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DRAINAGE MASTER PLAN

Prepared for:

City of Terrell, Texas

June 2020

Prepared by:

FREESE AND NICHOLS, INC.
2711 N. Haskell Ave, Suite 3300
Dallas, Texas 75204
214-217-2200

VOLUME 3

RELATED INTERIM DELIVERABLES

TABLE OF CONTENTS

1.0 INTRODUCTION

This volume includes the interim deliverables submitted during the study that relate to the Drainage Master Plan report. In some cases, there were minor subsequent modifications due to the increased level of detail the analyses achieved later into the study.

The Drainage Maintenance Best Practices Memorandum discusses the findings and recommendation after FNI completed the peer review process with local municipalities.

The Small Project Memorandum identifies a list of small projects based on the site visits, recent history of work orders, feedback from the public meeting and the ROM analysis. The more detailed modelling performed later in the study showed that problems originally noted as Small Projects were in fact part of a problem that would require a larger scale solution. In these situations, the Small Project was upgraded to the Large Project list.

The Funding Assessment Memorandum demonstrates the magnitude of the need to increase stormwater utility fee revenues to fund the City's proposed drainage infrastructure. The Large and Small Projects lists are used to assess the quantity and timing of the financial need.

Drainage Maintenance Best Practices Memorandum

MEMORANDUM

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TO: Steve Rogers, P.E.

CC: Mike Mikeska, P.E.

FROM: Scott Hubley, P.E., Jeremy Dixon, P.E.

SUBJECT: Drainage Maintenance Best Practices

DATE: 12/17/2018

PROJECT: TER17602 – Drainage Master Plan

As part of the Drainage Master Plan (DMP) for the City of Terrell (City), Freese and Nichols, Inc. (FNI) was scoped to document current Drainage Maintenance Best Practices for stormwater infrastructure and provide recommendations for maintenance and inspection. FNI contacted peer municipalities in North Central Texas that collectively represent a range of stormwater systems and population sizes that could be used to benchmark the City's current practices. Representatives form Fort Worth, Weatherford, Ennis, Bryan, Mansfield, Greenville, and Red Oak provided responses to the questionnaire in Appendix A. Five categories of questions were posed in the questionnaire:

I. Summary of Staff and Equipment
II. Drainage Funding
III. Stormwater System Description
IV. Maintenance and Field Operations Capabilities
V. Maintenance and Field Operations Activities

Results

The direct responses are in Appendix B. This memo will summarize the feedback provided by the peer cities. FNI will use the interpreted industry standards to outline recommendations to the City regarding their drainage group and stormwater system.

I. Summary of Staff and Equipment

The number of drainage staff for each peer city varied from 7-70 people as shown in **Figure 1**. The number of field crews for each peer city is also included. There were some cities that did not have a field crew specified solely for drainage work. The figure also indicates if the group has a

specialized field crew for drainage maintenance, which is denoted by the asterisk (*).

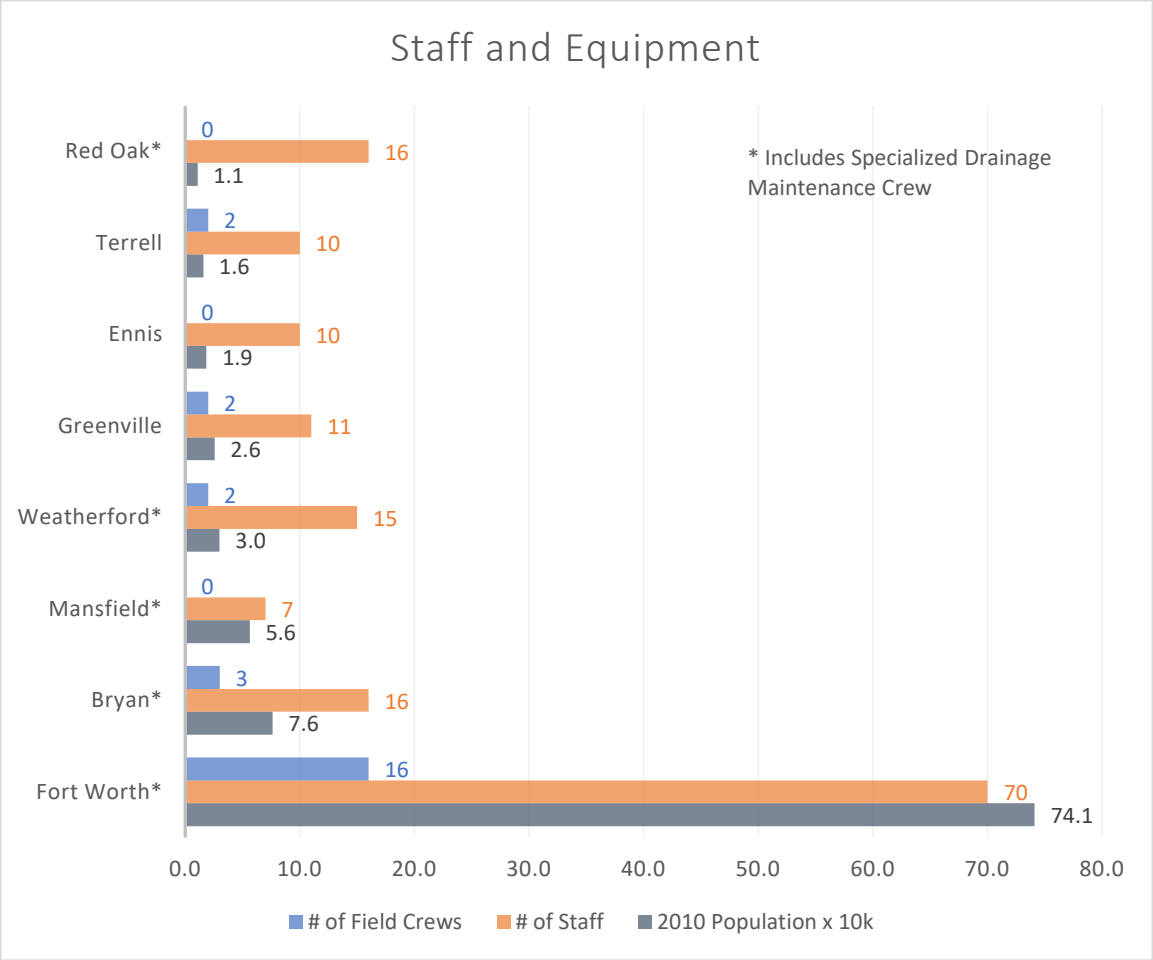

Figure 1: The number of staff and designated field crews for the city's drainage group.

The City is using a comparable number of staff and field crews compared to the other peer cities. Instead of being dedicated drainage staff, the City's staff perform other functions when drainage maintenance is not the top priority. The City reported 25 total maintenance staff and 5 field crews, however when adjusting for the intermittent nature of the work, the staffing level for the City is comparable to the peer cities. A ratio of 5 staff per field crew is consistent with other peer cities.

The number and types of maintenance equipment is shown in **Figure 2**. The City has a comparable variety of key equipment relative to the peer cities, though most of the peer cities only reported the streets and drainage maintenance equipment, whereas the City reported all the equipment including that used to service water and wastewater operations. An excavator was the only common type of equipment mentioned by the peer cities that the City does not own. The City may also investigate the costs to purchase or rent on an as needed basis both a street sweeper unit and a hydromulcher.

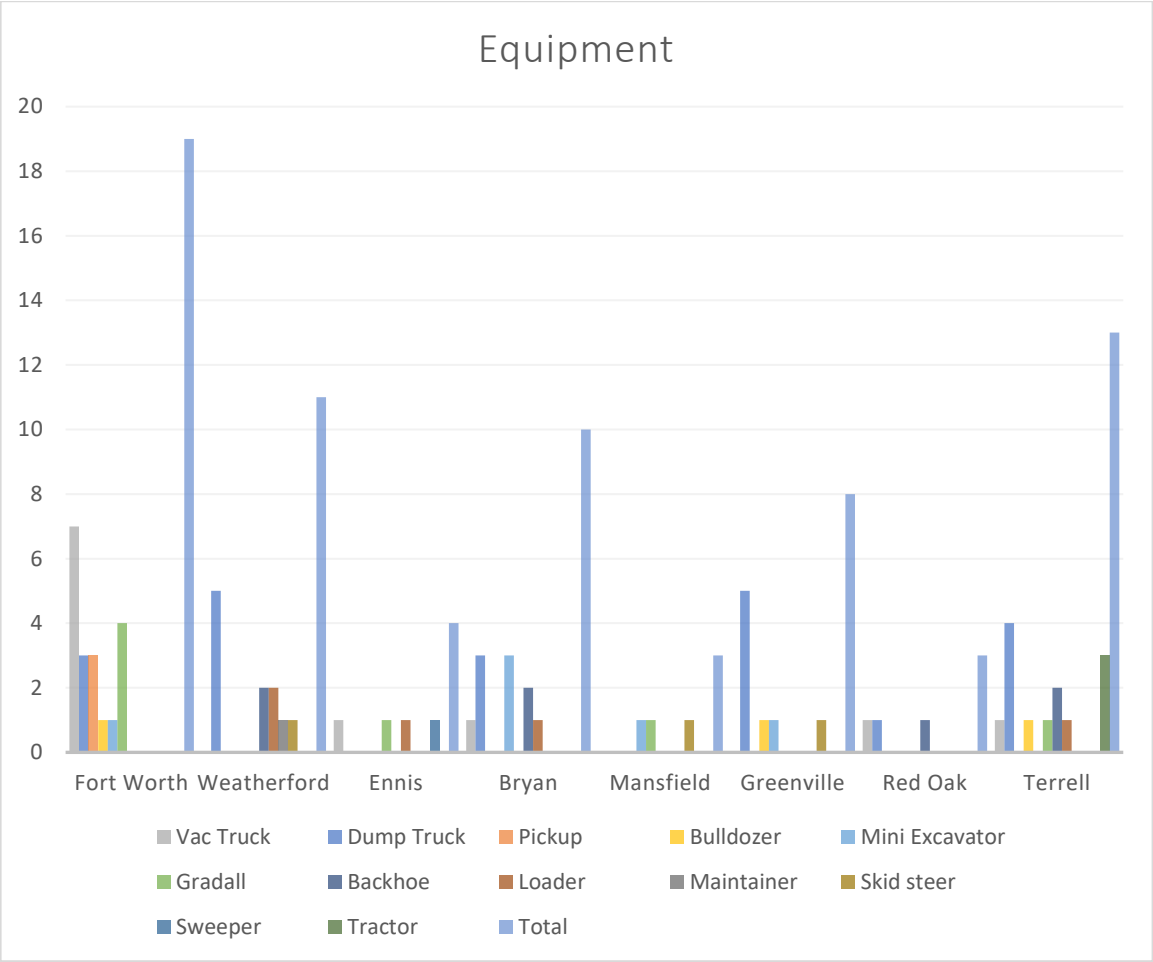

Figure 2: The number of and types of equipment used by the city's drainage group.

II. Drainage Funding

All the questioned peers except for Ennis and Greenville utilize a Stormwater Utility (SWU) fee. The ERU rate of the SWU ranges from $4.50 to $14.00, with an average of $7.10 (n=5). The City's current rate of $5.65 is the median value, as shown in **Figure 3**. The current rate of $5.65 per ERU provides approximately $1 million on an annual basis.

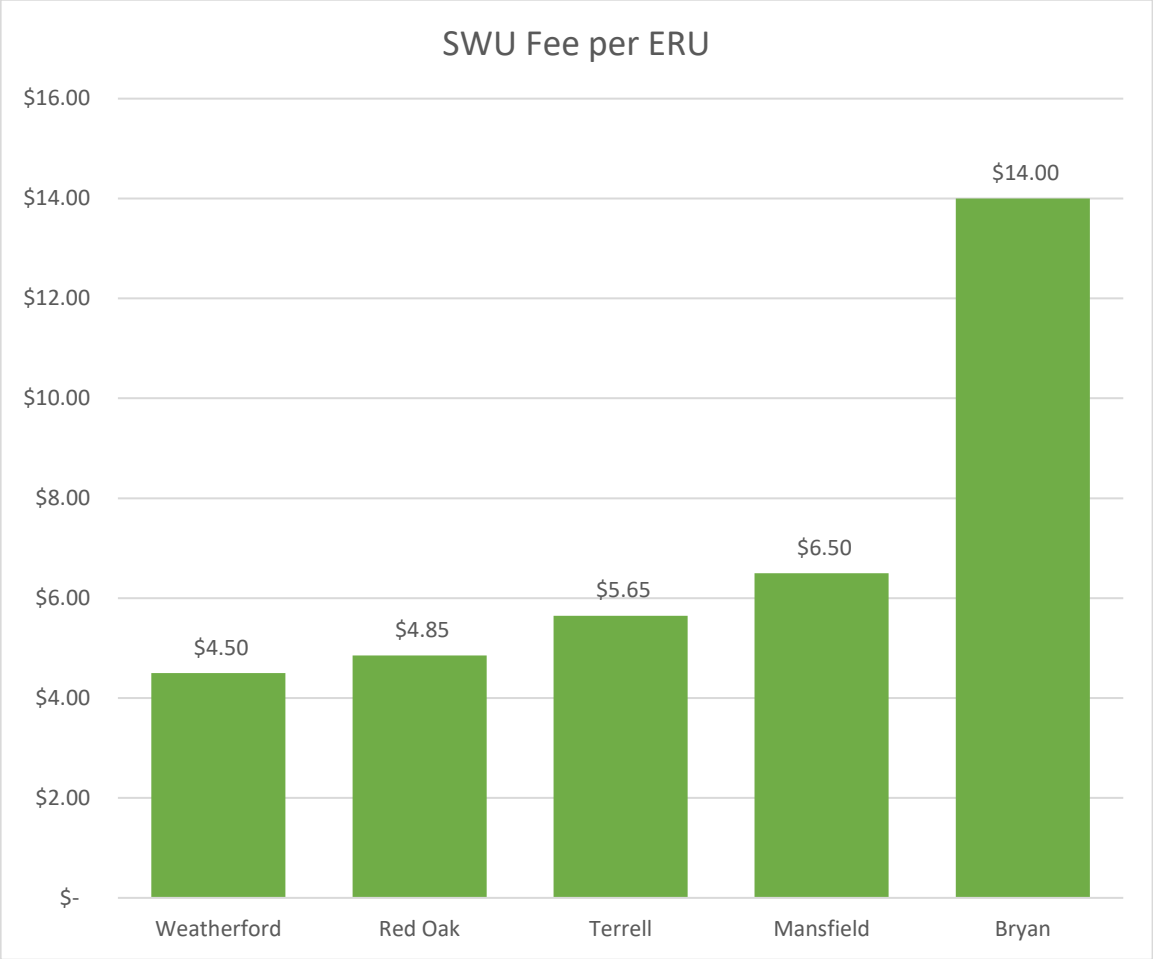

Figure 3: Stormwater Utility Fee per ERU

Use of the SWU fee varies by city, however some respondents indicated they use SWU funds to supplement the general fund to achieve their organization's maintenance goals.

III. Stormwater System Description

As part of the Drainage Master Plan project, most of the City's drainage infrastructure was inventoried and field-verified including a total of 26.2 miles of storm drain, 6.6 miles of open channel, 747 inlets, and 269 headwall structures.

A detailed assessment of the stormwater system has been performed in Fort Worth, Ennis, and Mansfield. Ennis has approximately twice the length of storm drain of the City and Mansfield has approximately four times the length of storm drains of the City.

VI. Maintenance and Field Operations Capabilities

The capabilities of the drainage groups' maintenance and field operations is displayed in **Table 2**. Drainage structure cleaning, channel maintenance, and installing and repairing storm drains were consistent capabilities of all the drainage groups. Rehabilitation of existing pipes and construction of retaining walls were usual capabilities of the peer cities. Other services like CCTV inspection of pipes and street sweeping were usually available via the drainage group or another group at the city.

Capable / Sometimes / Not Capable	Terrell	Fort Worth	Weatherford	Ennis	Bryan	Mansfield	Greenville	Red Oak
Drainage structure cleaning (inlets, manholes, etc)								
Channel maintenance (vegetation, grading, debris)								
Install new or replace storm drain pipes								
Rehabilitate storm drain pipes in place								
Cast in place concrete work for inlets, headwalls, aprons, etc.								
Construct or repair retaining walls (modular block, gabions, MSE)								
CCTV Inspection of storm drain pipes								
Street Sweeping								

Table 2: Capabilities of the Maintenance and Field Operations

All peer cities are using third-party work order systems including Accella, City Works, iWorQ, HTE, MyGov, and Go in Force/MS4 Web.

VII. Maintenance and Field Operations Activities

The general trend for inspection of channels, inlets, pipes, bridges/culverts, and water quality feature was a reactive approach. These assets are inspected when there is a complaint, after a storm event, or when there have been noted problems. One exception was Fort Worth noted they inspect inlets on a three-year cycle, regardless of need. The other peer cities noted that the developer or property owners are responsible for inspection of detention ponds whereas Fort Worth uses a city inspector.

Maintenance and repairs for drainage assets are also done on a primarily reactive basis. Mansfield performs quarterly upkeep to bridges/culvert at street crossings.

Recommendations

Immediate

The number of City Staff and Field Crews are consistent with other peer cities. If the rate of drainage maintenance activities is insufficient to achieve to the goals of the program, FNI recommends increasing the duration of storm drainage maintenance activities as part of the part time activities of city staff. If this is not an option, FNI recommends converting multipurpose staff to full time drainage maintenance personnel. Additionally, the amount of inspection required to identify issues with drainage infrastructure should minimally be quantified and scheduled. The results of the GIS inventory may be leveraged to identify the number of inlets that are critical and may need to be inspected on a more regular basis.

The City appears to have sufficient variety and quantity of equipment relative to the peer cities. Peer cities generally have an excavator, which was the only consistently missing piece of equipment for the City. A street sweeper can also be a piece of equipment with a high benefit to cost ratio the City should consider adding. As these pieces of equipment age out of service, the City should consider the benefit of replacing each piece of equipment relative to the needs and consider if rental could be more cost-effective than owning.

The City can optimize the drainage maintenance program by leveraging the GIS dataset produced as part of the Drainage Master Plan project. By keeping an accurate and robust GIS of the storm drain features including channels, inlets, pipes, etc., the City can determine the true cost of drainage maintenance and have a better overall program by developing and implementing a programmed schedule for inspection and maintenance instead of reactively working as issues arrive. This is consistent with the concept of the SWU fee.

Long Term

FNI recommends the City conduct an asset management benchmark evaluation as a best path forward for identifying future staffing, equipment, and approaches to maintain the City's storm system. While this effort has provided a benchmark evaluation with respect to peer cities, the next step would be a benchmark evaluation with respect to the goal performance of the City's drainage system. Through this

process, the City will be able to identify critical infrastructure requiring a planned, proactive approach to maintenance to maintain system function and minimize risk to the community and infrastructure such as buildings, roadways, and buried utility lines. Similarly, the City will be able to identify infrastructure with low consequence of failure for which a reactive, run-to-failure approach to service is viable and cost effective.

Following is a step-wise process to developing a storm system asset management evaluation:

1. Review the storm system inventory to identify gaps and develop a plan to prioritize the capture of key missing infrastructure in the system inventory.
2. Review condition assessment data for the storm system infrastructure and develop plan to collect and/or enhance condition data for informed evaluations.
3. Conduct a risk-based assessment of the storm system to identify the probability and consequence of infrastructure failure throughout the system.
4. Evaluate and update the storm system level of service policies to set benchmark performance goals.
5. Develop a prioritized maintenance, rehab, and renewal program with projected costs based on the current understanding of the system condition and goal service levels.

The City should consider the above steps to be an iterative process, with continuously improving data being input into the asset management decision-making process to provide for more informed decisions; however, it is not necessary to obtain full and complete information for each step prior to progressing to the next step.

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Appendix A

Questionnare

Stormwater Maintenance Questionnaire

Describe your Maintenance/Field Operations Group
Staff Contact Name
Staff Contact Role
Staff Contact Email
Staff Contact Phone
Interview Date

Number of Staff

Number of Field Crews

Summary of Equipment
Is this information summarized in a business plan or similar document? (if yes, are you willing to share)
Are you embedded within a general maintenance group along with streets and water/sewer?
Do you have specialized Drainage Maintenance field crews?
What is your annual budget for your drainage maintenance staff?

Describe your Stormwater System
Miles of Pipes
Miles of Culverts
Miles of Channels
Number of Inlets
Number of Outfalls
Number of Manholes
Number of detention ponds/dams

Describer you Maintenace/Field Operations Capabilities.

Is your staff able to perform the following tasks with in-house personnel and equipment:
Drainage Structure cleaning (inlets, manholes, etc)
Channel maintenance (vegetation, grading, debris)
Install new or replacement storm drain pipes
Rehabilitate storm drain pipes in place
Cast in place concrete work for inlets, headwalls, aprons, etc.
Construct or repair retaining walls (modular block, gabions, MSE)
CCTV Inspection of storm drain pipes
Street Sweeping
Are your activities primarily reactive in nature or programmed?
Do you use a work order system to track and plan your activities? If so, which software do you use?
Does your maintenance staff regularly interface with GIS data or assist with keeping it maintained by reporting or collecting geo-spatial information?

Describe you Maintenance/Field Operations Activities

How frequently do you inspect the following assets?

- Channels
- Inlets
- Pipes
- Ponds/Dams

- Bridges/Culverts
- Water Quality features

How frequently do you perform maintenance or repairs on the following assets?

- Channels
- Inlets
- Pipes
- Ponds/Dams
- Bridges/Culverts
- Water Quality features

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Appendix B

Questionnaire Reponses

Stormwater Maintenance Questionnaire

Describe your Maintenance/Field Operations Group	Terrell	Fort Worth	Weatherford	Ennis	Bryan	Mansfield	Greenville	Red Oak
Staff Contact Name	Glen Caldwell	Vicente Elias	Matt Leppla	Robert Bolen	Robert Willis	Howard Redfearn	John Wright	Ray Silva-Reyes
Staff Contact Role		Field Operations Supervisor	Operations Manager	Public Works	Streets and Drainage Superintendent	Environmental Manager	Public Works Di	Public Works Director
Staff Contact Email		vicente.elias@fortworthtexas.gov	mleppla@weatherfordtx.gov	rbolen@ennistx.gov	rwillis@bryantx.gov	howard.redfearn@mansfieldtexa	Jwright@ci.Gree	rsilvareyes@redoaktx.org
Staff Contact Phone	972-551-6642	817-392-5191	817-598-4148	972-875-1234	979-549-7169	817-276-4240	903-457-3135	469-218-7723
Interview Date	2018-08-01	2018-02-16	2018-06-05	2018-06-14	2018-06-13	2018-06-15	2018-07-03	2018-06-06
Number of Staff	10-12 not just SW (25 for parks, w/ww/ sw)	70	15	10 staff members in street department 0 specifically assigned to drainage	16	7	11	16
Number of Field Crews	5 (intermittently focused on SW)	16 total (6 inlet, 4 Vegetation, 3 Channel, 3 Concrete)	2	None specifically assigned to drainage	1 concrete, 1 drainage, 1 asphalt	1	2	N/A
Summary of Equipment	gradall, 2 backhoe, 3 dump, 1 6y dump, trackloader, dozer, low boy (deck), tractor (to pull), 18y dump trailer, back truck, 3 tractor (kase, kabota, ___),	7 vac trucks, dump trucks, pickups, 1 bulldozer, 1 mini excavator, 1 grade-all-rubber tire, 3 track grade-all	2) Backhoes, 2)Loaders,1) Maintainer,1)Skid Steer, 5)Dump Trucks	Vac truck, sweeper, dump trucks loader, Gradall	3 excavators, several dump trucks, 2 backhoes, 1 loader, vac truck, do lots of rentals	Gradall steel track, 1 mini-excavator rubber track, skid steer wheeled	1 Dozer 1 Excavator 1Tractor Skid Steer 5 Dump Truck	1 15 yd dump truck Backhoe Vac Truck
Is this information summarized in a business plan or similar document? (if yes, are you willing to share)	No	org chart only	we do not have a formal document	No	No	Not really	No Document	no
Are you embedded within a general maintenance group along with streets and water/sewer?	Yes and no	separate	We are streets and stormwater	yes and no	Streets and Drainage	Yes	Yes Streets	Yes
Do you have specialized Drainage Maintenance field crews?		yes	no	no	yes	Yes and no	No	In transition
What is your annual budget for your drainage maintenance staff?	$100k from street budget; $1.2M SW ($100k for equipment rental, raw Maintenance is ~$200k; some outsourced maintenance work)	$8.5M	N/A	n/a	$1.9M for all 16 staff (not including outsourced work ~$5-6M)	Hard to say	$20,000	$800,000.00
How is your maintenance group funded? (SWU, general fund, etc)	Stormwater fund,				general fund		General Fund	
Do you have a SWU?		Yes	Yes	No	Yes	Yes	No	Yes
What is the current rate (ERU)?			$ 4.50		$ 14.00	$ 6.50	?	$ 4.85
Describe your Stormwater System			A detailed assessment of our stormwater system has not been done				A detailed assessment of our stormwater system has not been Done	A detailed assessment of our stormwater system has not been done
Miles of Pipes	27	947		50		112	Unknowed	
Miles of Culverts		72		5		11	Unknowed	
Miles of Channels		1028		25		15	Unknowed	
Number of Inlets		26362		250		2551	Unknowed	
Number of Outfalls		7627		25		799	Unknowed	
Number of Manholes		6318		75		430	Unknowed	
Number of detention ponds/dams						2	Unknowed	
Describer you Maintenace/Field Operations Capabilities.								
Is your staff able to perform the following tasks with in-house personnel and equipment:								
Drainage Structure cleaning (inlets, manholes, etc)	Y (not pipes)	Yes	Yes	yes (in most cases)	Yes	Yes	Yes Streets	Yes
Channel maintenance (vegetation, grading, debris)	Y	Yes	Yes	yes (in most cases)	Yes	Depends on scope	Yes Streets	Yes -Vegetation
Install new or replacement storm drain pipes	Y	Yes	Yes	yes (in most cases)	Yes	Depends on scope	Yes Streets	Yes
Rehabilitate storm drain pipes in place	Can; but typically replace	No	No	no	In progress	Not really	no	no
Cast in place concrete work for inlets, headwalls, aprons, etc.	No	Yes	Not on a regular basis	in some cases	Yes	Aprons only	Yes Streets	yes
Construct or repair retaining walls (modular block, gabions, MSE)	No	Some, depends	No	in some cases	Gabions	Not really	No	no
CCTV Inspection of storm drain pipes	Can; but typically outsource	Yes	No	no	Water services has CCTV, only a	No equipment	Yes Streets	yes
Street Sweeping	No	Environmental	Yes	yes	Solid waste	Contract	yes as needed	yes-as needed
Are your activities primarily reactive in nature or programmed?	50/50 Programmed - routine maintenance, vegetation mgmt Reactive - failure of failed pipes, RCP joint separations	Reactive	Reactive	reactive (in most cases)	Varies. Some of both. Annual process to clean all culverts and creek crossings with rented equipment. Use inmate crew for cleaning culvert crossings	Reactive	Reactive	In transition from reactive to proactive
Do you use a work order system to track and plan your activities? If so, which software do you use?	iWorq; looking for alternative	Accella	City Works	Just starting iWorQ	HTE	MyGov	My Grov	Go in Force/MS4 web
Does your maintenance staff regularly interface with GIS data or assist with keeping it maintained by reporting or collecting geo-spatial information?	No	Tablets-GIS-linked to Accella	City Works is GIS based	No	No	Not really	yes	GIS based
Describe you Maintenance/Field Operations Activities							Reactive to Events	rehab streets and surrounding area.
How frequently do you inspect the following assets?	No routine inspection, post-events/reactive		We currently do not have a scheduled inspection process for stormwater infrastructure, reactionary only		No scheduled process for the most part except to meet MS4 requirements. Primarily ad hoc during other field activities		We currently do not have a scheduled	We currently do not have a scheduled inspection process for stormwater infrastructure, reactionary only
Channels		Reactive-inspections done by planning staff		Reactive		On complaints	No	

Stormwater Maintenance Questionnaire								
Describe your Maintenance/Field Operations Group	Terrell	Fort Worth	Weatherford	Ennis	Bryan	Mansfield	Greenville	Red Oak
Inlets		3 year cycle		Intermittent triggered by problems		On complaints	No	
Pipes		Not yet		Intermittent triggered by problems		On complaints	No	
Ponds/Dams	Outsources and pays through PID	Ranjan does dams and detention ponds	Detention ponds are maintained by developer/property owner	Dam inspection on City lake		Have not inspected	Detention Ponds are maintained by property owner	Detention ponds are maintained by developer/property owner
Bridges/Culverts		No routine-ditch list-22 routes before/after rains		Intermittent triggered by problems		After rains	No	
Water Quality features		no		no		Depends on type of device	No	
How frequently do you perform maintenance or repairs on the following assets?	Reactive	Reactive	Reactive	Reactive			Reactive	Reactive
Channels		10 yr backlog		Reactive		As problems discovered	annaul	
Inlets		--		Reactive		As problems discovered	as needed	
Pipes		--		Reactive		As problems discovered	as needed	
Ponds/Dams		--		Reactive		Never	as needed	
Bridges/Culverts		--		Reactive		At street crossings, about quarte	as needed	
Water Quality features		--		Reactive		As needed		
	in reference to study, looking for maintenance plan and a body that will assigned to drainage and those tasks; wants a team dedicated to drainage, work more proactively		https://ci.weatherford.tx.us/Faq.aspx?QID=407		SWU Fee combined with road fee			https://www.redoaktx.org/DocumentCenter/View/2069/Stormwater-Fee-Memo
	Stated that ERU is too low in addition to Drainage portion of budget is too low to fund necessary work							
	Stated there is a need for excavator; share with w/ww							

Small Projects Memorandum

MEMORANDUM

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TO: Steve Rogers, P.E., Mike Mikeska, P.E.

CC: Scott K. Hubley, P.E., CFM

FROM: Jeremy D. Dixon, P.E., CFM, Kristina McLaren, E.I.T., CFM

SUBJECT: Small Projects List

DATE: December 21, 2018

PROJECT: TER17602 – Drainage Master Plan

As part of the Drainage Master Plan (DMP) for the City of Terrell (City), Freese and Nichols, Inc. (FNI) was scoped to develop a list of "small" drainage projects that the City could fund with cash. FNI inventoried the City drainage infrastructure through multiple days of site visits and documented the findings within the ArcGIS Online Database developed for the DMP. The locations of potential small projects noted were compared relative to completed work orders provided by the city, the results of a Rain-on-Mesh analysis of the 100-year storm events, and public comments received through an online survey and public meeting held on April 4, 2018.

The identified projects were compared to the list of projects provided by the City. The combined list of projects was prioritized based on the following categories:

1. Road Flooding (RF): Rank is based on the type of street and the potential for overtopping or flooding during a 1% chance (100-year) or more frequent storm event that will affect general public mobility based on the results of the Rain-on-Mesh analysis. Rankings consider the depth of overtopping, emergency access, and traffic frequency.

High	3
Moderate	2
Low	1
None	0

2. Property Damage (PD): Rank is based on the potential that property damage would occur during a 1% chance (100-year) or more frequent storm event based on the results of the Rain-on-Mesh analysis and/or reported flood damages from the public survey. Rankings consider the number of properties, frequency and depth of flooding. Increased rank value indicates increased risk.

High	3
Moderate	2
Low	1
None	0

3. Infrastructure Damage (ID): Rank is based on observed and/or potential damage to infrastructure such as headwalls, wingwalls, embankments, culverts, etc. based on conditions from the site visit. Rankings consider consequence of infrastructure failure as a result of the damage. Increased ranking indicates increased risk or consequence.

High	3
Moderate	2
Low	1
None	0

4. Maintenance Cost (MC): Rank is based on potential reduction of long term maintenance costs associated with the project based on the number of historic work orders or observed maintenance issues. Rankings consider possibility of additional upstream areas that may contribute to problems at the location, such as sedimentation.

High (≥3 work orders)	3
Moderate (2 work orders)	2
Low (1 work orders)	1
None (0 work orders)	0

5. Public Impact (PI): Rank is based on the number of drainage complaints and/or comments received as part of the survey. Rankings consider visibility of the project to the public, particularly in high-traffic areas.

High (High visibility or public has commented)	3
Moderate (Moderate visibility and no comment)	2
Low (Low visibility and no comment)	1
None (No visibility and no comment)	0

Some of the identified projects have the potential to require H&H modeling or could be part of a much larger comprehensive solution. These were noted and will be reviewed in Phase 2 of the DMP project. Previously considered projects at Lamar Street and Roosevelt Street were developed and determined to be either too expensive to be a small project or to need further analysis to identify a preferred configuration.

The small project list includes a total of 14 projects, which are identified in Table 1 below. Each project is shown in Exhibit 1: Identified Projects and can be referenced by the number shown in the table. There are other identified locations with issues that should be monitored, or could be addressed with routine maintenance, which are called out as blue and yellow pushpins, respectively.

An exhibit and cost estimate describing the proposed solution for each small project is provided as Appendix A.

Table 1: Small Projects List

#	LOCATION (DISTRICT)	PROBLEMS	POTENTIAL SOLUTION	RF	PD	ID	MC	PI	Score	OPCC X $1,000
39	Skyline Drive (3)	Existing 30" storm sewer under existing building	Proposed reroute of 30" storm sewer	0	3	3	2	1	9	106.0
8	Gill Park/Lions Club Lane (2)	Culvert from turf field submerged; Standing water in channels	Visibility project - solve nuisances	1	1	1	2	3	8	167.4
28	Colquitt & Lovers (5)	Channel on both sides of crossing needs improvement; Flooding complaints; Safety hazard since barrier was hit	Short term: address safety hazard; repair crossing and improve channels	1	0	3	1	3	8	38.6
9	Park/Moore (2)	DS HW - east flows undercutting other HW	Cut from wingwall and add riprap	0	0	3	2	2	7	30.8
15	S. Medora and Rockwall (3)	Multiple clogging work orders; Slope inconsistent	Look into drainage ditch improvements; Lower priority - run a pipe NW	2	0	1	2	2	7	46.9
36	S. Airport Rd. (3)	Open channel grading is inconsistent; Culverts more than 50% submerged	Look into drainage ditch improvements	1	1	1	1	3	7	127.6
41	Elm & Roberts	High runoff approaches intersection (ROM), drainage ditches small and sedimentation buildup	Install culverts at intersection to equalize flow; Upsize drainage ditches and install parallel inlet	2	1	1	1	2	9	168.8
1	Lexington Drive (5)	Standing water due to concrete grade; Yard flooding	Regrade	2	1	0	1	2	6	182.1
14	Airport & SH34 (3)	Retaining wall failure; Channel losing conveyance area; Debris	Monitor and replace upon failure	1	0	3	1	1	6	228.8
18	Rochester channel (3)	Erosion/undermining; Multiple work orders	Monitor US outfall; Concrete line natural section	2	0	1	2	1	6	129.9

#	LOCATION (DISTRICT)	PROBLEMS	POTENTIAL SOLUTION	RF	PD	ID	MC	PI	Score	OPCC X $1,000
26	Tanger Drive (3)	HWs are failing	Repair/Replace	1	0	3	1	1	6	68.7
40	Rose St @ N. Blanche Washout (3)	DS discharge from pipe is silted	Regrade and add riprap	3	1	2	0	0	6	75.4
12	Obstruction in channel (2, 2, 3)	Multiple locations of telephone pole in channel: Mineral Wells, Myers and Medora, E. Rochester and Delphine	Relocate pole and stabilize channel; Armor channel	1	0	2	1	1	5	41.2
10	Cemetery (2)	Inconsistent grade; Standing water; Channel in transitional phase	Send water behind cemetery; Regrade existing	1	1	0	1	1	4	138.3
35	Bachelor Creek crossing @ Colquitt (5)	Alignment between channel and crossing is off; Sedimentation/debris build up	Clear out debris; Realign transition from channel to crossing	1	0	1	0	1	3	74.7

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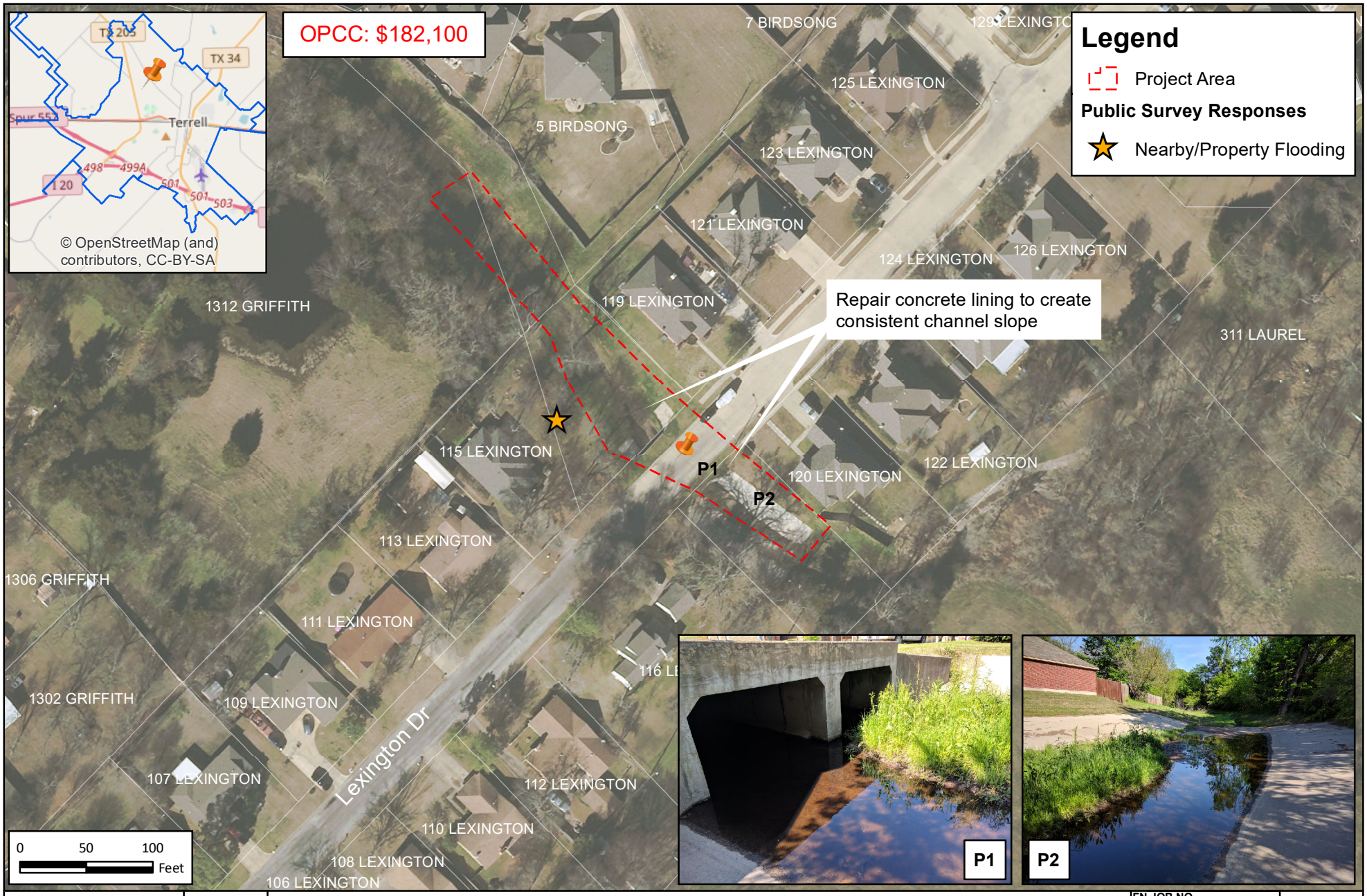
Appendix A: Project Exhibits and OPCC



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Small Project List

Lexington Drive

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	6/4/2018
SCALE	1:1,200
DESIGNED	BH
DRAFTED	02730

FIGURE 1

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Main.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

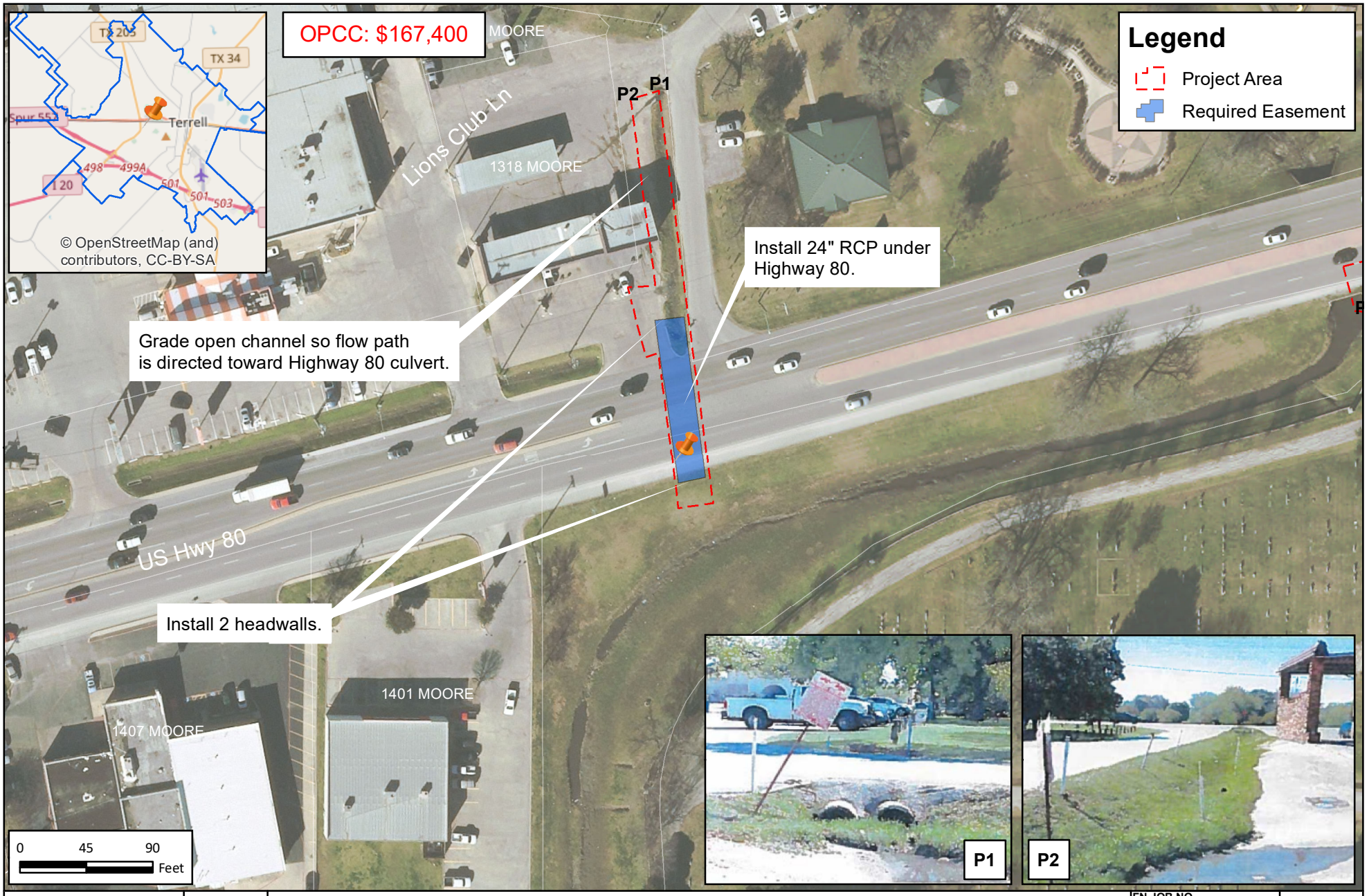
FREESE AND NICHOLS

01. Lexington Drive
Opinion of Probable Construction Cost
Small Project List
City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	May 31, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Hydro Demolition (4")	300	SY	$200	$60,000
	Excavation and Haul	200	CY	$15	$3,000
	Reinforced Concrete Channel Lining (Floor)	300	SY	$70	$21,000
	Turf Reinforcement Mat	125	SY	$15	$1,900
	Grading	800	SY	$25	$20,000
	SWPPP	1	LS	$2,500	$2,500
				Subtotal	**$108,400**
	Associated Infrastructure Improvements	20	%	$21,700	$21,700
				Subtotal	**$130,100**
	Mobilization	5	%	$6,500	$6,500
	Engineering & Design	15	%	$19,500	$19,500
	Contingency	20	%	$26,000	$26,000
				Subtotal	**$182,100**
				Project Total	**$182,100**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.



FREESE AND NICHOLS
2711 North Haskell Ave.
Suite 3300
Dallas, Texas 75204
P: 214-217-2200

Small Project List

Gill Park/Lions Club Lane

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	6/4/2018
SCALE	1:1,080
DESIGNED	BH
DRAFTED	02730

FIGURE 2

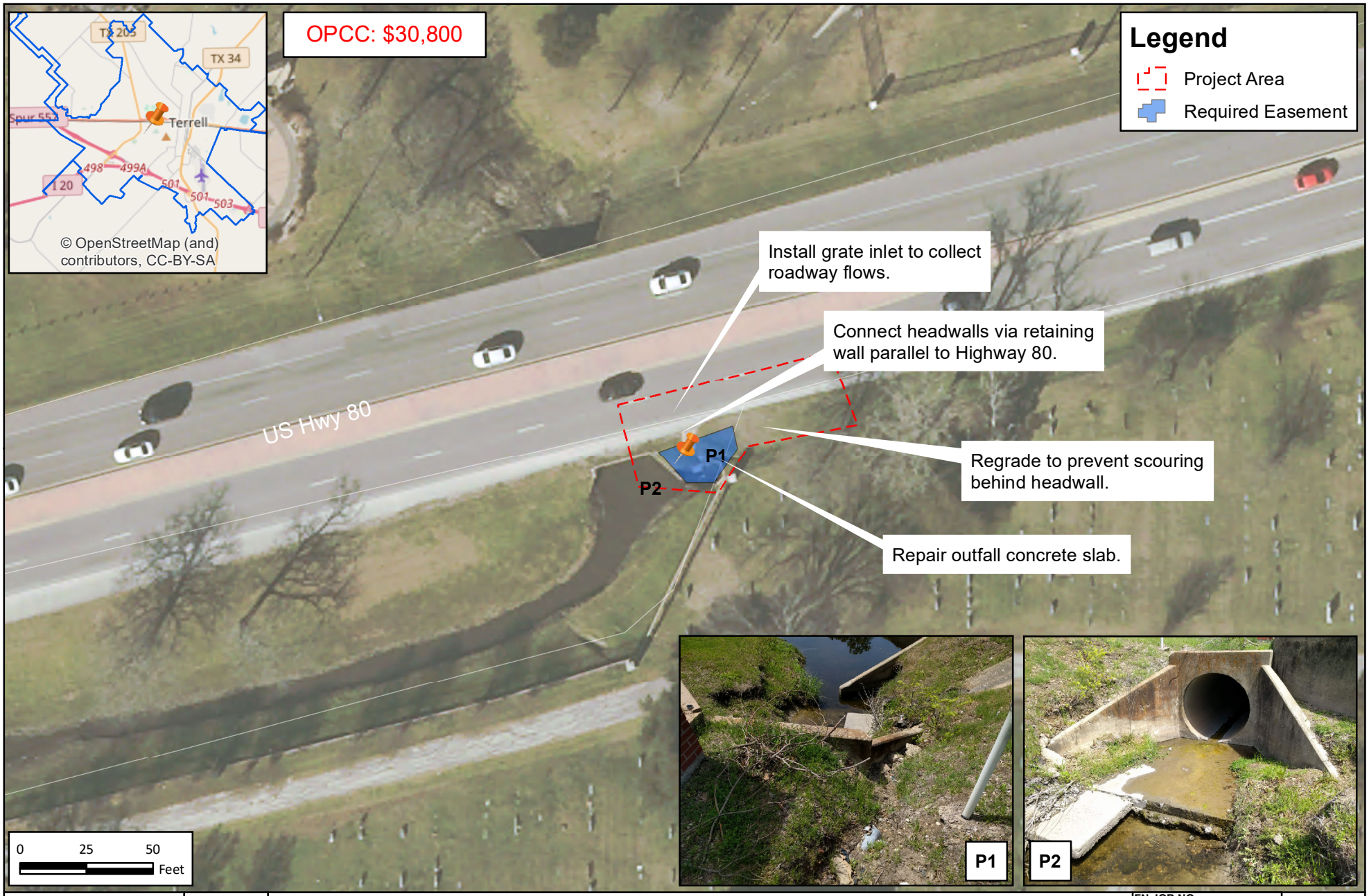
FREESE AND NICHOLS

08. Gill Park/Lions Club Lane
Opinion of Probable Construction Cost
Small Project List
City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	May 31, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Excavation and Haul	50	CY	$15	$800
	Grading	400	SY	$25	$10,000
	Seed/Sod	400	SY	$5	$2,000
	Headwall	2	EA	$10,000	$20,000
	Bore 36" Encasement	140	LF	$350	$49,000
	Install 24" pipe	140	LF	$110	$15,400
	Easement	0.05	AC	$20,000	$1,000
	SWPPP	1	LS	$1,500	$1,500
				Subtotal	**$99,700**
	Associated Infrastructure Improvements	20	%	$19,900	$19,900
				Subtotal	**$119,600**
	Mobilization	5	%	$6,000	$6,000
	Engineering & Design	15	%	$17,900	$17,900
	Contingency	20	%	$23,900	$23,900
				Subtotal	**$167,400**
				Project Total	**$167,400**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.



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Small Project List

Park/Moore

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	6/4/2018
SCALE	1:600
DESIGNED	BH
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FIGURE 3

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Main.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

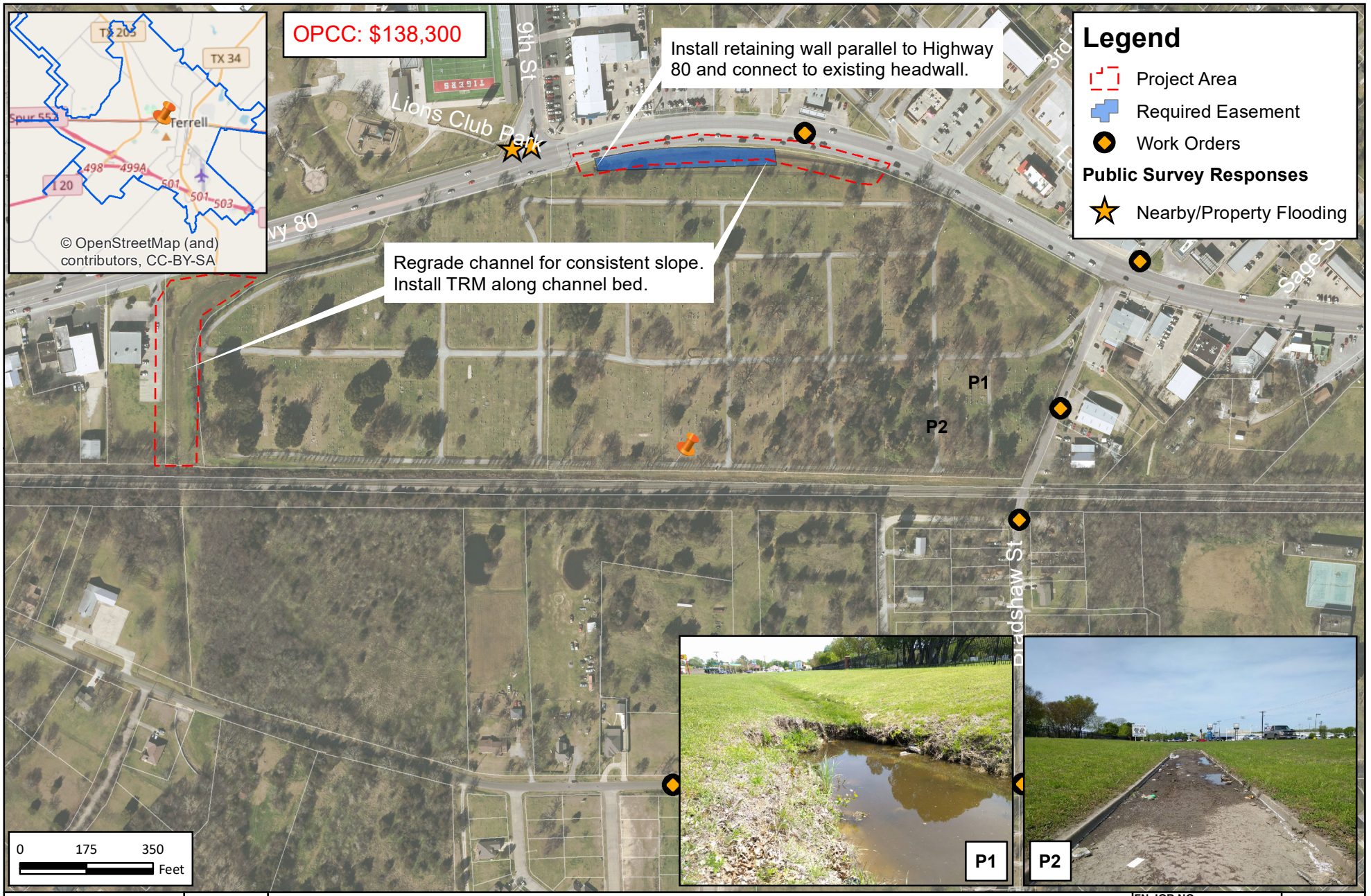
FREESE AND NICHOLS

09. Park/Moore
Opinion of Probable Construction Cost
Small Project List
City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	June 4, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Excavation and Haul	10	CY	$15	$200
	Grading	60	SY	$25	$1,500
	Seed/Sod	40	SY	$5	$200
	Retaining Wall	150	SF	$75	$11,300
	Hydro Demolition (4")	10	SY	$200	$2,000
	Concrete Lining	10	SY	$20	$200
	Easement	0.02	AC	$20,000	$400
	SWPPP	1	LS	$2,500	$2,500
				Subtotal	**$18,300**
	Associated Infrastructure Improvements	20	%	$3,700	$3,700
				Subtotal	**$22,000**
	Mobilization	5	%	$1,100	$1,100
	Engineering & Design	15	%	$3,300	$3,300
	Contingency	20	%	$4,400	$4,400
				Subtotal	**$30,800**
				Project Total	**$30,800**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.



Small Project List

Cemetery

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FN JOB NO	TER17602
FILE NAME	Small_Projects - Cemetery.mxd
DATE	5/31/2018
SCALE	1:4,200
DESIGNED	BH
DRAFTED	02730

FIGURE 4

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Cemetery.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

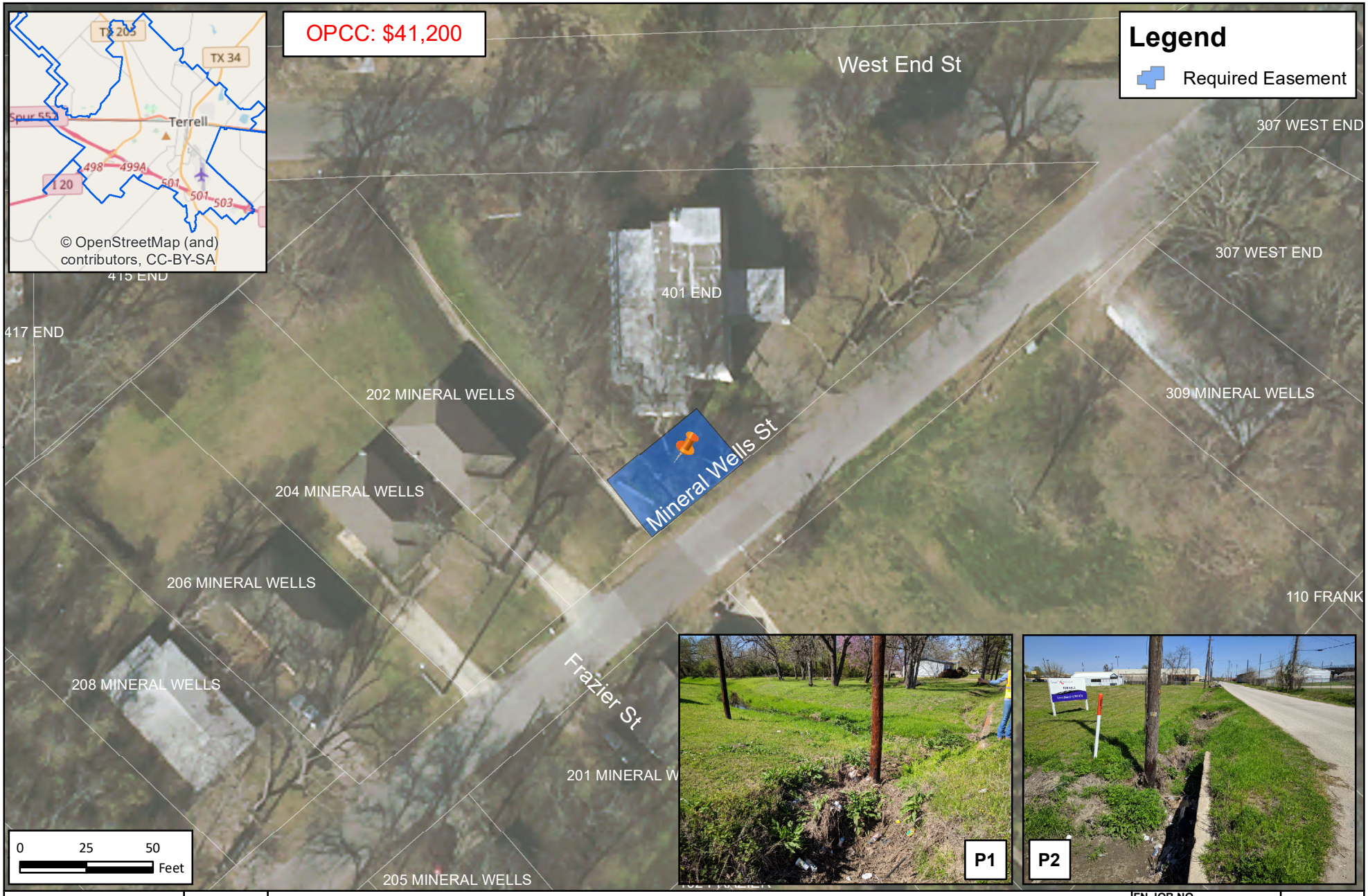
FREESE AND NICHOLS

10. Cemetery
Opinion of Probable Construction Cost
Small Project List
City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	May 31, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Excavation and Haul	20	CY	$15	$300
	Grading	2,000	SY	$25	$50,000
	Seed/Sod	1,400	SY	$5	$7,000
	Retaining Wall	60	SF	$75	$4,500
	Turf Reinforcement Mat	600	SY	$15	$9,000
	Easement	0.45	AC	$20,000	$9,000
	SWPPP	1	LS	$2,500	$2,500
				Subtotal	**$82,300**
	Associated Infrastructure Improvements	20	%	$16,500	$16,500
				Subtotal	**$98,800**
	Mobilization	5	%	$4,900	$4,900
	Engineering & Design	15	%	$14,800	$14,800
	Contingency	20	%	$19,800	$19,800
				Subtotal	**$138,300**
				Project Total	**$138,300**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.



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Small Project List

Obstruction in channel - Mineral Wells

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	6/4/2018
SCALE	1:600
DESIGNED	BH
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FIGURE 5

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Main.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

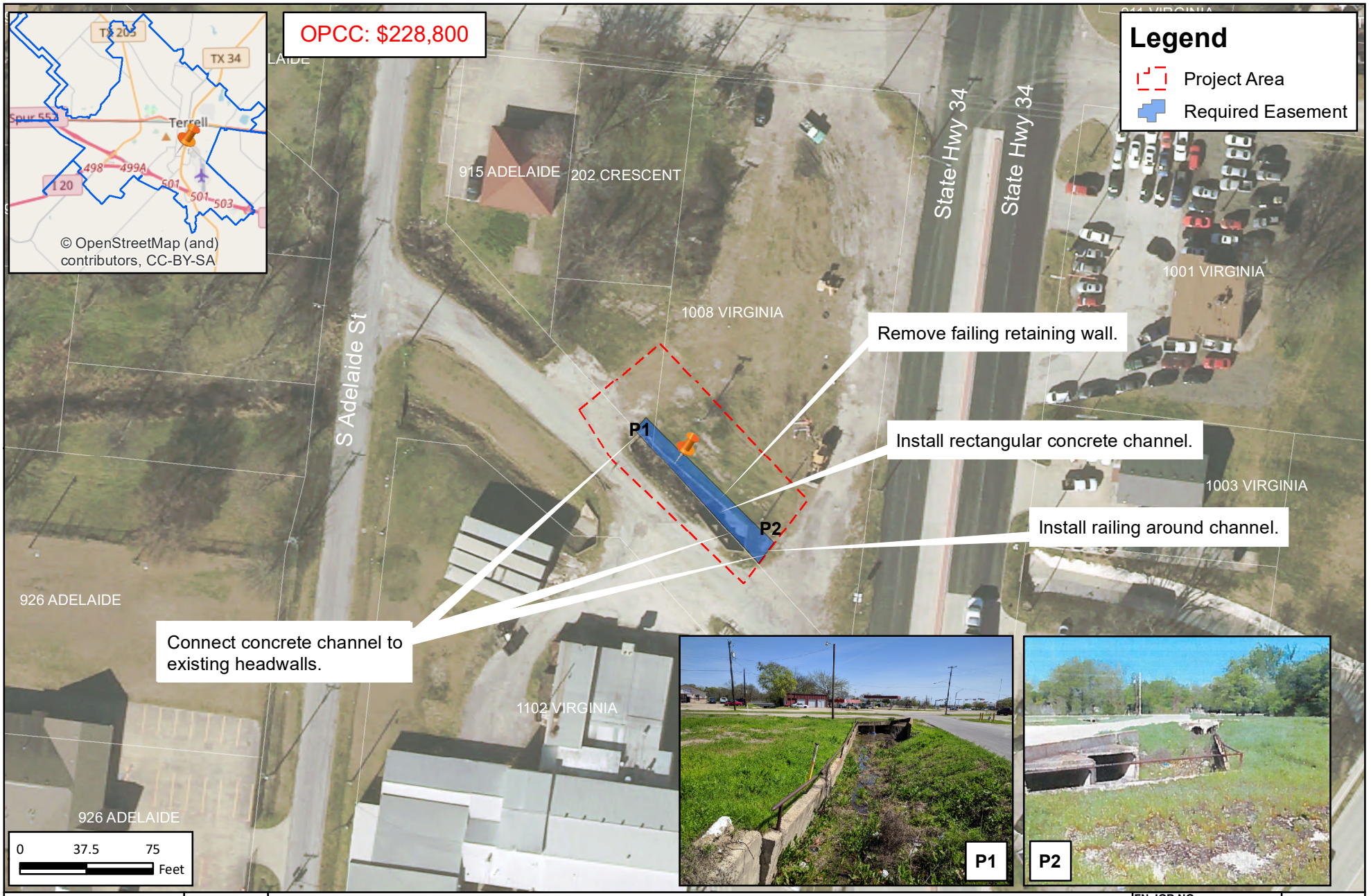
FREESE AND NICHOLS

12. Obstruction in Channel
Opinion of Probable Construction Cost
Small Project List
City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	June 4, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Excavation and Haul	30	CY	$15	$500
	Grading	60	SY	$25	$1,500
	Seed/Sod	60	SY	$5	$300
	Relocate Utility Pole	3	LS	$5,000	$15,000
	Turf Reinforcement Mat	45	SY	$15	$700
	Easement	0.10	AC	$20,000	$2,000
	SWPPP	3	LS	$1,500	$4,500
				Subtotal	**$24,500**
	Associated Infrastructure Improvements	20	%	$4,900	$4,900
				Subtotal	**$29,400**
	Mobilization	5	%	$1,500	$1,500
	Engineering & Design	15	%	$4,400	$4,400
	Contingency	20	%	$5,900	$5,900
				Subtotal	**$41,200**
				Project Total	**$41,200**

Notes: Subtotal reflects OPCC for the three identified locations: Mineral Wells, Myers & Medora, and E. Rochester & Delphine. Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.



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Small Project List

Airport & SH34

FN JOB NO	TER17602
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DATE	6/4/2018
SCALE	1:900
DESIGNED	BH
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FIGURE 6

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Main.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

FREESE AND NICHOLS

14. Airport & SH34

Opinion of Probable Construction Cost

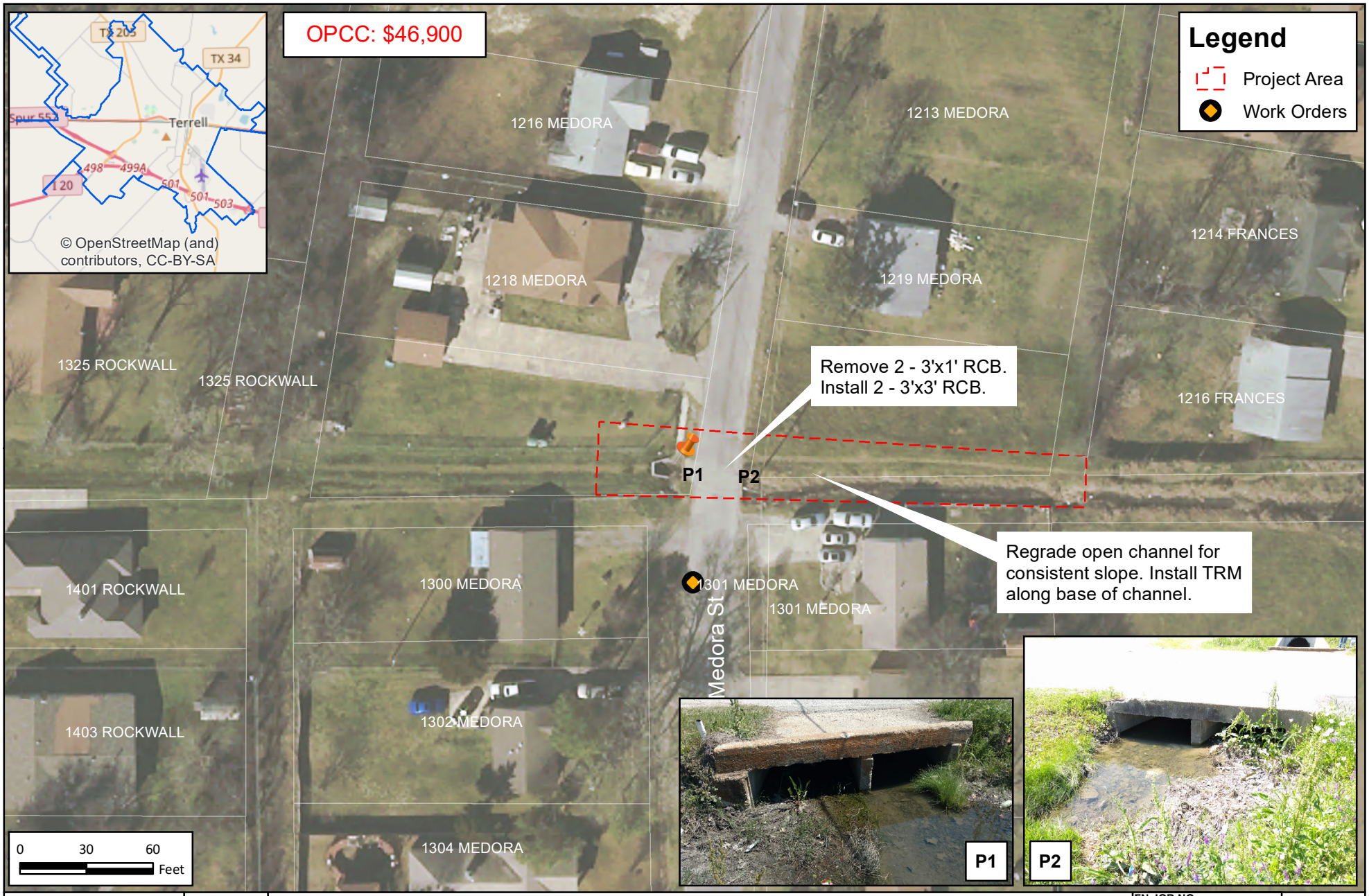
Small Project List

City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	May 31, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Excavation and Haul	150	CY	$15	$2,300
	Hydro Demolition (4")	300	SY	$200	$60,000
	Grading	365	SY	$25	$9,200
	Seed/Sod	150	SY	$5	$800
	Install Rail	250	LF	$50	$12,500
	Concrete Lining	40	SY	$20	$800
	Retaining Wall	540	SF	$75	$40,500
	Connect to Headwall	2	EA	$4,000	$8,000
	Easement	0.03	AC	$20,000	$600
	SWPPP	1	LS	$1,500	$1,500
				Subtotal	**$136,200**
	Associated Infrastructure Improvements	20	%	$27,200	$27,200
				Subtotal	**$163,400**
	Mobilization	5	%	$8,200	$8,200
	Engineering & Design	15	%	$24,500	$24,500
	Contingency	20	%	$32,700	$32,700
				Subtotal	**$228,800**
				Project Total	**$228,800**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.



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Small Project List

S. Medora and Rockwall

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	6/4/2018
SCALE	1:720
DESIGNED	BH
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FIGURE 7

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Main.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

FREESE AND NICHOLS

15. S. Medora and Rockwall
Opinion of Probable Construction Cost
Small Project List
City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	May 31, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Structure Excavation (Box)	10	CY	$350	$3,500
	Excavation and Haul	20	CY	$15	$300
	Grading	60	SY	$25	$1,500
	Seed/Sod	150	SY	$5	$800
	Turf Reinforcement Mat	50	SY	$15	$800
	3'x3' RCB	50	LF	$330	$16,500
	Cut & Restore Ashpalt Paving	20	SY	$150	$3,000
	SWPPP	1	LS	$1,500	$1,500
				Subtotal	**$27,900**
	Associated Infrastructure Improvements	20	%	$5,600	$5,600
				Subtotal	**$33,500**
	Mobilization	5	%	$1,700	$1,700
	Engineering & Design	15	%	$5,000	$5,000
	Contingency	20	%	$6,700	$6,700
				Subtotal	**$46,900**
				Project Total	**$46,900**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.

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Small Project List

Rochester channel

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	6/4/2018
SCALE	1:1,200
DESIGNED	BH
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FIGURE 8

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Main.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

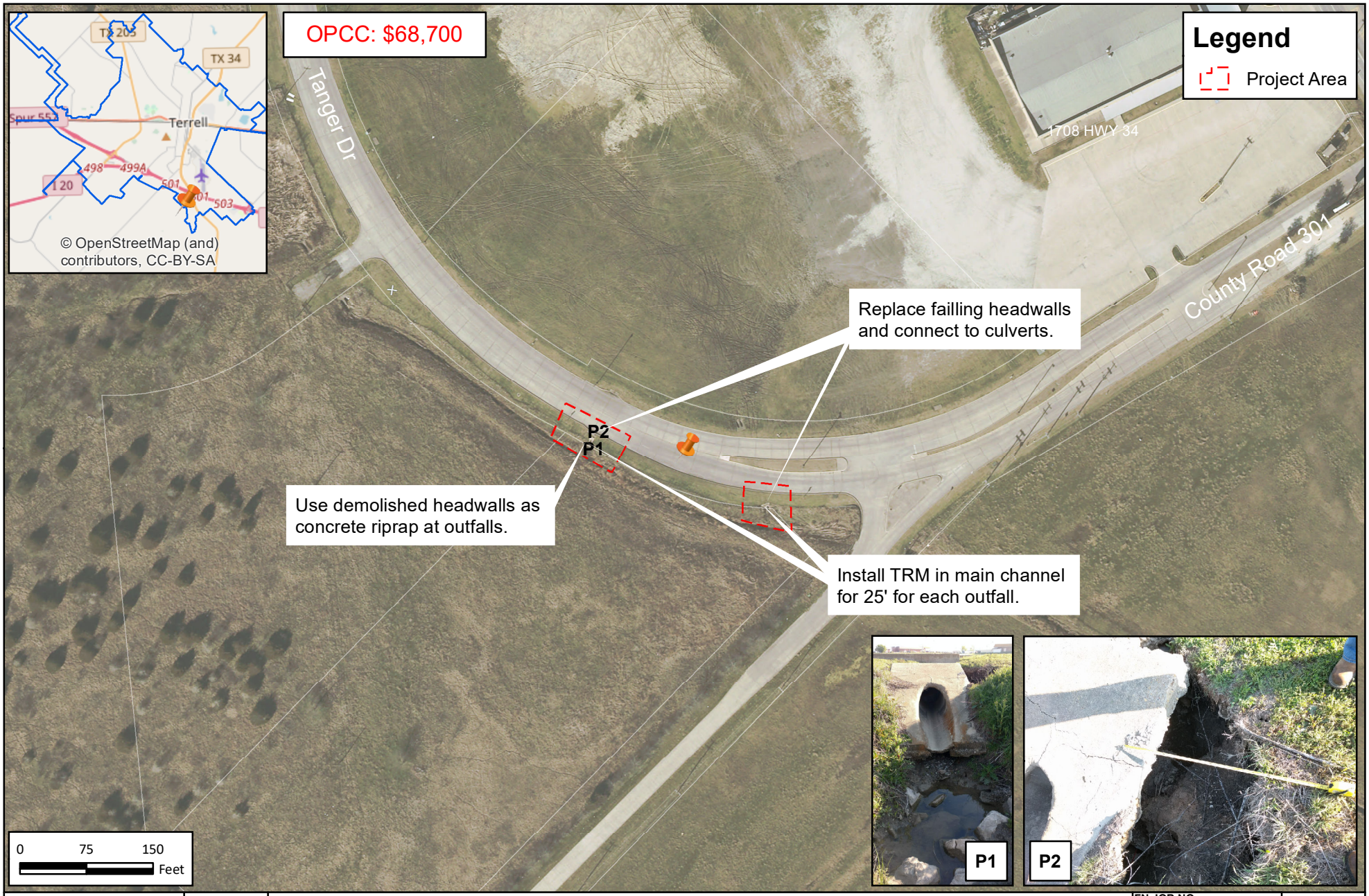
FREESE AND NICHOLS

18. Rochester Channel
Opinion of Probable Construction Cost
Small Project List
City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	May 31, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Excavation and Haul	550	CY	$15	$8,300
	Grading	400	SY	$25	$10,000
	Seed/Sod	200	SY	$5	$1,000
	Concrete Lining	100	SY	$20	$2,000
	Retaining Wall	600	SF	$75	$45,000
	Connect to Headwall	2	EA	$4,000	$8,000
	Temporary Easement	0.03	AC	$20,000	$500
	SWPPP	1	LS	$2,500	$2,500
				Subtotal	**$77,300**
	Associated Infrastructure Improvements	20	%	$15,500	$15,500
				Subtotal	**$92,800**
	Mobilization	5	%	$4,600	$4,600
	Engineering & Design	15	%	$13,900	$13,900
	Contingency	20	%	$18,600	$18,600
				Subtotal	**$129,900**
				Project Total	**$129,900**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.



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Small Project List

Tanger Drive

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	6/4/2018
SCALE	1:1,800
DESIGNED	BH
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FIGURE 9

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Main.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

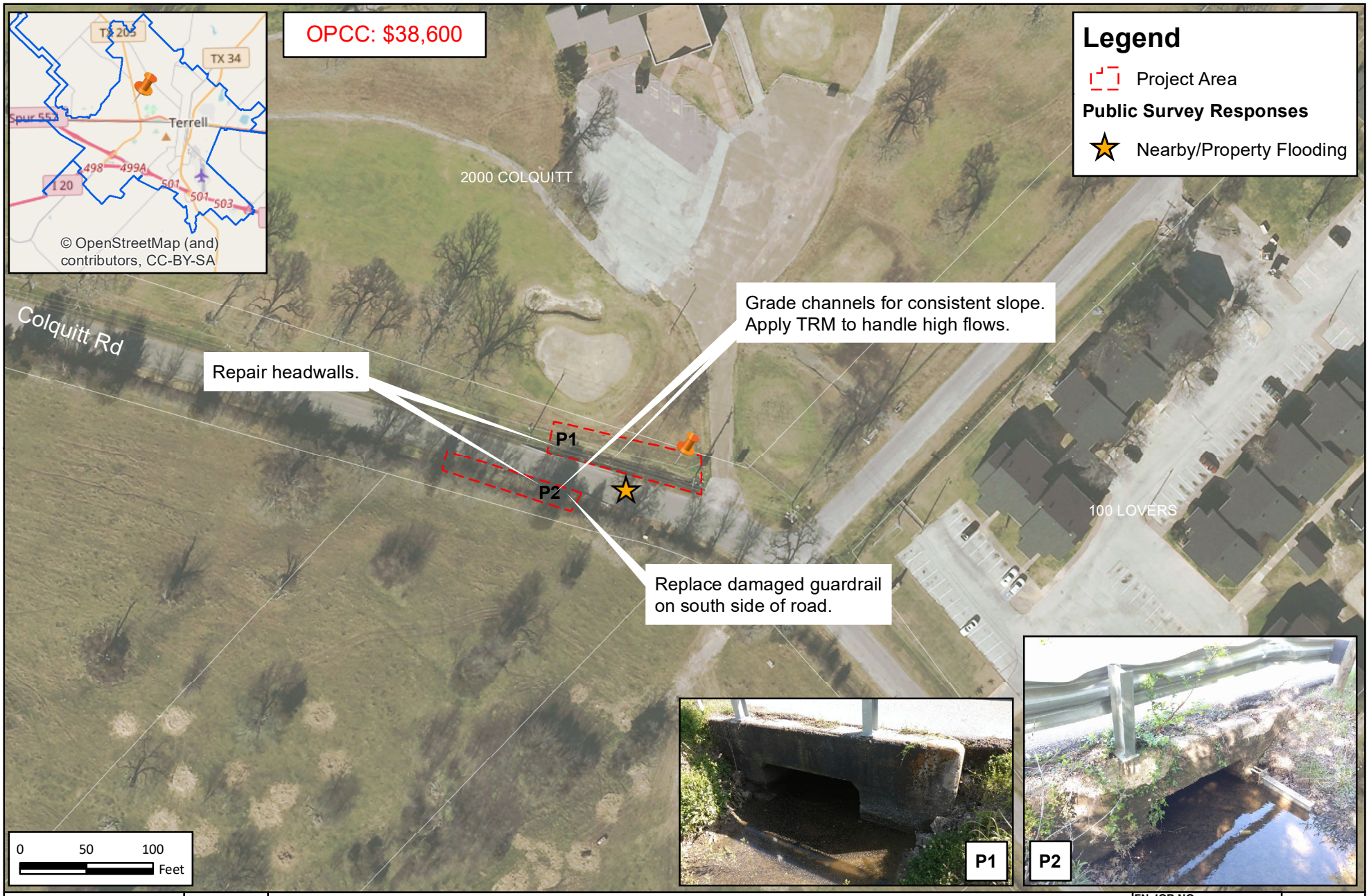
FREESE AND NICHOLS

26. Tanger Drive
Opinion of Probable Construction Cost
Small Project List
City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	May 31, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Structure Excavation (Box)	15	CY	$350	$5,300
	Headwall	2	EA	$12,000	$24,000
	Seed/Sod	125	SY	$5	$700
	Connect Headwall to Culvert	2	EA	$4,000	$8,000
	Turf Reinforcement Mat	20	EA	$15	$300
	SWPPP	1	LS	$2,500	$2,500
				Subtotal	**$40,800**
	Associated Infrastructure Improvements	20	%	$8,200	$8,200
				Subtotal	**$49,000**
	Mobilization	5	%	$2,500	$2,500
	Engineering & Design	15	%	$7,400	$7,400
	Contingency	20	%	$9,800	$9,800
				Subtotal	**$68,700**
				Project Total	**$68,700**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.



FREESE AND NICHOLS
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Small Project List

Colquitt & Lovers

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	6/4/2018
SCALE	1:1,200
DESIGNED	BH
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FIGURE 10

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Main.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

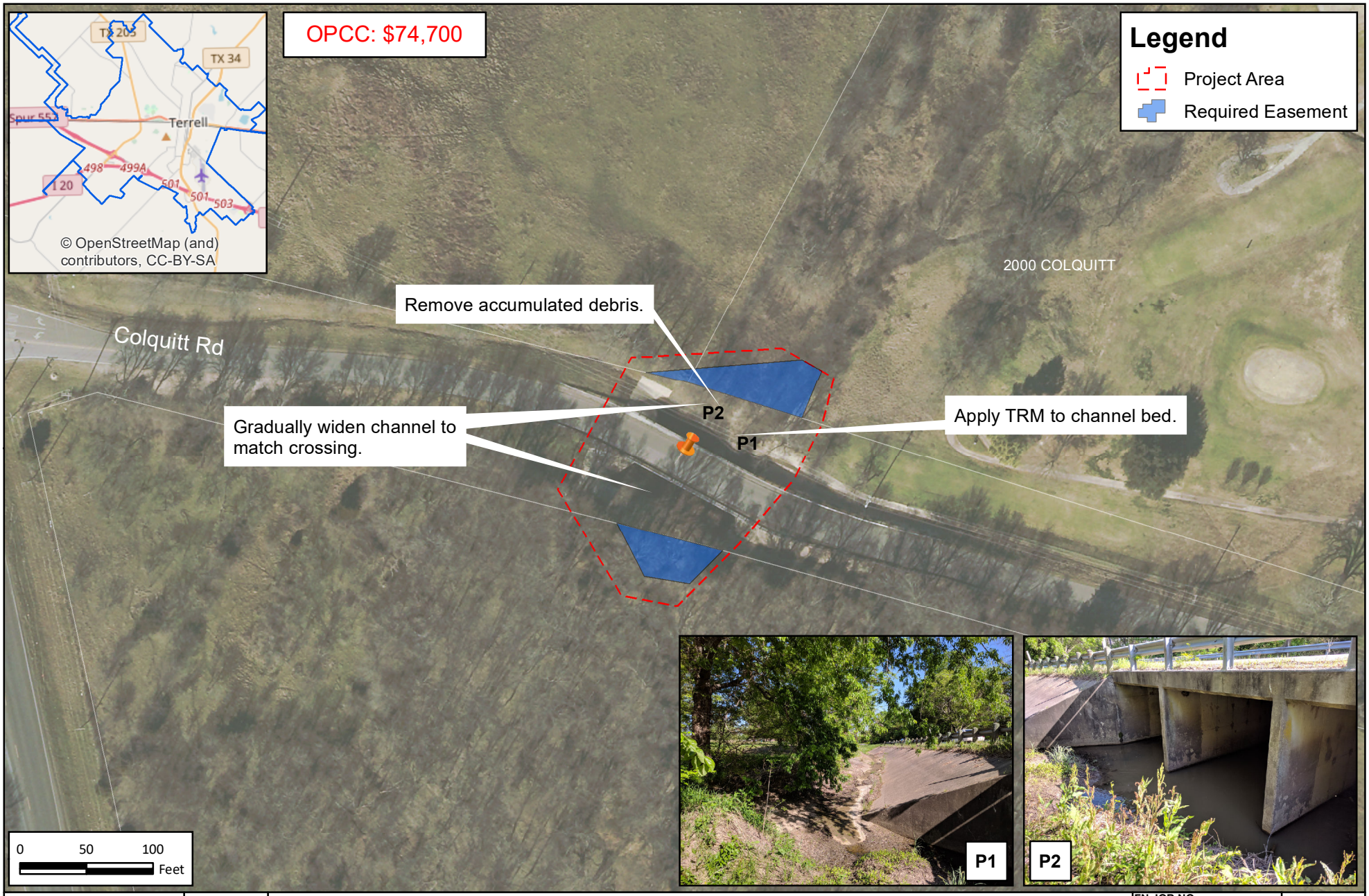
FREESE AND NICHOLS

28. Colquitt & Lovers
Opinion of Probable Construction Cost
Small Project List
City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	June 4, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Excavation and Haul	20	CY	$15	$300
	Grading	300	SY	$25	$7,500
	Seed/Sod	100	SY	$5	$500
	Turf Reinforcement Mat	280	SY	$15	$4,200
	Repair Headwall	2	EA	$1,500	$3,000
	Replace Guardrail and Foundation	1	LS	$5,000	$5,000
	SWPPP	1	LS	$2,500	$2,500
				Subtotal	**$23,000**
	Associated Infrastructure Improvements	20	%	$4,600	$4,600
				Subtotal	**$27,600**
	Mobilization	5	%	$1,400	$1,400
	Engineering & Design	15	%	$4,100	$4,100
	Contingency	20	%	$5,500	$5,500
				Subtotal	**$38,600**
				Project Total	**$38,600**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.



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Small Project List

Bachelor Creek Crossing @ Colquitt

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	6/4/2018
SCALE	1:1,200
DESIGNED	BH
DRAFTED	02730

FIGURE 11

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Main.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

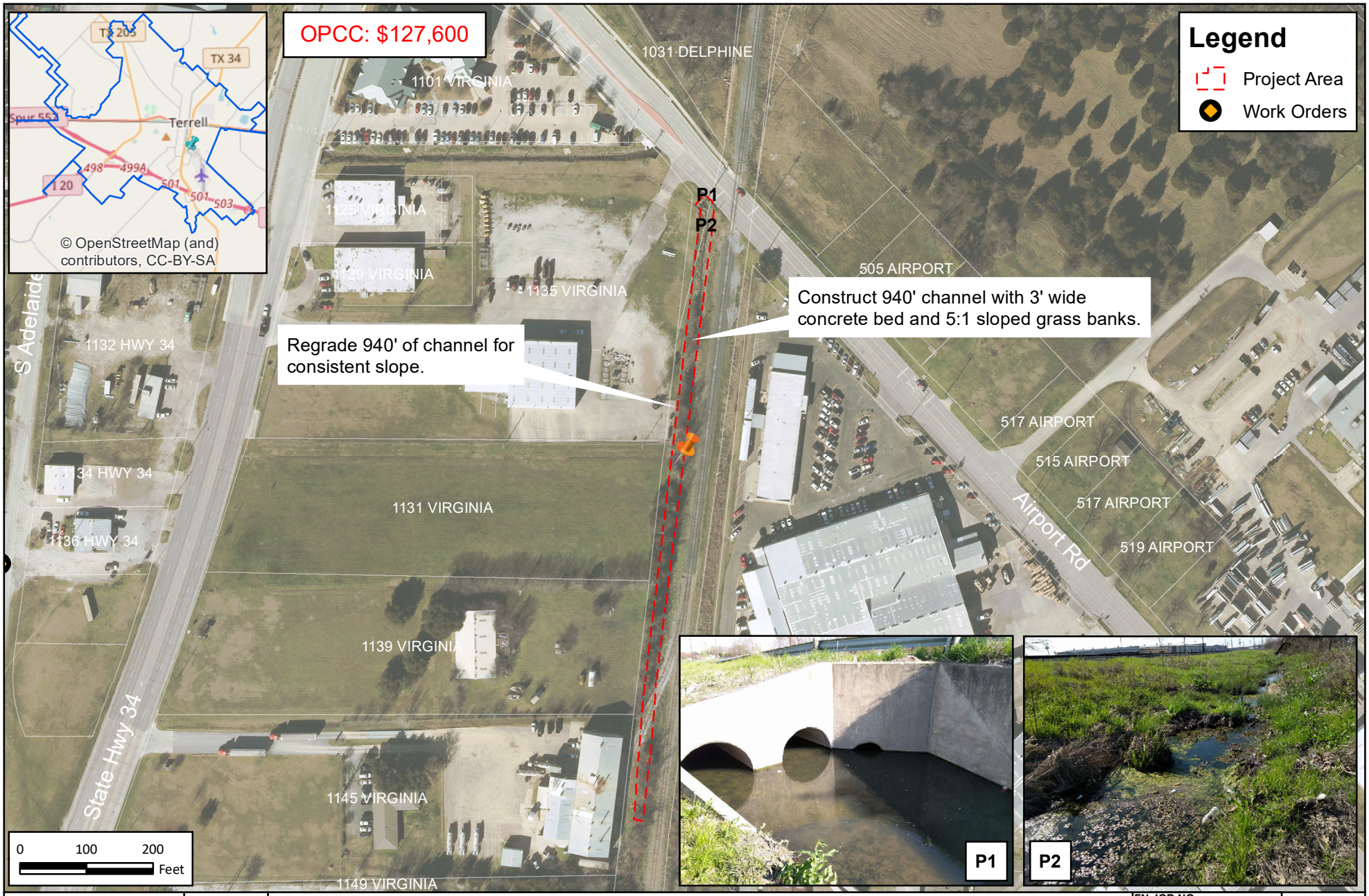
FREESE AND NICHOLS

35. Bachelor Creek Crossing @ Colquitt
Opinion of Probable Construction Cost
Small Project List
City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	May 31, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Excavation and Haul	75	CY	$15	$1,200
	Grading	1,200	SY	$25	$30,000
	Seed/Sod	900	SY	$5	$4,500
	Turf Reinforcement Mat	135	SY	$15	$2,100
	Easement	0.08	AC	$20,000	$1,600
	SWPPP	1	LS	$5,000	$5,000
				Subtotal	**$44,400**
	Associated Infrastructure Improvements	20	%	$8,900	$8,900
				Subtotal	**$53,300**
	Mobilization	5	%	$2,700	$2,700
	Engineering & Design	15	%	$8,000	$8,000
	Contingency	20	%	$10,700	$10,700
				Subtotal	**$74,700**
				Project Total	**$74,700**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.



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Small Project List

S. Airport Rd.

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	6/4/2018
SCALE	1:2,400
DESIGNED	BH
DRAFTED	02730

FIGURE 12

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Main.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

FREESE AND NICHOLS

36. S. Airport Rd.

Opinion of Probable Construction Cost

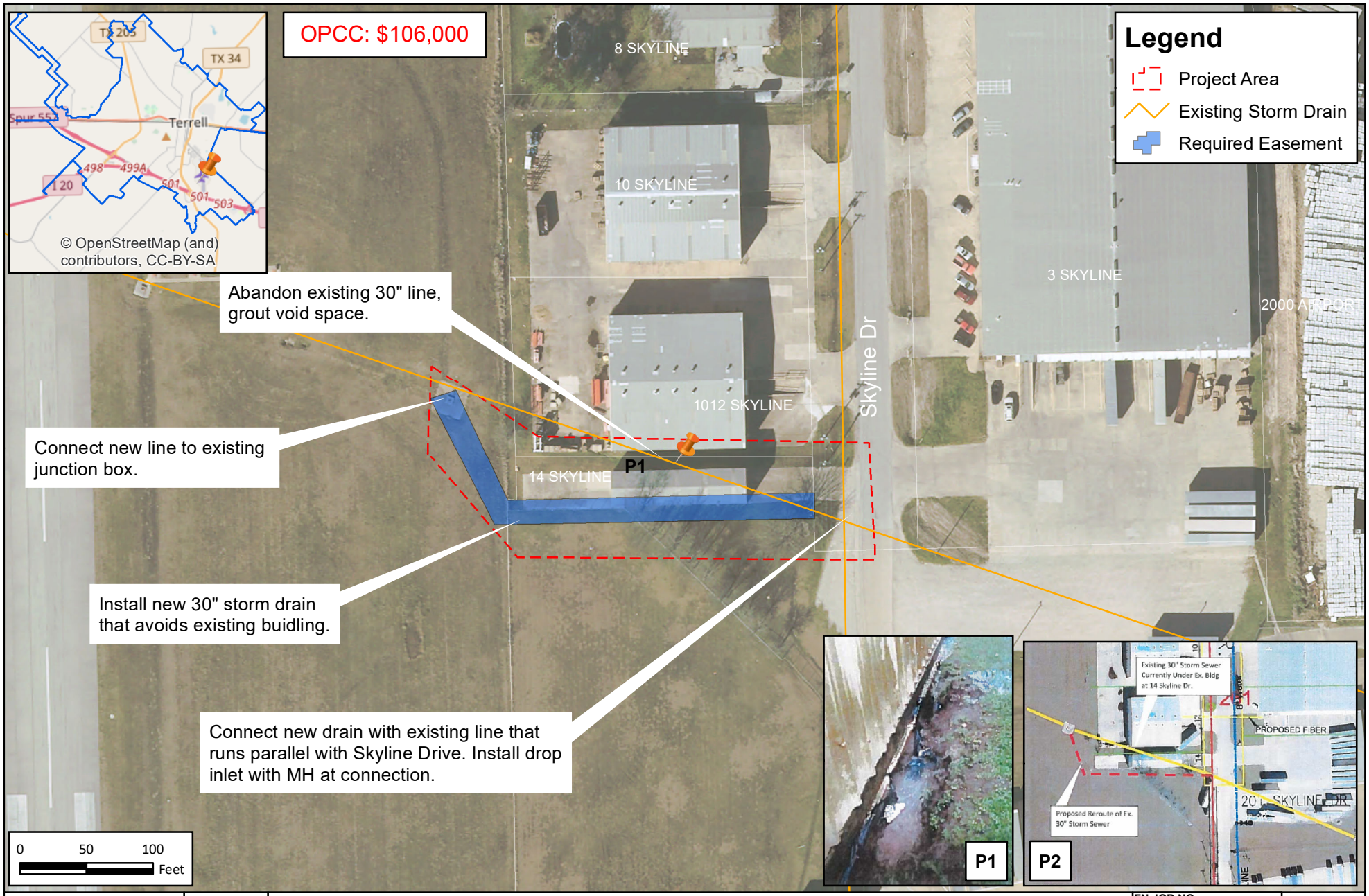
Small Project List

City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	May 31, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Excavation and Haul	300	CY	$15	$4,500
	Remove Tree (5-12")	20	EA	$145	$2,900
	Grading	1,500	SY	$25	$37,500
	Seed/Sod	1,200	SY	$5	$6,000
	Concrete Lining	350	SY	$20	$7,000
	RR ROW Permit and Inspection	1	LS	$15,000	$15,000
	SWPPP	1	LS	$3,000	$3,000
				Subtotal	**$75,900**
	Associated Infrastructure Improvements	20	%	$15,200	$15,200
				Subtotal	**$91,100**
	Mobilization	5	%	$4,600	$4,600
	Engineering & Design	15	%	$13,700	$13,700
	Contingency	20	%	$18,200	$18,200
				Subtotal	**$127,600**
				Project Total	**$127,600**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.



FREESE AND NICHOLS
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Small Project List

Skyline Drive

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	6/4/2018
SCALE	1:1,200
DESIGNED	BH
DRAFTED	02730

FIGURE 13

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Main.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

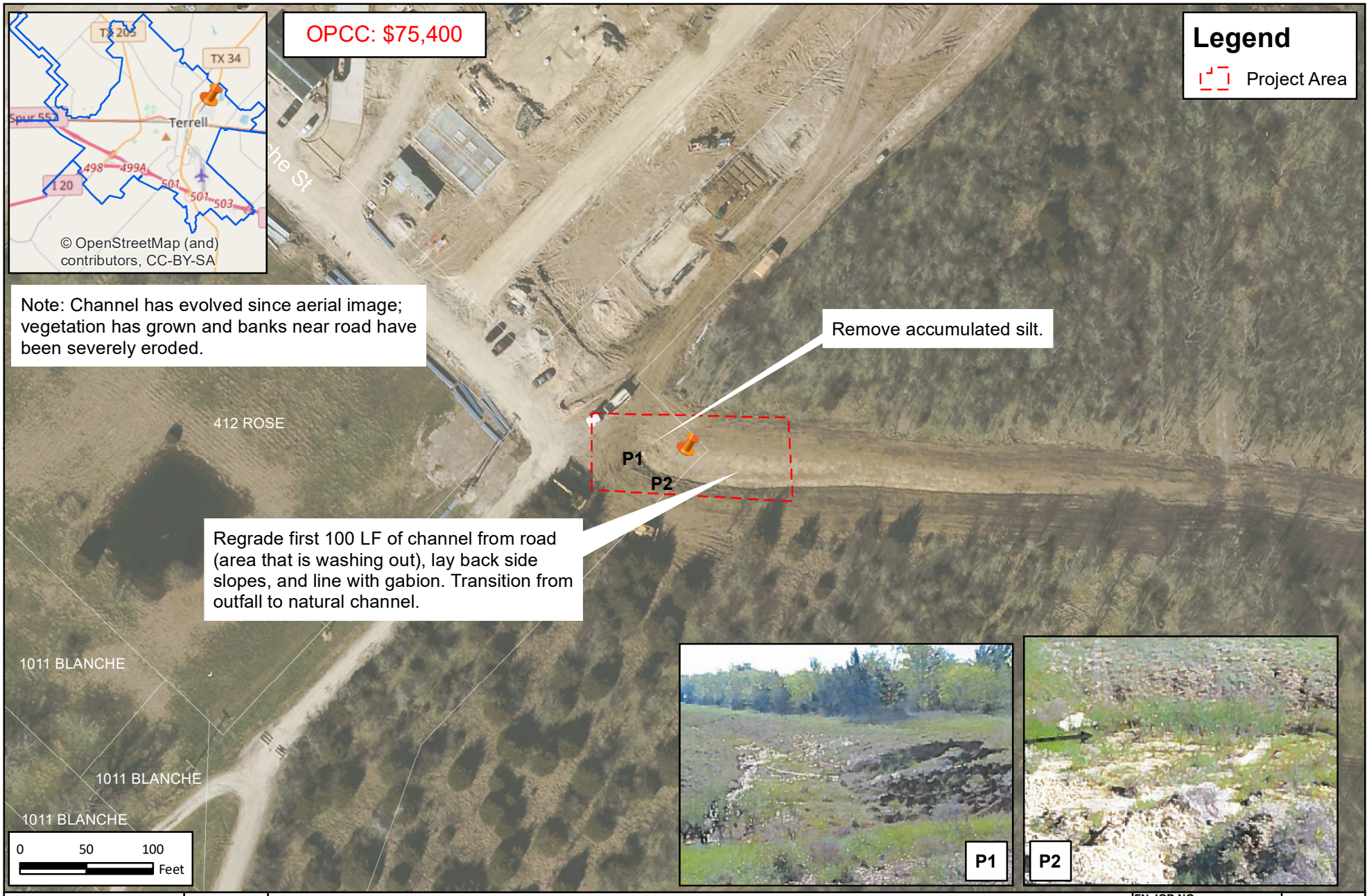
FREESE AND NICHOLS

39. Skyline Drive
Opinion of Probable Construction Cost
Small Project List
City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	May 31, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Excavation and Haul	180	CY	$15	$2,700
	Backfill	80	CY	$100	$8,000
	Seed/Sod	200	SY	$5	$1,000
	Structural Grout	140	CY	$175	$24,500
	Cap existing line	1	LS	$2,000	$2,000
	Install Drop Inlet	1	EA	$5,000	$5,000
	Install 24" pipe	140	LF	$110	$15,400
	Easement	0.15	AC	$20,000	$3,000
	SWPPP	1	LS	$1,500	$1,500
				Subtotal	**$63,100**
	Associated Infrastructure Improvements	20	%	$12,600	$12,600
				Subtotal	**$75,700**
	Mobilization	5	%	$3,800	$3,800
	Engineering & Design	15	%	$11,400	$11,400
	Contingency	20	%	$15,100	$15,100
				Subtotal	**$106,000**
				Project Total	**$106,000**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.



FREESE AND NICHOLS
2711 North Haskell Ave.
Suite 3300
Dallas, Texas 75204
P: 214-217-2200

Small Project List

Rose St. @ N. Blanche Washout

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	6/4/2018
SCALE	1:1,200
DESIGNED	BH
DRAFTED	02730

FIGURE 14

FREESE AND NICHOLS

40. Rose St. @ N. Blanche Washout
Opinion of Probable Construction Cost
Small Project List
City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	May 31, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Excavation and Haul	30	CY	$15	$500
	Grading	1,000	SY	$25	$25,000
	Seed/Sod	200	SY	$5	$1,000
	Gabion Mattress (Galv) (6")	250	CY	$65	$16,300
	SWPPP	1	LS	$2,000	$2,000
				Subtotal	**$44,800**
	Associated Infrastructure Improvements	20	%	$9,000	$9,000
				Subtotal	**$53,800**
	Mobilization	5	%	$2,700	$2,700
	Engineering & Design	15	%	$8,100	$8,100
	Contingency	20	%	$10,800	$10,800
				Subtotal	**$75,400**
				Project Total	**$75,400**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.

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Small Project List

Elm & Roberts

FN JOB NO	TER17602
FILE NAME	Small_Projects - Main.mxd
DATE	12/21/2018
SCALE	1:1,800
DESIGNED	BH
DRAFTED	02730

FIGURE 15

Path: H:\STORMWATER\Final Exhibits\Small Projects\Small_Projects - Main.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

41. Elm & Roberts

Opinion of Probable Construction Cost

Small Project List

City of Terrell

ACCOUNT NO.	ESTIMATOR	CHECKED BY	DATE
TER17602	KLM	JDD	December 21, 2018

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Excavation and Haul	1,200	CY	$15	$18,000
	Grading	1,600	SY	$25	$40,000
	Seed/Sod	1,600	SY	$5	$8,000
	24" RCP	200	LF	$125	$25,000
	10' Curb Inlet	2	EA	$3,500	$7,000
	SWPPP	1	LS	$2,500	$2,500
				Subtotal	**$100,500**
	Associated Infrastructure Improvements	20	%	$20,100	$20,100
				Subtotal	**$120,600**
	Mobilization	5	%	$6,000	$6,000
	Engineering & Design	15	%	$18,100	$18,100
	Contingency	20	%	$24,100	$24,100
				Subtotal	**$168,800**
				Project Total	**$168,800**

Notes: Associated infrastructure markup includes demolition costs, pavement repair and potential utility relocations expected to be incurred by Stormwater Department.

Funding Assessment Memorandum

Innovative approaches
Practical results
Outstanding service

STORMWATER FUNDING OPTIONS

Prepared for:

City of Terrell

May 2020

Prepared by:

FREESE AND NICHOLS, INC.
2711 N. Haskell Ave, Suite 3300
Dallas, Texas 75204

TER17602

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APPENDICES

1.0 INTRODUCTION

The City of Terrell contracted Freese and Nichols, Inc. (FNI) to provide assistance with a funding evaluation for proposed stormwater management, including capital improvement projects (CIPs). This ongoing assistance includes project management and meetings, refining the planning level cost estimates, documenting the CIP ranking process, researching CIP funding options, and developing a recommended funding approach to address the City's identified stormwater management needs. The objective of the evaluation is to determine the additional Stormwater Utility Fee (SWUF) revenue needed to fund a Capital Improvement Program based on the Drainage Master Plan. As such, FNI developed a funding scenario that incorporates a selection of the evaluated alternative funding options and will factor the infrastructure, project costs, and prioritization rankings developed in the master plan study.

The City has expressed in prior meetings the desire to fund more projects out of the Stormwater Utility Fee (SWUF), and certain preferences for cash, pay-as-you-go (PAYGO) and debt-based financing of CIPs. This memo discusses the development of a program to achieve these goals and the requisite changes to the SWUF as implemented, such that the stormwater infrastructure might stand on its own without additional support from the general fund.

The City of Terrell established a stormwater utility fee in 2011 to provide reliable, dedicated funding to address storm system maintenance needs. The initial rate was established at $1.00 per month per single-family residence, with a $1.00 per month charge per equivalent residential unit (ERU) for all other non-exempt property and generated approximately $180,000 per year. This initial rate provided revenue for basic services to address minimum storm water needs and provides for complaint-based maintenance. No capital improvements were budgeted with this service level.

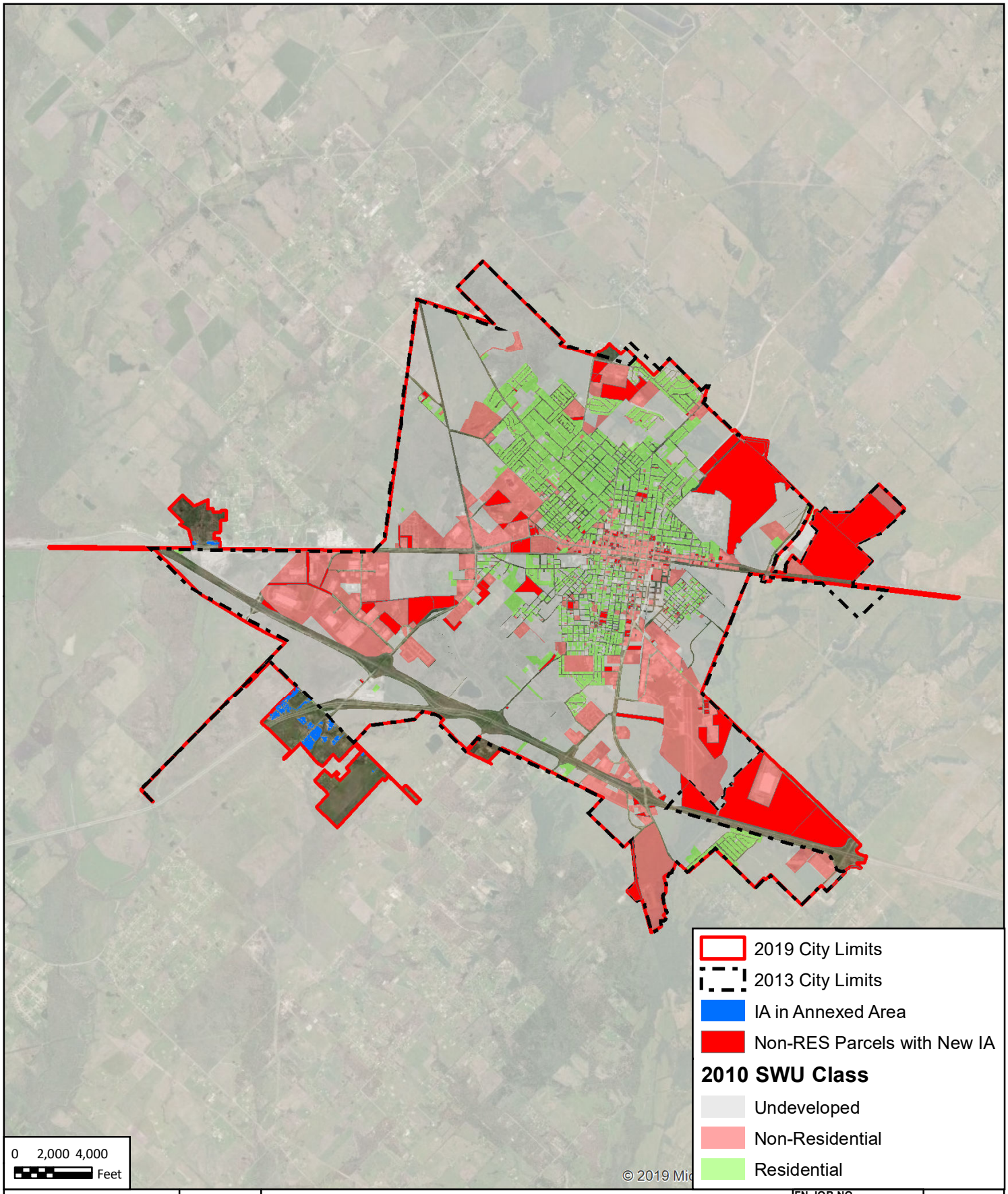
In 2015, the rate was increased to $3.75 per ERU, identified as Service Level 2 in the City's 2011 Stormwater Utility Report.

In 2017, the rate was increased to $5.65 per ERU, identified as Service Level 3 in the City's 2011 Stormwater Utility Report, which currently generates approximately $1,000,000 annually. This increased revenue enabled expanded storm system maintenance services, as well as capital improvements identified through an update to the City's stormwater master plan.

Since 2011, additional development has occurred within the City, which has also increased the stormwater utility revenue. Figure 1 shows parcels developed at the initial implementation of the stormwater utility

fee in 2011 and parcels that appear to be newly developed subsequent to 2011, resulting in additional projected revenue growth.

The stormwater utility is generally used for funding maintenance of the constructed storm system, which is described in detail in Section 2.0. In addition to directly funding maintenance for the City's storm system needs, it can also fund small and large projects, as described in Section 3.0 and Section 4.0, respectively. In the final use, stormwater utility revenues provide a source of matching funds for complementary funding sources further described in Section 5.0. It appears the City's revenue could be at least $200,000 annually for each $1.00 assessed monthly per ERU based on a screening analysis of new commercial properties through development and annexation. This memo conservatively assumes a continued annual revenue rate of $180,000 per $1.00/ERU per month for the funding and rate scenario analyses in this document. Additional documentation of externally available funding is included as reference material in Section 7.0.



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Growth 2011 to Present

City of Terrell Stowmwater Utility

FN JOB NO	TER13328
FILE NAME	TerrellIA.mxd
DATE	4/22/2019
SCALE	1:80,806
DESIGNED	BH
DRAFTED	02271

FIGURE 1

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NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

2.0 CURRENT INFRASTRUCTURE LIABILITIES

Though current stormwater infrastructure may be counted in the asset column of the City's budget, it is also a liability in that it must be replaced upon its failure. Because the City now has an inventory of the stormwater infrastructure, an estimate can be made for this potential liability.

Using the unit costs developed for the CIPs in the Drainage Master Plan, and without considering contingencies or markups of any kind, the total liability is approximately $39 million. Regular replacement and retirement of stormwater infrastructure, at its most convenient time prior to failure will allow the City to maintain the drainage network in perpetuity at a consistent level of change. For example, if a Water and Sanitary Sewer project is scheduled in the next year and has drainage components along the route of the project, the City can anticipate and fund the coincident drainage improvements that are required, if needed as part of another project. This would only be for the replacement of existing infrastructure, not the construction of new or upsized infrastructure. For example, this component could fund the replacement of inlets and storm drains coincident with another subsurface utilities project if the storm drain was discovered to be in poor condition.

Since simultaneous failure of all the existing infrastructure is unlikely, the $39 million is not anticipated to be expended in a short duration of time but should be distributed evenly over time to replace failed or nearly failed drainage infrastructure as needed. There are a range of potential life cycles over which to consider the replacement, but generally drainage infrastructure has a long lifespan. For the purposes of this memo, we will assume that all infrastructure should be replaced according to **Table 1**.

Table 1: Infrastructure Liabilities and Life Expectancy

Item	**Estimated Liability**	**Life Expectancy, years**
Inlets	$ 3,900,000	30
Headwalls	$ 4,000,000	50
Conduits	$ 25,300,000	70
Channels	$ 5,800,000	20
Total	**$ 39,000,000**	

Sustainably funding the $39 million over its design life by using a PAYGO strategy with the SWUF will require approximately $8.97 per ERU. Because this is a significant increase over the current SWUF, the

variables included in its calculation should be carefully and periodically reviewed to see if the underlying assumptions are still valid.

Assumptions include:

- Unit Prices for components
- Cost escalation factor
- Design Life

In conversations with the City, this format of replacement is not likely to be implemented at this time, but the information is important and available in the event it becomes necessary. The updated cost to implement this element of the SWUF based on starting fresh in a given year is shown in **Table 2**. The costs continue to increase into the future because the cost to replace the infrastructure is assumed to increase.

Table 2: Infrastructure Liability Replacement Delay Schedule

Begin in Year	Cost	Fee
2020	$ 1,614,000	$ 8.97
2025	$ 1,927,000	$ 10.71
2030	$ 2,233,000	$ 12.41
2035	$ 2,589,000	$ 14.38
2040	$ 3,001,000	$ 16.67
2050	$ 4,033,000	$ 22.41

3.0 SMALL PROJECTS

The City has expressed a desire to use a PAYGO strategy to fund from the SWUF the small projects FNI previously identified as part of the drainage master plan effort, to demonstrate progress and provide a tangible justification for the fee increase as well as those to come. In order to achieve this strategy within five years, the City will need to outlay funds in the following manner.

The original small projects had Opinions of Probable Construction Costs (OPCC) totaling $1,443,100 for 15 (fifteen) projects, however there are three projects that will ultimately be replaced by large capital projects. Assuming the three projects are not urgent, the cost for the remaining 12 (twelve) projects totals to $1,138,700, as shown in **Table 3**. This can be completed in five years with an annual outlay of approximately $325,000 or can be completed in just over three years with an annual outlay of $403,000. By completing the 12 small projects in 3 years, the City will demonstrate good progress and usefulness out of the stormwater utility and will reduce the amount of cost escalation incurred over time.

Funding this amount over the 3-year duration will require approximately $2.24 per ERU. FNI does not recommend rolling back the fee increase. Following completion of the projects listed below, the cost to reconstruct these projects within 50 years will require approximately $0.16 per ERU, leaving $2.08 to apply to additional unidentified projects, increase the ability to fund maintenance, or proceed to the next phase in the funding scenario.

Table 3: Revised Small Projects List

#	LOCATION	OPCC
39	Skyline Drive	$106,000
8	Gill Park/Lions Club Lane	$167,400
28	Colquitt & Lovers	$38,600
9	Park/Moore	$30,800
41	Elm & Roberts	$168,800
1	Lexington Drive	$182,100
14	Airport & SH34	$228,800
26	Tanger Drive	$68,700
40	Rose St @ N. Blanche Washout	$75,400
12	Obstruction in channel	$41,200
10	Cemetery	$138,300
35	Bachelor Creek crossing @ Colquitt	$74,700

4.0 LARGE PROJECTS AS PAYGO

Certain capital projects are candidates to fund with a PAYGO strategy using the SWUF due to lower costs and complexity. Generally, these projects are estimated at less than $1 million each, and total approximately $1.1 million for 3 (three) projects. To complete these projects within 3 years, beginning in 2023 after the completion of the small projects, will require approximately $2.36 per ERU, which will provide $424,000 annually. The subset of Large Projects is shown in **Table 4**.

Table 4: Large Projects less than $1 Million

PROJECT	DESCRIPTION	OPCC	RANK
CIP12	KC1 Upper Channel Improvements	$272,000	6
CIP02	West End St. Culvert	$698,000	14
CIP06	SWCC Railroad Crossing (UPRR 183.15) Improvements	$126,000	19
	TOTAL	**$1,096,000**	

The duration of the utility fee allocated to this purpose will minimally be 3 years, after which FNI does not recommend rolling back the fee increases. Following completion of the projects above, the cost to reconstruct these projects within 50 years will require approximately $0.16 per ERU, leaving $2.20 apply to additional unidentified projects, increase the ability to fund maintenance, or proceed to the next phase in the funding scenario. The remaining 17 (seventeen) CIPs are discussed in **Section 5.0**.

5.0 LARGE PROJECTS AS DEBT

Certain capital projects that are not candidates to fund with a PAYGO strategy due to size, complexity, etc., will require some different funding strategies. The intent would be to use the SWUF to fund debt service of GO bonds. Generally, these projects are estimated at more than $1 million each, and total approximately $64.7 million for 17 (seventeen) projects. The City has expressed a desire to issue no debt for about 5-10 years. To complete these projects within a 30-year period beginning in 2027 to limit the cost escalation will require approximately $24.58 per ERU. This will generate the $4.4 million necessary annually to fund the debt service for that time period. This rate represents a significant multiple of the current and future projected SWUF and is practically untenable. In order to slowly build up the amount of funding required to service the debt, FNI recommends breaking up the Large Projects into three (3) tranches, or groups. The proposed tranches are shown in **Table 5**.

Table 5: Large Projects greater than $1 Million

PROJECT	DESCRIPTION	OPCC	RANK	TRANCHE
CIP09	Heath St. SD	$1,806,000	1	1
CIP07	KC2 Channel Improvements	$10,677,000	2	1
CIP08	W. Alamo SD	$1,998,000	3	1
CIP10	N. Rockwall Channel & N. Morris Bypass	$8,866,000	12	1
CIP13	Virginia St. SD Extension	$3,921,000	4	2
CIP19	Fuji Drainage Improvements	$3,898,000	5	2
CIP11	KC1 Railroad Crossing (UPRR 182.12) and	$1,536,000	7	2
CIP18	RR SPUR Culvert	$1,825,000	10	2
CIP14	College St. SD	$4,814,000	11	2
CIP15	Brin St. SD	$3,466,000	16	2
CIP16	Gardner St. Improvements	$1,889,000	18	2
CIP04	Cemetery Channel	$2,730,000	8	3
CIP03	BC2 Railroad Crossing (UPRR 183.74) and	$1,258,000	9	3
CIP05	Stadium Channel	$1,791,000	13	3
CIP17	Rochester St. Channel	$8,926,000	15	3
CIP01	Brookhollow Channel and SD	$2,277,000	17	3
CIP20	Airport Lead	$2,018,000	20	3
	TOTAL	**$63,696,000**		

Tranche 1 is anticipated to start in 2027, with a total bond amount of $34.2 million, escalated at 3.0% per year from 2019. To fund the debt service over a 30-year period, assuming a 3.0% interest rate would take a SWUF of $9.70 per ERU. From 2027 to 2031, the debt service would represent approximately 62% of the SWUF.

Tranche 2 is anticipated to start in 2032, with a total bond amount of $30.8 million, escalated at 3.0% per year from 2019. To fund the debt service over a 30-year period, assuming a 3.0% interest rate would take a SWUF of $8.74 per ERU. From 2032 to 2036, the debt service would represent approximately 76% of the SWUF.

Tranche 3 is anticipated to start in 2037, with a total bond amount of $32.8 million, escalated at 3.0% per year from 2019. To fund the debt service over a 30-year period, assuming a 3.0% interest rate would take a SWUF of $9.28 per ERU. From 2037 to 2056, the debt service would represent approximately 82% of the SWUF.

6.0 STORMWATER UTILITY FEE

As demonstrated in the sections above, the Stormwater Utility Fee can now be associated with a real cost for each component of drainage maintenance and construction. Not only does each component include a cost but is inherently based on an assumed schedule of implementation.

The stormwater utility will be structured to fund the priorities of the City within a realistic timeframe. An accounting of the required changes, durations, and changing maintenance obligations is tabulated in **Table 6**, and presented graphically in **Figure 2**.

Table 6: Stormwater Utility Fee Schedule of Rates

Description	Start	Duration, years	Incremental Rate	Rate at Start	Rate at Completion	Net Rate
Baseline	2017	∞	$5.65	$5.65	$5.65	$5.65
Small Projects	2020	3	$2.24	$7.89	$0.16	$5.81
Large Projects PAYGO	2023	3	$2.36	$8.16	$0.16	$5.97
Large Projects Debt Tranche 1	2027	30	$9.70	$15.67	$4.51	$10.48
Large Projects Debt Tranche 2	2032	30	$8.74	$24.41	$4.07	$14.55
Large Projects Debt Tranche 3	2037	30	$9.28	$33.69	$4.32	$18.87
Replacement Fund	2050	∞	$22.41	$56.10	$22.41	$41.28

Note: Rates have been escalated from 2019 to the year identified as Start, based on a 3.0% cost escalation factor.
Duration: length of time SWUF increased rate would be allocated specifically for the stated component.
Incremental Rate: Amount of SWUF allocation for each component.
Rate at Start: Cumulative SWUF rate when each component is initiated.
Rate at Completion: SWUF required for long term replacement of the component.
Net Rate: Effective Rate once all components have been constructed, representing the minimum SWUF to be maintained following completion of each component for perpetual system replacement.

Since the cost escalation factor is assumed at 3.0%, this reference is added to **Figure 2** as a guide for how much things will cost in the future. It is calculated based on the current SWUF of $5.65 per ERU. Considering a cost escalation factor of 3.0%, a 3.0% annual increase in the SWUF is required to maintain the same level of service as is presently funded from the SWUF. Uniform annual percentage increases in the SWUF could work following a large enough initial increase, however some combination of annual increases or stepwise increases will be required, depending on what the public can bear.

Since each component of the utility fee is a significant multiple of the existing utility fee, there must be some other additional element to the funding program. As the funding program is implemented things will likely change, including the underlying assumptions. FNI assumes that reallocation can be made within utility fee to meet changes in priorities, but the rates presented above are the base scenario.

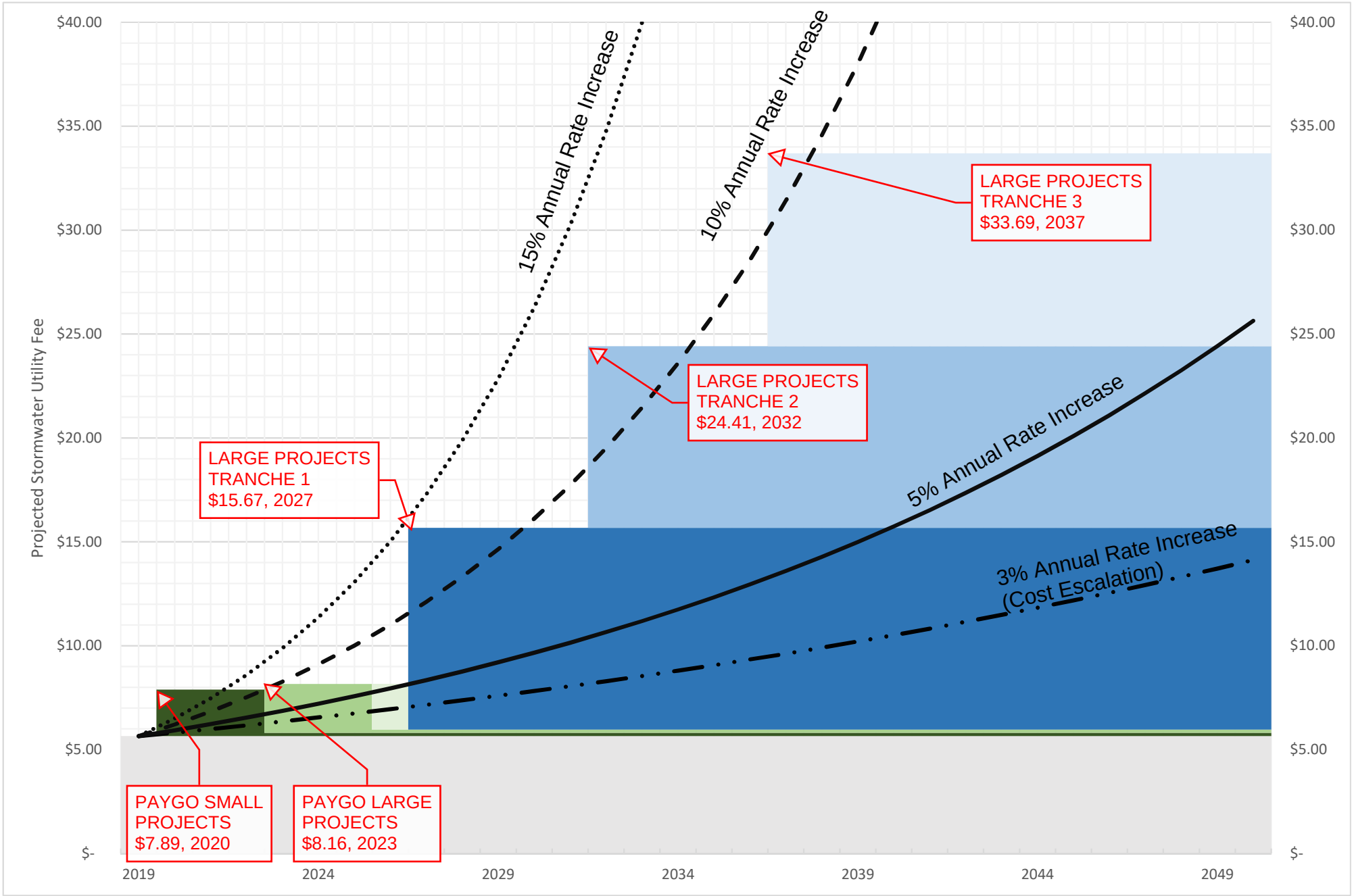

Figure 2: Timeline of Proposed Stormwater Utility Fee

7.0 ADDITIONAL FUNDING OPTIONS

In addition to the Stormwater Utility Fee revenue for PAYGO funding and debt service, there are other sources for funding options. The following section presents a high-level summary of additional funding mechanisms to complement stormwater utility funding for drainage operations, maintenance, and CIPs. An evaluation of the purpose, constraints, benefits, potential applications, and potential roadblocks is provided for each potential funding mechanism in Appendix A.

7.1 GENERAL OBLIGATION BONDS

A general obligation bond (GO bond) is a common type of municipal bond that is secured by the local government's general operating revenues and taxing power. Two conditions must be met before a city can issue GO bonds: (1) there must be a specific provision in the city charter that allows the issuance of bonds for the specified purpose of stormwater drainage improvements, and (2) the voters must approve the bond issuance at an election held on the issue.

7.2 STATE AND FEDERAL GRANTS

A grant is one of the ways federal and state governments fund ideas and projects to provide public services and stimulate the economy. Grants support critical recovery initiatives, innovative research, and many other programs listed in the Catalog of Federal Domestic Assistance (CFDA) [6]. Grants are provided by many state and federal agencies. Grant availability varies throughout the year and funds are awarded based on approval of an entity's application. Each grant has specific criteria that must be met.

- Economic Development Assistance Programs (EDAP); sponsored by EDA
- Nonpoint Source Grant Program [Section 319 (h)]; sponsored by EPA
- Emergency Watershed Protection (EWP) Program; sponsored by NRCS
- Flood Mitigation Assistance (FMA) Grant Program; sponsored by FEMA
- Flood Protection Planning Grant (TWDB)
- Hazard Mitigation Grant Program (HMGP); sponsored by FEMA
- Pre-Disaster Mitigation (PDM) Grant; sponsored by FEMA
- Watershed Protection and Flood Prevention Program; sponsored by NRCS
- Watershed Rehabilitation Program (Rehab); sponsored by NRCS
- Water and Environmental Programs; sponsored by USDA RD

- Continuing Authorities Program; sponsored by USACE

7.3 4B SALES TAX FUND

The use of the sales tax for economic development purposes has been one of the most popular and effective tools used by cities to promote economic development.

7.4 ESTABLISHMENT OF SPECIAL DISTRICTS

A special district is a political subdivision established to provide a single public service (such as water supply or sanitation) within a specific geographic area.

- Public Improvement District (PID)

  A PID is a special assessment area created at the request of the property owners in the district. These owners pay a supplemental assessment with their taxes, which the PID uses for services above and beyond existing City services. Current examples include the new PIDs created for new developments along IH-20.

- Water Control and Improvement District (WCID)

  A WCID is a political subdivision of the State of Texas, and is empowered to purchase, construct, operate, and maintain everything necessary to provide water, wastewater, and drainage services. Current examples include Kaufman County WCID No. 1.

- Municipal Utility District (MUD)

  A MUD is a special-purpose district that provides public utilities (such as electricity, natural gas, sewage treatment, waste collection/management, wholesale telecommunications, water) to district residents. Current examples include Las Lomas MUD 4 of Kaufman County and Las Lomas MUD 4B of Kaufman County.

- Drainage District (DD)

  Most DDs (or drainage improvement districts, DID) are administered by an internal drainage board (IDB), which are single purpose local drainage authorities, dealing with the drainage and water level management of clean water only. Each DD has a defined area, and the IDB only has powers to deal with matters affecting that area. No known examples of Drainage Districts exist within Terrell or Kaufman County.

- Local Improvement District (LID)

  A LID is a method by which a group of property owners can share in the cost of transportation infrastructure improvements or other types of public improvements such as installing water and sanitary sewer lines. Most LIDs involve improving a street, building sidewalks, and installing a stormwater management system. No known examples of Local Improvement Districts exist within Terrell or Kaufman County.

- Flood Control District (FCD)

The role of the FCD is to reduce flood risk and conserve stormwater runoff while improving water quality, providing recreation opportunities, and enhancing open space where feasible. No known examples of Flood Control Districts exist within Terrell or Kaufman County.

- Tax Increment Reinvestment Zone (TIRZ)

A TIRZ is a political subdivision of a municipality or county in Texas created to implement tax increment financing. They may be initiated by the city or county or by petition of owners whose total holdings in the zone consist of a majority of the appraised property value. Current examples include the Tax Increment Finance Zone #1, created through an interlocal agreement between the City of Terrell and Kaufman County.

- Municipal Development District (MDD)

An MDD is created to generate economic development and growth opportunities within the boundaries of the district. To create an MDD, a City must call an election through an order that defines the proposed boundaries of the district. No known examples of Municipal Development Districts exist within Terrell or Kaufman County.

7.5 SALES TAX REALLOCATION ELECTION (HB 157)

House Bill 157 law allows for cities to hold an election to reallocate sales tax revenue. Cities may hold elections to adopt sales taxes (general revenue or dedicated) in any increment of one-eighth of one percent, so long as the total city sales tax does not exceed the maximum two-percent local sales tax cap.

7.6 GENERAL FUND

From a general fund, all operating expenses, services and employee payrolls are provided. The money for this fund comes from several sources, typically the majority is drawn from taxes.

7.7 CERTIFICATES OF OBLIGATION (CO BONDS)

Certificates of Obligation are often are associated with emergency spending, but their use isn't restricted to such purposes. They can be used to fund public works as part of standard local government operations to fund the construction, demolition or restoration of structures; purchase materials, supplies, equipment, machinery, buildings, land and rights of way; and pay for related professional services.

7.8 COMMUNITY DEVELOPMENT CORPORATION (CDC)

A Community Development Corporation, often referred to as a 4B corporation for its enabling legislation, uses a half of a cent of the municipality's sales tax to fund a defined array of public improvements including

buildings, equipment, programs and parks, as well as the promotion and development of business enterprises. The Terrell Economic Development Corporation functions as the CDC in Terrell.

7.9 TEXAS CAPITAL FUND INFRASTRUCTURE PROGRAM (EDA/TEDC)

The Texas Capital Fund Infrastructure Program provides grants for infrastructure development to create or retain permanent jobs in primarily rural communities and counties. The money can be used for a variety of public infrastructure improvements.

7.10 CLEAN WATER STATE REVOLVING LOAN FUND (EPA/TWDB)

The Clean Water State Revolving Fund, authorized by the Clean Water Act, provides low-cost financial assistance (both low-interest loans and principal forgiveness) for planning, acquisition, design, and construction of wastewater, reuse, and stormwater infrastructure. The City of Terrell has been awarded $24,550,000 of committed funds from the CWSRF for Wastewater Projects but has not been awarded any money for Stormwater Projects.

7.11 IMPACT FEES

To establish an impact fee system, the City must demonstrate the added burden on public infrastructure caused by development. Because the majority of the study area is built-out, it is unlikely that an impact-fee based approach would yield much revenue to fund projects.

7.12 TEXAS GLO CDBG MITIGATION (CDBG-MIT) ACTION PLAN

The Texas General Land Office (GLO) is administering the disbursement of U.S. Department of Housing and Urban Development (HUD) funding associated with federally declared disasters. Kaufman County was included as a Disaster Impacted County in the FEMA Disaster Declaration 4223 (May 29, 2015) but was not considered a “Most-impacted” county by HUD. A total of 112 counties, including Kaufman County, are eligible to compete for approximately $24.3 million in infrastructure funding as State “Most-impacted” counties. According to the minimum award amount of $3 million, this funding source will generate at most 8 infrastructure projects spread amongst the other counties. If HUD “Most-impacted” counties apply and have a greater need, the amount available may be reduced.

A candidate for application may be a combination or subset of CIP11, CIP 12, CIP13, CIP14, and CIP15 projects to address the downtown flooding related to Virginia Street. The total cost for these CIP projects

is just over $14 million and could be optimized during design to find the appropriate project extents to fit within the grant amount.

The rules for scoring are available in the document released on January 31, 2020. A preliminary screening showed some favorable scoring, but everything will be relative to the other disaster-declared counties.

- County Composite: Kaufman County is in the Top 75% category, worth 5 points.
- Social Vulnerability Index: Kaufman County is in the Medium High category, worth 8 points. A more localized analysis could get the extra two points available in this category.
- Per Capita Market Value: Kaufman County is in the Medium High category, worth 8 points. A more localized analysis could get the extra two points available in this category.
- Low-to-Moderate Income (LMI) National Objective: The project would most likely meet the LMI National Objective of at least 51%, worth 20 points.
- Local Adopted Plan: The requirements for this category include a formal adoption of the plan, of which the Drainage Master Plan would count, worth 5 points.
- Management Capacity: This criterion measures past performance on other CDBG grants, worth up to 15 points and variable.
- Project Impact: The scoring of this is not well defined but is a function of the project beneficiaries relative to the cost of the project and to the total population of the City. In the application phase, the methodology of counting beneficiaries can be modified in excess of property owners and employees, and could be extended to other impacted people, i.e. displaced bus riders. Worth up to 15 points for cost divided by beneficiaries, and up to 10 points for project beneficiaries divided by total population.
- Leverage: If the City can procure funding for at least 1% of the project cost through non-CDBG means, that would be worth 5 points.

Excluding the project impact points available as there is no way to compare against all the projects the GLO will be comparing and assuming the City's management of previous CDBG grants was sufficient, the City has a solid foundation of 66 points, which is a good start. It will be crucial to maximize the points available through project impact for a maximum of 91 points out of 100. Even so, there are few dollars

available relative to the number of potential applicants, so it is difficult to predict the chances of success with this grant. The timeline for applications has yet to be released at the time of this report, but the rules are available online through this URL: https://recovery.texas.gov/files/programs/mitigation/cdbg-mit-submitted-plan.pdf.

7.13 TEXAS STATE FLOOD PLAN AND FLOOD INFRASTRUCTURE FUND

On March 16, 2020, the TWDB issued the final Flood Infrastructure Fund (FIF) rules and began accepting Abridged Applications from municipalities for financial assistance with drainage, flood mitigation, and flood control projects. To be considered for funding, applications are due to TWDB no later than 5:00 PM May 14, 2020. The FIF is an initial $793 million to be awarded as grants and zero interest loans for qualifying projects.

Projects are classified into 4 categories, 1) Flood Protection Planning for Watersheds, 2) Planning, Acquisition, Design, Construction, and/or Rehabilitation, 3) Federal Award Matching, 4) Measures immediately effective in protecting life and property. According to the data provided and referenced by TWDB, the City qualifies for the following grant percentages for each category, shown in **Table 7**.

Table 7: TWDB FIF Funding Categories and Grant Applicability

Category Description	Grant Percentage
1: Flood Protection Planning for Watersheds	90%
2: Planning, Acquisition, Design, Construction, and/or Rehabilitation	35% (40% if Green)
3: Federal Award Matching Funds	65% (70% if Green)
4: Measures immediately effective in protecting life and property	65% (70% if Green)

The City qualifies for Category 1 Funding of flood control planning projects based on Annual Median Household Income (AMHI) as a ratio to the State AMHI statistic. Because the City's ratio is 74.8%, the City qualifies for a 90% grant for these projects.

These Category 1 Planning Projects entail the planning of entire watersheds no smaller than HUC-10 size. The City lies entirely within HUC 1203010701, a 331-square mile area stretching from Rockwall to Cedar Creek Reservoir. The area is already studied as a Base Level Engineering (BLE) based on the latest LIDAR

data. A watershed study of this area could update to the BLE models to include structure data, and effort would likely require a coordinated effort with the County and other neighboring cities in the HUC-10.

The City qualifies for Category 2 based on AMHI to receive grants of 25%, plus 5% Based on unemployment rate, plus an additional 5% for being “rural”, located in a County with no urban area in excess of 50,000 population. If the city chooses a project that could be considered “Green or Nature-Based”, the City could receive an additional 5% match for a total percentage of up to 40%.

The Category 2 funding could cover the full range of project life from conceptualization to construction. A project such as CIP07 KC2 Channel Improvements and CIP 08 Heath Street Storm Drain could be adjusted to qualify for the full 40% grant, reducing the cost to the City to approximately $7.6 million of the $12.7 million original cost. The remaining $5.1 million could be issued as a 0% loan from TWDB. Other projects might qualify as well, but likely could not be given credit for the additional 5% grant for being “Green”.

The City qualifies for Category 3 and 4 based on AMHI to receive grants of 55%, plus 5% Based on unemployment rate, plus an additional 5% for being “rural”, located in a County with no urban area in excess of 50,000 population. If the city chooses a project that could be considered “Green or Nature-Based”, the City could receive an additional 5% match for a total percentage of up to 70% for each Category.

Category 3 projects would need to be in response to a federal award for flood-related activities contingent on the availability of local matching funds. The grant could cover a portion of the City’s required local match to receive the additional Federal funding. This funding is much more advantageous in locations with a disaster declaration.

Category 4 projects are not typical flood control projects and instead are anticipated to be flood warning systems, low water crossing barriers, gauges, and public education and outreach. This Category explicitly excludes planning, design, and construction projects.

In the first round of funding to be awarded, a project does not have to be identified in the State Flood Plan, but after the initial round of funding, subsequent projects must be included in the Plan to receive funding. TWDB is still working out the details of how the State Flood Plan program will work, but it appears advantageous to submit an initial abridged application for FIF funding on the known projects that can provide the most immediate benefit, such as CIP 07 and CIP 08.

8.0 STORMWATER FUNDING RECOMMENDATION

Based on the researched funding mechanisms and known project scopes, FNI created a scenario to fund the development of all the projects, which would make the utility fee for the City of Terrell among the highest in the State of Texas. Further refinement of the baseline plan is described in the section below.

The Existing Infrastructure Liabilities will only continue to grow as time progresses. To avoid a drastic increase in the utility fee to account for these liabilities, the fee associated with these may be phased in over time, as politically expedient. If action is not taken now, the cycle of lurching from crisis to crisis can be expected as more drainage infrastructure reaches the end of its service life. More extreme measures may be required to replace unnecessary storm drains with open channels to reduce the cost burden, even if that means that structures must be bought out.

The Small Projects are an easy way to build momentum and public trust. The bonus is that the fee increase associated with the small projects may be counted towards other components when the projects are complete. This is a must do, as soon as possible.

The Large Projects to be funded entirely with the utility fee may be delayed or broken up into smaller parts, but generally represent simple, straight-forward, and affordable projects. FNI recommends to initiate these projects as soon as the Small Projects are completed, to maintain the positive momentum.

The Large Projects to be funded by debt, with debt service fully funded by the utility fee, represent a tremendous increase in the utility fee. The utility fee could be increased annually or incrementally, as bonds or other debt issuance may be spaced out when politically expedient, but the rate of increase should always exceed the cost escalation rate.

FNI recommends the City utilize the TIF Zone #1 revenues to fund the Large Projects. The proposed projects that appear to meet the requirements total to approximately $21.5 million. TIF Zone #1 was created in 2007 and has a limited life span, so this funding source is time sensitive. TIF Zone #1 funding could be leveraged in the application for GLO funding of a combination or subset of CIP11, CIP12, CIP13, CIP14, and CIP15.

Specific Large Projects should be used in attempt to receive grant funding or low- to no- interest rate loans so that the total burden of the cost is not upon the City of Terrell. An example might be one of the most studied problem areas in the city, which is addressed by projects CIP07, CIP08, CIP09, and CIP10 ($26.2

million total). FNI assumes these projects are good candidates to apply a grant from the TWDB as part of the State Flood Plan because they address most of the significant flood hazard within the City. If State Flood Plan funding is not received, other grant opportunities for these projects should be pursued. FNI also recommends the City to actively participate in the process of identifying these projects and gain whatever funding it can from the State Flood Plan process.

This memo has defined a logical, high level overview of how the City of Terrell might further develop its Stormwater Utility Fee to achieve its goals for the reduction of flood hazard and improvement in level of service to its citizens. Because of its nature, the memo has made several simplifying assumptions that should be periodically revisited, including the priorities of the City, the desire for a higher level of service from drainage infrastructure, the costs of projects, and especially the rate at which the costs escalate. Further compounding these assumptions could be the expectation of level of service from the citizens, and priorities can change when financial resources are not enough to meet those expectations. The path forward following this plan depends on a solid understanding of citizen expectations, commitment to address the known and significant drainage issues by using the revenue generated by the SWUF for its highest and best purpose, and recalibration of the plan when either of those components change. In any case, the City staff will need the ability to determine and address the highest priorities, with the resources available at that time.

APPENDIX A
RESEARCH OF ADDITIONAL FUNDING OPTIONS

1.0 RESEARCH OF ADDITIONAL FUNDING OPTIONS

The following are additional funding mechanisms to complement stormwater utility funding for drainage operations, maintenance, and CIPs. An evaluation of the purpose, constraints, benefits, potential applications, and potential roadblocks is provided for each potential funding mechanism.

1.1 GENERAL OBLIGATION BONDS (GO BONDS)

Purpose

A general obligation bond (GO bond) is a common type of municipal bond that is secured by the local government's general operating revenues and taxing power [1]. As a bond used to finance public projects, the issuer (i.e., the local government) owes the bond holders a debt and is obliged to pay them interest and/or to repay the principal at the maturity date [1]. Most GO bond pledges at the local government level include a pledge to levy a property tax to meet debt service requirements [1]. The city can issue GO bonds to finance capital improvement projects (CIPs) as they are considered long-term municipal financial solutions.

Constraints

Two conditions must be met before a city can issue GO bonds: (1) there must be a specific provision in the city charter that allows the issuance of bonds for the specified purpose of stormwater drainage improvements, and (2) the voters must approve the bond issuance at an election held on the issue [2]. Before a local government can receive a GO bond, the capital market evaluates the credit-worthiness of the government but does not specifically evaluate the technical and marketing risk of any project [3].

The effective minimum offering size for GO bonds is approximately $500,000. They can be used to finance any project approved by the voters, but if the CIP costs less than $500,000, several projects must be grouped together for a single offering [3].

Benefits

Because the credit of a municipality stands behind GO bonds, they typically have high bond ratings. In other words, they have a high assessment of the likelihood the debt will be repaid, resulting in high-quality bonds that offer good protection for principal and interest payments [4]. The reason for this high rating is the municipality's power of taxation: a city or town always has the option of raising tax rates or levying new taxes to meet its obligation to bondholders [4]. Thus, it is rare for a

municipality to default on its GO bonds. GO bonds are also paired with low interest rates because the investor risk is minimal resulting from guarantees by the city's tax-collecting capacity [3].

Potential Applications

Potential applications are wide-ranging, from landscaping to improvement of public buildings such as libraries, to drainage improvements, to street improvements. GO bonds are sold to raise funds for works that benefit the entire community and do not provide direct sources of revenue, such as roads, bridges, and parks.

Potential Roadblocks

There must be a specific provision in the city charter that allows the issuance of bonds for the specified purpose of drainage improvements and voters must approve the bond by election before it can be issued.

1.2 STATE AND FEDERAL GRANTS

Purpose

A grant is one of the ways federal and state governments fund ideas and projects to provide public services and stimulate the economy. Grants support critical recovery initiatives, innovative research, and many other programs listed in the Catalog of Federal Domestic Assistance (CFDA) [6]. Grants are provided by many state and federal agencies. Grant availability varies throughout the year and funds are awarded based on approval of an entity's application. Each grant has specific criteria that must be met.

A descriptive list of federal grants which can be applied to stormwater projects is provided below:

- Economic Development Assistance Programs (EDAP); sponsored by EDA

  Under the EDAP Federal Funding Opportunity (FFO) announcement, EDA will make construction, non-construction, and revolving loan fund investments under the Public Works (PW) and Economic Adjustment Assistance (EAA) Programs [7]. Grants made under these programs must support development in economically distressed areas of the United States by fostering job creation and attracting private investment. The cost-sharing amount varies.

- Nonpoint Source Grant Program [Section 319 (h)]; sponsored by EPA

The 1987 amendments to the Clean Water Act (CWA) established the Section 3219 Nonpoint Source (NPS) Management Program. Under Section 319, states, territories, and tribes receive grant money that supports a wide variety of activities including technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. In 2017, $167.9 million in grant money was awarded [8].

The Texas NPS Management Program is Texas' comprehensive strategy for addressing NPS pollution. The most recent program publication was submitted to the EPA by the Governor in December 2017. The types of projects covered by this program are watershed protection plans in priority watershed, NPS portion of Total Maximum Daily Load (TMDL) implementation plans, surface water quality monitoring, data analysis and modeling, best management practices (BMPs), and public outreach/education. Over the past two years, the State's allocation of funding has been approximately $7.6 million [9]. The Texas NPS Management Grant Program is jointly managed by Texas Commission on Environmental Quality and the Texas State Soil and Water Conservation Board. [a]

- Emergency Watershed Protection (EWP) Program; sponsored by NRCS

  The objective of the EWP Program is to assist sponsors, landowners, and operators in implementing emergency recovery measures for runoff retardation and erosion prevention to relieve imminent hazards to life and property created by a natural disaster that causes a sudden impairment of a watershed [10]. Financial assistance for flood protection projects are made available following a Presidential Disaster Declaration. Applicants submit requests immediately following a disaster in anticipation of future funding through disaster declaration.

  This grant applies to the construction of projects that: (1) provide protection from flooding or soil erosion, (2) remove debris that would affect runoff or erosion, and (3) restore hydraulic capacity following a disaster.

- Flood Mitigation Assistance (FMA) Grant Program; sponsored by FEMA

  The FMA program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FMA provides funding to States, Territories, federally-

recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP [11]. FMA funding is also available for management costs.

There are two types of work that can be funded. [b]

FMA Planning Grants: To develop or update the Flood Hazard component of the Multi-Hazard Mitigation Plan.

FMA Project Grants: To implement measures to reduce flood losses. Projects that reduce the risk of flood damage to structures insurable under the NFIP are eligible. Such activities include:

- Acquisition of insured structures and real property;
- Relocation or demolition of insured structures;
- Dry flood proofing of insured structures;
- Elevation of insured structures; and
- Minor localized flood reduction projects.

Generally, local communities will sponsor applications, submit the applications to the State, who in turn submits the applications to FEMA.

- Flood Protection Planning Grant (TWDB) [12]

  The Texas Water Development Board offers grants to political subdivisions of the State of Texas for evaluation of structural and nonstructural solutions to flooding problems. Upstream and/or downstream effects of proposed solutions must be considered in the planning. The proposed planning must be regional in nature by considering the flood protection needs of the entire watershed. The financing of the program is from the TWDB's Research and Planning Fund.

  Planning studies may include, but are not limited to, the following activities:

  - Determining and describing problems resulting from or relating to flooding;
  - Conducting hydrologic and hydraulic studies;
  - Identifying potential solutions;
  - Estimating benefits and costs of potential solutions, including structural and nonstructural measures;

- Determining the views and needs of the affected public relating to flooding problems;
- Recommending feasible solutions to flood protection problems;
- Evaluating environmental, social, and cultural factors; and
- Ensuring proposed solutions are consistent with appropriate regional or statewide plans and relevant laws and regulations.

Political subdivisions of the State of Texas with the legal authority to plan for and implement flood protection measures within their jurisdictional area, and that are members of the National Flood Insurance Program are eligible to apply.

Grants for flood protection planning shall be limited to 50% of the total cost of the project, except that the board may supply up to 75% of the total cost to political subdivisions which have unemployment rates exceeding the state average by 50% or more, and which have per capita income which is 65% or less of the state average for the last reporting period available. Grants more than 75% flood protection planning will be provided if authorized by specific legislation or legislative appropriation language.

- Hazard Mitigation Grant Program (HMGP); sponsored by FEMA

  The purpose of HMGP is to help communities implement hazard mitigation measures following a Presidential Major Disaster Declaration in the areas of the state, tribe, or territory requested by the Governor or Tribal Executive. The key purpose of this grant if to enact mitigation measures that reduce the risk of loss of life and property from future disasters. HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act [13].

- Pre-Disaster Mitigation (PDM) Grant; sponsored by FEMA

  The PDM Program, authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, is designed to assist States, U.S. Territories, Federally-recognized tribes, and local communities in implementing a sustained pre-disaster natural hazard mitigation program. The goal is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters [14].

This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and repeated damage, PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis [14].

- Watershed Protection and Flood Prevention Program; sponsored by NRCS

  The Watershed and Flood Prevention Operations (WFPO) Program provides technical and financial assistance in carrying out works of improvement to protect, develop, and utilize the land and water resources in watersheds [15]. The program provides cost sharing funds to State agencies for flood mitigation projects including floodwater dams, floodplain easements and flood-proofing of residential and commercial structures.

- Watershed Rehabilitation Program (Rehab); sponsored by NRCS

  Rehab helps project sponsors rehabilitate aging dams that are reaching the end of their 50-year design lives. This rehabilitation addresses critical public health and safety concerns. Since 1948, NRCS has assisted local sponsors in constructing more than 11,800 dams [16].

- Water and Environmental Programs; sponsored by USDA RD

  Under the Water and Environmental Programs, the applicable grant program is the Water & Waste Disposal Loan & Grant Program. This program provides funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas [17].

- Continuing Authorities Program; sponsored by USACE

  This program allows the Corps of Engineers to plan, design, and construct smaller projects without specific authorization from Congress. The potential sponsor must request the Corps of Engineers to investigate potential flood risk management issues that might fit the program. Once the Corps of Engineers determines that the project fits the program, the District will request funds to initiate a reconnaissance effort to determine potential Federal interest in proceeding to a feasibility study. There are three authorities available for this program [18]:

- Section 14 – Emergency Streambank and Shoreline Protection.
- Section 205 – Small Flood Risk Management Projects.
- Section 208 – Clearing and Snagging of Waterways.

Constraints

- *EDAP*: The maximum award amount from the EDA is $3,000,000 with a minimum award amount of $100,000. An area receiving this grant must be considered economically distressed and the project must support the creation of new, permanent jobs. To be considered economically distressed, the applicable region must meet the following criteria [19]:
  - A 24-month unemployment rate that is at least 1 percentage point greater than the national average.
  - Per capita income that is not more than 80% of the national average.
  - "Special Need," as determined by EDA and as discussed in section C.3. of the application instructions

- *NPS Grant Program:* The NPS Grant Program is administered by the Texas Commission on Environmental Quality (TCEQ) and the Texas State Soil and Water Conservation Board (TSSWCB) for providing funding as grants to cooperating entities for activities that address the goals and objectives stated in the Texas NPS Management Program. The TCEQ and TSSWCB requests proposals during each grant cycle. They should stress interagency coordination, demonstrate new or innovative technologies, use comprehensive strategies that have statewide applicability, and stress public participation. The should also include a Quality Assurance Project Plan (QAPP) [9].
  - This grant is more applicable to water quality projects, not stormwater drainage projects.
- *EWP Program:* All EWP work must reduce threats to life and property and must be economically, environmentally, and socially defensible and sound from a technical standpoint [10]. EWP cannot solve problems that existed before the disaster or to improve the level of protection above that which existed before a disaster. It cannot fund operation and maintenance work or repair private or public transportation facilities or utilities. The work cannot adversely affect downstream water rights and fund cannot be used to install measures not essential to the reduction of hazards [10].

  - Sponsors must submit a formal request to the State Conservationist for assistance within 60 days of the natural disaster occurrence, or 60 days from the date when access to the sites becomes available.

- *FMA Program:* Requirements include community participation in the National Flood Insurance Program (NFIP), mitigated property insured by NFIP, a FEMA-approved hazard mitigation plan (HMAP), and that the CIP be cost-beneficial.

- *FPP* Program: Political subdivisions of the State of Texas with the legal authority to plan for and implement flood protection measures within their jurisdictional area are eligible to apply.

- *HMGP*: Requirements include community participation in NFIP, a FEMA-approved HMAP, and a cost-beneficial project. The foundational requirement, however, is the grant is only applicable following a Presidential Disaster Declaration.

- *PDM Program*: Requirements include a FEMA-approved HMAP and that the CIP be cost-beneficial.

- *WFPO Program:* Sponsoring local organizations can request that watershed project plans be authorized for Federal Watershed Operations funding assistance. Watershed plans involving Federal contributions more than $5,000,000 for contribution, or construction of any single structure having a capacity more than 2,500 ac-ft, require Congressional approval. Criteria for being an eligible authorized watershed project are [20]:
  - Public sponsorship.
  - Watershed projects up to 250,000 acres.
  - Benefits that are directly related to agriculture, including rural communities, that are at least 20% of the total benefits of the project.

- *Rehab Program:* The Rehab grant program is only applicable to the rehabilitation or decommissioning of NRCS aging dams.

- *Water & Waste Disposal Program:* Borrowers must have the legal authority to construct, operate and maintain the proposed services or facilities. Projects must also be financially sustainable. A preliminary engineering report, environmental report, and median household

income is required in the application for this grant. Areas that may be served by this grant program include [17]:

- Rural areas and towns with fewer than 10,000 people.
- Tribal lands in rural areas
- Colonias

- *Continuing Authorities Program*

  Section 14: The Corps of Engineers is authorized to construct bank protection works to protect endangered highways, highway bridge approaches, and other essential, important public works, such as municipal water supply systems and sewage disposal plants, churches, hospitals, schools, and non-profit public services and known cultural sites that are endangered by flood-caused bank or shoreline erosion. Privately owned property and facilities are not eligible for protection under this authority. Each project is limited to a total Federal cost of $1.5 million [18].

  Section 205: Before the Federal Government can participate in implementing a flood risk management project, a planning study must be conducted to determine if the project is economically justified (benefits exceed the costs), technically feasible, and environmentally acceptable. Planning studies are typically conducted in two phases - reconnaissance and feasibility [18].

  Section 208: In the interest of flood control, the Corps of Engineers can conduct clearing, snagging, or channel excavation. Limited embankment construction can be provided by utilizing the materials from the cleaning operation [18].

<u>Benefits</u>

- *EDAP*: There are no submission deadlines under this opportunity. Proposals and applications are accepted on an ongoing basis until the publication of a new EDAP FFO. Applicants may be from rural or urban areas. As previously mentioned, the cost-sharing varies, but generally, the amount of the EDA grant may not exceed 50% of the total cost of the project. Projects may receive up to an additional 30% based on the relative needs of the region in which the project will be located [19].

- *NPS Grant Program*: Cost sharing is 40% allocated to local governments and 60% allocated to the federal government.

- *EWP Program*: The NRCS may bear up to 75% (90% within limited resource areas as identified by the U.S. Census data) of the construction cost of emergency measures. Thus, the local government must cover the other 25% of the cost.

- *FMA Program*: Funding is appropriated by Congress annually. For projects involving Severe Repetitive Loss Properties, the grant will cover 100% of the project. For projects involving Repetitive Loss Properties, the grant will cover 90% of the project. Finally, for projects involving NFIP insured properties, the grant will cover 75% of the project while the local government must pay for 25% of the project.

- *FPP Program*: Grants for flood protection planning shall be limited to 50% of the total cost of the project, except that the board may supply up to 75% of the total cost to political subdivisions which have unemployment rates exceeding the state average by 50% or more, and which have per capita income which is 65% or less of the state average for the last reporting period available.

- *HMGP*: The benefits of HMGP include support for risk reduction activities, improvement of resiliency, elimination of the impact of future events, long-term solutions to problems, cost-effective solutions, and help to avoid repetitive damage form disasters [13]. FEMA provides up to 75% of the funds for mitigation projects under HMGP. The remaining 25% can come from a variety of sources.

- *PDM Program*: FEMA provides up to 75% of the funds for mitigation projects under PDM. The remaining 25% can come from a variety of sources.

- *WFPO Program*: Cost sharing varies and availability of the grant is annually. This grant program is applicable to the Terrell CIPs.

- *Rehab Program*: The NRCS has made $4.8 million available to Ellis and Williamson counties to complete the design and construction of four watershed rehabilitation projects through Rehab [16]. The cost sharing allocation is 65% federal and 35% local.

- *Water & Waste Disposal Program*: Long-term, low-interest loans are available, and grants may be combined with a loan if necessary to keep user costs reasonable [17]. However, they are only available to rural areas with a population less than 10,000 people.

- *Continuing Authorities Program*: The first $100,000 of the Planning Design Analysis phase is a Federal expense. All PDA costs after the first $100,000 are cost shared 50/50. All construction costs are cost shared 65% Federal and 35% non-Federal. Each project is limited to a total Federal cost of $1.5 million [18].

Potential Applications

- *EDAP*: Potential applications of this program are public works projects such as water and sewer system improvements, industrial parks, shipping and logistics facilities, etc.

- *NPS Grant Program*: Potential applications are limited for the CIPs in Terrell, but may include watershed assessment, planning, implementation, demonstration and education projects with the boundaries of impaired watersheds.

- *EWP Program*: Potential applications are limited for the CIPs in Terrell since the grant does not apply to pre-existing conditions and may only be applied immediately after a disaster has occurred.

- *FMA Program*: Potential applications include acquisition for demolition or relocation, structure elevation or reconstruction, dry flood-proofing, minor localized flood reduction projects, HMAP (flood hazard only) development or update.

- *FFP Program*: Planning studies may include, but are not limited to, the following activities:
    - Determining and describing problems resulting from or relating to flooding;
    - Conducting hydrologic and hydraulic studies;
    - Identifying potential solutions;
    - Estimating benefits and costs of potential solutions, including structural and nonstructural measures;
    - Determining the views and needs of the affected public relating to flooding problems;
    - Recommending feasible solutions to flood protection problems;

  - Evaluating environmental, social, and cultural factors; and
  - Ensuring proposed solutions are consistent with appropriate regional or statewide plans and relevant laws and regulations.

- *HMGP*: Potential applications are limited for the CIPs in Terrell since the grant does not apply to pre-existing conditions and may only be applied immediately after a disaster has occurred.

- *PDM Program*: Potential applications include acquisition for demolition or relocation, structure elevation, dry flood-proofing, minor localized flood reduction projects, HMAP development.

- *WFPO Program*: Potential applications include flood damage mitigation through dams, easements, and flood-proofing, agricultural/rural water supply projects, water quality projects, water conservation projects, groundwater recharge projects, public fish and wildlife habitat conservation, and public water-based recreation projects.

- *Rehab Program*: The main application for this grant is to the rehabilitation or decommissioning of NRCS dams.

- *Water & Waste Disposal Program*: Applications of this grant are toward the design and construction of water, sanitary sewer, stormwater and solid waste facilities. However, the area's population must be fewer than 10,000 people.

- *Continuing Authorities Program*: Potential applications include flood risk management, ecosystem restoration, erosion control, streambank restoration, and multipurpose projects.

Potential Roadblocks

- *EDAP*: The City of Terrell is unlikely to be considered an "economically distressed area," and is thus unlikely to receive this grant.

- *NPS Grant Program*: The grant cycle closed June 3, 2016 and the new cycle has not yet started. The City of Terrell may not be within the boundaries of an impaired watershed [9].

- *EWP Program*: Potential roadblocks are obvious as described in the section, Potential Applications.

- *FMA Program*: The FMA program is a competitive grant program and FEMA chooses the applicants to be funded based on the applicant's ranking of the project and the eligibility and cost-effectiveness of the project. The application deadline is typically in October.

- *FFP Program*: There are several requirements in the application for the grant as described by the Texas Water Development Board (TWDB).

- *HMGP*: Potential roadblocks are obvious as described in the section, Potential Applications.

- *PDM*: The PDM program is a competitive grant program and FEMA chooses the applicants to be funded based on the applicant's ranking of the project and the eligibility and cost-effectiveness of the project. The application deadline is typically in October.

- *WFPO Program*: The watershed area must not exceed 250,000 acres, the capacity of a single structure is limited to 25,000 acre-ft of total capacity, and 12,500 acre-ft of floodwater detention capacity. The watershed meets this criterion, but the CIPs must also meet the latter two requirements.

- *Rehab Program*: If none of the City of Terrell's proposed CIPs include the decommissioning or rehabilitation of an aging dam, then this grant does not apply.

- *Water & Waste Disposal Program*: Potential roadblocks are obvious as described in the section, Potential Applications.

- *Continuing Authorities Program*: Formal assurance in the form of a Project Partnership Agreement must be executed with the project sponsor. The Corps of Engineers would oversee project construction; however, once constructed, the operation and maintenance of the project would be the responsibility of the project sponsor [18].

1.3 4B SALES TAX FUND

Purpose

The use of the sales tax for economic development purposes has been one of the most popular and effective tools used by cities to promote economic development. Since the authorization for the local option tax took effect in 1989, more than 586 cities have levied an economic development sales tax. These cities have cumulatively raised more than $573 million annually in additional sales tax revenue

dedicated to the promotion of local economic development. Of these cities, 101 have adopted a Type A economic development sales tax, 367 cities have adopted a Type B economic development sales tax, and 118 cities have adopted both a Type A and a Type B sales tax [2].

Constraints

There are several important differences between Type A and Type B sales taxes for economic development. Type A and Type B taxes can be distinguished on the following grounds: 1) the authorized use of the tax proceeds; 2) the oversight procedure regarding project expenditures; and 3) the means for adopting and altering the tax by election [2].

The Type B tax also can be used to fund the provision of land, buildings, equipment, facilities, expenditures, targeted infrastructure and improvements that are for the creation or retention of primary jobs for projects such as manufacturing and industrial facilities, research and development facilities, military facilities, including closed or realigned military bases, transportation facilities, sewage or solid waste disposal facilities, recycling facilities, air or water pollution control facilities, distribution centers, small warehouse facilities, primary job training facilities for use by institutions of higher education, regional or national corporate headquarters facilities, eligible job training classes, certain career centers and certain infrastructural improvements that promote or develop new or expanded business enterprises. However, unlike the Type A tax, the Type B tax can additionally fund projects that are typically considered to be community development initiatives. For example, authorized categories under Type B include, among other items, land, buildings, equipment, facilities, expenditures, and improvements for professional and amateur sports facilities, park facilities and events, entertainment and tourist facilities, and affordable housing. Also, the Type B tax may be expended for the development of water supply facilities or water conservation programs [2].

If the city is eligible to adopt a Type B tax, it may propose a tax rate equal to one-eighth, one-fourth, three-eighths or one-half of one percent. The city may not adopt a sales tax rate that would result in a combined rate of all local sales taxes that would exceed two percent [2].

Benefits

Every Texas city is eligible to adopt a Type B sales tax if the combined local sales tax rate does not exceed two percent.

Potential Applications

Type B corporations may provide land, buildings, equipment, facilities and improvements found by the board of directors to promote or develop new or expanded business enterprises that create or retain primary jobs, including a project to provide [2]:

- Transportation facilities (including but not limited to airports, hangars, airport maintenance and repair facilities, air cargo facilities, related infrastructure located on or adjacent to an airport facility, ports, mass commuting facilities and parking facilities),
- Sewage or solid waste disposal facilities,
- Air or water pollution control facilities,
- Facilities for furnishing water to the public,
- Public safety facilities,
- Streets and roads,
- Drainage and related improvements,
- Demolition of existing structures,
- General municipally owned improvements,
- Any improvements or facilities that are related to any of those projects and any other projects that the board in its discretion determines promoted or develops new or expanded business enterprises that create or retain primary jobs.

Potential Roadblocks

Any drainage improvements would have to be approved by the Type B corporation board.

1.4 ESTABLISHMENT OF SPECIAL DISTRICTS

A special district is a political subdivision established to provide a single public service (such as water supply or sanitation) within a specific geographic area [21].

- Public Improvement District (PID)

  A PID is a special assessment area created at the request of the property owners in the district. These owners pay a supplemental assessment with their taxes, which the PID uses for services above and beyond existing City services [22]. A PID may be formed to perform any of the following improvements:

  - Water, wastewater, health and sanitation, or drainage improvements
  - Street and sidewalk improvements

- Mass transit improvements
- Parking improvements
- Library improvements
- Etc.

- Water Control and Improvement District (WCID)

  A WCID is a political subdivision of the State of Texas, and is empowered to purchase, construct, operate, and maintain everything necessary to provide water, wastewater, and drainage services [23]. Through "general law," a district may be created by the TCEQ or the county commissioners court. WCIDs have broad authority to supply and store water for domestic, commercial, and industrial use; to operate sanitary wastewater systems; and to provide irrigation, drainage, and water quality services [24].

- Municipal Utility District (MUD)

  A MUD is a special-purpose district that provides public utilities (such as electricity, natural gas, sewage treatment, waste collection/management, wholesale telecommunications, water) to district residents [25]. MUDs engage in the supply of water, conservation, irrigation, drainage, firefighting, solid waste (garbage) collection and disposal (including recycling activities), wastewater (sewage) treatment, and recreational facilities. A MUD can require its customers to use its solid waste services as a condition for receiving other MUD services. A MUD may provide solid waste and recycling services through a private company. While they can develop, maintain, or acquire parks or recreational facilities, MUDs are prohibited from issuing bonds to pay for these facilities. They can, however, set and charge user fees [24].

- Drainage District (DD)

  Most DDs (or drainage improvement districts, DID) are administered by an internal drainage board (IDB), which are single purpose local drainage authorities, dealing with the drainage and water level management of clean water only. Each DD has a defined area, and the IDB only has powers to deal with matters affecting that area [26]. An example of an established DD in Texas is the City of Garland. They established a DD to assist residential and commercial property owners who are experiencing property damage due to erosion from creeks or other bodies of water within the City [27].

- Local Improvement District (LID) [28]

An LID is a method by which a group of property owners can share in the cost of transportation infrastructure improvements or other types of public improvements such as installing water and sanitary sewer lines. Most LIDs involve improving a street, building sidewalks, and installing a stormwater management system. An LID can also be used to install sidewalks on existing streets that previously have been accepted for maintenance by the City. When property owners decide they want to form an LID, they assume responsibility to pay for the project if the project is approved by City Council. The City works with property owners to determine the scope of the project and develops an assessment methodology. A variety of methods are used, including square footage, linear footage or equivalent dwelling unit. Sometimes a combination of these methods is used, but square footage is most commonly used for projects in residential areas.

- Flood Control District (FCD)

  The role of the FCD is to reduce flood risk and conserve stormwater runoff while improving water quality, providing recreation opportunities, and enhancing open space where feasible [29]. The Harris County FCD roles include widening and deepening bayous to carry more stormwater and reduce the size of floodplains, excavating stormwater detention basins to safely store millions of gallons of stormwater, implementing voluntary home buyouts, and maintaining drainage infrastructure by addressing erosion, slope failure, and sediment build-up [30]. FCDs are generally capital improvement programs that address flooding from a regional perspective.

- Tax Increment Reinvestment Zone (TIRZ) [31]

  A TIRZ is a political subdivision of a municipality or county in Texas created to implement tax increment financing. They may be initiated by the city or county or by petition of owners whose total holdings in the zone consist of a majority of the appraised property value. To get funding for a TIRZ area, applicants should follow three steps.

  1. Property owners possessing 50% or more of the appraised value of a district submit a petition to the county, city, or town requesting a TIRZ be set up, or the local government may decide to create one. A specific lifetime for the TIRZ is determined. A TIRZ may only be city-initiated if less than 10% of its land area consists of residential area.
  2. For the purposes of existing tax-collecting entities (water districts, counties, etc.) the assessed values of properties within the new TIRZ are frozen. It is assumed that property values will increase over the lifetime of the TIRZ; the property taxes collected on this increase constitute the "increment".

3. The municipality or county passes an ordinance establishing a governing board for the TIRZ and the zone as a legal entity itself. The board then meets to create a budget for the lifetime of the zone, establishing what projects it will undertake and how they will be financed. This plan is passed as another ordinance.

- Municipal Development District (MDD) [32]

  An MDD is created to generate economic development and growth opportunities within the boundaries of the district. To create an MDD, a City must call an election through an order that defines the proposed boundaries of the district. The ballot at this election must be printed to allow voting for or against the proposition. In the order calling the election, the City may provide that the district boundaries will automatically conform to future changes in the city's boundaries. If the voters turn down the creation of the district, a subsequent election to establish a district may not be held within a year of the first election. The MDD is funded through a local sales tax. State law permits a tax rate of one-eighth to one-half of one percent.

1.5 SALES TAX REALLOCATION ELECTION (HB 157)

On June 20, 2015 Governor Abbott signed H.B. 157 into law. The law allows for cities to hold an election to reallocate sales tax revenue. Cities may hold elections to adopt sales taxes (general revenue or dedicated) in any increment of one-eighth of one percent, so long as the total city sales tax does not exceed the maximum two-percent local sales tax cap. In other words, cities now have increased flexibility to reallocate city sales taxes in a way that makes sense to the city and its residents [33]. The election can be initiated at the discretion of the city council or by a petition signed 20 percent of the number of voters who cast ballots in the most recent regular municipal elections [34].

1.6 GENERAL FUND

A general fund is a financial term referring to a nonprofit entity's financial pool of resources. This term traditionally refers to a fund used by a government or university, because for-profit businesses use a general ledger to monitor finances. From a general fund, all operating expenses, services and employee payrolls are provided. The money for this fund comes from several sources, depending on the institution. The bulk of a governmental fund is drawn from taxes. No matter if it is a state, local or national government, taxpayers are primarily the people helping fund services and operation. Beyond taxes, a government makes other income from having a surplus from the previous fund, from interest on investments and from charging fees, such as entry fees into parks [33].

1.7 CERTIFICATES OF OBLIGATION (CO BONDS)

COs initially were authorized by Texas' Certificate of Obligation Act of 1971. Cities, counties and health or hospital districts can use them to fund the construction, demolition or restoration of structures; purchase materials, supplies, equipment, machinery, buildings, land and rights of way; and pay for related professional services. COs are issued for terms of up to 40 years and usually are supported by property taxes or other local revenues [34].

COs often are associated with emergency spending, but their use isn't restricted to such purposes. They can be used to fund public works as part of standard local government operations [34].

Commissioners courts, city councils and health or hospital district boards opting to issue COs must post a description of the projects to be financed in local newspapers at least twice, first more than 30 days before the governing body's vote on the CO issuance and again a week after the initial posting. These postings must describe the general purpose and amount of the debt to be issued, name the method of repayment and list the time and place of the governing body's vote [34].

COs do not require voter approval unless 5 percent of qualified voters within the jurisdiction petition for an election on the spending in question [34].

COs provide local governments with important flexibility when they need to finance projects quickly, as with reconstruction after a disaster or as a response to a court decision requiring capital spending. But the way COs circumvent voter approval has made them controversial in the past, leading to 2015 legislation restricting their use [34].

1.8 COMMUNITY DEVELOPMENT CORPORATION (CDC)

Community Development Corporations (CDCs) are nonprofit, community-based organizations focused on revitalizing the areas in which they are located, typically low-income, underserved neighborhoods that have experienced significant disinvestment. While they are most commonly celebrated for developing affordable housing, they are usually involved in a range of initiatives critical to community health such as economic development, sanitation, streetscaping, and neighborhood planning projects, and oftentimes even provide education and social services to neighborhood residents [35].

CDCs play a critical role in building community wealth for a few key reasons [35]:

- They anchor capital in communities by developing residential and commercial property, ranging from affordable housing to shopping centers and even businesses.
- At least one-third of a CDC's board is typically composed of community residents, allowing for the possibility of direct, grass-roots participation in decision-making.
- CDCs' work to enhance community conditions oftentimes involves neighborhood organizing, a process critical for empowering residents and gaining political power.

A Community Development Corporation, often referred to as a 4B corporation for its enabling legislation, uses a half of a cent of the municipality's sales tax to fund a defined array of public improvements including buildings, equipment, programs and parks, as well as the promotion and development of business enterprises [36].

1.9 TEXAS CAPITAL FUND INFRASTRUCTURE PROGRAM (EDA/TEDC)

TEDC, or Texas Economic Development Council, is an Austin-based, statewide, non-profit professional association dedicated to the development of economic and employment opportunities in Texas [37]. The Texas Capital Fund Infrastructure Program provides grants for infrastructure development to create or retain permanent jobs in primarily rural communities and counties. The money can be used for a variety of public infrastructure improvements. The program is only available to "non-entitlement" city or county governments. Non-entitlement cities/counties do not receive direct funding from HUD (U.S. Department of Housing and Urban Development) and typically include cities with a population of less than 50,000 and counties of less than 200,000. There are over 1,200 eligible cities and counties in the state. The award floor is $50,000 and the award ceiling is $1,500,000 [38].

1.10 CLEAN WATER STATE REVOLVING LOAN FUND (EPA/TWDB)

The Clean Water State Revolving Fund, authorized by the Clean Water Act, provides low-cost financial assistance (both low-interest loans and principal forgiveness) for planning, acquisition, design, and construction of wastewater, reuse, and stormwater infrastructure. [c]

Eligible applicants for the CWSRF include cities, counties, districts, river authorities, designated management agencies, authorized Indian tribal organizations, and public and private entities proposing nonpoint source or estuary management projects.

City of Terrell

Financial assistance from the CWSRF can be utilized for wastewater treatment facilities, collection systems, wastewater recycling and reuse improvements, stormwater mitigation, nonpoint source pollution control, estuary management project, eligible green project reserve components, and disaster recovery. Both below market interest rate loans (terms up to 30 years) and loan forgiveness (similar to grants) are offered and the program can fund all project phases: Application, planning, acquisition, design, and construction.

Stormwater projects may be publicly or privately owned; permitted and unpermitted; or used for measures to manage, reduce, treat, or recapture stormwater or subsurface drainage water. Activities eligible for funding include, but may not be limited to structural or engineered control devices and systems to manage, reduce, store, and/or treat stormwater; stormwater best management practices, both technical and institutional , acquisition, protection, and/or rehabilitation of natural waterways, and low impact development. [d]

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