde Blvd will pass 100-year storm

CHALLENGES

- Rock channel excavation required
- Requires significant tree removal
- Existing Community Center at N Heatherwilde Blvd and Cactus Blossom Dr prevents northern channel improvements along Gilleland Creek

QUICK PfACTS:

- Project Score: **66.7**
- N Heatherwilde Blvd to pass **100**-year event
- **500** feet channel improvements
- **280** foot roadway/bridge improvement

PROJECT COST ESTIMATE (2021):

Road Improvements:	**$ 4.55 M**
Channel Improvements:	**$ 830,000**
Design Costs:	**$ 1.09 M**
Other Costs:	**$ 2.02 M**
Project Total:	**$ 8.49 M**

Project: GC-02 N Heatherwilde

Stream: Gilleland Creek

Engineer's Estimate of Probable Construction Cost

Date: May 24, 2022

PAY ITEM NO	DESCRIPTION	UNITS	UNIT PRICE	QTY	TOTALS
1	PREPARING ROW	LS	$15,000	1	$15,000
2	REMOVING CONC (CURB AND GUTTER)	LF	$10	240	$2,400
3	REMOVING CONC (SIDEWALK)	SY	$12	120	$1,440
2	REMOVE BRIDGE (0-99 FT LENGTH)	EA	$18,000	2	$36,000
4	EXCAVATION (CHANNEL)	CY	$35	18,250	$638,750
5	CUT & RESTORING PAVEMENT (base and HMAC)	SY	$130	650	$84,500
3	BRIDGE	SF	$150	22,250	$3,337,500
4	METAL BEAM GUARD FENCE	LF	$25	800	$20,000
6	REMOV STR (HEADWALL)	EA	$2,500	2	$5,000
7	CONC CURB & GUTTER (TY II)	LF	$30	240	$7,200
4	CONC SIDEWALKS (4")	SY	$55	120	$6,600
5	TRAFFIC CONTROL (1%)	LS	$41,500	1	$41,500
8	EROSION AND SEDIMENT CONTROL (10%)	LS	$419,600	1	$419,600
9	MOBILIZATION (10%)	LS	$461,500	1	$461,500
10	UTILITY RELOCATION (10%)	LS	$507,700	1	$507,700
				PROJECT SUBTOTAL	**$5,584,700**
				30% CONTINGENCY	$1,675,500
				BASE TOTAL	$7,260,200
				Environmental Permitting (2%)	$145,300
				Engineering Design (15%)	$1,089,100
				PROJECT TOTAL	**$8,494,600**

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be held liable to Owner or third party for any failure to accurately estimate the cost of the project, or any part thereof. Unit prices are in current dollars and should be adjusted as required when letting schedule for project is determined.

CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

GC-03 Swenson Farms at Gilleland Creek

PROJECT DESCRIPTION:

Swenson Farms Blvd floods during the 100-year storm event. Proposed improvements include extending the bridge opening by 50 feet to the north, 200 linear feet of channel improvements, including channel benching upstream and downstream of Swenson Farms Blvd, and a 2,000 foot embankment adjacent to Pfennig Ln to contain the floodplain.

The design allows the bridge to pass the 100-year storm event, removes 10 homes from the floodplain, and relieves flooding on Pfennig Ln.

BENEFITS

- Removes 10 homes from 100-year floodplain
- Relieves flooding on Pfennig Ln during the 100-year storm event
- Swenson Farms Blvd will pass 100-year storm

CHALLENGES

- Rock channel excavation required
- Requires significant tree removal
- Pedestrian crossing must be removed and redesigned to accommodate bridge, channel improvements, and embankment

QUICK PfACTS:

- Project Score: **70.0**
- **210** feet roadway/bridge improvements
- **2,000** foot embankment
- **200** feet channel improvements

PROJECT COST ESTIMATE (2021):

Road Improvements:	**$ 3.04 M**
Channel Improvements:	**$ 264,000**
Design Costs:	**$ 670,000**
Other Costs:	**$ 1.25 M**
Project Total:	**$ 5.22 M**

Project: GC-03 Swenson Farms Blvd

Stream: Gilleland Creek

Engineer's Estimate of Probable Construction Cost

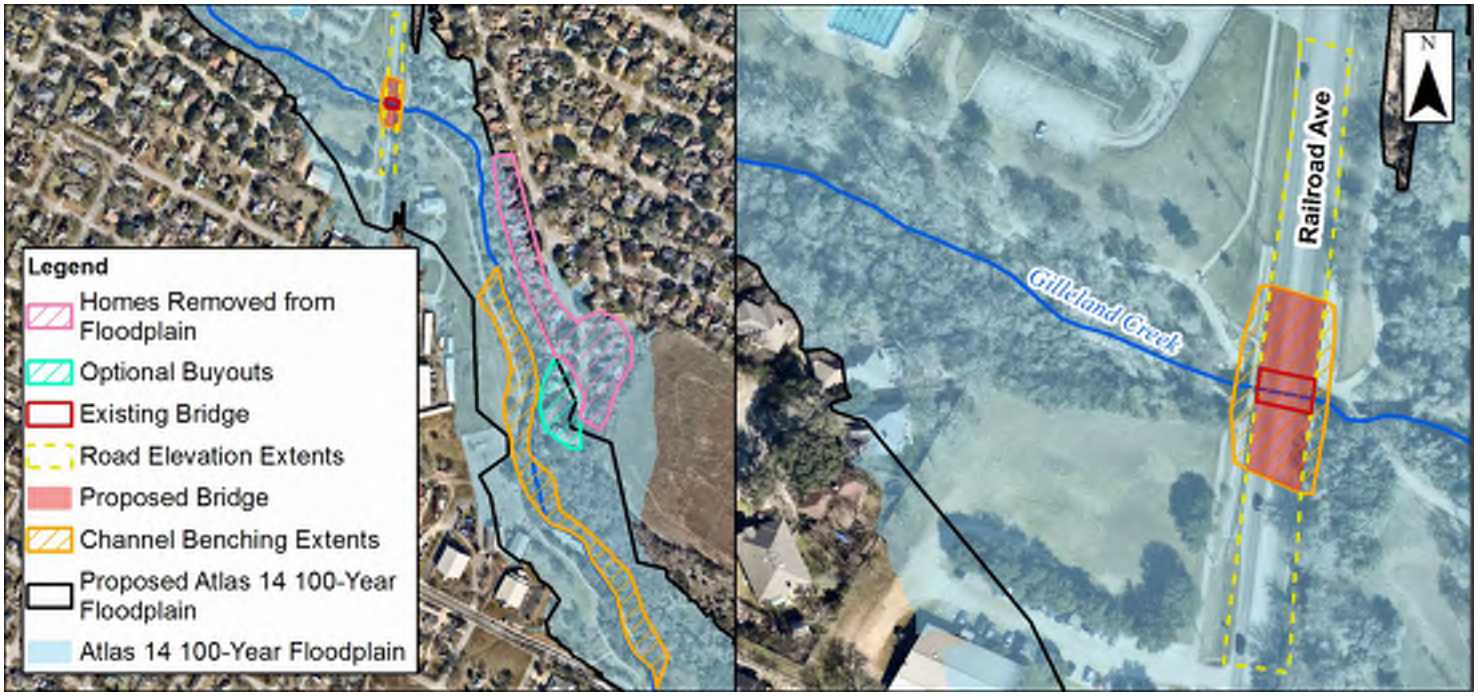
Date: May 24, 2022

PAY ITEM NO	DESCRIPTION	UNITS	UNIT PRICE	QTY	TOTALS
1	PREPARING ROW	LS	$15,000	1	$15,000
2	REMOVING CONC (CURB AND GUTTER)	LF	$10	120	$1,200
3	REMOVING CONC (SIDEWALK)	SY	$12	135	$1,620
4	REMOVE BRIDGE (0-99 FT LENGTH)	SY	$18,000	2	$36,000
5	EXCAVATION (CHANNEL)	CY	$35	5,800	$203,000
6	EMBANKMENT	CY	$40	1,805	$72,200
7	CUT & RESTORING PAVEMENT (base and HMAC)	SY	$130	200	$26,000
8	BRIDGE	SF	$150	14,425	$2,163,750
9	METAL BEAM GUARD FENCE	LF	$25	800	$20,000
10	REMOV STR (HEADWALL)	EA	$2,500	2	$5,000
11	CONC CURB & GUTTER (TY II)	LF	$30	120	$3,600
12	CONC SIDEWALKS (4")	SY	$55	135	$7,425
13	TRAFFIC CONTROL (1%)	LS	$25,500	1	$25,500
14	EROSION AND SEDIMENT CONTROL (10%)	LS	$258,000	1	$258,000
15	MOBILIZATION (10%)	LS	$283,800	1	$283,800
16	UTILITY RELOCATION (10%)	LS	$312,200	1	$312,200
				PROJECT SUBTOTAL	**$3,434,300**
				30% CONTINGENCY	$1,030,300
				BASE TOTAL	$4,464,600
				Environmental Permitting (2%)	$89,300
				Engineering Design (15%)	$669,700
				PROJECT TOTAL	**$5,223,600**

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be held liable to Owner or third party for any failure to accurately estimate the cost of the project, or any part thereof. Unit prices are in current dollars and should be adjusted as required when letting schedule for project is determined.

CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

GC-04 Railroad Avenue at Gilleland Creek



PROJECT DESCRIPTION:

Railroad Ave floods during the 2-year storm event. Proposed improvements include raising Railroad Ave up to 5 feet and widening the bridge opening by 220 feet. Design includes 1,760 feet of channel improvements including channel benching downstream of Railroad Ave.

The design allows Railroad Ave to pass the 10-year storm event, removes 10 homes from the floodplain, and reduces flooding for 6 additional homes.

BENEFITS

- Removes 10 homes from 100-year floodplain
- Railroad Ave will pass 10-year flood

CHALLENGES

- Railroad Ave cannot meet City criteria due to existing development and infrastructure constraints
- Utility relocation along channel
- Optional buyouts of remaining properties that cannot be removed from floodplains
- Main St roadway bond project coordination required

QUICK PfACTS:

- Project Score: **66.7**
- Railroad Ave to pass **10**-year event
- **1,760** feet channel improvements
- **250** foot bridge/roadway improvement

PROJECT COST ESTIMATE (2021):

Road Improvements:	**$ 3.65 M**
Channel Improvements:	**$ 2.28 M**
Optional Buyouts:	**$ 7.34 M**
Other Costs:	**$ 3.57 M**
Project Total:	**$ 16.84 M**

Project: GC-04 Railroad Ave

Stream: Gilleland Creek

Engineer's Estimate of Probable Construction Cost

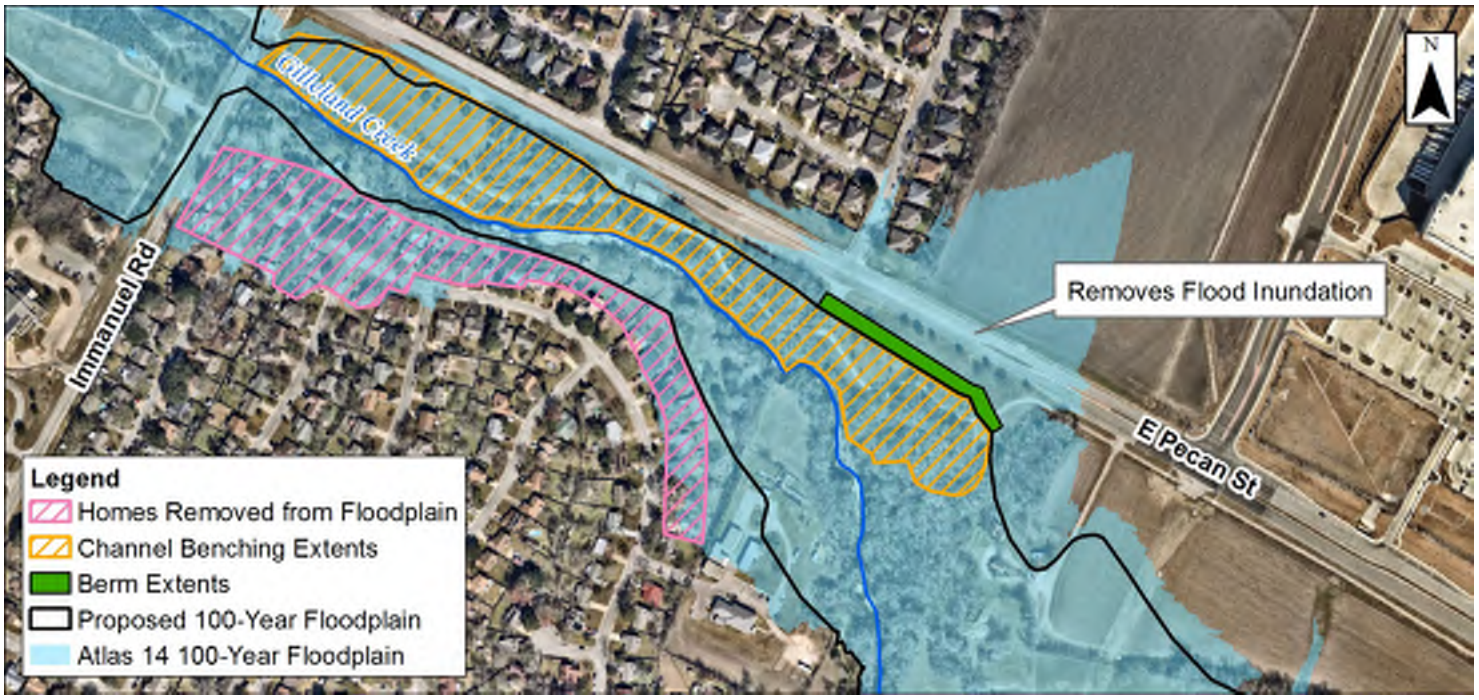
Date: May 24, 2022

PAY ITEM NO	DESCRIPTION	UNITS	UNIT PRICE	QTY	TOTALS
1	PREPARING ROW	LS	$30,000	1	$30,000
2	REMOVING CONC (CURB AND GUTTER)	LF	$10	1,400	$14,000
3	REMOVING CONC (SIDEWALK)	SY	$12	1,050	$12,600
4	REMOVE BRIDGE (0-99 FT LENGTH)	EA	$18,000	1	$18,000
5	EXCAVATION (CHANNEL)	CY	$35	50,000	$1,750,000
6	EMBANKMENT	CY	$40	2,100	$84,000
7	CUT & RESTORING PAVEMENT (base and HMAC)	SY	$130	8,180	$1,063,400
8	BRIDGE	SF	$150	10,000	$1,500,000
9	METAL BEAM GUARD FENCE	LF	$25	800	$20,000
10	REMOV STR (HEADWALL)	EA	$2,500	4	$10,000
11	CONC CURB & GUTTER (TY II)	LF	$30	920	$27,600
12	CONC SIDEWALKS (4")	SY	$55	1,050	$57,750
13	TRAFFIC CONTROL (1%)	LS	$45,900	1	$45,900
14	EROSION AND SEDIMENT CONTROL (10%)	LS	$463,300	1	$463,300
15	MOBILIZATION (10%)	LS	$509,700	1	$509,700
16	UTILITY RELOCATION (10%)	LS	$560,600	1	$560,600
				PROJECT SUBTOTAL	**$6,166,900**
				30% CONTINGENCY	$1,850,100
				BASE TOTAL	$8,017,000
				Optional Buyouts (Property Value x 3)	$7,383,123
				Environmental Permitting (3%)	$240,600
				Engineering Design (15%)	$1,202,600
				PROJECT TOTAL	**$16,843,323**

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be held liable to Owner or third party for any failure to accurately estimate the cost of the project, or any part thereof. Unit prices are in current dollars and should be adjusted as required when letting schedule for project is determined.

CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

GC-05 Immanuel Road/Pecan Park at Gilleland Creek



PROJECT DESCRIPTION:

Immanuel Rd floods during the 5-year storm event. The 100-year floodplain extends into the neighborhood south of Gilleland Creek and floods E Pecan St to the north. Proposed improvements include 2,200 ft of channel improvements and a 515 ft embankment to protect E Pecan St from flooding.

The design allows Immanuel Rd to pass the 10-year storm event, removes 29 homes from the floodplain, and relieves flooding on the E Pecan St.

Immanuel Rd improvements will occur as part of the roadway bond project

BENEFITS

- Removes 29 homes from the floodplain
- Relieves flooding on E Pecan St during the100-year storm event
- Immanuel Rd will pass the 10-year storm event

CHALLENGES

- Potential utility conflict (natural gas) near E Pecan St as well as any unknown underground utilities
- Channel improvements will impact recreational park located south of E Pecan St
- Immanuel Rd. roadway bond project coordination

QUICK PfACTS:

- Project Score: **81.7**
- **2,200** Feet of Channel Improvements
- **515** Feet Embankment
- Immanuel Rd to pass **10**-year event

PROJECT COST ESTIMATE (2021):

Channel Improvements:	**$ 2.68 M**
Design Costs:	**$ 618,000**
Other Costs:	**$ 1.56 M**
Project Total:	**$ 4.86 M**

Project: GC-05 Immanuel Road/Pecan Park

Stream: Gilleland Creek

Engineer's Estimate of Probable Construction Cost

Date: May 24, 2022

PAY ITEM NO	DESCRIPTION	UNITS	UNIT PRICE	QTY	TOTALS
1	PREPARING ROW	LS	$30,000	1	$30,000
2	REMOVING CONC (SIDEWALK)	SY	$12	3,959	$47,507
3	EXCAVATION (CHANNEL)	CY	$15	129,702	$1,945,530
4	EMBANKMENT	CY	$40	2,931	$117,240
6	CONC SIDEWALKS (4")	SY	$55	3,959	$217,739
7	TRAFFIC CONTROL (1%)	LS	$23,600	1	$23,600
8	EROSION AND SEDIMENT CONTROL (10%)	LS	$238,200	1	$238,200
9	MOBILIZATION (10%)	LS	$262,000	1	$262,000
16	UTILITY RELOCATION (10%)	LS	$288,200	1	$288,200
				PROJECT SUBTOTAL	**$3,170,100**
				30% CONTINGENCY	$951,100
				BASE TOTAL	$4,121,200
				Environmental Permitting (3%)	$123,700
				Engineering Design (15%)	$618,200
				PROJECT TOTAL	**$4,863,100**

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CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

GC-06 Pfennig Ln Intersection N at Upper Gilleland Creek

PROJECT DESCRIPTION:

The Pfennig Ln and E Pecan St intersection floods during heavy rain events. Record drawings indicate offsite flow from the field NW of the intersection was not accounted for during construction of E Pecan St.

Proposed solution includes a 4'x2' and 6'x3' box culvert plus ditches to convey flow from the field north of E Pecan St into Gilleland Creek. The existing 36" storm drain is well-sized to convey flow in the Pfennig Ln ROW. Proposed improvements will minimize flooding in the intersection.

BENEFITS

- Proposed improvements convey 100-year flow from field NW of the intersection across E Pecan St to Upper Gilleland Creek

CHALLENGES

- Natural gas easement on north side of E Pecan St
- Coordinating ditch through recreational park located south of Pecan St
- Road closures and reroutes during construction

QUICK PfACTS:

- Project Score: **73.3**
- Conveys 100-year event from offsite field
- **190** foot box culvert
- **1,200** foot drainage ditch

PROJECT COST ESTIMATE (2021):

Storm Improvements:	**$ 184,000**
Design Costs:	**$ 47,000**
Other Costs:	**$ 141,000**
Project Total:	**$ 372,000**

Project: GC-06 Pfennig Ln Intersection N

Stream: Gilleland Creek

Engineer's Estimate of Probable Construction Cost

Date: July 22, 2022

PAY ITEM NO	DESCRIPTION	UNITS	UNIT PRICE	QTY	TOTALS
1	PREPARING ROW	LS	$20,000	1	$20,000
2	REMOVING CONC (CURB AND GUTTER)	LF	$10	50	$500
3	REMOVING CONC (SIDEWALK)	SY	$12	20	$240
4	EXCAVATION (CHANNEL)	CY	$35	1,560	$54,600
5	CUT & RESTORING PAVEMENT (base and HMAC)	SY	$130	120	$15,600
6	TRENCH EXCAVATION PROTECTION	LF	$10	150	$1,500
7	4' X 2' RCB	LF	$230	40	$9,200
8	6' X 3' RCB	LF	$360	150	$54,000
9	WINGWALL (< 5 FT TALL)	EA	$12,000	2	$24,000
10	CONC CURB & GUTTER (TY II)	LF	$30	40	$1,200
11	CONC SIDEWALKS (4")	SY	$55	20	$1,100
12	TRAFFIC CONTROL (1%)	LS	$1,800	1	$1,800
13	EROSION AND SEDIMENT CONTROL (10%)	LS	$18,400	1	$18,400
14	MOBILIZATION (10%)	LS	$20,200	1	$20,200
15	UTILITY RELOCATION (10%)	LS	$20,200	1	$20,200
				PROJECT SUBTOTAL	**$242,600**
				30% CONTINGENCY	$72,800
				BASE TOTAL	$315,400
				Environmental Permitting (3%)	$9,500
				Engineering Design (15%)	$47,400
				PROJECT TOTAL	**$372,300**

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CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

WC-01 Weiss Ln at Wilbarger Creek

PROJECT DESCRIPTION:

During the 50-year storm, Weiss Ln flood levels overtop the roadway south of the existing bridge. Proposed improvements consist of raising the roadway profile 4 ft to the south of the Weiss Ln bridge, adding six 10'x5' drainage relief culverts under the newly raised profile, and adding a 100' wide bypass channel to allow flow through the culvert.

The proposed improvements allow Weiss Ln to pass the 100-year storm event.

BENEFITS

- Allows Weiss Ln to pass 100-year event
- Prevents traffic disruptions coming to and from Cele Middle School during heavy rain events.

CHALLENGES

- Raised roadway profile will need to tie back into several existing residential driveways
- Proposed drainage channel may cut into private property (parcel data inconclusive)
- Raised roadway profile will need to accommodate future lane expansion.

QUICK PfACTS:

- Project Score: **76.7**
- Weiss Ln passes **100**-year Event
- **300** feet of new box culverts
- **400** feet of channel excavation

PROJECT COST ESTIMATE (2021):

Storm Improvements:	**$ 420,000**
Road Improvements:	**$ 582,000**
Design Costs:	**$ 207,000**
Other Costs:	**$ 421,000**
Project Total:	**$ 1.63 M**

Project: WC-01 Weiss Ln

Stream: Wilbarger Creek Trib 200

Engineer's Estimate of Probable Construction Cost

Date: May 24, 2022

PAY ITEM NO	DESCRIPTION	UNITS	UNIT PRICE	QTY	TOTALS
1	PREPARING ROW	LS	$20,000	1	$20,000
#REF!	EXCAVATION (CHANNEL)	CY	$35	2,279	$79,765
#REF!	EMBANKMENT	CY	$40	4,358	$174,320
#REF!	CUT & RESTORING PAVEMENT (base and HMAC)	SY	$130	1,950	$253,500
#REF!	TRENCH EXCAVATION PROTECTION	LF	$10	300	$3,000
23	10' X 5' RCB	LF	$800	300	$240,000
	METAL BEAM GUARD FENCE	LF	$25	800	$20,000
34	TRAFFIC CONTROL (1%)	LS	$7,900	1	$7,900
35	EROSION AND SEDIMENT CONTROL (10%)	LS	$79,800	1	$79,800
36	MOBILIZATION (10%)	LS	$87,800	1	$87,800
	UTILITY RELOCATION (10%)	LS	$96,600	1	$96,600

PROJECT SUBTOTAL	**$1,062,700**
30% CONTINGENCY	$318,900
BASE TOTAL	$1,381,600
Storm Improvements	$419,595
Road Improvements	$582,166
Other Costs	$421,339.50
Environmental Permitting (3%)	$41,500
Engineering Design (15%)	$207,300
PROJECT TOTAL	**$1,630,400**

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CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

WC-02 Hidden Lake Drive at Wilbarger Creek Tributary 200

PROJECT DESCRIPTION:

Hidden Lake Dr at Wilbarger Creek Tributary 200 floods during the 10-year storm event. Proposed improvements include replacing the fourteen 10' x 5' existing culverts with a 200-foot bridge span. Design includes raising Hidden Lake Dr to an elevation of 644 feet, 3 feet higher than the current elevation.

The design allows Hidden Lake Dr to pass the 100-year storm event.

BENEFITS

- Hidden Lake Dr will pass 100-year storm
- Does not negatively impact surrounding properties

CHALLENGES

- Proposal requires raising Hidden Lake Dr by 3 feet
- Pedestrian crossings must be removed and redesigned to accommodate roadway improvements

QUICK PfACTS:

- Project Score: **74.0**
- Hidden Lake Dr to pass **100**-year event
- **550** foot roadway/bridge improvements
- **200** foot bridge to replace culverts

PROJECT COST ESTIMATE (2021):

Road Improvements:	**$ 2.54 M**
Design Costs:	**$ 516,000**
Other Costs:	**$ 974,000**
Project Total:	**$ 4.03 M**

Project: WC-02 Hidden Lake Drive

Stream: Wilbarger Creek Trib 200

Engineer's Estimate of Probable Construction Cost

Date: May 24, 2022

HALFF

PAY ITEM NO	DESCRIPTION	UNITS	UNIT PRICE	QTY	TOTALS
1	PREPARING ROW	LS	$15,000	1	$15,000
2	REMOVING CONC (CURB AND GUTTER)	LF	$10	1,115	$11,150
3	REMOVING CONC (SIDEWALK)	SY	$12	875	$10,500
4	REMOVE CULVERT	LF	$65	80	$5,200
5	EMBANKMENT	CY	$40	1,840	$73,600
6	CUT & RESTORING PAVEMENT (base and HMAC)	SY	$125	4,100	$512,500
7	BRIDGE	SF	$150	8,035	$1,205,250
8	METAL BEAM GUARD FENCE	LF	$25	800	$20,000
9	WINGWALL (> 5 FT TALL)	EA	$15,000	2	$30,000
10	REMOV STR (HEADWALL)	EA	$2,500	2	$5,000
11	CONC CURB & GUTTER (TY II)	LF	$30	1,115	$33,450
12	CONC SIDEWALKS (4")	SY	$55	875	$48,125
13	TRAFFIC CONTROL (1%)	LS	$19,700	1	$19,700
14	EROSION AND SEDIMENT CONTROL (10%)	LS	$198,900	1	$198,900
15	MOBILIZATION (10%)	LS	$218,800	1	$218,800
	UTILITY RELOCATION (10%)	LS	$240,700	1	$240,700
				PROJECT SUBTOTAL	**$2,647,900**
				30% CONTINGENCY	$794,400
				BASE TOTAL	$3,442,300
				Environmental Permitting (2%)	$68,900
				Engineering Design (15%)	$516,400
				PROJECT TOTAL	**$4,027,600**

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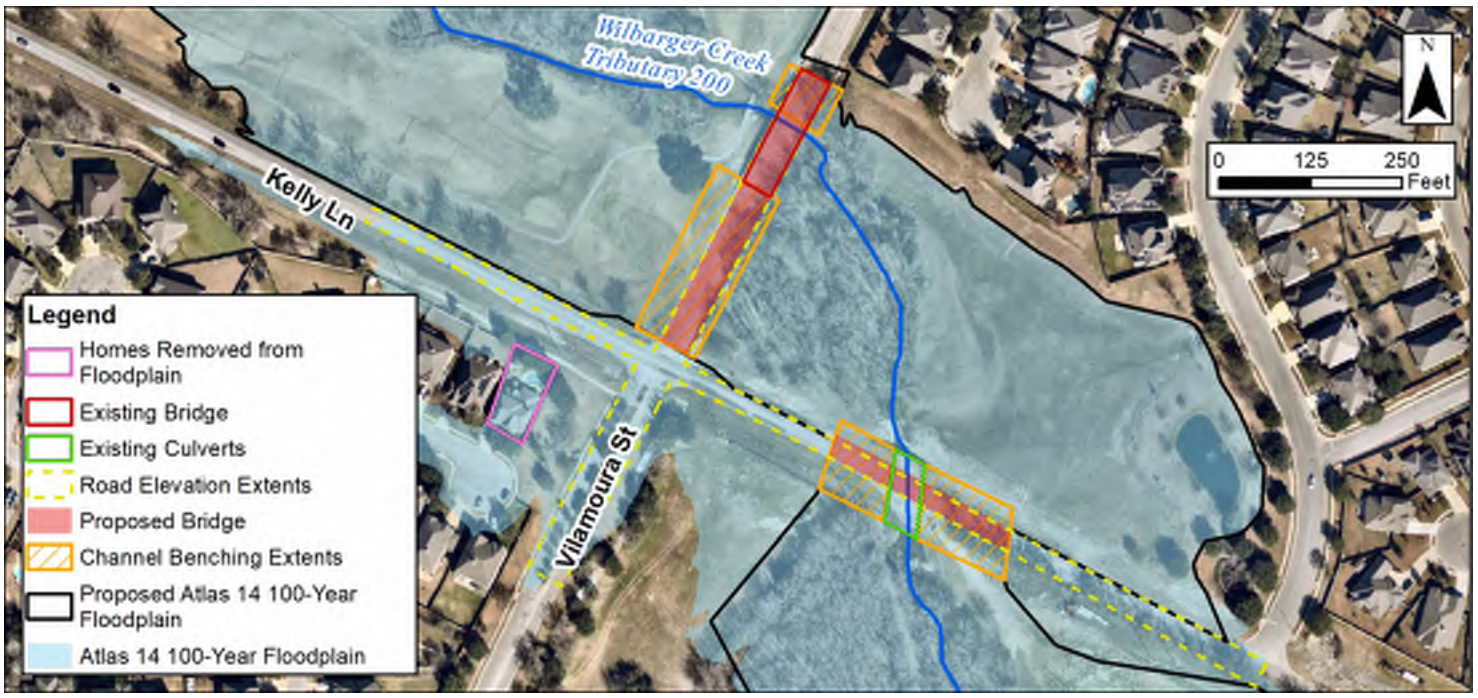
CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

WC-03 Vilamoura St & Kelly Ln at Wilbarger Creek Trib 200



PROJECT DESCRIPTION:

Vilamoura St and Kelly Ln floods during the 2-year storm. Proposed project includes extending Vilamoura St Bridge opening from 160 feet to 400 feet to the south towards Kelly Ln. Also replacing Kelly Ln culverts with a 270 foot bridge, and raising both roadways by up to 6.5 feet. Design includes 650 feet of channel improvements.

The design allows both streets to pass the 100-year storm event and removes 1 home from the floodplain.

BENEFITS

- Removes 1 home from 100-year floodplain
- Vilamoura St will pass 100-year storm
- Kelly Ln will pass 100-year storm

CHALLENGES

- Kelly Ln included in roadway bond project
- Proposal requires raising Vilamoura St by 3 feet
- Proposal requires raising Kelly Ln by 6.5 feet
- Will need to address local storm drainage improvements due to changes in roadways

QUICK PfACTS:

- Project Score: **71.0**
- **1,760** feet roadway improvements
- **670** feet bridge improvements
- **650** feet channel improvements

PROJECT COST ESTIMATE (2021):

Road Improvements:	**$ 7.27 M**
Channel Improvements:	**$ 505,000**
Design Costs:	**$ 1.58 M**
Other Costs:	**$ 3.05 M**
Project Total:	**$ 12.40 M**

Project: WC-03 Vilamoura Street and Kelly Ln

Stream: Wilbager Creek Tributary 200

Engineer's Estimate of Probable Construction Cost

Date: May 24, 2022

PAY ITEM NO	DESCRIPTION	UNITS	UNIT PRICE	QTY	TOTALS
1	PREPARING ROW	LS	$30,000	1	$30,000
2	REMOVING CONC (CURB AND GUTTER)	LF	$10	1,042	$10,420
3	REMOVING CONC (SIDEWALK)	SY	$12	700	$8,400
4	REMOVE BRIDGE (0-99 FT LENGTH)	EA	$18,000	2	$36,000
5	REMOVE CULVERT	LF	$65	110	$7,150
6	EXCAVATION (CHANNEL)	CY	$35	11,100	$388,500
7	EMBANKMENT	CY	$40	9,860	$394,400
8	CUT & RESTORING PAVEMENT (base and HMAC)	SY	$130	9,300	$1,209,000
9	BRIDGE	SF	$150	25,550	$3,832,500
10	METAL BEAM GUARD FENCE	LF	$25	800	$20,000
11	REMOV STR (HEADWALL)	EA	$2,500	2	$5,000
12	CONC CURB & GUTTER (TY II)	LF	$30	1,042	$31,260
13	CONC SIDEWALKS (4")	SY	$55	700	$38,500
14	TRAFFIC CONTROL (1%)	LS	$60,100	1	$60,100
15	EROSION AND SEDIMENT CONTROL (10%)	LS	$607,100	1	$607,100
16	MOBILIZATION (10%)	LS	$667,800	1	$667,800
17	UTILITY RELOCATION (10%)	LS	$734,600	1	$734,600
				PROJECT SUBTOTAL	**$8,080,800**
				30% CONTINGENCY	$2,424,300
				BASE TOTAL	$10,505,100
				Environmental Permitting (1%)	$315,200
				Engineering Design (15%)	$1,575,800
				PROJECT TOTAL	**$12,396,100**

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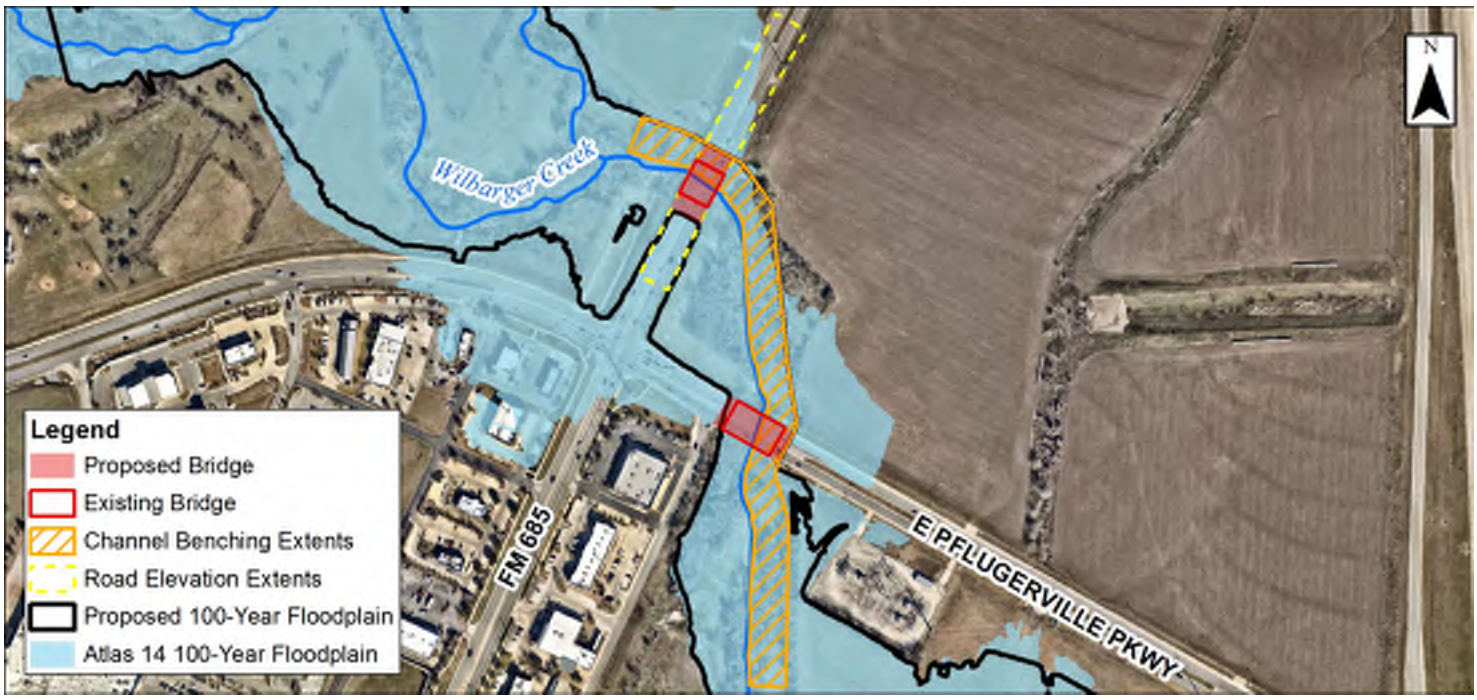
CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

WC-04 FM 685 & E Pflugerville Pkwy at Wilbarger Creek Trib 200



PROJECT DESCRIPTION:

FM 685 and East Pflugerville Parkway floods during the 5 year and 25 year storm events, respectively. Proposed improvements include extending each bridge opening to four 50-foot spans, and raising the roadway profile of FM 685 by 2 feet. Design also includes 1700 feet of channel improvements on the east side of the creek.

The design allows both streets to pass the 100-year storm event and removes 3 structures from the floodplain.

BENEFITS

- FM 685 and E Pflugerville Pkwy will pass 100-year storm
- Removes 3 structures from 100-year floodplain

CHALLENGES

- Proposal requires raising FM 685 roadway profile by 2 feet
- Potential utility conflicts with extensive channel improvement
- Will need to address local storm drainage improvements due to changes in roadways

QUICK PfACTS:

- Project Score: **56.3**
- **810** feet roadway improvements
- **400** feet bridge improvements
- **1700** feet channel improvements

PROJECT COST ESTIMATE (2021):

Road Improvements:	**$ 7.33 M**
Channel Improvements:	**$ 3.23 M**
Design Costs:	**$ 1.66 M**
Other Costs:	**$ 3.72 M**
Project Total:	**$ 15.94 M**

Project: WC-04 FM 685 and East Pflugerville Pkwy

Stream: Wilbarger Creek Trib 200

Engineer's Estimate of Probable Construction Cost

Date: May 24, 2022

PAY ITEM NO	DESCRIPTION	UNITS	UNIT PRICE	QTY	TOTALS
1	PREPARING ROW	LS	$15,000	1	$15,000
2	REMOVING CONC (CURB AND GUTTER)	LF	$10	2,036	$20,360
3	EXCAVATION (CHANNEL)	CY	$35	70,900	$2,481,500
4	EMBANKMENT	CY	$40	5,880	$235,200
5	CUT & RESTORING PAVEMENT (base and HMAC)	SY	$130	11,320	$1,471,600
6	BRIDGE	SF	$150	24,497	$3,674,550
7	METAL BEAM GUARD FENCE	LF	$25	1,170	$29,250
8	REMOVE BRIDGE (0-99 FT LENGTH)	EA	$18,000	2	$36,000
9	CONC CURB & GUTTER (TY II)	LF	$30	2,040	$61,200
10	CONC SIDEWALKS (4")	SY	$55	2,040	$112,200
11	TRAFFIC CONTROL (1%)	LS	$81,400	1	$81,400
12	EROSION AND SEDIMENT CONTROL (10%)	LS	$813,700	1	$813,700
13	MOBILIZATION (10%)	LS	$813,700	1	$813,700
14	UTILITY RELOCATION (10%)	LS	$813,700	1	$813,700
				PROJECT SUBTOTAL	**$10,659,400**
				30% CONTINGENCY	$3,197,900
				BASE TOTAL	$13,857,300
				Environmental Permitting (3%)	$415,800
				Engineering Design (15%)	$1,662,900
				PROJECT TOTAL	**$15,936,000**

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CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

WC-05 Kennemer Drive at Wilbarger Creek Trib 200

PROJECT DESCRIPTION:

Kennemer Dr currently floods during the 5 year storm. Proposed improvements include replacing the existing culverts with a 150 foot 3-span bridge and raising the roadway profile by 0.8 feet. Improvements also includes widening and stabilizing the channel underneath the bridge.

The proposed improvement allows Kennemer Ln to pass the 10 year storm and significantly reduces the flooding depth and width of the 100 year storm.

BENEFITS

- Allows Kennemer Dr to pass 10 year storm
- Floodplain width for the 100 year storm is reduced by 50 feet through the bridge

CHALLENGES

- Proposed improvements must tie in to existing residential driveways
- Proposal requires raising Kennemer Dr by 0.8 ft
- Will need to address local storm drainage improvements due to changes in roadways

QUICK PfACTS:

- Project Score: **59.3**
- **230** feet roadway improvements
- **150** feet bridge improvements

PROJECT COST ESTIMATE (2021):

Road Improvements:	**$ 2.08 M**
Design Costs:	**$ 330,000**
Other Costs:	**$ 700,000**
Project Total:	**$ 3.11 M**

Project: WC-05 Kennemer Dr

Stream: Wilbarger Creek Trib 200

Engineer's Estimate of Probable Construction Cost

Date: May 24, 2022

PAY ITEM NO	DESCRIPTION	UNITS	UNIT PRICE	QTY	TOTALS
1	PREPARING ROW	LS	$15,000	1	$15,000
2	REMOVING CONC (CURB AND GUTTER)	LF	$10	465	$4,650
3	EMBANKMENT	CY	$40	406	$16,240
4	CUT & RESTORING PAVEMENT (base and HMAC)	SY	$130	1,524	$198,120
5	BRIDGE	SF	$150	8,850	$1,327,500
6	METAL BEAM GUARD FENCE	LF	$25	382	$9,550
7	REMOV STR (HEADWALL)	EA	$2,500	2	$5,000
8	REMOV STR (PIPE)	LF	$20	588	$11,760
9	CONC CURB & GUTTER (TY II)	LF	$30	465	$13,950
10	CONC SIDEWALKS (4")	SY	$55	233	$12,815
11	TRAFFIC CONTROL (1%)	LS	$16,100	1	$16,100
12	EROSION AND SEDIMENT CONTROL (10%)	LS	$161,500	1	$161,500
13	MOBILIZATION (10%)	LS	$161,500	1	$161,500
14	UTILITY RELOCATION (10%)	LS	$161,500	1	$161,500
				PROJECT SUBTOTAL	**$2,115,200**
				30% CONTINGENCY	$634,600
				BASE TOTAL	$2,749,800
				Environmental Permitting (3%)	$27,500
				Engineering Design (15%)	$330,000
				PROJECT TOTAL	**$3,107,300**

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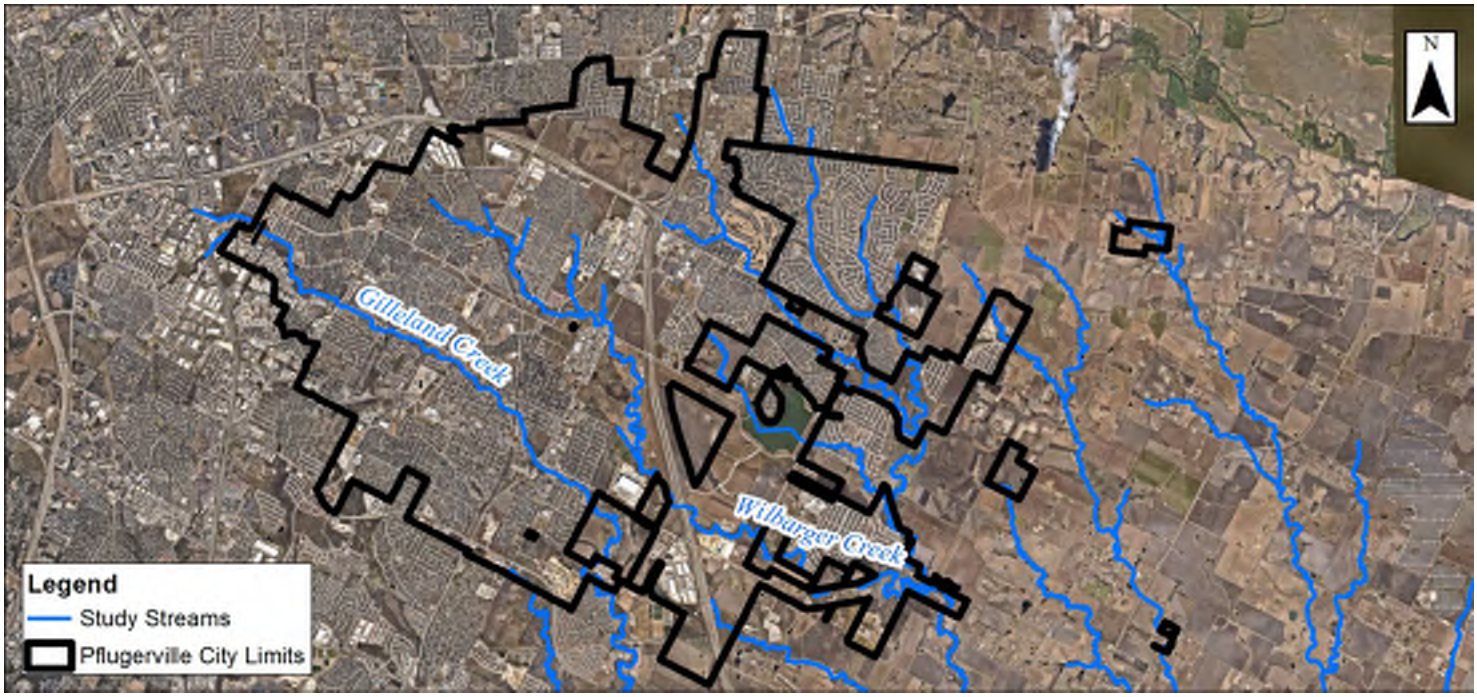
CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

Pf-01 Drainage Criteria Update



PROJECT DESCRIPTION:

City of Pflugerville will work with an engineering consultant to update the City's drainage criteria manual. The goal of the updated drainage criteria manual is to meet current drainage standard practices to mitigate future drainage issues and adapt the criteria for increased growing development occurring within the City of Pflugerville.

BENEFITS

- Update criteria for increasing residential and commercial land uses
- Mitigate potential new drainage issues

CHALLENGES

- Criteria must comply with current city ordinances and master plans

QUICK PfACTS:

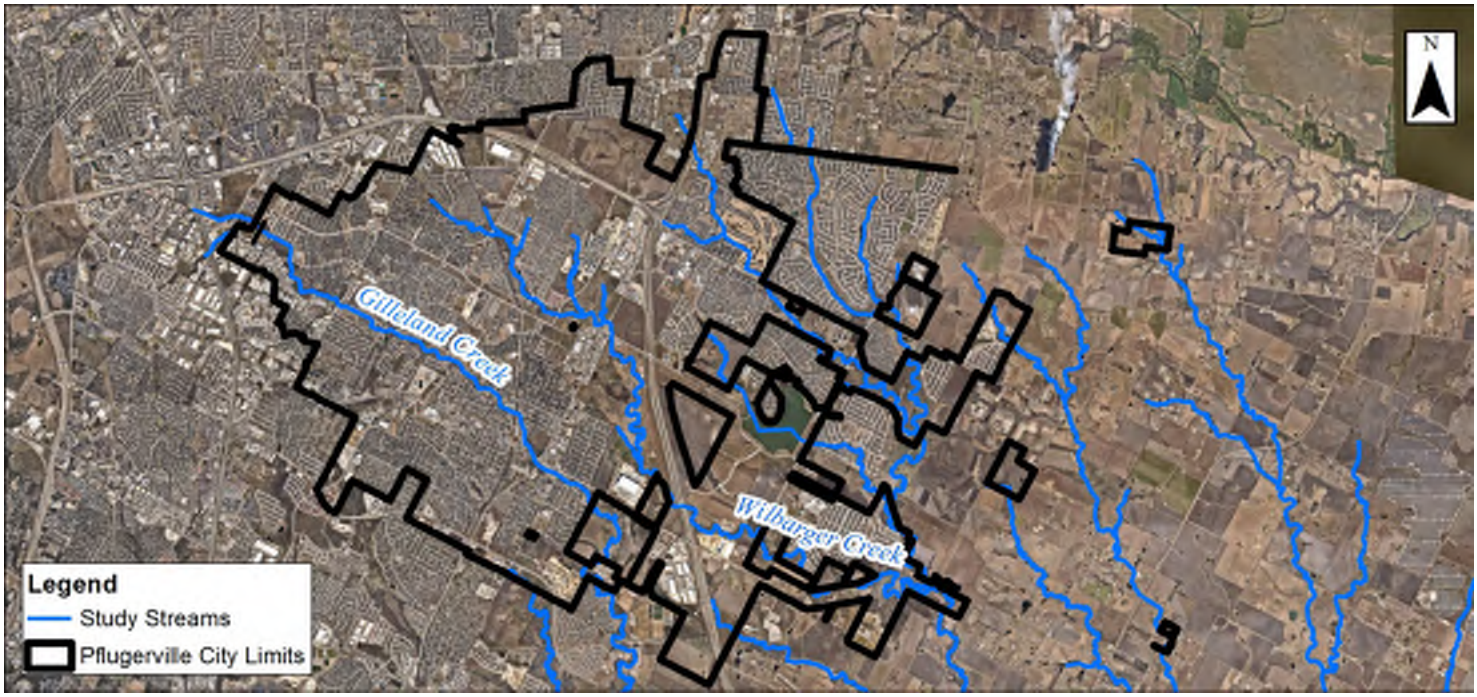
- Drainage criteria update to current standards
- Mitigate future drainage issues

PROJECT COST ESTIMATE (2021):

Engineer Fee:	$ 30,000

CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

Pf-02 Creek Maintenance Plan



PROJECT DESCRIPTION:

Work with engineering consultant to develop a city-wide creek maintenance plan. The creek maintenance plan will identify creeks in need of maintenance to reduce flooding and propose mitigation strategies to improve the creek conveyance and stability.

An effective creek maintenance plan will improve creek conveyance to reduce flooding.

BENEFITS

- Debris removal to increase channel conveyance
- Reduction of flooding

CHALLENGES

- Large amount of creeks and streams that will need analyzing
- May need additional city crews and equipment

QUICK PfACTS:

- Identify creek maintenance needs
- Identify crew and equipment needs
- Increase channel conveyance

PROJECT COST ESTIMATE (2021):

Engineer Fee:	$ 15,000

CITY OF PFLUGERVILLE DRAINAGE MASTER PLAN

Pf-03 Storm Drain CCTV Evaluation

PROJECT DESCRIPTION:

City will work with an engineering consultant to assess the condition of existing storm drain infrastructure within the downtown business district utilizing CCTV inspection. Inspection will analyze approximately 11,000 feet of storm drain infrastructure.

Once the analysis is complete, the design consultant will work with the city to create a storm drain maintenance plan.

BENEFITS

- Diagnose storm drain infrastructure in need of repair
- Develop storm drain maintenance plan based off CCTV footage

CHALLENGES

- Identifying storm drain infrastructure to analyze
- 11,000 total feet of storm drain to be analyzed

QUICK PfACTS:

- 11,000 LF CCTV inspection
- Evaluate storm drain infrastructure
- Develop storm drain maintenance plan

PROJECT COST ESTIMATE (2021):

Engineering Fee:	$ 330,000

Appendix C
Drainage CIP Project Ranking

HALFF

where quality meets life
PFLUGERVILLE
TEXAS

City of Pflugerville - Drainage Project Ranking Criteria

Category	Category Weight	Sub Category Weight	Sub Category	Scoring	GC-01 Caldwell Elem.		GC-02 N. Heatherwilde		GC-03 Swenson Farms Blvd.		GC-04 Railroad Ave.	
					Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score
Public Safety	40	15	Road Flooding and Mobility (Pre-Project Conditions)	1: Isolated Local Roadway Flooding 2: Collector Roadway Flooding 3: Moving water is likely to wash car off road (consider velocity and depth)	2	10.0	2	10.0	2	10.0	3	15.0
		15	Number of Structures within 100-yr (1% ACE) footprint (Pre-Project Condition)	1: 0-4 flooded 2: 5-10 flooded 3: 10+ flooded or critical facility effected	3	15.0	2	10.0	2	10.0	2	10.0
		10	Level of Service (Post-Project Protection)	1: ≤ 25-yr (4% ACE) 2: 25-yr (4% ACE) - 100-yr (1% ACE) 3: ≥ 100-yr (1% ACE)	3	10.0	3	10.0	3	10.0	2	6.7
Economic	30	20	Project Cost	1: ≥ 5 Million 2: $2 - 5 Million 3: ≤ $2 Million	2	13.3	1	6.7	2	13.3	1	6.7
		10	Operation & Maintenance Schedule	1: Monthly maintenance 2: Bi-Annual maintenance 3: Annual + maintenance	2	6.7	3	10.0	2	6.7	2	6.7
Project Timing	20	6	Ease of Permitting	1: Multi-jurisdiction more permits 2: Local permit with variances/Nationwide 3: Limited local permits	2	4.0	2	4.0	2	4.0	2	4.0
		7	Time for Implementation or Construction	1: ≥ 2 Years 2: 1 - 2 Years 3: 0 - 1 Years	2	4.7	2	4.7	2	4.7	2	4.7
		7	Land and Easement Acquisition	1: Condemnation required 2: Purchase necessary 3: No additional acquisition required	2	4.7	2	4.7	2	4.7	2	4.7
Social	10	5	Element of Comprehensive Plan (Parks, Transportation, Planning, etc.)	1: No elements in other plans 2: Related to elements in other plans 3: Multiple elements other plan	2	3.3	1	1.7	2	3.3	2	3.3
		5	Beneficial Neighborhood Impacts	1: Negative Neighborrhood Impact 2: No Neighborhood Impact 3: Positive Neighborhood Impact	2	3.3	3	5.0	2	3.3	3	5.0
						75.0		**66.7**		**70.0**		**66.7**

City of Pflugerville - Drainage Project Ranking Criteria

Category	Category Weight	Sub Category Weight	Sub Category	Scoring	GC-05 Immanuel Rd/Pecan Park		GC-06 Pfennig Ln/Pecan St. Intersection		WC-01 Weiss Ln		WC-02 Hidden Lake Dr	
					Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score
Public Safety	40	15	Road Flooding and Mobility (Pre-Project Conditions)	1: Isolated Local Roadway Flooding 2: Collector Roadway Flooding 3: Moving water is likely to wash car off road (consider velocity and depth)	3	15.0	1	5.0	2	10.0	3	15.0
		15	Number of Structures within 100-yr (1% ACE) footprint (Pre-Project Condition)	1: 0-4 flooded 2: 5-10 flooded 3: 10+ flooded or critical facility effected	3	15.0	1	5.0	1	5.0	1	5.0
		10	Level of Service (Post-Project Protection)	1: ≤ 25-yr (4% ACE) 2: 25-yr (4% ACE) - 100-yr (1% ACE) 3: ≥ 100-yr (1% ACE)	3	10.0	3	10.0	3	10.0	3	10.0
Economic	30	20	Project Cost	1: ≥ 5 Million 2: $2 - 5 Million 3: ≤ $2 Million	2	13.3	3	20.0	3	20.0	2	13.3
		10	Operation & Maintenance Schedule	1: Monthly maintenance 2: Bi-Annual maintenance 3: Annual + maintenance	3	10.0	2	6.7	3	10.0	3	10.0
Project Timing	20	6	Ease of Permitting	1: Multi-jurisdiction more permits 2: Local permit with variances/Nationwide 3: Limited local permits	2	4.0	3	6.0	2	4.0	2	4.0
		7	Time for Implementation or Construction	1: ≥ 2 Years 2: 1 - 2 Years 3: 0 - 1 Years	2	4.7	3	7.0	2	4.7	2	4.7
		7	Land and Easement Acquisition	1: Condemnation required 2: Purchase necessary 3: No additional acquisition required	2	4.7	3	7.0	2	4.7	3	7.0
Social	10	5	Element of Comprehensive Plan (Parks, Transportation, Planning, etc.)	1: No elements in other plans 2: Related to elements in other plans 3: Multiple elements other plan	1	1.7	1	1.7	2	3.3	1	1.7
		5	Beneficial Neighborhood Impacts	1: Negative Neighborrhood Impact 2: No Neighborhood Impact 3: Positive Neighborhood Impact	2	3.3	3	5.0	3	5.0	2	3.3
						81.7		**73.3**		**76.7**		**74.0**

City of Pflugerville - Drainage Project Ranking Criteria

Category	Category Weight	Sub Category Weight	Sub Category	Scoring	WC-03 Vilamoura St/Kelly Ln.		WC-04 FM 685/East Pflugerville Pkwy		WC-05 Kennemer Dr	
					Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score
Public Safety	40	15	Road Flooding and Mobility (Pre-Project Conditions)	1: Isolated Local Roadway Flooding 2: Collector Roadway Flooding 3: Moving water is likely to wash car off road (consider velocity and depth)	3	15.0	2	10.0	1	5.0
		15	Number of Structures within 100-yr (1% ACE) footprint (Pre-Project Condition)	1: 0-4 flooded 2: 5-10 flooded 3: 10+ flooded or critical facility effected	2	10.0	1	5.0	1	5.0
		10	Level of Service (Post-Project Protection)	1: ≤ 25-yr (4% ACE) 2: 25-yr (4% ACE) - 100-yr (1% ACE) 3: ≥ 100-yr (1% ACE)	3	10.0	3	10.0	1	3.3
Economic	30	20	Project Cost	1: ≥ 5 Million 2: $2 - 5 Million 3: ≤ $2 Million	1	6.7	1	6.7	2	13.3
		10	Operation & Maintenance Schedule	1: Monthly maintenance 2: Bi-Annual maintenance 3: Annual + maintenance	3	10.0	2	6.7	2	6.7
Project Timing	20	6	Ease of Permitting	1: Multi-jurisdiction more permits 2: Local permit with variances/Nationwide 3: Limited local permits	2	4.0	1	2.0	3	6.0
		7	Time for Implementation or Construction	1: ≥ 2 Years 2: 1 - 2 Years 3: 0 - 1 Years	1	2.3	2	4.7	2	4.7
		7	Land and Easement Acquisition	1: Condemnation required 2: Purchase necessary 3: No additional acquisition required	2	4.7	2	4.7	3	7.0
Social	10	5	Element of Comprehensive Plan (Parks, Transportation, Planning, etc.)	1: No elements in other plans 2: Related to elements in other plans 3: Multiple elements other plan	2	3.3	2	3.3	2	3.3
		5	Beneficial Neighborhood Impacts	1: Negative Neighborrhood Impact 2: No Neighborhood Impact 3: Positive Neighborhood Impact	3	5.0	2	3.3	3	5.0
						71.0		**56.3**		**59.3**

Appendix D
Drainage Utility Fee Feasibility Study

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REPORT

DRAINAGE UTILITY FEE FEASIBILITY STUDY

NewGen Strategies & Solutions

In support of Halff Associates, Inc.
City of Pflugerville, TX
Drainage Master Plan

NewGen Strategies & Solutions

275 W Campbell Road
Suite 440
Richardson, TX 75080
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August 4, 2022

Patricia A. Davis, M.S.C.E., P.E.
City Engineer
City of Pflugerville
15500 Sun Light Near Way, #B, Bldg 6
PO Box 589 Pflugerville, Texas 78691

Subject: Drainage Utility Fee Feasibility Study - Report

Dear Ms. Davis:

In conjunction with the Drainage Master Plan being conducted by Halff Associates, Inc. (Halff), the City of Pflugerville, TX (City) engaged NewGen Strategies & Solutions, LLC (Project Team) to prepare a financial plan specific to the City's cost of service associated with the provision of Stormwater service (Stormwater or Drainage) and to develop projected rates for the Drainage Utility specific to Fiscal Years (FY) 2023 through FY 2027. This report describes the analysis performed by the Project Team and makes recommendations with respect to prospective rates to be considered to charge to the City's Stormwater customers.

Drainage as a Utility

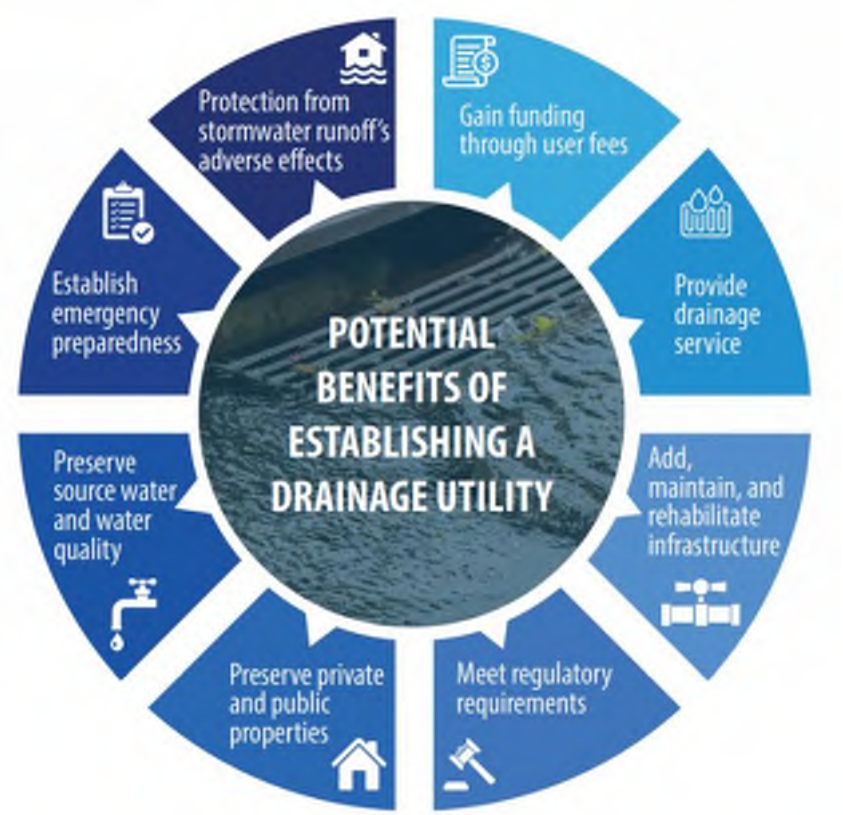
Establishing a Drainage or Stormwater Utility is a viable strategy for local governments to respond to the challenge of generating reliable revenue to support stormwater management activities. Setting up a drainage utility allows a community to establish a user fee based on the demands property owners place on the drainage system. It subsequently provides a dedicated revenue stream for stormwater programs.

There are several benefits to a local government of a dedicated drainage utility fee. These are visualized in Figure 1 on the next page, but the most commonly cited are described below.

- **Revenue** – A dedicated fee generates a stable source of revenue to fund stormwater BMPs.
- **Structure** – A distinct utility creates an organized entity to solve the problems regarding stormwater management including aging infrastructure, development, and legal challenges.
- **Environment** – Increased focus on stormwater issues such as erosion, flooding, preservation of source water and water quality can encourage environmental initiatives.
- **Regulation** – A dedicated Drainage Utility can focus on meeting the requirements of TPDES permits and other regulatory mandates.

Most importantly, a stormwater utility provides the means of collecting the revenue required to construct and maintain large stormwater capital improvements needed to help protect City businesses and residents from the effects of flooding.

Figure 1: Benefits of a Drainage Utility



There are several funding mechanisms that may be used to generate revenue for the operation of a stormwater utility. Examples are ad valorem taxes, rates based on lot size, and fees based on impervious area. Each funding mechanism has benefits and disadvantages. When deciding the funding mechanism of a stormwater utility a balance must be made between the administrative simplicity and understandability of the fee and the detail and equity by which it allocates costs to customers.

In all cases, assumptions and allocations must be made due to the impracticality of measuring the actual runoff contribution of each customer parcel within a stormwater system. In general, impervious area is considered the most equitable funding mechanism for a stormwater utility because it most accurately reflects the stormwater contribution of each customer's parcel to the system.

Financial Plan Development

To develop the forecasted costs and revenues for the City's potential Drainage Utility, NewGen coordinated city staff, as well as with Halff Associates. The forecasts contained herein estimates based on the latest available data and may change materially with changes in assumptions and the timing at which decisions are made to implement key policies. As the City makes decisions on the path forward, NewGen recommends updating the forecast with the latest available data.

The Project Team met with City staff multiple times to consider the City's existing activities as well as any potential new activities/services. In development of the financial plan, the Project Team included costs as

applicable and allowed under Section 522.044 of the Texas Local Government Code. Such costs may include the following:

- Cost of land acquisition;
- Capital cost of stormwater management facilities;
- Professional services fees including, but not limited to, architectural, engineering, planning, financial, and/or legal services;
- Operations & maintenance (O&M) and major repair and replacement expenses associated with stormwater facilities;
- Cost of rolling stock and other machinery and equipment;
- Interest and issuance costs associated with financing;
- Amortization of non-recurring costs (i.e., start-up costs, etc.);
- Direct and indirect administrative cost including, but not limited to, support services costs (i.e., utility billing, etc.); and;
- Any anticipated revenues from any ancillary funding mechanisms (i.e. revenue offsets).

The expenditures and estimated applicable revenues projected for FY 2023 and into the future based on the City's projected CIP and projected O&M costs, estimated annual inflation, and estimated customer growth are summarized in the remainder of this report.

Revenue Requirement

To develop the Test Year FY 2023 Revenue Requirement (i.e., the first year for which rates are developed), NewGen held discussions with City staff to determine the planned services and associated costs initially for this new utility. NewGen was able to meet with the City's Finance Director, Public Works Operations Director as well as the City Engineer to gather cost details. This first year was set transitioning a number of programs from the Public Works Department and included several new programs. These and other future year additions were forecasted through FY 2027 as shown below.

Personnel

Three total employees are included in revenue requirement. To reflect needed personnel specific to the management of stormwater within the City, NewGen worked with City staff to personnel needs beginning in FY 2023 as listed in Table 1-1 below.

Table 1-1: Estimated Personnel Need

Position Description	Estimated Costs	First Year Funded
2 Maintenance Technicians - Wages	$ 114,000	2023
2 Maintenance Technicians – Benefits	$ 51,300	2023
Technical Review Engineer - Wages	$ 75,000	2023
Technical Review Engineer - Benefits	$ 30,000	2023
New Maintenance Technician - Wages	$ 60,471	2025
New Maintenance Technicians – Benefits	$ 27,212	2025

Annual wages estimated for the Maintenance Technicians were provided by the Finance Department. Benefits were estimated at 45% of salaries or wages.

Operational Expenses

In addition to staffing, other operational expenses were identified. This includes general supplies, informs, personal protective equipment, transfers to Utility Billing (UB) and General Fund (GF) for services and facilities benefiting the utility, along with various contractual services. Table 1-2 below reflects these needs and outlines a few specific funding requests.

Table 1-2: Estimated Non-Personnel Operational Expenses

Position Description	Estimated Costs	First Year Funded
Crew Truck (Current Lease)	$ 12,614	2023
New Crew Truck	$ 13,449	2025
Contract Street Sweeping	$ 160,000	2023
Contract Mowing	$ 60,000	2023
Indirect Cost Allocations	$ 30,000	2023
Transfers (Payments to UB and GF)	$ 208,643	2023
General Operation Expenses	$ 156,200	2023

Given the assumptions outlined above, NewGen estimates that the City will need to generate $658,328 through stormwater fees in FY 2023 to cover personnel and other operational expenses.

Capital Projects

The Drainage-related CIP has been outlined in great detail in the Drainage Master Plan Document. The total listing of projects is over $80M. Given that the Drainage Utility will be new and other operational expense demands, it is not currently assumed the Drainage Utility will undertake all the CIP projects provided in the Masterplan within the five-year financial forecast period. The ultimate rate to charge, if any, will be determined by the City Council. Based on the fee set, some expenses and projects may be delayed beyond FY 2027. Figure 1 below outlines a funding scenario for various CIP projects that could be funded over the next five years at possible Drainage Fee amounts. For example, if a $9 or higher fee is set, the City could undertake the eleven projects with a red check mark under $9 fee. This is in stark contrast to the listing of five projects under the blue $3 fee column.

If the desire is to get each of the projects listed underway, NewGen estimates a $12 fee should cover the related expenses. This estimate is provided but warrants additional review in subsequent years given the

rapidly increasing interest rate environment at the time of this review. Alternately, if market conditions make the cost of borrowing higher than expected or desirable for the City, the City may choose to complete these over a longer timeframe such as 15-20 years.

Figure 2: CIP Project Listing by Funding Option

$9 FEE Funding S7 for Capital	$6 FEE Funding S4 for Capital	$3 Fee Funding S1 for Capital	Drainage CIP Project List			
			Ranking	Project Name	Ranking Value	Estimated Project Cost
✓	✓	✓	1	Immanuel Rd/Pecan Park at Gilleland Creek	81.7	$4.86M
✓	✓	✓	2	Weiss Ln at Gilleland Creek	76.7	$1.63M
✓	✓		3	Caldwell Elem. at Gilleland Creek	75.0	$9.68M
✓	✓		4	Hidden Lake Dr at Wilbarger Creek Trib 200	74.0	$4.03M
✓	✓		5	Pfenning Ln/Pecan St Intersection	73.3	$372K
		Previously Funded	6	Villamoura St/Kelly Ln at Wilbarger Creek Trib 200	71.0	$12.4M
✓	✓		7	Swenson Farms Blvd at Gilleland Creek	70.0	$5.22M
✓			8	N. Heatherwilde at Gilleland Creek	66.7	$8.49M
			9	Railroad Ave. at Gilleland Creek	66.7	$16.84M
✓			10	Kennemer Dr at Wilbarger Creek Trib 200	59.3	$3.11M
			11	FM 685/E. Pflugerville Pkwy at Wilbarger Creek Trib 200	56.3	$15.94M

$9 FEE Funding S7 for Capital	$6 FEE Funding S4 for Capital	$3 Fee Funding S1 for Capital	Operation & Maintenance Project List			
			Project ID	Project Name	Ranking Value	Estimated Project Cost
✓	✓	✓	PF-01	Drainage Criteria Update	NA	$30K
✓	✓	✓	PF-02	Creek Maintenance Plan	NA	$15K
✓	✓	✓	PF-03	Stormdrain CCTV Evaluation	NA	$330K

Inflation Assumptions in the Five-Year Financial Plan

The development of the five-year financial plan utilized FY 2023 as the base year for revenue requirement projections through FY 2027. Inflation factors were estimated and applied to the Test Year data. These factors are discussed in more detail below. It is worth noting that at the time of this Study and report, the United States has been recording record inflation figures relative to the last few decades. That said, the estimates derived in conversation and through City staff input are already informed with those adjustments. Therefore, the inflation adjustments scheduled for FY 2024-2027 rely heavily on the twenty-year historical averages.

- General – A general inflation factor of 3.26% was applied to all line-items not discussed specifically below per the 20 Year Average Municipal Cost Index developed by American City and County as of June 2022.
- Personnel – An inflation factor of 3.00% was applied to all salaries and wages, while a 7.50% factor is applied to benefit costs, based on conversations with City staff.
- Construction Cost Index (CCI) - 20 Year Average Engineering News Record CCI of 3.30 as of June 2022.
- Growth – Growth was assumed to be 640 Residential Accounts per year, similar to the Water and Wastewater Rate Study.

Drainage Utility Fee Basis and Billing Units

The Project Team developed rate scenarios for stormwater based on Equivalent Residency Units (ERU). The Project Team relied on Halff Associates GIS analysis to calculate ERUs per customer based on impervious square footage. This impervious cover was determined for every parcel in the City. Then Single Family (State Code A1) parcels were averaged to determine Pflugerville's ERU value as 3,650 sq ft.

From the same impervious surface analysis, Halff was able to determine that Non-Residential Parcels in Pflugerville contain just over 93.4M sq ft of impervious area. To set the total paid by non-residential parcels equitably, we determine each parcels relative number of ERUs. Dividing this total by the ERU value determined as 3,650 results in 25,593 Non-Residential ERUs. This calculated value plus the Residential count of 18,753 makes the total monthly billable ERUs approximately 44,346.

Since neither the Project Team nor the City have yet to complete the Utility Billing matching effort it is assumed some of the values may not ultimately get assigned to an account or billed. NewGen makes a 7% adjustment reducing the total billing units to account for this uncertainty. Additionally, since this is billed normally on water bills, which are occasionally inactive and unbilled, NewGen has made a second adjustment of 3% for non-billed and nonpayment potential. These adjustments reduce the monthly billable revenue projection to $39,912 per $1 charged to each ERU.

Table 1-3 below reflects the expected billable ERUs less the adjustments mentioned, plus growth to derive annual revenues for several fee levels. Notably, FY 2023 only assumes six months of billed revenue to allow for City implementation of the fee and updates in the Utility Billing system.

Table 1-3: Calculated Drainage Utility Fee per ERU

	2023	2024	2025	2026	2027
Annual ERU Assumption	239,470	486,621	494,301	501,981	509,661
$ 1 / ERU Annual Revenue	$ 239,470	$ 486,621	$ 494,301	$ 501,981	$ 509,661
$ 3 / ERU Annual Revenue	$ 718,411	$ 1,459,863	$ 1,482,903	$ 1,505,943	$ 1,528,983
$ 6 / ERU Annual Revenue	$ 1,436,823	$ 2,919,725	$ 2,965,805	$ 3,011,885	$ 3,057,965
$ 9 / ERU Annual Revenue	$ 2,155,234	$ 4,379,588	$ 4,448,708	$ 4,517,828	$ 4,586,948
$12 / ERU Annual Revenue	$ 2,873,645	$ 5,839,451	$ 5,931,611	$ 6,023,771	$ 6,688,292

It is worth noting here that NewGen has made no assumptions for discretionary exemptions. The City has some discretion in exempting or partially exempting the fee to a number of customer classes per the statute. Should the City choose to exempt any eligible property owners, the revenue potential for the utility will decrease equal to the ERUs exempted.

Feasibility Study Rate Recommendations

Given the results of operational revenue requirements, substantial capital needs, and feedback from the City Council about the criticality of the projects, NewGen recommends the City consider a fee of no less than $9 per ERU to help meet its five-year operational and capital objectives for the Drainage Utility.

NewGen Strategies & Solutions

THANK YOU!

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