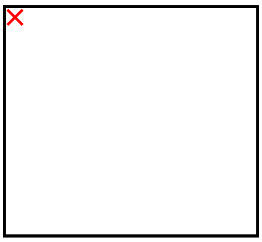


CONSENT AGENDA
DRAINAGE DISTRICT
BOARD OF DIRECTORS
January 19, 2016
9:00 A.M.

NOTICE is hereby given in accordance with Chapter 551, Texas Government Code, that a SPECIAL MEETING of the Drainage District #1 Board of Directors will be held in the Commissioners' Courtroom of the Administration Building, 100 E. Cano, 1st floor, Edinburg, Hidalgo County, Texas. Discussion and possible action relating to the following business will be transacted:

NOTICE TO THE PUBLIC
CONSENT AGENDA

The following items are of a routine or administrative nature. The Drainage District #1 Board has been furnished with background and support on each item, and/or it has been discussed at a previous meeting. All items will be acted upon by one vote without being discussed separately unless requested by a Board Member, in which event the item or items will immediately be withdrawn for individual consideration in its normal sequence after the items not requiring separate discussion have been acted upon. The remaining items will be adopted by one vote.

1. Approval of check register and payment of claims and bills - County Treasurer

2. AI -52972 **"Clarification Purpose Only"**
Clarification to Agenda Item No. 52759 B from January 5, 2016, item should be approval of Supplemental Agreement No. 4 to Agreement for Professional Engineering Services for Pct.1 2012 Bond Referendum Improvement Project with Tedsi Infrastructure Group approved by Board on 04-09-2013.

3. AI -52990 **2013 Bonds:**
Budget 365
Rural Drainage Development Pct.3
Engineering Firm: L&G Consulting Engineering

Approval to issue payment on the following items:

A. Inv#11325330 in the amount of $52,546.44 related to Work Authorization No. 6A-La Joya Watershed Improvement Project from TxDot Outfall to IBWC Levee. PO#627201.

B. Inv#11325443 in the amount of $3,457.55 related to Work Authorization No. 6A-La Joya Watershed Improvement Project from TxDot Outfall to IBWC Levee. PO#627201.

C. Inv#11325375 in the amount of $14,536.89 related to Work Authorization No. 4-La Joya Watershed Improvement Program for Liberty & South Basin Pit Facilities. PO#625396.

D. Inv#11325402 in the amount of $1,020.00 related to Work Authorization No. 4-La Joya Watershed Improvement Program for Liberty & South Basin Pit Facilities. PO#625396.

2013 Bonds:
Budget 365
Rural Drainage Development Pct.2

E. Inv#150303 in the amount of $34,538.01 related to Work Authorization No. 3-Pharr McAllen Drain & South Flood Water Channel Watershed Imp. Project. PO#627892.

4. AI -52992

2013 Bonds:
Budget 360
Lower Rio Grande Valley Regional Water Management Program (Delta Lake)
Engineering Firm: Tedsi Infrastructure Group.

Approval to issue payment on the following items:

A. Inv#20152594 in the amount of $737.18 related to Work Authorization No. 14-LRGVRWMP-Preliminary Planning & Development. PO#623576.

B. Inv#20152598 in the amount of $90.00 related to Work Authorization No. 12-LRGVRWMP-Legal Services. PO#623665.

C. Inv#20152593 in the amount of $5350.03 related to Work Authorization No. 13-LRGVRWMP-Preliminary Planning & Development. PO#623666.

D. Inv#20152561 in the amount of $7,443.28 related to Work Authorization No. 12-LRGVRWMP-Legal Services. PO#623665.

2013 Bonds:
Budget 365
Rural Drainage Development Pct.1

E. Inv#20152602 in the amount of $13,619.59 related to Work Authorization No. 18-Rural Drainage Improvement for Lucero Del Norte. PO#628010.

2013 Bonds:
Budget 370
Control Structures

F. Inv#20152608 in the amount of $28,147.74 related to Work Authorization No. 19-Donna North Lateral & FM 495 Control Structure. PO#628016.

2008 Bonds:
Budget 039
Consulting Management Services

G. Inv#20152581 in the amount of $10,790.97 related to Work Authorization No. 05-Pct.1 Rural Drainage Review. PO#623010.

AI -52972 2.

DRAINAGE - CONSENT

Meeting Date: 01/19/2016

Submitted By: Claudette Guerrero, DRAINAGE DISTRICT

Department: DRAINAGE DISTRICT

Information

CAPTION

"Clarification Purpose Only"

Clarification to Agenda Item No. 52759 B from January 5, 2016, item should be approval of Supplemental Agreement No. 4 to Agreement for Professional Engineering Services for Pct.1 2012 Bond Referendum Improvement Project with Tedsi Infrastructure Group approved by Board on 04-09-2013.

BACKGROUND

Fiscal Impact

Attachments

BOD Minutes 01-05-16-AI#52759-B

Form Review

Inbox	Reviewed By	Date
Budget & Management	Veronica Ortiz	01/15/2016 10:07 AM
Final Approval	Monica Badillo	01/15/2016 05:39 PM

Form Started By: Claudette Guerrero Started On: 01/14/2016 03:09 PM

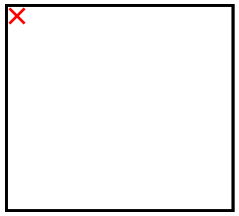
Final Approval Date: 01/15/2016

SPECIAL MEETING - January 5, 2016

BE IT REMEMBERED, that on this 5th day of January A.D., 2015, there was begun and held a SPECIAL MEETING of the Honorable Commissioners' Court of Hidalgo County, Texas, wherein the following members thereof were present, to-wit:

HONORABLE RAMON GARCIA	**HIDALGO COUNTY JUDGE**
HONORABLE A.C. CUELLAR, JR.	**COMMISSIONER, PRECINCT NO. 1**
HONORABLE EDUARDO "EDDIE" CANTU	**COMMISSIONER, PRECINCT NO. 2**
HONORABLE JOE M. FLORES	**COMMISSIONER, PRECINCT NO. 3**
HONORABLE JOSEPH PALACIOS	**COMMISSIONER, PRECINCT NO. 4**

and ARTURO GUAJARDO, JR., COUNTY CLERK & EX-OFFICIO CLERK OF THE COMMISSIONERS' COURT of Hidalgo County, Texas, wherein the following proceedings were had, to-wit:



AGENDA
DRAINAGE DISTRICT
BOARD OF DIRECTORS
January 5, 2016
9:00 A.M.

NOTICE is hereby given in accordance with Chapter 551, Texas Government Code, that a SPECIAL MEETING of the Drainage District #1 Board of Directors will be held at the Edinburg Council Chambers 415 W. University Drive, Edinburg, Hidalgo County, Texas. Discussion and possible action relating to the following business will be transacted:

1. **Roll Call**

   All members of the Drainage Board were in attendance.

2. **Prayer**

   Mr. Raul Sesin led the courtroom in Prayer.

3. **Open Forum**

   No comments under Open Forum.

4. **Approval of Consent Agenda**

   The Board moved to approve the Consent Agenda.

5. Discussion on Hidalgo County Drainage District No. 1 Drainage projects, maintenance and operations

   Mr. Sesin commented on previous questions in reference to the new FEMA maps. He spoke with Mr. Larry Loyds from FEMA, and have decided to postpone the new county maps due to several issues that are currently being taking care of.

6. AI -52779 Resolution in Honor of Sylvia T. Sanchez for her years of Service with the County of Hidalgo.

   Sylvia T. Sanchez proudly received recognition from Commissioners Court for her loyal service to Hidalgo County for 38 years. For 20 years Ms. Sanchez served various county departments, finally offering her last 18 years to the Drainage Department.

On motion by BOARD MEMBER PCT. 3, JOE M. FLORES, seconded by BOARD MEMBER PCT. 4, JOSEPH PALACIOS, the Board made a UNANIMOUS vote of approval.

Vote: 5 - 0 - Unanimously

7. AI -52683 2013 Bonds
Pct.1 Rural Drainage Development

Request approval to issue manual payment for Payment Application No. 3 in the amount of $53, 717.40 from Jimenez Engineering Solutions, LLC related to Construction Contract No. HCDD1-15-006-06-02A Pct.1 Tijerina Rural Development Drain Improvements. Project Engineer: Quintanilla Headley & Associates. PO#627160.

On motion by BOARD MEMBER PCT. 3, JOE M. FLORES, seconded by BOARD MEMBER PCT. 2, EDUARDO “EDDIE” CANTU, the Board made a UNANIMOUS vote of approval.

Vote: 5 - 0 - Unanimously

8. AI -52741 2013 Bonds:
Pct.4 Rural Drainage Development

A. Request approval to issue manual payment for Application for Payment No. 3 in the amount of $99,587.70 from PEGA JPS Utilities, LLC related to Construction Contract No. HCDD1-15-010-07-22B-Pct.4 Tower Road & Mile 17 1/2 Road Area Drainage Improvements.

Project Engineer: Jose N. Saldivar, P.E.-Hidalgo County Drainage District No. 1
PO#627525

On motion by BOARD MEMBER PCT. 3, JOE M. FLORES, seconded by BOARD MEMBER PCT. 1, A.C. CUELLAR, JR., the Board made a UNANIMOUS vote of approval.

Vote: 5 - 0 - Unanimously

B. Acceptance of Certificate of Substantial Completion from PEGA JPS Utilities, LLC for Construction Project HCDD1-15-010-07-22B-Pct.4 Tower Road & Mile 17 1/2 Area Drainage Improvement.

Project Engineer: Jose N. Saldivar, P.E.-Hidalgo County Drainage District No. 1
PO#627525.

On motion by BOARD MEMBER PCT. 3, JOE M. FLORES, seconded by BOARD MEMBER PCT. 1, A.C. CUELLAR, JR., the Board made a UNANIMOUS vote of approval.

Vote: 5 - 0 - Unanimously

9. AI -52745 2013 Bonds:
Pct.4 Rural Drainage Development

Approval to issue manual payment for Application for Retainage Release in the amount of $36,955.24 from Rojas Heavy Equipment LLC D/B/A Rojas Construction & Paving for Construction Contract No. HCDD1-14-011-04-029-Pct.4 N. Seminary Drainage Improvement.

Project Engineer: Quintanilla Headley & Associates, Inc.
PO#625109

On motion by BOARD MEMBER PCT. 3, JOE M. FLORES, seconded by BOARD MEMBER PCT. 1, A.C. CUELLAR, JR., the Board made a UNANIMOUS vote of approval.

Vote: 5 - 0 - Unanimously

10. AI -52742 2013 Bonds:
Pct.4 Rural Drainage Development

Approval of Change Order No. 1 in the amount of $172,205.00 from Texas Cordia Construction related to Contract No. HCDD1-15-009-07-22A-Pct.4 Hoehn Road and Drainage Improvement.

Project Engineer: DOS Logistics, Inc.
PO#627645

On motion by BOARD MEMBER PCT. 3, JOE M. FLORES, seconded by BOARD MEMBER PCT. 1, A.C. CUELLAR, JR., the Board made a UNANIMOUS vote of approval.

Vote: 5 - 0 - Unanimously

11. AI -52759 2013 Bonds:
Control Structures

A. Approval of Change Order No. 1 in the amount of $80,600.00 from M-5 Texas Enterprises, LLC related to Contract No. HCDD1-14-028-10-28 Monte Cristo & Weslaco North Lateral Control Structures. Change Order is necessary to modify downstream structure to support sluice gate for the Weslaco North Lateral Control Structure only.

Project Engineer: Tedsi Infrastructure Group

PO#626178-Monte Cristo CS
PO#626177-Weslaco North Lateral

On motion by BOARD MEMBER PCT. 3, JOE M. FLORES, seconded by BOARD MEMBER PCT. 1, A.C. CUELLAR, JR., the Board made a UNANIMOUS vote of approval.

Vote: 5 - 0 - Unanimously

B. Approval of Supplemental Agreement No.3 to Agreement for Professional Engineering Services for Pct.1 2012 Bond Referendum Improvement Projects with Tedsi Infrastructure Group approved by Board on 04-09-2013.

On motion by BOARD MEMBER PCT. 3, JOE M. FLORES, seconded by BOARD MEMBER PCT. 4, JOSEPH PALACIOS, the Board made a UNANIMOUS vote of approval.

Vote: 5 - 0 - Unanimously

12. AI -52786 A.) Presentation of Scoring Grid for the purpose of ranking by HCDD1 Board of Directors of responses received in connection with RFQ No. HCDD1-15-012-12-11 "Independent Financial Audit Services"

FIRM NAME:	SCORE:	RANK:
Burton, McCumber & Cortez, LLP	95	1
Long Chilton, LLP	86	2
Pattillo, Brown & Hill, LLP	84	3

On motion by BOARD MEMBER PCT. 4, JOSEPH PALACIOS, seconded by BOARD MEMBER PCT. 3, JOE M. FLORES, the Board made a UNANIMOUS vote of approval.

Vote: 5 - 0 – Unanimously

B.) Authority to negotiate letter of engagement with the number one ranked firm of Burton, McCumber & Cortez, LLP, as it relates to "Independent Financial Services" for the District.

On motion by BOARD MEMBER PCT. 4, JOSEPH PALACIOS, seconded by BOARD MEMBER PCT. 3, JOE M. FLORES, the Board made a UNANIMOUS vote of approval.

Vote: 5 - 0 – Unanimously

13. **Closed Session:**
Board of Directors may go into Closed Session pursuant to Chapter 551, Texas Government Code, Sections 551.071 & 551.072 to discuss the following:

No action taken on this item.

A. **Real Estate Acquisition**

No action taken on this item.

B. **Pending and/or Potential Litigation**

No action taken on this item.

14. **Open Session:**

A. **Real Estate Acquisition**

No action taken on this item.

B. **Pending and/or Potential Litigation**

No action taken on this item.

15. **Closed Session:**
Board of Directors may reconvene into Closed Session for the discussion regarding the agenda items listed

No action taken on this item.

16. **Open Session:**
Board of Directors may reconvene into Open Session for the discussion regarding the agenda items listed

No action taken on this item.

17. **Adjourn**

On motion by BOARD MEMBER PCT. 4, JOSEPH PALACIOS, seconded by BOARD MEMBER PCT. 3, JOE M. FLORES, the Board made a UNANIMOUS vote of approval.

Vote: 5 - 0 – Unanimously

There being no further business to come before said

Court, the meetings of the Commissioners' Court and the

Drainage District #1 Board are now hereby adjourned.

Dated this the 5th day of January, 2015

ARTURO GUAJARDO, JR., County Clerk
Hidalgo County, Texas

By: _____
Norma G. Cantu, Deputy

I, ARTURO GUAJARDO, JR., County Clerk attest that this is an accurate accounting of a proceeding of the Commissioners' Court held on January 5, 2015.

Signed this 5th day of JANUARY 2015

ATTEST:
ARTURO GUAJARDO, JR.
County Clerk and Ex-Officio Clerk
Of the Commissioners' Court of
Hidalgo County

By: _____
(Seal) Norma G. Cantu, Deputy

AI -52990 3.

DRAINAGE - CONSENT

Meeting Date: 01/19/2016

Submitted By: Claudette Guerrero, DRAINAGE DISTRICT

Department: DRAINAGE DISTRICT

Information

CAPTION

2013 Bonds:
Budget 365
Rural Drainage Development Pct.3
Engineering Firm: L&G Consulting Engineering

Approval to issue payment on the following items:

A. Inv#11325330 in the amount of $52,546.44 related to Work Authorization No. 6A-La Joya Watershed Improvement Project from TxDot Outfall to IBWC Levee. PO#627201.

B. Inv#11325443 in the amount of $3,457.55 related to Work Authorization No. 6A-La Joya Watershed Improvement Project from TxDot Outfall to IBWC Levee. PO#627201.

C. Inv#11325375 in the amount of $14,536.89 related to Work Authorization No. 4-La Joya Watershed Improvement Program for Liberty & South Basin Pit Facilities. PO#625396.

D. Inv#11325402 in the amount of $1,020.00 related to Work Authorization No. 4-La Joya Watershed Improvement Program for Liberty & South Basin Pit Facilities. PO#625396.

2013 Bonds:
Budget 365
Rural Drainage Development Pct.2

E. Inv#150303 in the amount of $34,538.01 related to Work Authorization No. 3-Pharr McAllen Drain & South Flood Water Channel Watershed Imp. Project. PO#627892.

BACKGROUND

Fiscal Impact

Attachments

L&G Inv#11325418

L&G Inv#11325443

L&G Inv#11325402

L&G Inv#11325375
L&G Inv#11325330

Form Review

Inbox	Reviewed By	Date
Budget & Management	Veronica Ortiz	01/15/2016 10:06 AM
Final Approval	Monica Badillo	01/15/2016 05:39 PM

Form Started By: Claudette Guerrero Started On: 01/14/2016 04:53 PM

Final Approval Date: 01/15/2016

Hidalgo County Drainage District No. 1

902 North Doolittle Road Edinburg, Texas 78542 Office: (956) 292-7080

Invoice Processing Checklist/Routing Slip

Invoice/ Backup

Date Received: 1/5/2016

Engineer/Firm Name: L&G Engineering

Project Name/Number: Pharr McAllen Drain & S. Floodwater Ch ~~WA No. 2~~ WA No. 3

Invoice No.: 11325418

Purchase Order No.: 627892

Received By: Rosa Arce

Forwarded to: Nora D. Cavazos _____ Date: _____
Claudette Guerrero _____ Date: _____

Total # of Pages Submitted: 4 + 3 Reports

Attachments: CD

Forwarded to: Jose N. Saldivar _____ Date: _____

Forwarded to: Lora Briones _____ Date: _____

Additional Comments: $34,538.01

THIS ROUTING SLIP MUST BE KEPT WITH ORIGINAL INVOICE

1of4

L&G Engineering

Transportation Consultants

January 4, 2016

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1

JAN 04 2016
4:30 AM (PM)
BY: Rosalva

Mr. Raul Sesin, P.E. – District Manager
Hidalgo County Drainage District #1
902 N. Doolittle
Edinburg, Texas 78542

RE: Work Authorization #3 on Pharr McAllen Drain & South Flood Water Channel Watershed Improvement Project
Job # 150303
P.O. # 627892

Dear Mr. Sesin,

Attached for your review and approval is our invoice for the services rendered during the month of December 2015 on the subject referenced project.

The following is attached:

- L&G's Invoice #11325418
- CD w/ Electronic Files of Data for:
  - Task 2, 4, & 5

TASK		% COMPL
Pharr-McAllen Drain & South Flood Water Channel Watershed Improvement Project		
Task 1 ~ Schematic Development (Overall Exhibit w/ Plan & Profiles)	L&G	100%
Task Complete – See progress report dated December 1, 2015		
Task 2 ~ Support to HCDD#1, HCID#2 & Hidalgo Co. Pct #2 on Project Development (i.e. Mtg. w/ City of Pharr, Irrigation Dist., etc.)	L&G	60.0%
Update – L&G has continued to coordinate with HCID#2 to gather canal operation data and utility info. L&G has held informal mtgs. w/ HC Pct. 2 and HCDD#1 to discuss project status.		
Task 3 ~ Coordination and Management of Surveyor	L&G	68.4%
No Update – See progress report dated 11/2/2015		
Task 3a ~ (SUB): R.O.W. SS ~ ROW Surveying and Mapping	ROW SS	68.3%
No Update – See progress report from R.O.W. SS dated 10/31/2015		

2100 W. Expressway 83 • Mercedes, TX 78570 • Office (956) 565-9813 • Fax (956) 565-9018
900 S. Stewart Rd., Ste. 9 • Mission, TX 78572 • Office (956) 585-1909 • Fax (956) 585-1927

Task 4 ~ Geotechnical Drilling/Testing/Engineering	L&G	100.0%
Update – Task Complete – L&G Lab division has completed all field work and lab testing for this project. This task has been completed.		
Task 5 ~ PS&E Development	L&G	60.0%
Update – L&G has continued PS&E development by producing general scope of project and sheets (specific tasks include expanding U&D's, incorporating additional survey data, generating coordination exhibits). In addition, L&G has researched latest general notes and specifications.		

Should you have any questions regarding this submittal or would like clarification on any aspect of the project, please do not hesitate to call me at (956) 585-1909.

Sincerely,

David Saenz, P.E., C.F.M.
Project Manager
L&G Engineering

L &G Consulting Engineers Inc
2100 W. Expressway 83
Mercedes, TX 78570
(956)565-9813 Fax (956)565-9018

INVOICE#: 11325418
INVOICE DATE: 12/31/2015

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
JAN 04 2016
4:30 AM / PM
BY: Rosa Ane

BILL TO:
Hidalgo County Drainage District#1
902 N. Doolittle
Edinburg, TX 78542

JOB:150303
Pharr McAllen Drain & South Flood
Water Channel Watershed Imp. Project
WA#3 - PO#627892

DESCRIPTION	CONTRACT	PREVIOUS APPLICATIONS	CURRENT COMPLETED	TOTAL COMPLETED	% COMPL	BALANCE TO FINISH
Engineering services for the month of December 2015.						
FC 161 - HYDROLOGY						
11006-Task 1-Schematic Development (Overall Exhibit w/Plar	17,100.56	17,100.56		17,100.56	100.0	-
10209-Task 2-Support to HCDD#1, HCID#2 & Hidalgo Co. pct#:	22,707.40	11,353.70	2,270.74	13,624.44	60.0	9,082.96
13002-Task 3-Coordination and Management of Surveyor	1,962.36	1,342.50		1,342.50	68.4	619.86
13020-Task 3a-Row Surveying and Mapping (SUB)	8,892.00	6,073.00		6,073.00	68.3	2,819.00
33001-Task 4-Geotechnical Drilling/Testing/Engineering	21,773.38	10,886.69	10,886.69	21,773.38	100.0	-
11003-Task 5- PS&E Development	71,268.60	21,380.58	21,380.58	42,761.16	60.0	28,507.44
TOTALS:	143,704.30	68,137.03	34,538.01	102,675.04	71.4	41,029.26

ORIGINAL CONTRACT SUM	$	143,704.30
CHANGE BY CHANGE ORDER	$	0.00
CONTRACT SUM TO DATE	$	143,704.30
TOTAL COMPLETED TO DATE	$	102,675.04
LESS PREVIOUS INVOICES	$	68,137.03
CURRENT PAYMENT DUE	$	34,538.01

PROJECT MANAGER'S SIGNATURE

L&G Consulting Engineers, Inc
2100 W. Expressway 83
Mercedes, Texas 78570
(956) 565-9813

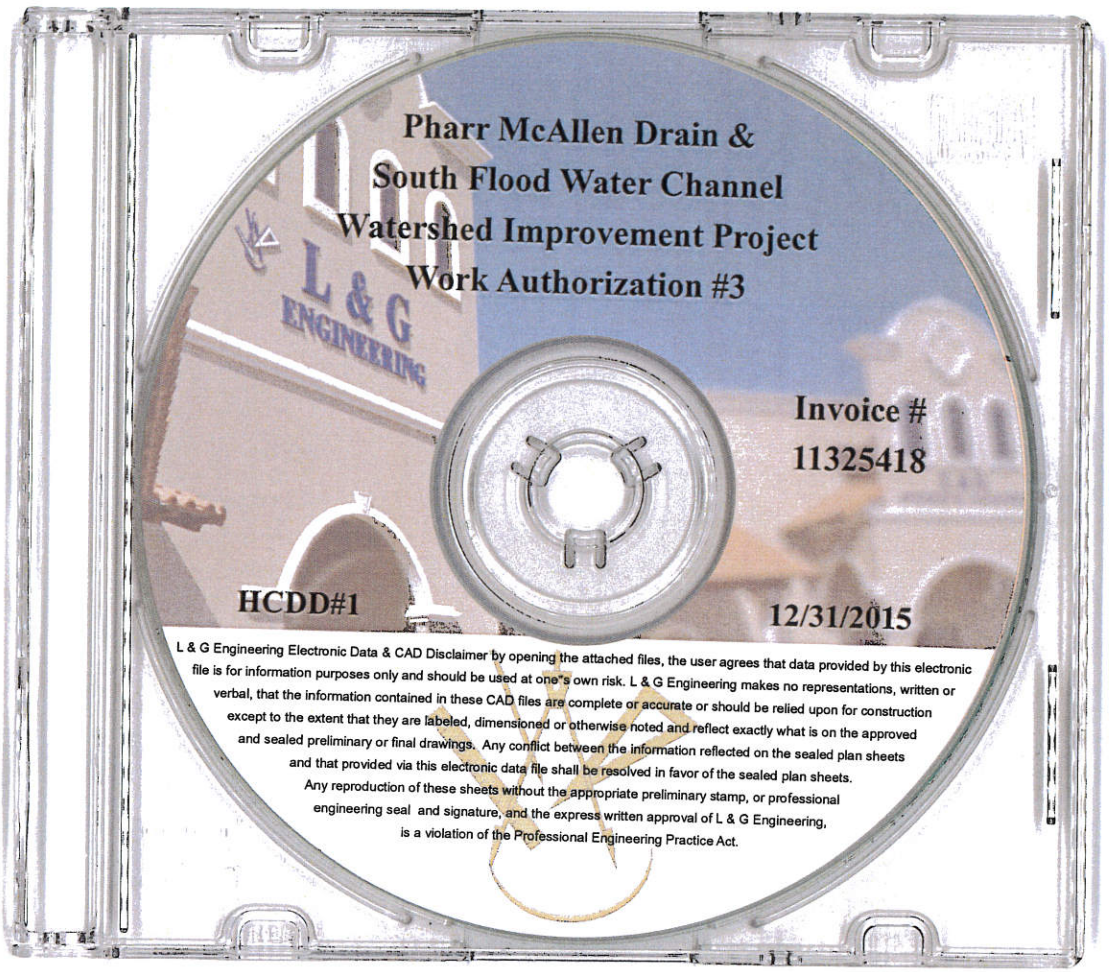
Project Workhour Report
Pharr McAllen Drain & South Flood Water Channel Warshed Improvement Project WA#3
Reference:Inv#11325418
Date: 12/31/2015
P.O.#626939

	Hrs		Rate	Total
Senior Project Manager	10.00	X	218.04	$2,180.40
Senior Engineer	54.00	X	180.66	$9,755.64
Project Engineer	47.00	X	133.94	$6,295.18
Senior Engineer Tech	50.00	X	93.45	$4,672.50
Admin/Clerical	12.00	X	62.3	$747.60

Grand Total of Hours		$ 23,651.32
(Difference due to rounding hours)		$ -

Invoice Summary

Man Hours					$ 23,651.32
Geoteck Drilling/Testing/Engineers					$ 10,886.69
Sub Contract					
(See Attached Sub Invoice for Man Hour Breakdown)					
	Current				
Direct Expenses	Units		Rate		
20 ft. Long by 3 ft. Tall Exhibits (60sq.ft.)@5.00/sq.ft (15 total Prints)	0	X	300.00	$ -	
					$ -
			(Difference due to rounding)		$ -
Total Per Invoice Submitted					**$ 34,538.01**


Pharr McAllen Drain &
South Flood Water Channel
Watershed Improvement Project
Work Authorization #3
L & G
ENGINEERING
Invoice #
11325418
HCDD#1
12/31/2015
L & G Engineering Electronic Data & CAD Disclaimer by opening the attached files, the user agrees that data provided by this electronic file is for information purposes only and should be used at one's own risk. L & G Engineering makes no representations, written or verbal, that the information contained in these CAD files are complete or accurate or should be relied upon for construction except to the extent that they are labeled, dimensioned or otherwise noted and reflect exactly what is on the approved and sealed preliminary or final drawings. Any conflict between the information reflected on the sealed plan sheets and that provided via this electronic data file shall be resolved in favor of the sealed plan sheets.
Any reproduction of these sheets without the appropriate preliminary stamp, or professional engineering seal and signature, and the express written approval of L & G Engineering, is a violation of the Professional Engineering Practice Act.

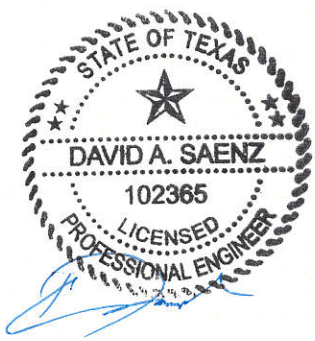
L&G Engineering
Transportation Consultants

GEOTECHNICAL INVESTIGATION
FOR THE
PHARR-MCALLEN DRAIN – DRAINAGE IMPROVEMENTS PROJECT
HIDALGO COUNTY, TEXAS

Prepared For:
Hidalgo County Drainage District No. 1

Prepared By:
L&G Consulting Engineers, Inc.
(L&G Engineering Laboratory – A Division of L&G)
Mercedes, Texas 78570
[Texas Registered Engineering Firm F-4105]

L&G Project No. GL15022
December 31, 2015



12/31/2015

David A. Saenz, P.E., C.F.M.
Project Manager / Project Engineer

INTRODUCTION

L&G Consulting Engineers, Inc. (L&G Engineering Laboratory – A Division of L&G (L&G)) was contracted by **Hidalgo County Drainage District No. 1 (HCDD#1)** to perform a subsurface geotechnical investigation and engineering analysis to assist in the preparation of Plans, Specifications, and Estimates (PS&E) for the proposed Pharr-McAllen Drain drainage improvements. This report addresses bearing capacity of structure locations (culvert crossings), global stability of ditch side slopes (slope stability), soil sulfate content and soil scour parameters. Also included in the report are boring logs, figures addressing the existing geology and general contour of the proposed construction site, and general construction recommendations.

GENERAL PROJECT OVERVIEW

Project Description

L&G is pleased to submit this document presenting our findings as the result of a subsurface geotechnical exploration performed at the request of **HCDD#1**. It is our understanding that the project involves increasing flow capacity of the existing Pharr-McAllen Drain crossings at Hidalgo County Irrigation District No. 2's elevated irrigation canal, 'Lateral E,' (Location 1) and Ridge Rd. (Location 2) through the construction of an additional 10ft x 9ft box culvert at each location. A general illustration of the project site is shown in Figure 1 (additional figures can be found in Appendix A). It is further our understanding that the existing ditch will need to be reshaped and re-graded just upstream and downstream of the proposed crossing improvements to account for the larger overall width of the crossings. The reworked sections will generally be a trapezoidal shape with maximum side slopes of 2 horizontal units to 1 vertical unit (2:1). A preliminary schematic for the proposed structures was provided by the Client (**HCDD#1**). No detailed grading plans or structural loads for the structures were provided; thus all foundation and site improvement recommendations as provided in this report are based on the geotechnical properties of the soils and generalized assumptions as noted.

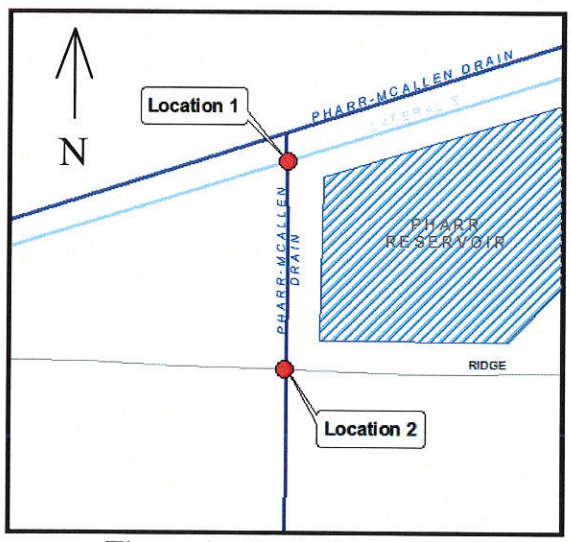


Figure 1 – Project Location

Scope and Limitations of Investigation

This report has been prepared in general accordance with accepted geotechnical engineering practices for the subject project site and the anticipated construction. No specific warranty program or other special standards, except acceptable industry standards for the general South Texas area, were followed during the course of this investigation and analysis. This geotechnical report is intended for use by **HCDD#1** and any direct representatives or affiliates. This geotechnical report may not contain sufficient information for purposes of other parties, or other uses in determining construction means and methods.

The strata, shown on the boring logs (included in Appendix B), represent the subsurface conditions at the boring locations at the time of our investigation. These strata designate approximate boundaries between subsurface materials; however, their actual transition may be gradual or may occur at varying depths. Variations may occur due to unexpected deposits of soft clays, silts or other undesirable soil material not detected through our investigation. It should be noted that the exploratory borings were performed within the limits of the proposed project as approved and agreed upon by all previously noted parties prior to the commencement of our field operations.

The benchmarks of this geotechnical study are to:

1. *explore the general existing subsurface conditions at the site*
2. *evaluate the relevant engineering properties of the subsurface materials*
3. *evaluate settlement parameters and calculate site specific allowable bearing capacity*
4. *develop global stability models and analyses for verification of proposed slope stability*
5. *provide soil scour parameters for use in scour analysis at structure locations*
6. *provide general construction recommendations regarding all aspects of the project*

The scope of this geotechnical engineering study does not include an environmental assessment of the air, soil, rock or water conditions on or adjacent to the site. No environmental opinions are presented in this report. If environmental clearances are needed prior to construction, please contact our offices for assistance in this matter.

EXISTING SURFACE AND SUB-SURFACE CONDITIONS

Site Location / Description

The project site is located within Pharr, Texas (Hidalgo Co, TX), approximately one-half (0.5) miles east of FM2061 (Jackson Rd) at the existing Pharr-McAllen Drain crossings at Ridge Rd and Hidalgo County Irrigation District No. 2's (HCID2) elevated irrigation canal, 'Lateral E'. The proposed 10ft x 9ft box culvert structure will be placed adjacent to the existing twin 8ft x 6ft box culvert structures at both locations. The boring locations were drilled at the locations specified by the Client as shown on Figure 2 in Appendix A. No surveyor was contracted to determine the exact coordinates for the boring, as this was not a part of the scope of work for the project. However, field handheld GPS coordinates were verified and are noted on the boring logs in Appendix B. No clearing was required for site access.

Geology

The Geologic Atlas of Texas (McAllen - Brownsville Sheet dated 1976), created by the Bureau of Economic Geology, indicates that the subject site is located within the *Beaumont Formation* of the Quatenary Period Recent (Pleistocene Epoch). The *Beaumont Formation* is described as "mostly clay, silt, sand, and gravel; includes mainly stream channel, point bar, natural levee, and backswamp deposits; concretions and massive accumulations of calcium carbonate (caliche) and concretions of iron oxide and iron-manganese oxides in zone of weathering." Specifically, the project lies within a specific area of the *Beaumont Formation* that is described as "dominantly clay and mud of low permeability, high water-holding capacity, high compressibility, high to very high shrink-swell potential, poor drainage, level to depressed relief, low shear strength, and high plasticity; geologic units include interdistributary muds, abandoned channel-fill muds, and fluvial overbank muds." See Figure 5 in Appendix A for Geologic Atlas Map.

Soil Survey Description

According to the Soil Survey of Hidalgo County, Texas, published by the United States Department of Agriculture, the proposed facility is located within the Hidalgo Sandy Clay Loam, 0 to 1 percent slopes (28). The description of this soil map unit is as follows (see Figure 3 in Appendix A for USDA Soils Map):

Hidalgo Sandy Clay Loam, 0 to 1 percent slopes (28) – This very deep, gently sloping soil is on convex uplands. The soil map unit is well drained with medium surface runoff, moderate available water capacity (about 7.8 inches), and moderate permeability. The soil is non-saline to slightly saline (0.0 to 4.0 mmhos/cm) with no frequency of flooding or ponding. The typical soil profile is 0 to 16 inches: dark grayish brown fine sandy loam; 16 to 27 inches: grayish brown sandy clay loam; 27 to 37 inches: brown sandy clay loam; and 37 to 65 inches: pale brown sandy clay loam. The soil is calcareous throughout.

Rainfall

The mean annual precipitation for this area of Hidalgo County is approximately twenty (20) to twenty-four (24) inches, as reported by the U.S. Department of Agriculture Soil Conservation Service. For the purpose of this report, our geotechnical investigation, performed in December of 2015, was conducted during a non-drought condition (none, as noted by the National Weather Service), with moisture and precipitation levels around annual averages. The National Oceanic and Atmospheric Administration (NOAA) reports for the subject date indicated that no significant rainfall observations (at least one inch) occurred prior to or during our exploration that could have significant effects on any groundwater levels.

SITE INVESTIGATION

Soil Borings and Laboratory Tests

Subsurface conditions at the site were evaluated through four (4) structural borings (designated as B-#) drilled to a depth of forty (40) feet below natural ground at the locations shown on Figure 2 of Appendix A. The soil borings were drilled and sampled in general accordance with American Society of Testing Materials Procedures (ASTM) D420 and D1452 using a truck mounted drilling rig (Simco 2800 HS (HT)) and solid stem augers.

As part of the drilling procedure, Texas Cone Penetration (TCP) field tests were performed at various depth intervals for use in determination of soil strength parameters. TCP tests were executed in compliance with TxDOT test procedures (Tex-132-E, Texas Cone Penetration) and results were reported as blows per increment on the boring logs. A 170 pound hammer was used to drive the conical driving point through three (3) - six inch increments. The first six inch increment (or 12 blows, whichever was reached first), typically referred to as the seating drive, was not included in the blow count as per the test procedure. The number of blows required to drive the sampler through the subsequent two (2) - six inch increments were recorded as the TCP results (and were included on the boring logs in Appendix B). Where very dense or hard material was encountered (resulting in less than 6 inches of movement per 50 blows) the cone was driven for a minimum 100 blows, and the depth of penetration for the first and second 50 blows was recorded as the TCP results.

As part of the sampling procedure, auger samples were collected through general grab sampling during the drilling process (auger cuttings were collected at drilling intervals between TCP tests). Representative portions of the samples were identified, packaged, sealed in containers (to reduce moisture loss) and transported to our laboratory for subsequent testing. In the laboratory, each sample was evaluated and visually classified by a member of our Geotechnical Engineering staff. The properties of the strata were evaluated by a series of laboratory index tests (Tex-142-E, Laboratory Classification of Soils for Engineering Purposes and ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)). A summary of the laboratory data and their corresponding depths are presented on the boring logs in Appendix B.

Samples will be retained in our laboratory for 30 days after submittal of this report. Other arrangements may be provided at the request of the Client.

Subsurface Stratigraphy

Based on the results of the field and laboratory sample analyses, the subsurface stratigraphy at the project location can be characterized as follows (Tables 1a and 1b):

Location 1 - Irrigation Canal (Borings B-01 & B-02)			
Description	*Approximate Depth Range (ft.)	Material Type	Consistency / Density
Stratum I	0 to 7	Sandy Clay[1]	Stiff
Stratum II	7 to 32	Clay w/ Sand, Clay[2]	Medium Stiff to Hard
Stratum III	32 to 40	Clay[3]	Medium Stiff to Very Stiff

1. This stratum contained dark brown sandy lean clay (CL) with moderate plasticity indices (PI = 26). These soils contained approximately 67% fine soil particle contents (clays & silts). TCP N-values ranged from 30 to 31 blows per foot. Samples were noted as dry.

2. This stratum contained brown fat clay w/ sand (CH) and lean clay (CL) with low to high plasticity indices (PI ranging from 9 to 43). These soils contained approximately 84 to 98% fine soil particle contents (clays & silts). TCP N-values ranged from 19 to 73 blows per foot. Samples were noted as dry.

3. This stratum contained brown lean and fat clays (CL/CH) with low to high plasticity indices (PI ranging from 9 to 42). These soils contained approximately 95 to 96% fine soil particle contents (clays & silts). TCP N-values ranged from 20 to 46 blows per foot. Samples were noted as moist to wet.

Table 1a – Existing Soil Strata & Description (Location 1 - Irrigation Canal)
**all depths are referenced from existing natural ground*

Location 2 - Ridge Rd (Borings B-03 & B-04)			
Description	*Approximate Depth Range (ft.)	Material Type	Consistency / Density
Stratum I	0 to 12	Sandy Clay, Clay w/ Sand[1]	Medium Stiff to Hard
Stratum II	12 to 40	Clay w/ Sand, Clay[2]	Medium Stiff to Hard
1. This stratum contained brown sandy fat clay (CH) and lean clay w/ sand (CL) with moderate to high plasticity indices (PI ranging from 24 to 40). These soils contained approximately 69 to 72% fine soil particle contents (clays & silts). TCP N-values ranged from 25 to 82 blows per foot. Samples were noted as dry.			
2. This stratum contained brown lean and fat clays (CL/CH) and fat clay w/ sand (CH) with moderate to high plasticity indices (PI ranging from 20 to 40). These soils contained approximately 84 to 99% fine soil particle contents (clays & silts). TCP N-values ranged from 19 to 57 blows per foot. Samples were noted as dry to wet.			

Table 1b – Existing Soil Strata & Description (Location 2 - Ridge Rd)
**all depths are referenced from existing natural ground*

It should be noted, the Soil Strata and Description illustrated in Tables 1a and 1b, are typical summarized representation of the site stratigraphy. The lines designating the interfaces between strata on the boring logs represent approximate boundaries. Transitions between strata may be gradual and may occur at varying depths.

Water Strikes

During the drilling operations, water strikes were encountered at all boring locations. It should be noted that fluctuations in groundwater levels are influenced by variations in rainfall and surface water run-off from season to season. The construction process itself may also cause variations in the groundwater level. If the water level is critical to the construction process, **L&G** recommends that the Contractor check the subsurface water conditions immediately prior to construction excavation through the installation of piezometer wells. Table 2 shows a summary of the initial water strike depth and 24 hour water level readings for each boring.

Boring No.	*Initial Water Strike	*24 Hr. Water Reading
Location 1 – Irrigation Canal		
B-01	37.00ft	24.67ft (Cave-In Depth = 27.75ft)
B-02	No Waterstrike Encountered	25.00ft (Cave-In Depth = 28.33ft)
Location 2 – Ridge Rd.		
B-03	27.00ft	21.00ft (Cave-In Depth = 25.00ft)
B-04	24.00ft	19.67ft (Cave-In Depth = 25.33ft)

Table 2: Water Strike Depth Summary
**all depths are referenced from existing natural ground*

GEOTECHNICAL BORING ANALYSIS

Moisture Content

The moisture content of a soil is defined as the ratio of the weight of the water in the sample to the dry weight of the soil sample. The moisture contents for the samples obtained as part of our geotechnical exploration were performed in compliance with ASTM procedure D2216. The results varied from ten (10) percent to forty-seven (47) percent. The variance in percentages within a given exploratory boring can be attributed to a multitude of issues including, range in depth, distance between samples, location of groundwater table and seasonal moisture zone. The variation could also be caused by differences in soil classifications, as some soils such as loose gravels and sands are made up of larger particles and thus exhibit more voids as a soil structure (higher capability to hold water than fine grained soils). Finer grained denser soils, though, due to high impermeability, may also exhibit high moisture contents in certain instances due to the slower movement of water through the soil structure. Most samples in this geotechnical exploration exhibited dry field moisture conditions. A list of all the moisture contents by corresponding depth can be found on the boring logs.

Plasticity Index

The Plasticity Index (PI) is defined as the difference between the liquid limit and the plastic limit of a soil. These limits are commonly referred to as the Atterberg limits, which describe the consistency of soils with respect to their varying moisture contents. The liquid limit is defined as the moisture content at which soil begins to transition from a plastic to a liquid state and begins to behave as a liquid material by beginning to flow. The plastic limit refers to the water content of a soil at the point of transition from a semisolid to a plastic state where soil starts to exhibit plastic behavior. A soils behavior can be divided into four basic states: liquid, plastic, semisolid and solid. The plasticity index shows the range in which a soil acts in a plastic state. Experience has shown that the more plastic a soil is the more expansive and compressive it will act. The plasticity indices for the samples obtained as part of our geotechnical exploration were performed in compliance with ASTM procedure D4318. PI values for the borings performed for this report range from nine (9) (low plasticity clays) to forty-three (43) (high plasticity clays).

Particle Size Analysis (Determination of Fines Content)

The standard grain size analysis is used to determine the relative proportions of different grain sizes as they are distributed along a range of different sized sieves. The minus 200 sieve analysis is used commonly as a tool for soil classification and identification using the Unified Soils Classification System. Results for this test are reported as a percentage of soil passing the No. 200 sieve, which has openings 0.075 mm wide. This test is also used to determine the suitability of soil for construction purposes and to estimate probable seepage through soils. Generally a % -200 greater than 50% indicates a non-granular cohesive soil with large amounts of fines in the soil composition. The particle size analyses for the samples obtained as part of our geotechnical exploration were performed in compliance with ASTM procedure D1140. The % -200 values for the samples collected range from 67% to 99%.

Particle Size Analysis (Gradation Curves – D50 & D90)

Full standard gradation analysis is necessary to establish soil gradation curves. Standard gradation analysis involves two parts, the sieve analysis and the hydrometer analysis. The sieve analysis consists of stacking progressively finer sieves and passing a soil mass through. The sieve sizes correspond to different particle sizes within a soil. Hydrometer analyses are used primarily in fine grained soils but are also very useful in establishing the 'tail-end' of a gradation curve for soils having a mixture of coarse grained and fine grained soil constituents. The diameter of soil particles corresponding to 50% (D50) and 90% (D90) finer in the soil sample were derived from sieve and hydrometer analyses (establishment of particle-size distribution curve) for use in Hydraulic Scour Analysis. The results are presented in Table 3:

**Boring #	*Sample Depth (ft.)	D50 (mm)	D90 (mm)
Location 1 – Irrigation Canal			
B-01	15	**0.004	0.130
B-02	20	**0.002	0.017
Location 2 – Ridge Rd.			
B-03	15	**0.007	0.130
B-04	20	**0.007	0.058

Table 3 – D50 & D90 Values for Scour Analysis

**all depths are referenced from existing natural ground*

***D50 values should be limited to 0.10 millimeters in cohesive material (see following paragraph)*

In accordance with the TxDOT Geotechnical Manual (2012), **L&G Lab** recommends D50 values be limited to 4 x 10^{-3} inches (0.10 millimeters) for this channel in cohesive material. In addition (and if required), it should be noted, the TxDOT Geotechnical Manual (2012) recommends Pier Scour utilize equations in HEC-18 with a reduction factor of 0.5 for soils with 11% or more clay.

Sulfate Content of Soil (Concrete Structures)

The presence of high concentrations of water-soluble sulfates (SO_4) in soils can be detrimental to concrete structures in direct contact. Concrete exposed to these sulfate rich soils (buried concrete structures, foundations, slabs-on-grade) are highly vulnerable to deterioration typically in the form of expansion, extensive cracking and spalling. In the long-term, sulfates causing micro-cracks in concrete structures can form areas of additional ettringite (calcium sulfoaluminate) formation that can potentially penetrate the structures and lead to weakening of the cement paste and structure as a whole. In order to detect levels of water-soluble sulfates in the soils, we performed testing on these soils in accordance with Tex-145-E (Determining Sulfate Content in Soils – Colorimetric Method). To ensure we got an accurate reading with regard to the water levels impacting the soils, we performed these tests at various depths feet below top of natural ground at the locations of the borings. The general site specific results are presented in Table 4.

Boring	*Sample Depth (ft.)	Water-Soluble Sulfate Level (Parts Per Million)
Location 1 – Irrigation Canal		
B-01	20	480
B-02	15	560
Location 2 – Ridge Rd.		
B-03	20	320
B-04	15	520

Table 4 – Summary of Sulfate Contents
**all depths are referenced from existing natural ground*

It should be noted, Texas Department of Transportation (TxDOT) Pharr District Master General Notes specifies the use of Sulfate Resistant Concrete when sulfate concentrations in the soil are greater than 1,000 ppm. In accordance with this and based our test results, **L&G** does not note the specific need for Sulfate Resistant Concrete at culvert locations and at any other structural components in direct contact with the existing soil.

GEOTECHNICAL ENGINEERING ANALYSES

Global Stability of Channel Side Slopes

It is the understanding of **L&G** that the proposed reworked and regraded ditch sections will be a trapezoidal shaped channel with maximum side slopes of 2 horizontal units to 1 vertical unit (2:1) as previously noted in this report (See 'Project Description').

This report includes complete Global Stability Analysis as the means to evaluate channel side slope geometry with regard to existing top strata (proposed slope sections), section geometry and underlying foundation soils. The Factor of Safety requirements utilized in this analysis are referenced from the 2012 TxDOT Geotechnical Manual. For this project, we will utilize the threshold value of FS = 1.3 for all analyses.

The limit equilibrium method of analysis is the most commonly used method of analyzing the overall stability of both natural and manmade slopes as well as retaining wall structures. The fundamental principles behind this method are that the soil mass above a potential failure surface acts as a rigid body, and the shear strength of the material is fully engaged at all points along the surface at the moment of initial movement. A failure criterion is adopted and the conditions for static equilibrium are applied to analyze the problem. This method of analysis assumes that no strain takes place until the failure condition is reached. The results of the analyses are expressed in terms of a safety factor in the form of a ratio of the available shear strength along the potential failure surface to the shear stress required to maintain equilibrium of the failure mass under the applied loads. This method has traditionally been used in the analysis of man-made earth structures such as embankments, levees and retaining wall structures.

The Global Stability Analyses of the channel bank sections (slopes) was performed using ***GSTABL with STEDwin*** Version 7 software program. Analyses were performed using the Modified Bishop Method of slices for circular surfaces (random surfaces were not investigated in this report). It should be noted that the possibility of undetected anomalies in the soil, such as

remnants of previous sliding, tension cracks or water-bearing seams of sand, could potentially alter or negate the findings of the stability analysis. Through the utilization of the GSTABL software program, conservative modeling techniques, and engineering judgment we present what we believe are the most accurate factors of safety.

Input parameters such as shear strength (cohesion and angle of friction) were correlated from the results of the TCP testing and laboratory soil classification testing (unit weight was assumed based on material properties from laboratory tests). Both short-term (undrained) and long-term (drained) conditions were analyzed in accordance with the TxDOT Geotechnical Manual. Correlations for undrained parameters were based on the most current TxDOT Geotechnical Manual and supplemented with a Technical Report from the FHWA and TxDOT titled "Improved Correlation between Texas Cone Penetrometer Blow Count and Undrained Shear Strength of Soft Clays." Correlations for drained parameters were based on correlation equations of Holtz & Kovacks (1981), Bjerrum and Simons (1960), and Gibson (1953). It should be noted; only total shear strengths of soils were input into the GSTABL models for the short-term (undrained) condition, as opposed to individual cohesions and friction angles to maintain consistency with the strength correlations. In addition it should be noted, a minimum residual cohesion value of 50 pounds per square foot (psf) was incorporated into the long-term (drained) condition models.

The geometric model of the Drainage Ditch Side Slopes utilized for analysis consisted of maximum height (approximated as 18 feet) assumed at all boring locations along the proposed drainage ditch for a worst case analysis. Traffic surcharge loading was incorporated into the modeling considered equivalent to two (2) feet of soil (approximately 250 psf) placed atop the slopes (to model the access road). Piezometric surfaces (groundwater surfaces) were modeled at depths noted in boring logs. The model was analyzed as follows (See Appendix C for Global Stability Runs):

- Worst Case Analysis – Maximum Ht. Ditch, Maximum Side Slope, Worst Boring
    - The global stability analysis for this side slope was completed utilizing an assumed overall ditch height of 18 feet with 2:1 side slopes.
    - The global stability analysis was completed using boring B-04 (undrained) and B-03 (drained). The resulting critical Factors of Safety were equal to **8.881** for the short-term condition (undrained) and **1.338** for the long-term condition (drained). It should be noted, the FOS values are above the project threshold minimum of 1.3.

Bearing Capacity of Soils

The bearing capacity of the existing natural ground is defined as the ability of a foundation to safely support the imposed loadings (surcharge), without experiencing any form of shear failure. The ultimate bearing capacity is a measure of the soil's maximum resistance immediately prior to a bearing capacity failure. The ultimate bearing capacity was estimated using the methods and equations, as recommended by the USACE in Manual EM 1110-1-1905 titled "Bearing Capacity of Soils":

$$q_u = c\,N_c\zeta_c + \tfrac{1}{2}\,B\,\gamma_h\,N_\gamma\zeta_\gamma + \sigma\,N_q\zeta_q$$

where:
- q_u = ultimate bearing capacity
- c = soil cohesion
- B = effective width of foundation
- γ_h = effective unit weight of soil within failure zone
- σ = effective soil surcharge pressure at depth
- N_c, N_γ, N_q = dimensionless bearing capacity factors
- $\zeta_c\ \zeta_\gamma\ \zeta_q$ = dimensionless correction factors for cohesion, soil unit weight, and surcharge

Nc, Nγ, and Nq are the dimensionless bearing capacity factors developed by Meyerhof, Hansen, and Vesic for general shear failure listed in Table 4-4 of EM 1110-1-1905. Cohesion and angle of friction values were estimated using a correlation with the Texas Cone Penetration Tests performed in the field. All correlations used were in accordance with the applicable USACE manuals.

The factor of safety used in our analysis was equal to 3.0, as recommended by Chapter 1 of EM 1110-1-1905. The absolute minimum factor of safety, as recommended by Chapter 1 of EM 1110-1-1905 for this construction is 2.0. The maximum allowable bearing capacity was calculated by dividing the ultimate bearing capacity by the factor of safety. All recommendations reflect the maximum allowable bearing capacity in pounds per square foot.

- Bearing Capacity of Soils (Culvert Crossings)
  - **The maximum allowable bearing capacity at culvert location 1 (Irrigation Canal) is 7,000 pounds per square foot**. This value was calculated using a **factor of safety equal to 3**. It should be noted, bearing capacity was calculated for the most critical rectangular foundation geometry with a width to length ratio of 1:3.
  - **The maximum allowable bearing capacity at proposed culvert location 2 (Ridge Rd) is 5,250 pounds per square foot**. This value was calculated using a **factor of safety equal to 3**. It should be noted, bearing capacity was calculated for the most critical rectangular foundation geometry with a width to length ratio of 1:3.

GENERAL CONSTRUCTION RECOMMENDATIONS

Excavation and Trenching Recommendations

L&G recommends drain ditches be constructed in accordance with details shown on plans and approved working drawings, and to the pertinent requirements of the following TxDOT 2014 Standard Specification Items: Item 110 "Excavation", and Item 132 "Embankment." Excavate to the lines and grades shown on the plans or as directed. Where trenches or shallow excavations are to extend to or below a depth of five (5) feet, the Contractor or persons performing the trenching or shallow excavations should adhere to the current Occupational Health and Safety Administration (OSHA) guidelines on trench excavation safety and protection measures. Other industry standards may be applicable. If proposed trenching is to require excavation protection,

L&G recommends protection is provided in accordance with the requirements of TxDOT 2014 'Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges', Item 402 – Trench Excavation Protection and/or Item 403 – Temporary Special Shoring.

Culvert & Backfill Recommendations

L&G recommends box culverts be constructed in accordance with the requirements of TxDOT 2014 Standard Specification Items: Item 462 "Concrete Box Culverts and Drains". In addition, **L&G** recommends shaping, bedding and backfill for the structures are completed in accordance with Item 400 "Excavation and Backfill for Structures".

Drainage / Dewatering Recommendations

Drainage is one of the most important aspects to be addressed to ensure the successful construction, installation and longevity of construction projects. Positive surface drainage should be implemented prior to and during construction to prevent water ponding in all construction areas (especially at trench locations and bedding area of the proposed entrance and exit culverts). If water is present at the construction area, **L&G** recommends that dewatering techniques be used (bailing, point wells, pumping wells, cofferdam structures, or other approved methods) to ensure proper construction of the proposed culvert crossing(s) on a firm dry surface. This will reduce the probability of maintenance problems in the future at these locations. If the culvert areas cannot be de-watered, stabilizing material (lean concrete or cement stabilized fill) may be used to establish a working platform. This material should meet the requirements of Items 400 and 401 of the TxDOT 2014 Standard Specifications.

Channel Side Slope Recommendations

While **L&G** has shown minimum recommended side slopes for channels in this report to include utilizing 2(horizontal) to 1(vertical) slopes based on satisfactory factors of safety with regard to slope stability, we generally recommend utilizing 3(horizontal) to 1(vertical) slopes or flatter for the banks of the drainage channels, where possible. Slopes steeper than our typical recommended 3:1 may have the potential to cause problems with erosion, minor slope stability (in the form of surface sloughing), and general maintenance of the slopes. If steeper slopes become a requirement of this project, **L&G** should be notified to provide updated Slope Stability modeling and calculations. The construction of the channel slopes should include the installation of vegetation to assist in reducing erosion, preventing slough failures, and increasing the general slope stability. In the areas of anticipated inlet/outlet structures, as well as any other areas where turbulent or rapid flows may occur (at channel bends or turns), we recommend the use of additional erosion protection such as concrete riprap, rock riprap, geotextiles, or hydraulic energy dissipaters to minimize erosion.

Erosion Protection of Inlet & Outlet Structures

Erosion protection is essential in prolonging the life of the proposed drainage structures due to the higher velocities and water forces caused by these structures. Though no locations investigated noted very loose sands in the upper soils, we recommend general good practice measures to counteract any potential problems with future erosion. **L&G** recommends utilizing multiple erosion protection measures at channel entrance and exit locations (culverts, pipes, etc.):

- **L&G** recommends general good practice measures such as good embedment and compaction of supporting soils surrounding these structures to help ensure stability.
- **L&G** recommends that if concrete box culverts or pipes are utilized they include concrete headwalls, wingwalls and riprap at inlet/outlet points with two (2) foot minimum toe walls along all structures for enhanced stability and protection of culvert/pipe bedding and subgrade.
- **L&G** recommends that any circular pipe inlet points to the channel provide a concrete splash-pad (or outlet to concrete riprap or flexible erosion protection system) to avoid localized erosion points.
- **L&G** recommends utilizing flexible erosion protection on the channel side slopes such as rock riprap (in accordance with Article 432.3 of the TxDOT Standard Specifications) at inlet/outlet locations (alternatively erosion protection measures such as articulated block or rigid erosion protection systems (concrete riprap) may be utilized). In areas where bank protection will not (or cannot) be used, vegetation of earthen slopes and topsoil should be utilized as a minimum to reduce erosion problems.

Embankment Recommendations (If Required)

L&G Lab recommends that Embankment Fill Sections utilized on this project be constructed in accordance with the requirements of TxDOT 2014 'Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges', Item 132 – Embankment. Furthermore, L&G recommends the following controls be followed in accordance with TxDOT Pharr District Master General Notes:

- 'Embankment (DENS CONT) shall be Type C with a max. PI of 40. Material used as embankment material in the top two feet below the bottom of Flexible Base shall meet the following requirements based on preliminary tests and such other tests found necessary by the Engineer.
    - The material shall be such as to produce a well-bonded embankment and shall have a minimum PI of 8 and a maximum PI of 30.'

Compaction method is recommended for Embankment Fill Sections and shall be Density Controlled in accordance with the requirements of TxDOT 2014 'Standard Specifications', Item 132 – Embankment.

REFERENCES

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APPENDIX A – FIGURES

Figure 1

HCDD #1
Pharr-McAllen Drain
Location Map

Legend

- Project Location
- HCDD1 Ditch
- HCID2 Canal
- Minor Arterial
- Local Street

1,000 Feet
1 inch = 1,000 feet

L&G Engineering Laboratory, LLC.
Construction Material Testing
Geotechnical Engineering

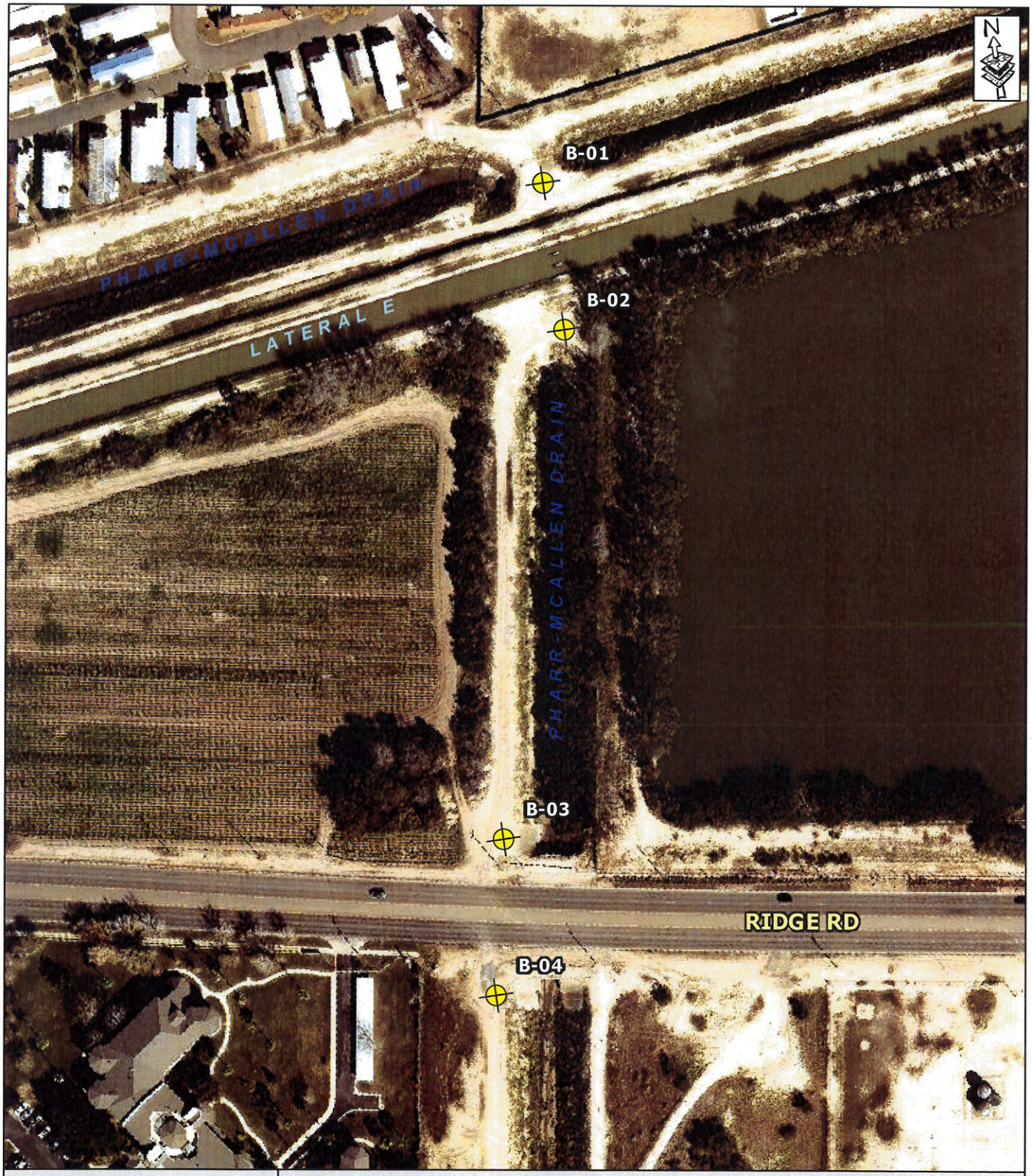


Figure 2

HCDD #1
Pharr-McAllen Drain
Boring Location Map

Legend

Boring Locate

150 Feet

1 inch = 150 feet

LEG Engineering Laboratory, LLC.
Geotechnical Engineering

Figure 3

HCDD #1
Pharr-McAllen Drain

Soil Classification Map
USDA SOIL CONSERVATION SERVICE

Legend

- Project Location
- 28 — Hidalgo Sandy Clay Loam, 0 to 1 Percent Slopes

600 Feet

1 inch = 600 feet

L&G Engineering Laboratory, LLC.
Construction Material Testing
Geotechnical Engineering

Figure 4

HCDD #1
Pharr-McAllen Drain
Digital Elevation Map

Legend

Project Location
5 ft Contour
High
Low
600
Feet
1 inch = 600 feet

L&G Engineering Laboratory, LLC.
Construction Material Testing
Geotechnical Engineering

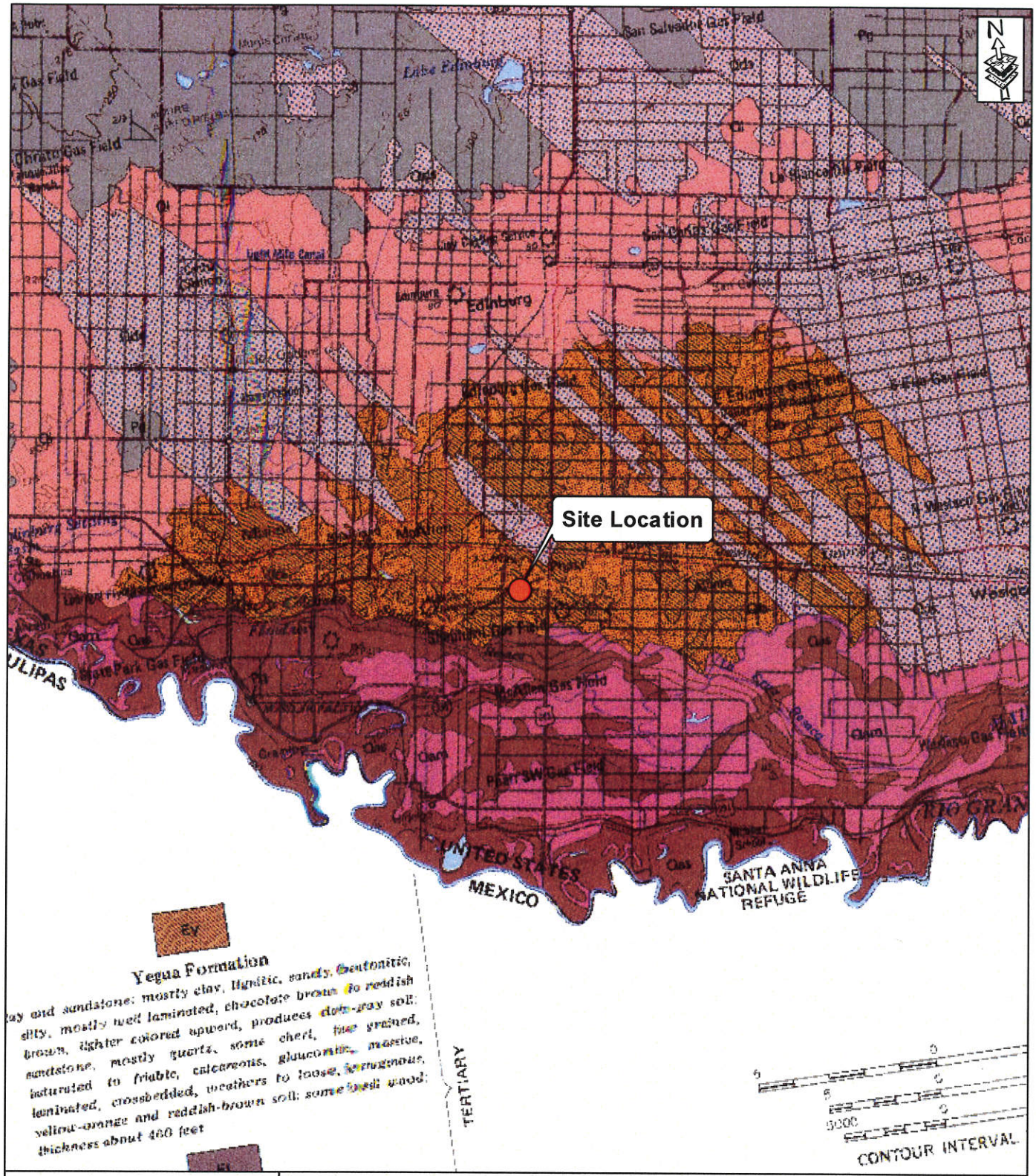


Figure 5

HCDD #1
Pharr-McAllen Drain
Location Map

Legend

Project Location

Qb — Beaumont Formation

20,000 Feet

1 inch = 20,000 feet

L&G Engineering Laboratory, LLC.
Geotechnical Engineering

Appendix B

APPENDIX B – BORING LOGS & GRADATION CURVES

DRILLING LOG

WinCore Version 3.1

County Hidalgo
Highway
CSJ

Hole B-01
Structure
Station
Offset

District
Date 12-02-15
Grnd. Elev. 120.00 ft
GW Elev. 83.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, Sandy Lean Clay, Dark Brown, Stiff, Dry (CL)							
5		13 (6) 17 (6)				11.3				-200 = 67.2%
113.			CLAY, Fat Clay w/ Sand, Brown, Medium Stiff to Very Stiff, Dry (CH)							
10		8 (6) 11 (6)				17.2	52	35		
15		8 (6) 11 (6)				18.3				-200 = 84.0%
20		11 (6) 18 (6)				18.9	59	40		
25		19 (6) 27 (6)				19.8				-200 = 83.9%
30		21 (6) 30 (6)				19.1	59	43		
88.			CLAY, Lean Clay, Brown, Medium Stiff to Stiff, Moist to Wet (CL)							
35		12 (6) 14 (6)				27.5				-200 = 95.7%
80. 40		9 (6) 11 (6)				28	30	9		

Remarks: Sulfate Tests Performed at 20 ft. Results Provided on Seperate Document. Boring Locate - N 26°11'03.90", W 98°11'51.84". Assumed Natural Ground Elevation.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: B. Gonzalez **Logger: O. Garcia** **Organization: L&G Consulting Engineers**

L:\Projects\Year 2015 Projects\HCDD 1\GL15022 - Pharr-McAllen Drain\Borings\PMD.CLG

DRILLING LOG

WinCore Version 3.1

County Hidalgo
Highway
CSJ

Hole B-02
Structure
Station
Offset

District
Date 12-02-15
Grnd. Elev. 125.00 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, Sandy Lean Clay, Dark Brown, Stiff, Dry (CL)							
5		13 (6) 18 (6)				9.6	36	22		
118.			CLAY, Lean Clay, Brown, Stiff to Hard, Dry (CL)							
10		35 (6) 38 (6)				12.4				-200 = 86.1%
15		27 (6) 26 (6)				13.2	48	33		
20		18 (6) 22 (6)				17.2				-200 = 98.0%
25		18 (6) 20 (6)				23.7	30	9		
30		19 (6) 22 (6)				25				-200 = 94.6%
93.			CLAY, Fat Clay, Brown, Very Stiff, Dry (CH)							
35		21 (6) 24 (6)				22.7	61	42		
85. 40		22 (6) 24 (6)				19.8				-200 = 94.8%

Remarks: Sulfate Tests Performed at 15 ft. Results Provided on Seperate Document. Boring Locate - N 26°11'02.34", W 98°11'51.84". Assumed Natural Ground Elevation.

The ground water elevation was not determined during the course of this boring.

Driller: B. Gonzalez **Logger: O. Garcia** **Organization: L&G Consulting Engineers**

DRILLING LOG

WinCore Version 3.1

County Hidalgo
Highway
CSJ

Hole B-03
Structure
Station
Offset

District
Date 12-01-15
Grnd. Elev. 117.00 ft
GW Elev. 90.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, Sandy Fat Clay, Brown, Hard, Dry (CH)							
5		27 (6) 45 (6)				10.1				-200 = 69.1%
10		39 (6) 43 (6)				10.1	56	40		
105.			CLAY, Fat Clay w/ Sand, Brown, Hard, Dry (CH)							
15		24 (6) 33 (6)				10.5				-200 = 84.0%
100.			CLAY, Fat Clay, Brown, Stiff, Dry to Wet (CH)							
20		15 (6) 12 (6)				17	59	39		
25		16 (6) 21 (6)				22.8				-200 = 97.3%
30		15 (6) 17 (6)				28.2	52	34		
35		11 (6) 19 (6)				26.6				-200 = 99.2%
77. 40		14 (6) 17 (6)				46.5	67	40		

Remarks: Sulfate Tests Performed at 20 ft. Results Provided on Seperate Document. Boring Locate - N 26°10'57.12", W 98°11'53.40". Assumed Natural Ground Elevation.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: B. Gonzalez **Logger: O. Garcia** **Organization: L&G Consulting Engineers**

DRILLING LOG

WinCore Version 3.1

County Hidalgo
Highway
CSJ

Hole B-04
Structure
Station
Offset

District
Date 12-01-15
Grnd. Elev. 117.00 ft
GW Elev. 93.00 ft

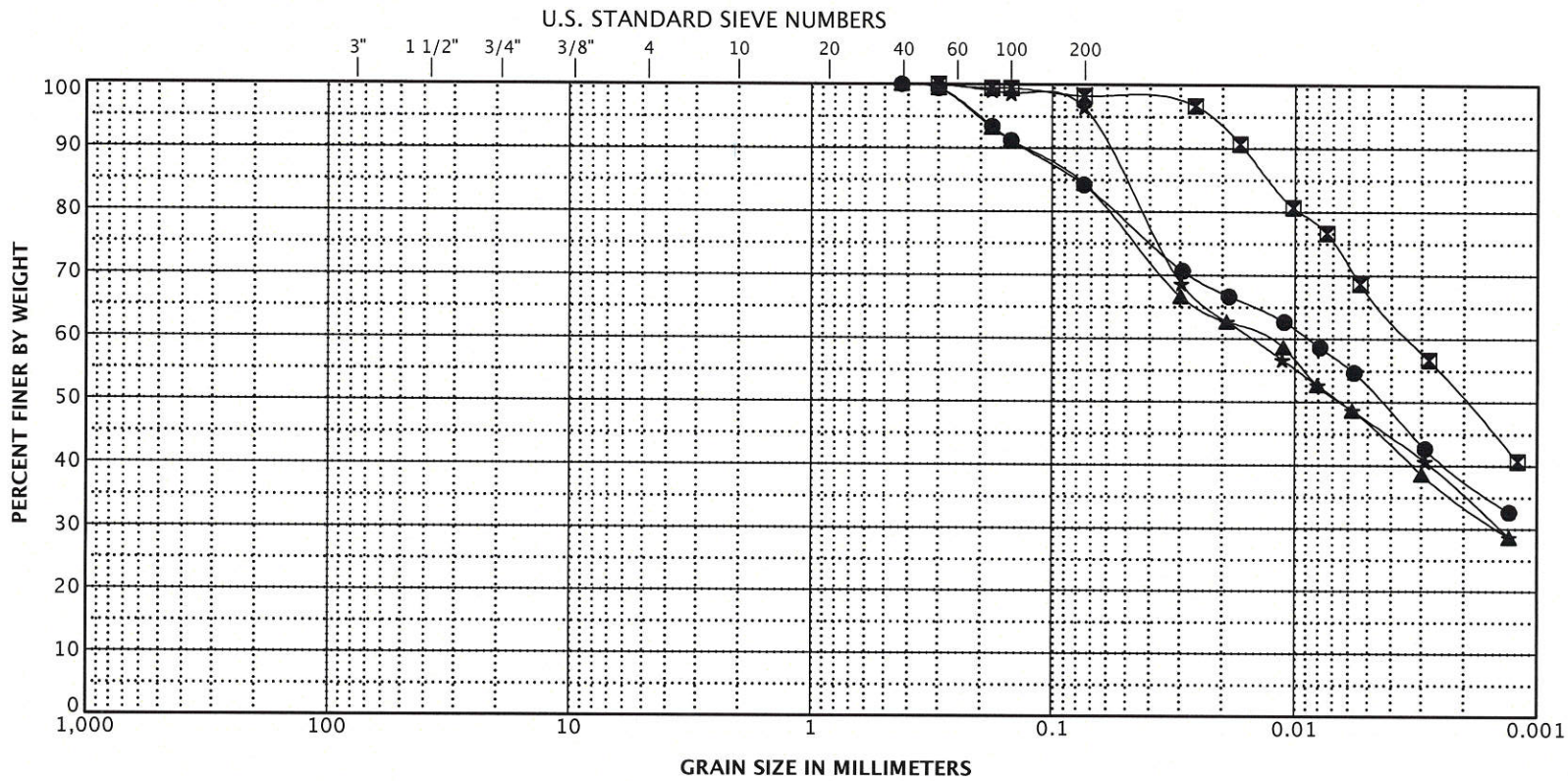
Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, Lean Clay w/ Sand, Brown, Medium Stiff to Stiff, Dry (CL)							
5		14 (6) 17 (6)				12.9	39	24		
10		10 (6) 15 (6)				12.8				-200 = 71.9%
105.			CLAY, Lean Clay, Brown, Medium Stiff to Stiff, Dry to Wet (CL)							
15		15 (6) 26 (6)				15.9	44	27		
20		8 (6) 11 (6)				20.6				-200 = 96.0%
25		15 (6) 20 (6)				23.6	37	20		
30		16 (6) 19 (6)				31.6				-200 = 97.2%
35		12 (6) 17 (6)				25.7	49	30		
77. 40		16 (6) 19 (6)				37.7				-200 = 99.1%

Remarks: Sulfate Tests Performed at 15 ft. Results Provided on Seperate Document. Boring Locate - N 26°10'55.50", W 98°11'53.76". Assumed Natural Ground Elevation.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: B. Gonzalez **Logger: O. Garcia** **Organization: L&G Engineering Laboratory**

L:\Projects\Year 2015 Projects\HCDD 1\GL15022 - Pharr-McAllen Drain\Borings\PMD.CLG



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

KEY	EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	MOISTURE CONTENT (PERCENT)	D60	D50	D30	D10	D5	GRAVEL (PERCENT)	SAND (PERCENT)	SILT (PERCENT)	CLAY (PERCENT)
●	B-1	15.0		0.01	0.00				0	16	32	52
⊠	B-2	20.0		0.00	0.00				0	2	31	67
▲	B-3	15.0		0.01	0.01	0.00			0	16	38	46
★	B-4	20.0		0.02	0.01	0.00			0	4	49	47

L&G Engineering Laboratory
Construction Material Testing
Geotechnical Engineering

GRAIN-SIZE TEST RESULTS

PHARR-MCALLEN DRAIN
HIDALGO COUNTY

FIGURE

APPENDIX C – GLOBAL STABILITY (SIDE SLOPES)

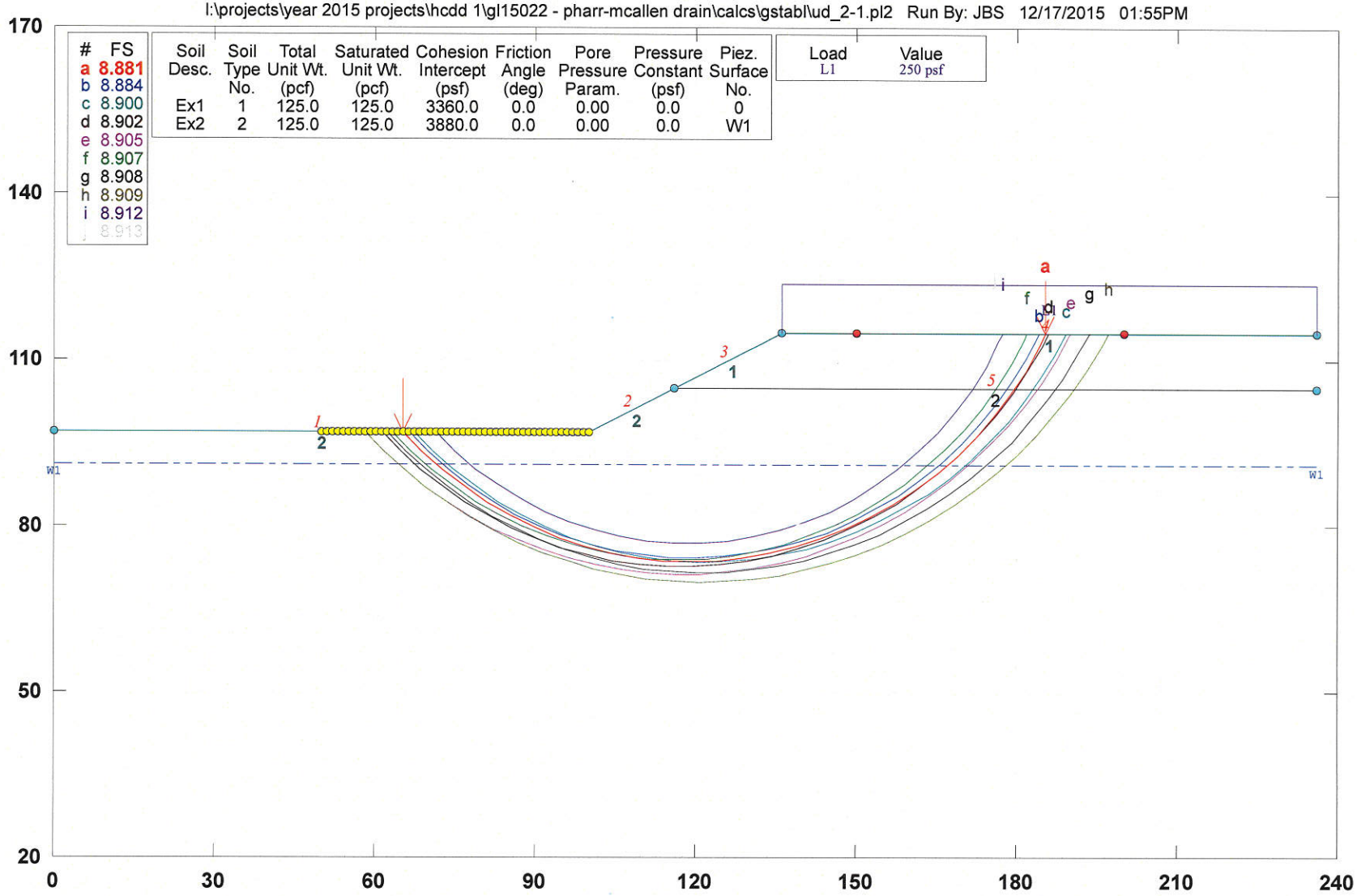
Pharr-McAllen Drain (Short Term Condition - Undrained)

I:\projects\year 2015 projects\hcdd 1\gl15022 - pharr-mcallen drain\calcs\gstabl\ud_2-1.pl2 Run By: JBS 12/17/2015 01:55PM

#	FS
a	8.881
b	8.884
c	8.900
d	8.902
e	8.905
f	8.907
g	8.908
h	8.909
i	8.912
j	8.913

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Ex1	1	125.0	125.0	3360.0	0.0	0.00	0.0	0
Ex2	2	125.0	125.0	3880.0	0.0	0.00	0.0	W1

Load	Value
L1	250 psf



GSTABL7 v.2 FSmin=8.881

Safety Factors Are Calculated By The Modified Bishop Method

Pharr-McAllen Drain (Long Term Condition - Drained)

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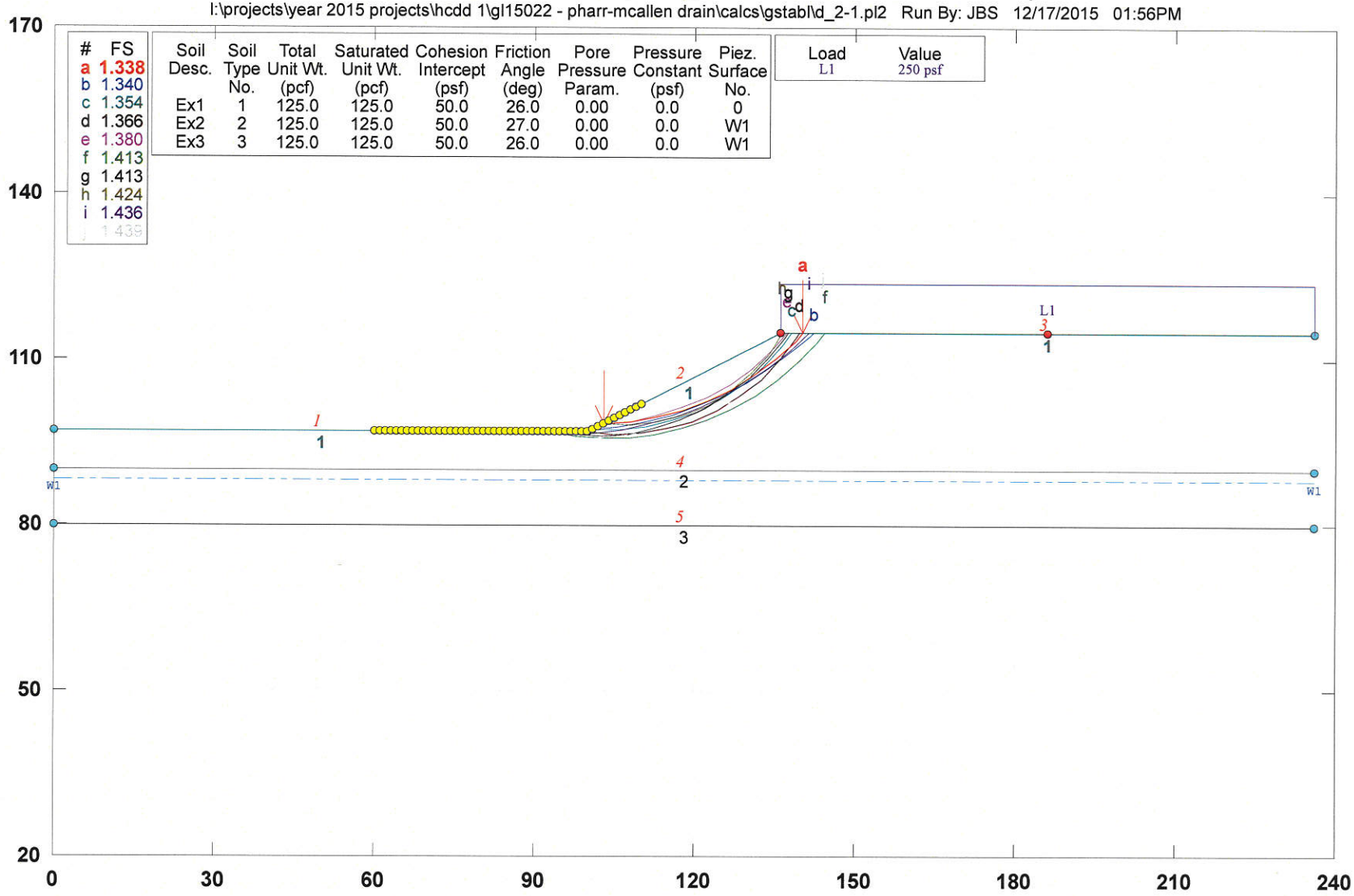


GSTABL7 v.2 FSmin=1.338

Safety Factors Are Calculated By The Modified Bishop Method

APPENDIX D – PLANS & SPECS (PROVIDED BY CLIENT)

Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.

HIDALGO COUNTY
DRAINAGE DISTRICT NO. 1

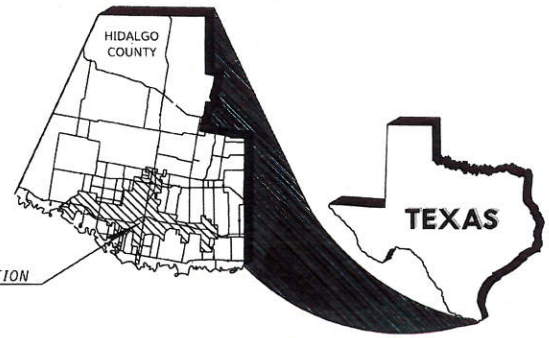
PLANS OF PROPOSED DRAINAGE IMPROVEMENT

NET LENGTH OF PROJECT: 1,191.50 FT. = 0.23 MI.

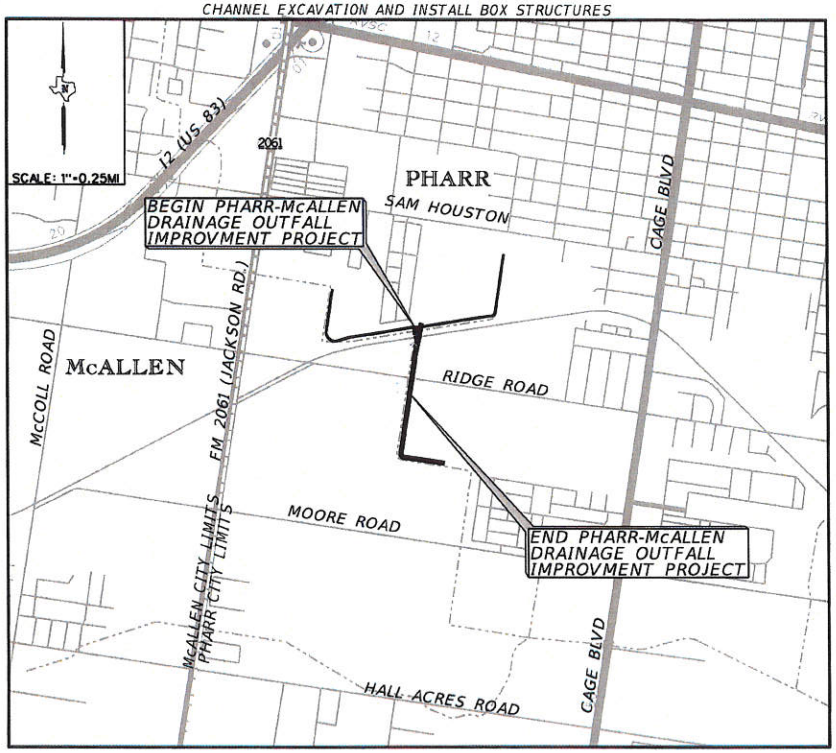
HIDALGO COUNTY

PHARR-McALLEN DRAINAGE OUTFALL IMPROVMENTS

LIMITS FROM: 0.18 MILES N. OF RIDGE RD ALONG PHARR-McALLEN DRAIN
TO: 0.05 MILES S. OF RIDGE RD ALONG PHARR-McALLEN DRAIN



CHANNEL EXCAVATION AND INSTALL BOX STRUCTURES



HIDALGO COUNTY DRAINAGE DISTRICT No.1 HCDD1

RAMON GARCIA
COMMISSIONER EDDIE CANTU

COUNTY JUDGE
PRECINCT No. 2

L&G Engineering

Highway / Civil
Structural / Bridge
Environmental
Firm No. : F-4105

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Fax : (956) 565-9018

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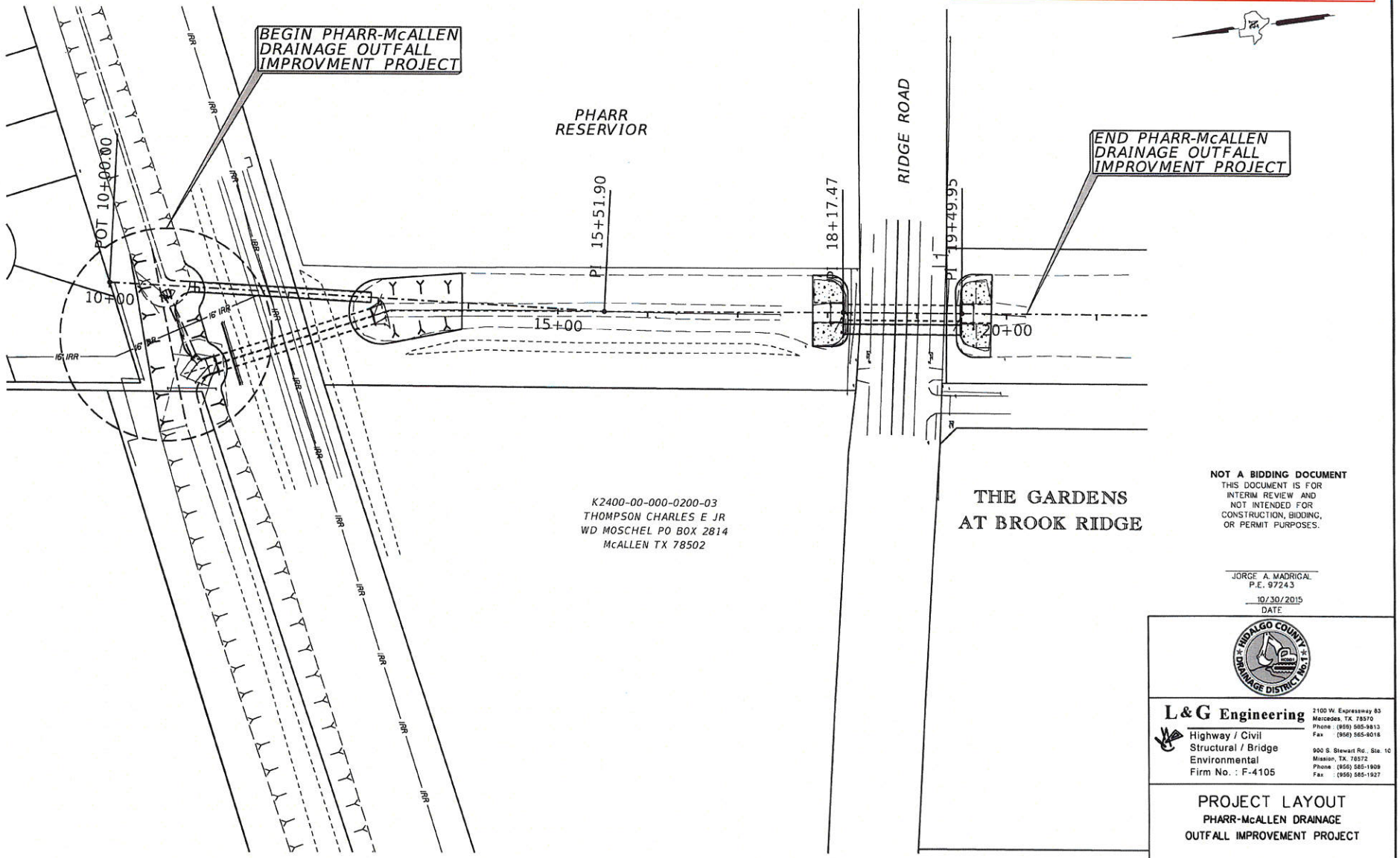
Mission, TX. 78572
Phone : (956) 585-1909
Fax : (956) 585-1927

Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.



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JORGE A. MADRIGAL
P.E. 97243
10/30/2015
DATE

HIDALGO COUNTY DRAINAGE DISTRICT No. 1

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Highway / Civil
Structural / Bridge
Environmental
Firm No. : F-4105

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Mission, TX. 78572
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Fax (956) 585-1927

PROJECT LAYOUT
PHARR-McALLEN DRAINAGE OUTFALL IMPROVEMENT PROJECT

DR: JAM	FED. RD. DIV. NO.	STATE	PROJECT NO.	SHEET NO.
CK DR:	6	TEXAS		
DR: DC	STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	HIGHWAY NO.
CK DR: JAM	PHR	HIDALGO		
TR:				LJWI
CK TR:				

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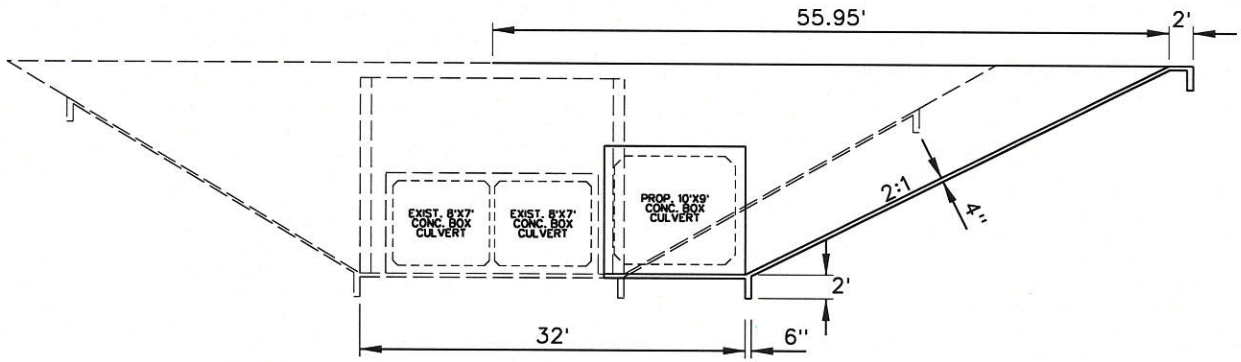
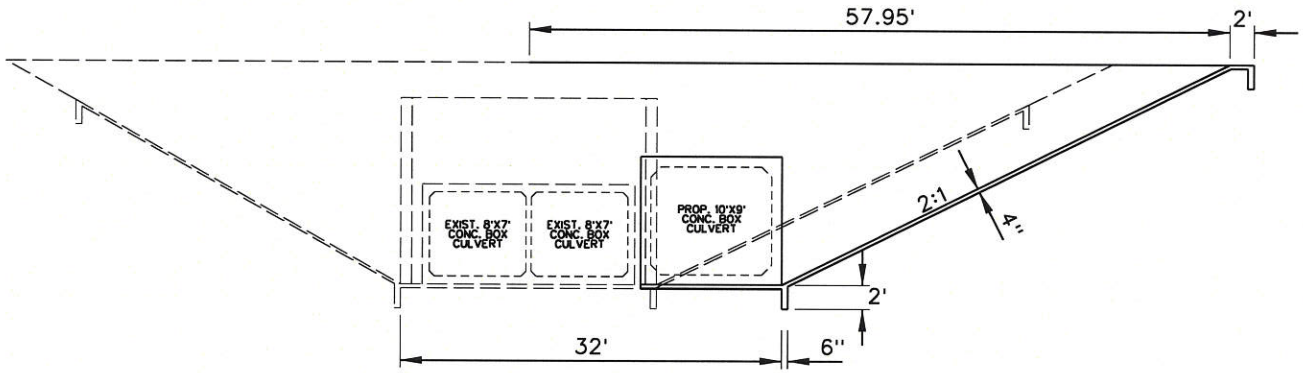
Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.





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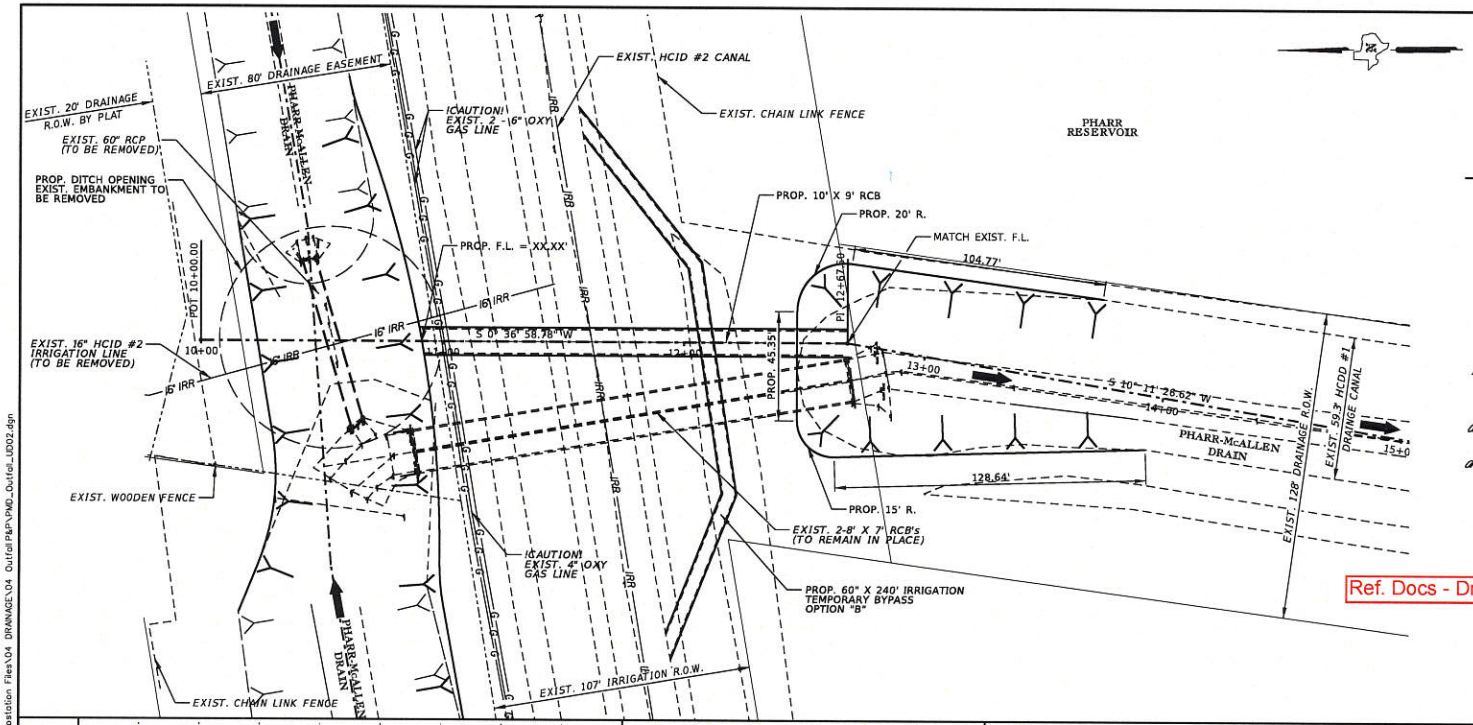
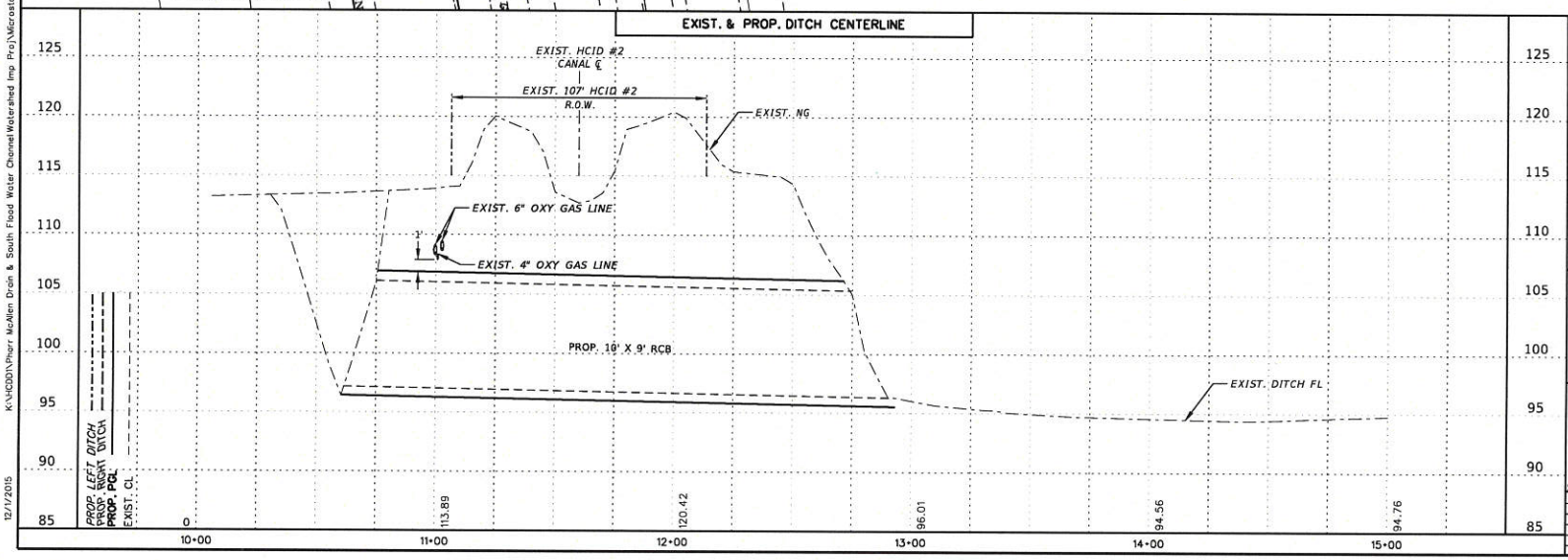
Mission, TX. 78572
Phone : (956) 585-1909
Fax : (956) 585-1927

TYPICAL SECTIONS
PHARR-McALLEN DRAINAGE OUTFALL PROJECT

DN: JAM	FED. RD. DIV. NO.	STATE	PROJECT NO.				SHEET NO.	
CK DN:	6	TEXAS						
DN: DC	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.	
CK DN: JAM	PHR	HIDALGO					LJWI	
TR:								
CK TR:								





SHEET SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY

LEGEND:

- *W — EXIST. * (DIAM INCH) WATER LINE
- *FM — EXIST. * (DIAM INCH) FORCE MAIN SANITARY SEWER LINE
- *SS — EXIST. * (DIAM INCH) SANITARY SEWER LINE
- *G — EXIST. * (DIAM INCH) GAS PIPELINE
- UFO — EXIST. UNDEGROUND FIBER OPTIC CABLE
- UT — EXIST. UNDERGROUND CABEL/TELE LINE
- OHE — EXIST. OVERHEAD ELECTRIC LINE
- HVTL — EXIST. HIGH VOLTAGE TRANSMISSION LINE
- UE — EXIST. UNDERGROUND ELECTRIC LINE
- OHEC — EXIST. OVERHEAD ELECTRIC LINE WITH CABLE LINE ATTACHED
- OHEFC — EXIST. OVERHEAD ELECTRIC LINE WITH FIBER OPTIC AND CABLE LINE ATTACHED

- SEE P&P SHEETS
- EXIST. ITEM TO BE REMOVED UNDER ITEM 496
- PROP. CONC. PLUG (NON-PAY ITEM)
- DIRECTION OF FLOW
- OUTFALL CHANNEL FLOW

NOTES:

1. SEE ALIGNMENT DATA SHEET FOR PROPOSED CENTERLINE DATA.
2. SEE SURVEY DATA SHEET FOR BM STATIONS, OFFSET, ELEV. ETC.
3. ALL RCP SHALL BE CL III UNLESS OTHERWISE NOTED.
4. SEE DRAINAGE STRUCTURE STANDARD SHEETS FOR DESCRIPTION OF OFFSET IN STORM DRAIN TABLE.
5. RECONNECTION OF EXISTING STORM DRAIN SHALL BE SUBSIDIARY TO PERTINENT BID ITEMS.
6. SEE "HYDRAULIC DATA SHEETS FOR PAYMENT OF ALL PROPOSED DRAINAGE STRUCTURES.
7. FOR OTHER DITCH GRADES SEE DITCH PROFILE SHEETS.
8. CONTRACTOR SHALL COORDINATE WITH HCID # X & HCDD # 172 HR PRIOR TO ANY WORK DONE ON OR NEAR IRRIGATION STRUCTURES. (CONCTACT NAME AND NUMBER)

Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.

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DAVID A. SAENZ
P.E. 102365
12/1/2015
DATE

HIDALGO COUNTY DRAINAGE DISTRICT NO. 1

L&G Engineering
Highway / Civil
Structural / Bridge
Environmental
Firm No. : F-4105

2100 W. Expressway 83
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900 S. Stewart Rd., Ste. 10
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Phone : (956) 585-1909
Fax : (956) 585-1927

UTILITY AND DRAINAGE

PHARR-McALLEN DRAINAGE PROJECT

STA. 40+00 TO STA. 40+00

SCALE: 1" = 50'

SHEET 2 OF 3

DW: JAM	FED. RD. DIV. NO.	STATE	PROJECT NO.	SHEET NO.
CK. DW:	6	TEXAS		XX
DW: DG	STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	HIGHWAY NO.
CK. DW: JAM	PHR	HIDALGO		LJWI
TR:				
CK. TR:				

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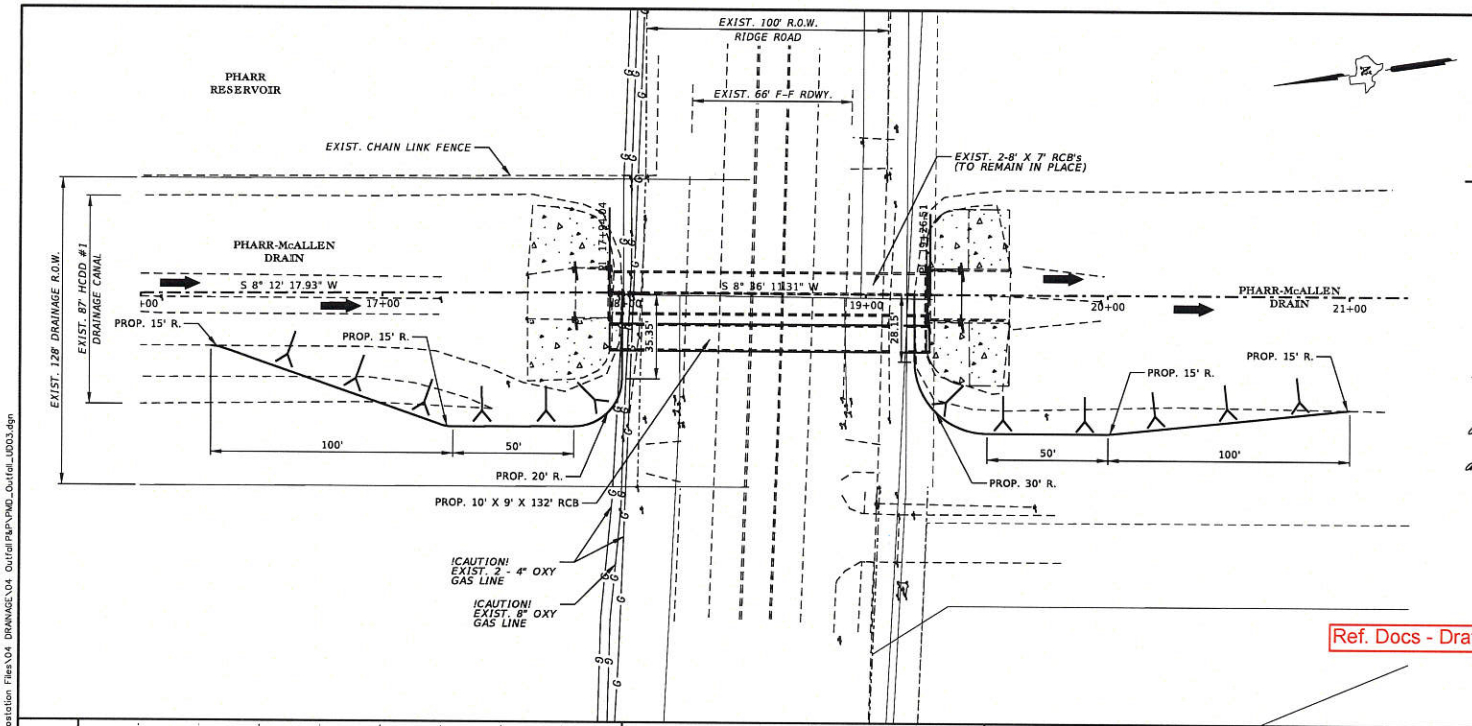

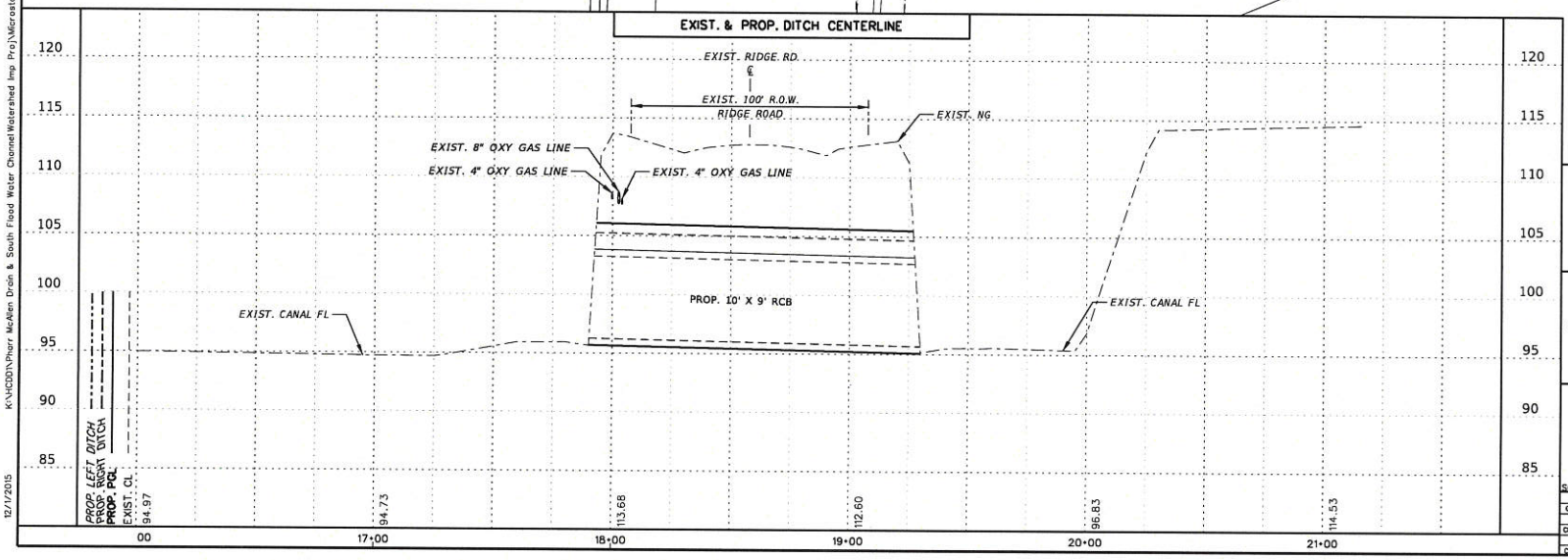

SHEET SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY

LEGEND:

- "W" — EXIST. * (DIAM INCH) WATER LINE
- "FM" — EXIST. * (DIAM INCH) FORCE MAIN SANITARY SEWER LINE
- "SS" — EXIST. * (DIAM INCH) SANITARY SEWER LINE
- "G" — EXIST. * (DIAM INCH) GAS PIPELINE
- UFO — EXIST. UNDEGROUND FIBER OPTIC CABLE
- UT — EXIST. UNDERGROUND CABEL/TELE LINE
- OHE — EXIST. OVERHEAD ELECTRIC LINE
- HVTL — EXIST. HIGH VOLTAGE TRANSMISSION LINE
- UE — EXIST. UNDERGROUND ELECTRIC LINE
- OHEC — EXIST. OVERHEAD ELECTRIC LINE WITH CABLE LINE ATTACHED
- OHEFC — EXIST. OVERHEAD ELECTRIC LINE WITH FIBER OPTIC AND CABLE LINE ATTACHED

- SEE P&P SHEETS
- EXIST. ITEM TO BE REMOVED UNDER ITEM 496
- PROP. CONC. PLUG (NON-PAY ITEM)
- DIRECTION OF FLOW
- OUTFALL CHANNEL FLOW

NOTES:

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2. SEE SURVEY DATA SHEET FOR BM STATIONS, OFFSET, ELEV. ETC.
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6. SEE "HYDRAULIC DATA SHEETS FOR PAYMENT OF ALL PROPOSED DRAINAGE STRUCTURES.
7. FOR OTHER DITCH GRADES SEE DITCH PROFILE SHEETS
8. CONTRACTOR SHALL COORDINATE WITH HCID # X & HCDD # 172 HR PRIOR TO ANY WORK DONE ON OR NEAR IRRIGATION STRUCTURES. (CONCTACT NAME AND NUMBER)

Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.

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DAVID A. SAENZ
P.E. 102365
12/1/2015
DATE

HIDALGO COUNTY DRAINAGE DISTRICT NO. 1

L&G Engineering
Highway / Civil
Structural / Bridge
Environmental
Firm No. : F-4105

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Fax : (956) 565-9018

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Mission, TX. 78572
Phone : (956) 585-1909
Fax : (956) 585-1927

UTILITY AND DRAINAGE
PHARR-McALLEN DRAINAGE PROJECT
RIDGE RD DRAINAGE CROSSING

SCALE: 1" = 50'

SHEET 3 OF 3

DSN: JAM	FED. RD. DIV. NO.	STATE	PROJECT NO.	SHEET NO.
CK. DSN:	6	TEXAS		XX
DR: DG	STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	HIGHWAY NO.
CK. DR: JAM	PHR	HIDALGO		LJW1
TR:				
CK. TR:				

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L&G Engineering
Transportation Consultants

GEOTECHNICAL INVESTIGATION
FOR THE
PHARR-MCALLEN DRAIN – DRAINAGE IMPROVEMENTS PROJECT
HIDALGO COUNTY, TEXAS

Prepared For:
Hidalgo County Drainage District No. 1

Prepared By:
L&G Consulting Engineers, Inc.
(L&G Engineering Laboratory – A Division of L&G)
Mercedes, Texas 78570
[Texas Registered Engineering Firm F-4105]

L&G Project No. GL15022
December 31, 2015

12/31/2015

David A. Saenz, P.E., C.F.M.
Project Manager / Project Engineer

INTRODUCTION

L&G Consulting Engineers, Inc. (L&G Engineering Laboratory – A Division of L&G (L&G)) was contracted by **Hidalgo County Drainage District No. 1 (HCDD#1)** to perform a subsurface geotechnical investigation and engineering analysis to assist in the preparation of Plans, Specifications, and Estimates (PS&E) for the proposed Pharr-McAllen Drain drainage improvements. This report addresses bearing capacity of structure locations (culvert crossings), global stability of ditch side slopes (slope stability), soil sulfate content and soil scour parameters. Also included in the report are boring logs, figures addressing the existing geology and general contour of the proposed construction site, and general construction recommendations.

GENERAL PROJECT OVERVIEW

Project Description

L&G is pleased to submit this document presenting our findings as the result of a subsurface geotechnical exploration performed at the request of **HCDD#1**. It is our understanding that the project involves increasing flow capacity of the existing Pharr-McAllen Drain crossings at Hidalgo County Irrigation District No. 2's elevated irrigation canal, 'Lateral E,' (Location 1) and Ridge Rd. (Location 2) through the construction of an additional 10ft x 9ft box culvert at each location. A general illustration of the project site is shown in Figure 1 (additional figures can be found in Appendix A). It is further our understanding that the existing ditch will need to be reshaped and re-graded just upstream and downstream of the proposed crossing improvements to account for the larger overall width of the crossings. The reworked sections will generally be a trapezoidal shape with maximum side slopes of 2 horizontal units to 1 vertical unit (2:1). A preliminary schematic for the proposed structures was provided by the Client (**HCDD#1**). No detailed grading plans or structural loads for the structures were provided; thus all foundation and site improvement recommendations as provided in this report are based on the geotechnical properties of the soils and generalized assumptions as noted.

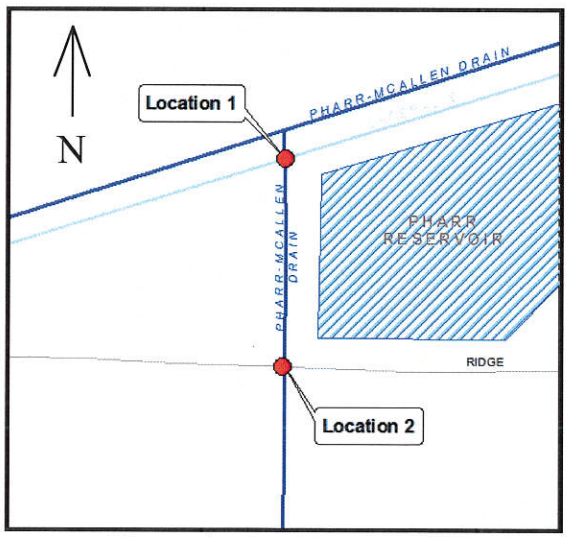

Figure 1 – Project Location

Scope and Limitations of Investigation

This report has been prepared in general accordance with accepted geotechnical engineering practices for the subject project site and the anticipated construction. No specific warranty program or other special standards, except acceptable industry standards for the general South Texas area, were followed during the course of this investigation and analysis. This geotechnical report is intended for use by **HCDD#1** and any direct representatives or affiliates. This geotechnical report may not contain sufficient information for purposes of other parties, or other uses in determining construction means and methods.

The strata, shown on the boring logs (included in Appendix B), represent the subsurface conditions at the boring locations at the time of our investigation. These strata designate approximate boundaries between subsurface materials; however, their actual transition may be gradual or may occur at varying depths. Variations may occur due to unexpected deposits of soft clays, silts or other undesirable soil material not detected through our investigation. It should be noted that the exploratory borings were performed within the limits of the proposed project as approved and agreed upon by all previously noted parties prior to the commencement of our field operations.

The benchmarks of this geotechnical study are to:

1. *explore the general existing subsurface conditions at the site*
2. *evaluate the relevant engineering properties of the subsurface materials*
3. *evaluate settlement parameters and calculate site specific allowable bearing capacity*
4. *develop global stability models and analyses for verification of proposed slope stability*
5. *provide soil scour parameters for use in scour analysis at structure locations*
6. *provide general construction recommendations regarding all aspects of the project*

The scope of this geotechnical engineering study does not include an environmental assessment of the air, soil, rock or water conditions on or adjacent to the site. No environmental opinions are presented in this report. If environmental clearances are needed prior to construction, please contact our offices for assistance in this matter.

EXISTING SURFACE AND SUB-SURFACE CONDITIONS

Site Location / Description

The project site is located within Pharr, Texas (Hidalgo Co, TX), approximately one-half (0.5) miles east of FM2061 (Jackson Rd) at the existing Pharr-McAllen Drain crossings at Ridge Rd and Hidalgo County Irrigation District No. 2's (HCID2) elevated irrigation canal, 'Lateral E'. The proposed 10ft x 9ft box culvert structure will be placed adjacent to the existing twin 8ft x 6ft box culvert structures at both locations. The boring locations were drilled at the locations specified by the Client as shown on Figure 2 in Appendix A. No surveyor was contracted to determine the exact coordinates for the boring, as this was not a part of the scope of work for the project. However, field handheld GPS coordinates were verified and are noted on the boring logs in Appendix B. No clearing was required for site access.

Geology

The Geologic Atlas of Texas (McAllen - Brownsville Sheet dated 1976), created by the Bureau of Economic Geology, indicates that the subject site is located within the *Beaumont Formation* of the Quatenary Period Recent (Pleistocene Epoch). The *Beaumont Formation* is described as "mostly clay, silt, sand, and gravel; includes mainly stream channel, point bar, natural levee, and backswamp deposits; concretions and massive accumulations of calcium carbonate (caliche) and concretions of iron oxide and iron-manganese oxides in zone of weathering." Specifically, the project lies within a specific area of the *Beaumont Formation* that is described as "dominantly clay and mud of low permeability, high water-holding capacity, high compressibility, high to very high shrink-swell potential, poor drainage, level to depressed relief, low shear strength, and high plasticity; geologic units include interdistributary muds, abandoned channel-fill muds, and fluvial overbank muds." See Figure 5 in Appendix A for Geologic Atlas Map.

Soil Survey Description

According to the Soil Survey of Hidalgo County, Texas, published by the United States Department of Agriculture, the proposed facility is located within the Hidalgo Sandy Clay Loam, 0 to 1 percent slopes (28). The description of this soil map unit is as follows (see Figure 3 in Appendix A for USDA Soils Map):

Hidalgo Sandy Clay Loam, 0 to 1 percent slopes (28) – This very deep, gently sloping soil is on convex uplands. The soil map unit is well drained with medium surface runoff, moderate available water capacity (about 7.8 inches), and moderate permeability. The soil is non-saline to slightly saline (0.0 to 4.0 mmhos/cm) with no frequency of flooding or ponding. The typical soil profile is 0 to 16 inches: dark grayish brown fine sandy loam; 16 to 27 inches: grayish brown sandy clay loam; 27 to 37 inches: brown sandy clay loam; and 37 to 65 inches: pale brown sandy clay loam. The soil is calcareous throughout.

Rainfall

The mean annual precipitation for this area of Hidalgo County is approximately twenty (20) to twenty-four (24) inches, as reported by the U.S. Department of Agriculture Soil Conservation Service. For the purpose of this report, our geotechnical investigation, performed in December of 2015, was conducted during a non-drought condition (none, as noted by the National Weather Service), with moisture and precipitation levels around annual averages. The National Oceanic and Atmospheric Administration (NOAA) reports for the subject date indicated that no significant rainfall observations (at least one inch) occurred prior to or during our exploration that could have significant effects on any groundwater levels.

SITE INVESTIGATION

Soil Borings and Laboratory Tests

Subsurface conditions at the site were evaluated through four (4) structural borings (designated as B-#) drilled to a depth of forty (40) feet below natural ground at the locations shown on Figure 2 of Appendix A. The soil borings were drilled and sampled in general accordance with American Society of Testing Materials Procedures (ASTM) D420 and D1452 using a truck mounted drilling rig (Simco 2800 HS (HT)) and solid stem augers.

As part of the drilling procedure, Texas Cone Penetration (TCP) field tests were performed at various depth intervals for use in determination of soil strength parameters. TCP tests were executed in compliance with TxDOT test procedures (Tex-132-E, Texas Cone Penetration) and results were reported as blows per increment on the boring logs. A 170 pound hammer was used to drive the conical driving point through three (3) - six inch increments. The first six inch increment (or 12 blows, whichever was reached first), typically referred to as the seating drive, was not included in the blow count as per the test procedure. The number of blows required to drive the sampler through the subsequent two (2) - six inch increments were recorded as the TCP results (and were included on the boring logs in Appendix B). Where very dense or hard material was encountered (resulting in less than 6 inches of movement per 50 blows) the cone was driven for a minimum 100 blows, and the depth of penetration for the first and second 50 blows was recorded as the TCP results.

As part of the sampling procedure, auger samples were collected through general grab sampling during the drilling process (auger cuttings were collected at drilling intervals between TCP tests). Representative portions of the samples were identified, packaged, sealed in containers (to reduce moisture loss) and transported to our laboratory for subsequent testing. In the laboratory, each sample was evaluated and visually classified by a member of our Geotechnical Engineering staff. The properties of the strata were evaluated by a series of laboratory index tests (Tex-142-E, Laboratory Classification of Soils for Engineering Purposes and ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)). A summary of the laboratory data and their corresponding depths are presented on the boring logs in Appendix B.

Samples will be retained in our laboratory for 30 days after submittal of this report. Other arrangements may be provided at the request of the Client.

Subsurface Stratigraphy

Based on the results of the field and laboratory sample analyses, the subsurface stratigraphy at the project location can be characterized as follows (Tables 1a and 1b):

Location 1 - Irrigation Canal (Borings B-01 & B-02)			
Description	*Approximate Depth Range (ft.)	Material Type	Consistency / Density
Stratum I	0 to 7	Sandy Clay[1]	Stiff
Stratum II	7 to 32	Clay w/ Sand, Clay[2]	Medium Stiff to Hard
Stratum III	32 to 40	Clay[3]	Medium Stiff to Very Stiff

1. This stratum contained dark brown sandy lean clay (CL) with moderate plasticity indices (PI = 26). These soils contained approximately 67% fine soil particle contents (clays & silts). TCP N-values ranged from 30 to 31 blows per foot. Samples were noted as dry.

2. This stratum contained brown fat clay w/ sand (CH) and lean clay (CL) with low to high plasticity indices (PI ranging from 9 to 43). These soils contained approximately 84 to 98% fine soil particle contents (clays & silts). TCP N-values ranged from 19 to 73 blows per foot. Samples were noted as dry.

3. This stratum contained brown lean and fat clays (CL/CH) with low to high plasticity indices (PI ranging from 9 to 42). These soils contained approximately 95 to 96% fine soil particle contents (clays & silts). TCP N-values ranged from 20 to 46 blows per foot. Samples were noted as moist to wet.

Table 1a – Existing Soil Strata & Description (Location 1 - Irrigation Canal)
**all depths are referenced from existing natural ground*

Location 2 - Ridge Rd (Borings B-03 & B-04)			
Description	*Approximate Depth Range (ft.)	Material Type	Consistency / Density
Stratum I	0 to 12	Sandy Clay, Clay w/ Sand[1]	Medium Stiff to Hard
Stratum II	12 to 40	Clay w/ Sand, Clay[2]	Medium Stiff to Hard
1. This stratum contained brown sandy fat clay (CH) and lean clay w/ sand (CL) with moderate to high plasticity indices (PI ranging from 24 to 40). These soils contained approximately 69 to 72% fine soil particle contents (clays & silts). TCP N-values ranged from 25 to 82 blows per foot. Samples were noted as dry.			
2. This stratum contained brown lean and fat clays (CL/CH) and fat clay w/ sand (CH) with moderate to high plasticity indices (PI ranging from 20 to 40). These soils contained approximately 84 to 99% fine soil particle contents (clays & silts). TCP N-values ranged from 19 to 57 blows per foot. Samples were noted as dry to wet.			

Table 1b – Existing Soil Strata & Description (Location 2 - Ridge Rd)
**all depths are referenced from existing natural ground*

It should be noted, the Soil Strata and Description illustrated in Tables 1a and 1b, are typical summarized representation of the site stratigraphy. The lines designating the interfaces between strata on the boring logs represent approximate boundaries. Transitions between strata may be gradual and may occur at varying depths.

Water Strikes

During the drilling operations, water strikes were encountered at all boring locations. It should be noted that fluctuations in groundwater levels are influenced by variations in rainfall and surface water run-off from season to season. The construction process itself may also cause variations in the groundwater level. If the water level is critical to the construction process, **L&G** recommends that the Contractor check the subsurface water conditions immediately prior to construction excavation through the installation of piezometer wells. Table 2 shows a summary of the initial water strike depth and 24 hour water level readings for each boring.

Boring No.	*Initial Water Strike	*24 Hr. Water Reading
Location 1 – Irrigation Canal		
B-01	37.00ft	24.67ft (Cave-In Depth = 27.75ft)
B-02	No Waterstrike Encountered	25.00ft (Cave-In Depth = 28.33ft)
Location 2 – Ridge Rd.		
B-03	27.00ft	21.00ft (Cave-In Depth = 25.00ft)
B-04	24.00ft	19.67ft (Cave-In Depth = 25.33ft)

Table 2: Water Strike Depth Summary
**all depths are referenced from existing natural ground*

GEOTECHNICAL BORING ANALYSIS

Moisture Content

The moisture content of a soil is defined as the ratio of the weight of the water in the sample to the dry weight of the soil sample. The moisture contents for the samples obtained as part of our geotechnical exploration were performed in compliance with ASTM procedure D2216. The results varied from ten (10) percent to forty-seven (47) percent. The variance in percentages within a given exploratory boring can be attributed to a multitude of issues including, range in depth, distance between samples, location of groundwater table and seasonal moisture zone. The variation could also be caused by differences in soil classifications, as some soils such as loose gravels and sands are made up of larger particles and thus exhibit more voids as a soil structure (higher capability to hold water than fine grained soils). Finer grained denser soils, though, due to high impermeability, may also exhibit high moisture contents in certain instances due to the slower movement of water through the soil structure. Most samples in this geotechnical exploration exhibited dry field moisture conditions. A list of all the moisture contents by corresponding depth can be found on the boring logs.

Plasticity Index

The Plasticity Index (PI) is defined as the difference between the liquid limit and the plastic limit of a soil. These limits are commonly referred to as the Atterberg limits, which describe the consistency of soils with respect to their varying moisture contents. The liquid limit is defined as the moisture content at which soil begins to transition from a plastic to a liquid state and begins to behave as a liquid material by beginning to flow. The plastic limit refers to the water content of a soil at the point of transition from a semisolid to a plastic state where soil starts to exhibit plastic behavior. A soils behavior can be divided into four basic states: liquid, plastic, semisolid and solid. The plasticity index shows the range in which a soil acts in a plastic state. Experience has shown that the more plastic a soil is the more expansive and compressive it will act. The plasticity indices for the samples obtained as part of our geotechnical exploration were performed in compliance with ASTM procedure D4318. PI values for the borings performed for this report range from nine (9) (low plasticity clays) to forty-three (43) (high plasticity clays).

Particle Size Analysis (Determination of Fines Content)

The standard grain size analysis is used to determine the relative proportions of different grain sizes as they are distributed along a range of different sized sieves. The minus 200 sieve analysis is used commonly as a tool for soil classification and identification using the Unified Soils Classification System. Results for this test are reported as a percentage of soil passing the No. 200 sieve, which has openings 0.075 mm wide. This test is also used to determine the suitability of soil for construction purposes and to estimate probable seepage through soils. Generally a % -200 greater than 50% indicates a non-granular cohesive soil with large amounts of fines in the soil composition. The particle size analyses for the samples obtained as part of our geotechnical exploration were performed in compliance with ASTM procedure D1140. The % -200 values for the samples collected range from 67% to 99%.

Particle Size Analysis (Gradation Curves – D50 & D90)

Full standard gradation analysis is necessary to establish soil gradation curves. Standard gradation analysis involves two parts, the sieve analysis and the hydrometer analysis. The sieve analysis consists of stacking progressively finer sieves and passing a soil mass through. The sieve sizes correspond to different particle sizes within a soil. Hydrometer analyses are used primarily in fine grained soils but are also very useful in establishing the 'tail-end' of a gradation curve for soils having a mixture of coarse grained and fine grained soil constituents. The diameter of soil particles corresponding to 50% (D50) and 90% (D90) finer in the soil sample were derived from sieve and hydrometer analyses (establishment of particle-size distribution curve) for use in Hydraulic Scour Analysis. The results are presented in Table 3:

**Boring #	*Sample Depth (ft.)	D50 (mm)	D90 (mm)
Location 1 – Irrigation Canal			
B-01	15	**0.004	0.130
B-02	20	**0.002	0.017
Location 2 – Ridge Rd.			
B-03	15	**0.007	0.130
B-04	20	**0.007	0.058

Table 3 – D50 & D90 Values for Scour Analysis

**all depths are referenced from existing natural ground*

***D50 values should be limited to 0.10 millimeters in cohesive material (see following paragraph)*

In accordance with the TxDOT Geotechnical Manual (2012), **L&G Lab** recommends D50 values be limited to 4×10^{-3} inches (0.10 millimeters) for this channel in cohesive material. In addition (and if required), it should be noted, the TxDOT Geotechnical Manual (2012) recommends Pier Scour utilize equations in HEC-18 with a reduction factor of 0.5 for soils with 11% or more clay.

Sulfate Content of Soil (Concrete Structures)

The presence of high concentrations of water-soluble sulfates (SO_4) in soils can be detrimental to concrete structures in direct contact. Concrete exposed to these sulfate rich soils (buried concrete structures, foundations, slabs-on-grade) are highly vulnerable to deterioration typically in the form of expansion, extensive cracking and spalling. In the long-term, sulfates causing micro-cracks in concrete structures can form areas of additional ettringite (calcium sulfoaluminate) formation that can potentially penetrate the structures and lead to weakening of the cement paste and structure as a whole. In order to detect levels of water-soluble sulfates in the soils, we performed testing on these soils in accordance with Tex-145-E (Determining Sulfate Content in Soils – Colorimetric Method). To ensure we got an accurate reading with regard to the water levels impacting the soils, we performed these tests at various depths feet below top of natural ground at the locations of the borings. The general site specific results are presented in Table 4.

Boring	*Sample Depth (ft.)	Water-Soluble Sulfate Level (Parts Per Million)
Location 1 – Irrigation Canal		
B-01	20	480
B-02	15	560
Location 2 – Ridge Rd.		
B-03	20	320
B-04	15	520

Table 4 – Summary of Sulfate Contents
**all depths are referenced from existing natural ground*

It should be noted, Texas Department of Transportation (TxDOT) Pharr District Master General Notes specifies the use of Sulfate Resistant Concrete when sulfate concentrations in the soil are greater than 1,000 ppm. In accordance with this and based our test results, **L&G** does not note the specific need for Sulfate Resistant Concrete at culvert locations and at any other structural components in direct contact with the existing soil.

GEOTECHNICAL ENGINEERING ANALYSES

Global Stability of Channel Side Slopes

It is the understanding of **L&G** that the proposed reworked and regraded ditch sections will be a trapezoidal shaped channel with maximum side slopes of 2 horizontal units to 1 vertical unit (2:1) as previously noted in this report (See 'Project Description').

This report includes complete Global Stability Analysis as the means to evaluate channel side slope geometry with regard to existing top strata (proposed slope sections), section geometry and underlying foundation soils. The Factor of Safety requirements utilized in this analysis are referenced from the 2012 TxDOT Geotechnical Manual. For this project, we will utilize the threshold value of FS = 1.3 for all analyses.

The limit equilibrium method of analysis is the most commonly used method of analyzing the overall stability of both natural and manmade slopes as well as retaining wall structures. The fundamental principles behind this method are that the soil mass above a potential failure surface acts as a rigid body, and the shear strength of the material is fully engaged at all points along the surface at the moment of initial movement. A failure criterion is adopted and the conditions for static equilibrium are applied to analyze the problem. This method of analysis assumes that no strain takes place until the failure condition is reached. The results of the analyses are expressed in terms of a safety factor in the form of a ratio of the available shear strength along the potential failure surface to the shear stress required to maintain equilibrium of the failure mass under the applied loads. This method has traditionally been used in the analysis of man-made earth structures such as embankments, levees and retaining wall structures.

The Global Stability Analyses of the channel bank sections (slopes) was performed using ***GSTABL with STEDwin*** Version 7 software program. Analyses were performed using the Modified Bishop Method of slices for circular surfaces (random surfaces were not investigated in this report). It should be noted that the possibility of undetected anomalies in the soil, such as

remnants of previous sliding, tension cracks or water-bearing seams of sand, could potentially alter or negate the findings of the stability analysis. Through the utilization of the GSTABL software program, conservative modeling techniques, and engineering judgment we present what we believe are the most accurate factors of safety.

Input parameters such as shear strength (cohesion and angle of friction) were correlated from the results of the TCP testing and laboratory soil classification testing (unit weight was assumed based on material properties from laboratory tests). Both short-term (undrained) and long-term (drained) conditions were analyzed in accordance with the TxDOT Geotechnical Manual. Correlations for undrained parameters were based on the most current TxDOT Geotechnical Manual and supplemented with a Technical Report from the FHWA and TxDOT titled "Improved Correlation between Texas Cone Penetrometer Blow Count and Undrained Shear Strength of Soft Clays." Correlations for drained parameters were based on correlation equations of Holtz & Kovacks (1981), Bjerrum and Simons (1960), and Gibson (1953). It should be noted; only total shear strengths of soils were input into the GSTABL models for the short-term (undrained) condition, as opposed to individual cohesions and friction angles to maintain consistency with the strength correlations. In addition it should be noted, a minimum residual cohesion value of 50 pounds per square foot (psf) was incorporated into the long-term (drained) condition models.

The geometric model of the Drainage Ditch Side Slopes utilized for analysis consisted of maximum height (approximated as 18 feet) assumed at all boring locations along the proposed drainage ditch for a worst case analysis. Traffic surcharge loading was incorporated into the modeling considered equivalent to two (2) feet of soil (approximately 250 psf) placed atop the slopes (to model the access road). Piezometric surfaces (groundwater surfaces) were modeled at depths noted in boring logs. The model was analyzed as follows (See Appendix C for Global Stability Runs):

- Worst Case Analysis – Maximum Ht. Ditch, Maximum Side Slope, Worst Boring
    - The global stability analysis for this side slope was completed utilizing an assumed overall ditch height of 18 feet with 2:1 side slopes.
    - The global stability analysis was completed using boring B-04 (undrained) and B-03 (drained). The resulting critical Factors of Safety were equal to **8.881** for the short-term condition (undrained) and **1.338** for the long-term condition (drained). It should be noted, the FOS values are above the project threshold minimum of 1.3.

Bearing Capacity of Soils

The bearing capacity of the existing natural ground is defined as the ability of a foundation to safely support the imposed loadings (surcharge), without experiencing any form of shear failure. The ultimate bearing capacity is a measure of the soil's maximum resistance immediately prior to a bearing capacity failure. The ultimate bearing capacity was estimated using the methods and equations, as recommended by the USACE in Manual EM 1110-1-1905 titled "Bearing Capacity of Soils":

$$q_u = c\,N_c\zeta_c + \tfrac{1}{2}\,B\,\gamma_h\,N_\gamma\zeta_\gamma + \sigma\,N_q\zeta_q$$

where:

q_u = ultimate bearing capacity
c = soil cohesion
B = effective width of foundation
γ_h = effective unit weight of soil within failure zone
σ = effective soil surcharge pressure at depth
N_c, N_γ, N_q = dimensionless bearing capacity factors
ζ_c ζ_γ ζ_q = dimensionless correction factors for cohesion, soil unit weight, and surcharge

Nc, Nγ, and Nq are the dimensionless bearing capacity factors developed by Meyerhof, Hansen, and Vesic for general shear failure listed in Table 4-4 of EM 1110-1-1905. Cohesion and angle of friction values were estimated using a correlation with the Texas Cone Penetration Tests performed in the field. All correlations used were in accordance with the applicable USACE manuals.

The factor of safety used in our analysis was equal to 3.0, as recommended by Chapter 1 of EM 1110-1-1905. The absolute minimum factor of safety, as recommended by Chapter 1 of EM 1110-1-1905 for this construction is 2.0. The maximum allowable bearing capacity was calculated by dividing the ultimate bearing capacity by the factor of safety. All recommendations reflect the maximum allowable bearing capacity in pounds per square foot.

- Bearing Capacity of Soils (Culvert Crossings)
    - **The maximum allowable bearing capacity at culvert location 1 (Irrigation Canal) is 7,000 pounds per square foot**. This value was calculated using a **factor of safety equal to 3**. It should be noted, bearing capacity was calculated for the most critical rectangular foundation geometry with a width to length ratio of 1:3.
    - **The maximum allowable bearing capacity at proposed culvert location 2 (Ridge Rd) is 5,250 pounds per square foot**. This value was calculated using a **factor of safety equal to 3**. It should be noted, bearing capacity was calculated for the most critical rectangular foundation geometry with a width to length ratio of 1:3.

GENERAL CONSTRUCTION RECOMMENDATIONS

Excavation and Trenching Recommendations

L&G recommends drain ditches be constructed in accordance with details shown on plans and approved working drawings, and to the pertinent requirements of the following TxDOT 2014 Standard Specification Items: Item 110 "Excavation", and Item 132 "Embankment." Excavate to the lines and grades shown on the plans or as directed. Where trenches or shallow excavations are to extend to or below a depth of five (5) feet, the Contractor or persons performing the trenching or shallow excavations should adhere to the current Occupational Health and Safety Administration (OSHA) guidelines on trench excavation safety and protection measures. Other industry standards may be applicable. If proposed trenching is to require excavation protection,

L&G recommends protection is provided in accordance with the requirements of TxDOT 2014 'Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges', Item 402 – Trench Excavation Protection and/or Item 403 – Temporary Special Shoring.

Culvert & Backfill Recommendations

L&G recommends box culverts be constructed in accordance with the requirements of TxDOT 2014 Standard Specification Items: Item 462 "Concrete Box Culverts and Drains". In addition, **L&G** recommends shaping, bedding and backfill for the structures are completed in accordance with Item 400 "Excavation and Backfill for Structures".

Drainage / Dewatering Recommendations

Drainage is one of the most important aspects to be addressed to ensure the successful construction, installation and longevity of construction projects. Positive surface drainage should be implemented prior to and during construction to prevent water ponding in all construction areas (especially at trench locations and bedding area of the proposed entrance and exit culverts). If water is present at the construction area, **L&G** recommends that dewatering techniques be used (bailing, point wells, pumping wells, cofferdam structures, or other approved methods) to ensure proper construction of the proposed culvert crossing(s) on a firm dry surface. This will reduce the probability of maintenance problems in the future at these locations. If the culvert areas cannot be de-watered, stabilizing material (lean concrete or cement stabilized fill) may be used to establish a working platform. This material should meet the requirements of Items 400 and 401 of the TxDOT 2014 Standard Specifications.

Channel Side Slope Recommendations

While **L&G** has shown minimum recommended side slopes for channels in this report to include utilizing 2(horizontal) to 1(vertical) slopes based on satisfactory factors of safety with regard to slope stability, we generally recommend utilizing 3(horizontal) to 1(vertical) slopes or flatter for the banks of the drainage channels, where possible. Slopes steeper than our typical recommended 3:1 may have the potential to cause problems with erosion, minor slope stability (in the form of surface sloughing), and general maintenance of the slopes. If steeper slopes become a requirement of this project, **L&G** should be notified to provide updated Slope Stability modeling and calculations. The construction of the channel slopes should include the installation of vegetation to assist in reducing erosion, preventing slough failures, and increasing the general slope stability. In the areas of anticipated inlet/outlet structures, as well as any other areas where turbulent or rapid flows may occur (at channel bends or turns), we recommend the use of additional erosion protection such as concrete riprap, rock riprap, geotextiles, or hydraulic energy dissipaters to minimize erosion.

Erosion Protection of Inlet & Outlet Structures

Erosion protection is essential in prolonging the life of the proposed drainage structures due to the higher velocities and water forces caused by these structures. Though no locations investigated noted very loose sands in the upper soils, we recommend general good practice measures to counteract any potential problems with future erosion. **L&G** recommends utilizing multiple erosion protection measures at channel entrance and exit locations (culverts, pipes, etc.):

- **L&G** recommends general good practice measures such as good embedment and compaction of supporting soils surrounding these structures to help ensure stability.
- **L&G** recommends that if concrete box culverts or pipes are utilized they include concrete headwalls, wingwalls and riprap at inlet/outlet points with two (2) foot minimum toe walls along all structures for enhanced stability and protection of culvert/pipe bedding and subgrade.
- **L&G** recommends that any circular pipe inlet points to the channel provide a concrete splash-pad (or outlet to concrete riprap or flexible erosion protection system) to avoid localized erosion points.
- **L&G** recommends utilizing flexible erosion protection on the channel side slopes such as rock riprap (in accordance with Article 432.3 of the TxDOT Standard Specifications) at inlet/outlet locations (alternatively erosion protection measures such as articulated block or rigid erosion protection systems (concrete riprap) may be utilized). In areas where bank protection will not (or cannot) be used, vegetation of earthen slopes and topsoil should be utilized as a minimum to reduce erosion problems.

Embankment Recommendations (If Required)

L&G Lab recommends that Embankment Fill Sections utilized on this project be constructed in accordance with the requirements of TxDOT 2014 'Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges', Item 132 – Embankment. Furthermore, L&G recommends the following controls be followed in accordance with TxDOT Pharr District Master General Notes:

- 'Embankment (DENS CONT) shall be Type C with a max. PI of 40. Material used as embankment material in the top two feet below the bottom of Flexible Base shall meet the following requirements based on preliminary tests and such other tests found necessary by the Engineer.
    - The material shall be such as to produce a well-bonded embankment and shall have a minimum PI of 8 and a maximum PI of 30.'

Compaction method is recommended for Embankment Fill Sections and shall be Density Controlled in accordance with the requirements of TxDOT 2014 'Standard Specifications', Item 132 – Embankment.

REFERENCES

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6. TxDOT, 2005, "100-E, Soils & Aggregates Test Procedures", Austin, TX.

7. American Society of Testing Materials, Volume 04.08, Soil and Rock (I): D420- D5779 March 2003.

8. United Facilities Criteria (UFC), "Soils & Geology Procedures for Foundation Design of Building and Other Structures", UFC 3-220-03FA, (January 2004).

9. Das, Braja M., "Principles of Foundation Engineering, 6th Edition", July 2006.

APPENDIX A – FIGURES

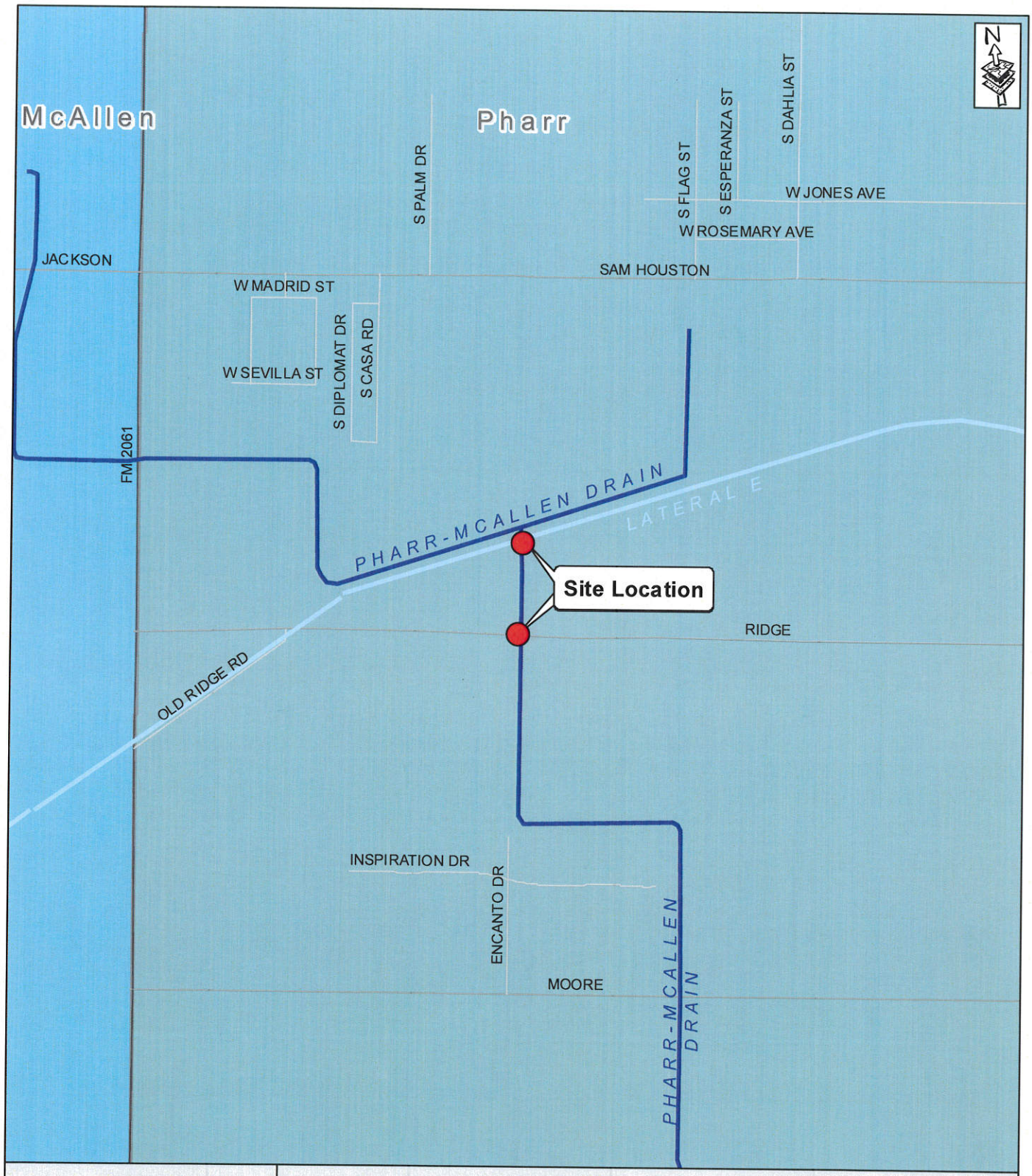

Figure 1

HCDD #1
Pharr-McAllen Drain
Location Map

Legend

- Project Location
- HCDD1 Ditch
- HCID2 Canal
- Minor Arterial
- Local Street

1,000 Feet
1 inch = 1,000 feet

L&G Engineering Laboratory, LLC.
Geotechnical Engineering

Figure 2

HCDD #1
Pharr-McAllen Drain
Boring Location Map

Legend

Boring Locate

150 Feet

1 inch = 150 feet

L&G Engineering Laboratory, LLC.
Construction Material Testing
Geotechnical Engineering

Figure 3

HCDD #1
Pharr-McAllen Drain

Soil Classification Map
USDA SOIL CONSERVATION SERVICE

Legend

Project Location

28 Hidalgo Sandy Clay Loam, 0 to 1 Percent Slopes

600 Feet

1 inch = 600 feet

L&G Engineering Laboratory, LLC.
Construction Material Testing
Geotechnical Engineering

Figure 4

HCDD #1
Pharr-McAllen Drain
Digital Elevation Map

Legend

Project Location
5 ft Contour

High
Low

600
Feet
1 inch = 600 feet

L&G Engineering Laboratory, LLC.
Geotechnical Engineering

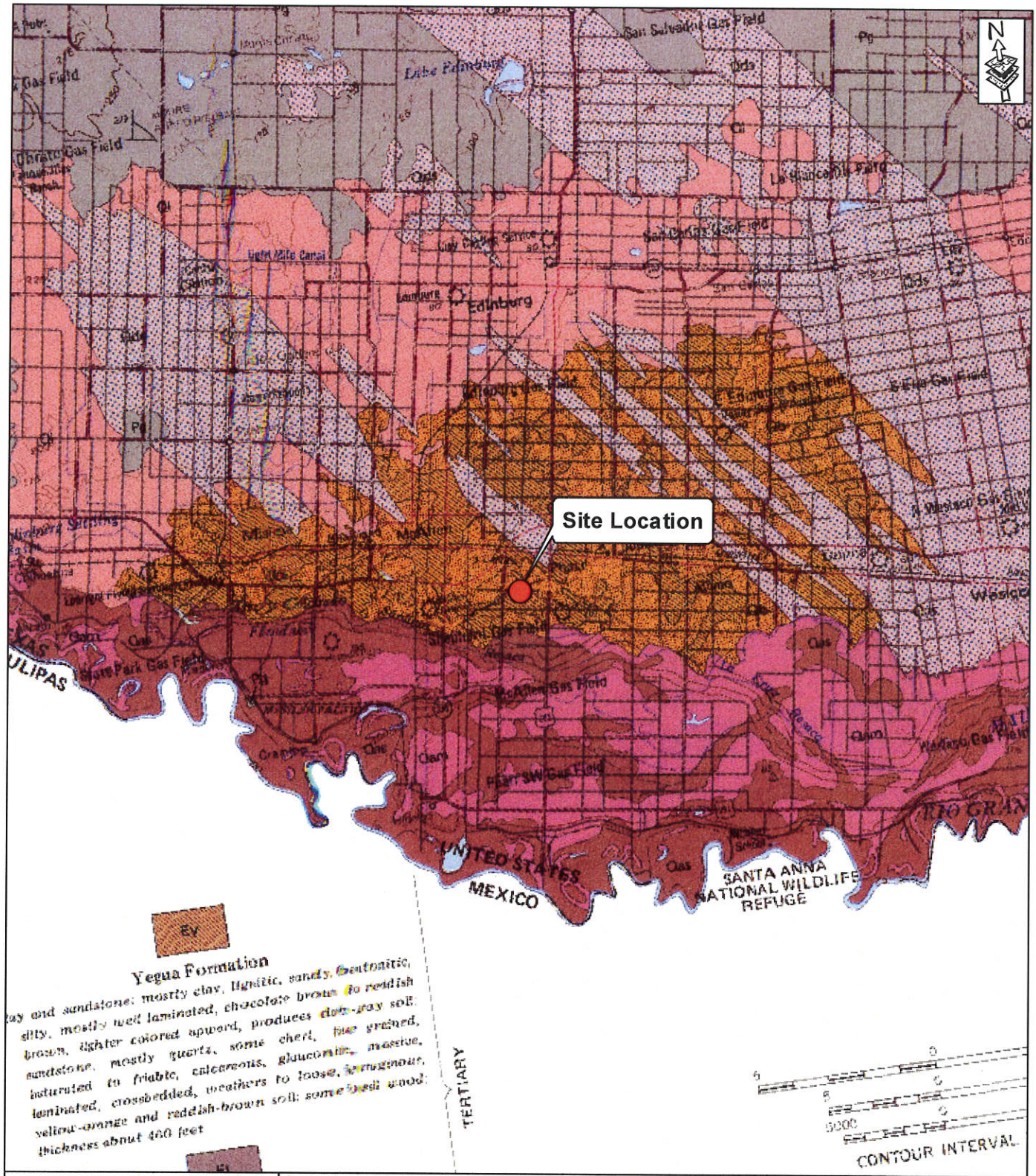

Figure 5

HCDD #1
Pharr-McAllen Drain
Location Map

Legend

- Project Location
- Qb — Beaumont Formation

20,000 Feet

1 inch = 20,000 feet

L&G Engineering Laboratory, LLC.
Geotechnical Engineering

APPENDIX B – BORING LOGS & GRADATION CURVES

DRILLING LOG

WinCore Version 3.1

County Hidalgo
Highway
CSJ

Hole B-01
Structure
Station
Offset

District
Date 12-02-15
Grnd. Elev. 120.00 ft
GW Elev. 83.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, Sandy Lean Clay, Dark Brown, Stiff, Dry (CL)							
5		13 (6) 17 (6)				11.3				-200 = 67.2%
113.			CLAY, Fat Clay w/ Sand, Brown, Medium Stiff to Very Stiff, Dry (CH)							
10		8 (6) 11 (6)				17.2	52	35		
15		8 (6) 11 (6)				18.3				-200 = 84.0%
20		11 (6) 18 (6)				18.9	59	40		
25		19 (6) 27 (6)				19.8				-200 = 83.9%
30		21 (6) 30 (6)				19.1	59	43		
88.			CLAY, Lean Clay, Brown, Medium Stiff to Stiff, Moist to Wet (CL)							
35		12 (6) 14 (6)				27.5				-200 = 95.7%
80. 40		9 (6) 11 (6)				28	30	9		

Remarks: Sulfate Tests Performed at 20 ft. Results Provided on Seperate Document. Boring Locate - N 26°11'03.90", W 98°11'51.84". Assumed Natural Ground Elevation.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: B. Gonzalez **Logger: O. Garcia** **Organization: L&G Consulting Engineers**

L:\Projects\Year 2015 Projects\HCDD 1\GL15022 - Pharr-McAllen Drain\Borings\PMD.CLG

DRILLING LOG

WinCore Version 3.1

County Hidalgo
Highway
CSJ

Hole B-02
Structure
Station
Offset

District
Date 12-02-15
Grnd. Elev. 125.00 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, Sandy Lean Clay, Dark Brown, Stiff, Dry (CL)							
5		13 (6) 18 (6)				9.6	36	22		
118.			CLAY, Lean Clay, Brown, Stiff to Hard, Dry (CL)							
10		35 (6) 38 (6)				12.4				-200 = 86.1%
15		27 (6) 26 (6)				13.2	48	33		
20		18 (6) 22 (6)				17.2				-200 = 98.0%
25		18 (6) 20 (6)				23.7	30	9		
30		19 (6) 22 (6)				25				-200 = 94.6%
93.			CLAY, Fat Clay, Brown, Very Stiff, Dry (CH)							
35		21 (6) 24 (6)				22.7	61	42		
85. 40		22 (6) 24 (6)				19.8				-200 = 94.8%

Remarks: Sulfate Tests Performed at 15 ft. Results Provided on Seperate Document. Boring Locate - N 26°11'02.34", W 98°11'51.84". Assumed Natural Ground Elevation.

The ground water elevation was not determined during the course of this boring.

Driller: B. Gonzalez

Logger: O. Garcia

Organization: L&G Consulting Engineers

DRILLING LOG

WinCore Version 3.1

County Hidalgo
Highway
CSJ

Hole B-03
Structure
Station
Offset

District
Date 12-01-15
Grnd. Elev. 117.00 ft
GW Elev. 90.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, Sandy Fat Clay, Brown, Hard, Dry (CH)							
5		27 (6) 45 (6)				10.1				-200 = 69.1%
10		39 (6) 43 (6)				10.1	56	40		
105.			CLAY, Fat Clay w/ Sand, Brown, Hard, Dry (CH)							
15		24 (6) 33 (6)				10.5				-200 = 84.0%
100.			CLAY, Fat Clay, Brown, Stiff, Dry to Wet (CH)							
20		15 (6) 12 (6)				17	59	39		
25		16 (6) 21 (6)				22.8				-200 = 97.3%
30		15 (6) 17 (6)				28.2	52	34		
35		11 (6) 19 (6)				26.6				-200 = 99.2%
77. 40		14 (6) 17 (6)				46.5	67	40		

Remarks: Sulfate Tests Performed at 20 ft. Results Provided on Seperate Document. Boring Locate - N 26°10'57.12", W 98°11'53.40". Assumed Natural Ground Elevation.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: B. Gonzalez **Logger: O. Garcia** **Organization: L&G Consulting Engineers**

L:\Projects\Year 2015 Projects\HCDD 1\GL15022 - Pharr-McAllen Drain\Borings\PMD.CLG

DRILLING LOG

WinCore Version 3.1

County Hidalgo
Highway
CSJ

Hole B-04
Structure
Station
Offset

District
Date 12-01-15
Grnd. Elev. 117.00 ft
GW Elev. 93.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, Lean Clay w/ Sand, Brown, Medium Stiff to Stiff, Dry (CL)							
5		14 (6) 17 (6)				12.9	39	24		
10		10 (6) 15 (6)				12.8				-200 = 71.9%
105.			CLAY, Lean Clay, Brown, Medium Stiff to Stiff, Dry to Wet (CL)							
15		15 (6) 26 (6)				15.9	44	27		
20		8 (6) 11 (6)				20.6				-200 = 96.0%
25		15 (6) 20 (6)				23.6	37	20		
30		16 (6) 19 (6)				31.6				-200 = 97.2%
35		12 (6) 17 (6)				25.7	49	30		
77. 40		16 (6) 19 (6)				37.7				-200 = 99.1%

Remarks: Sulfate Tests Performed at 15 ft. Results Provided on Seperate Document. Boring Locate - N 26°10'55.50", W 98°11'53.76". Assumed Natural Ground Elevation.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: B. Gonzalez

Logger: O. Garcia

Organization: L&G Engineering Laboratory

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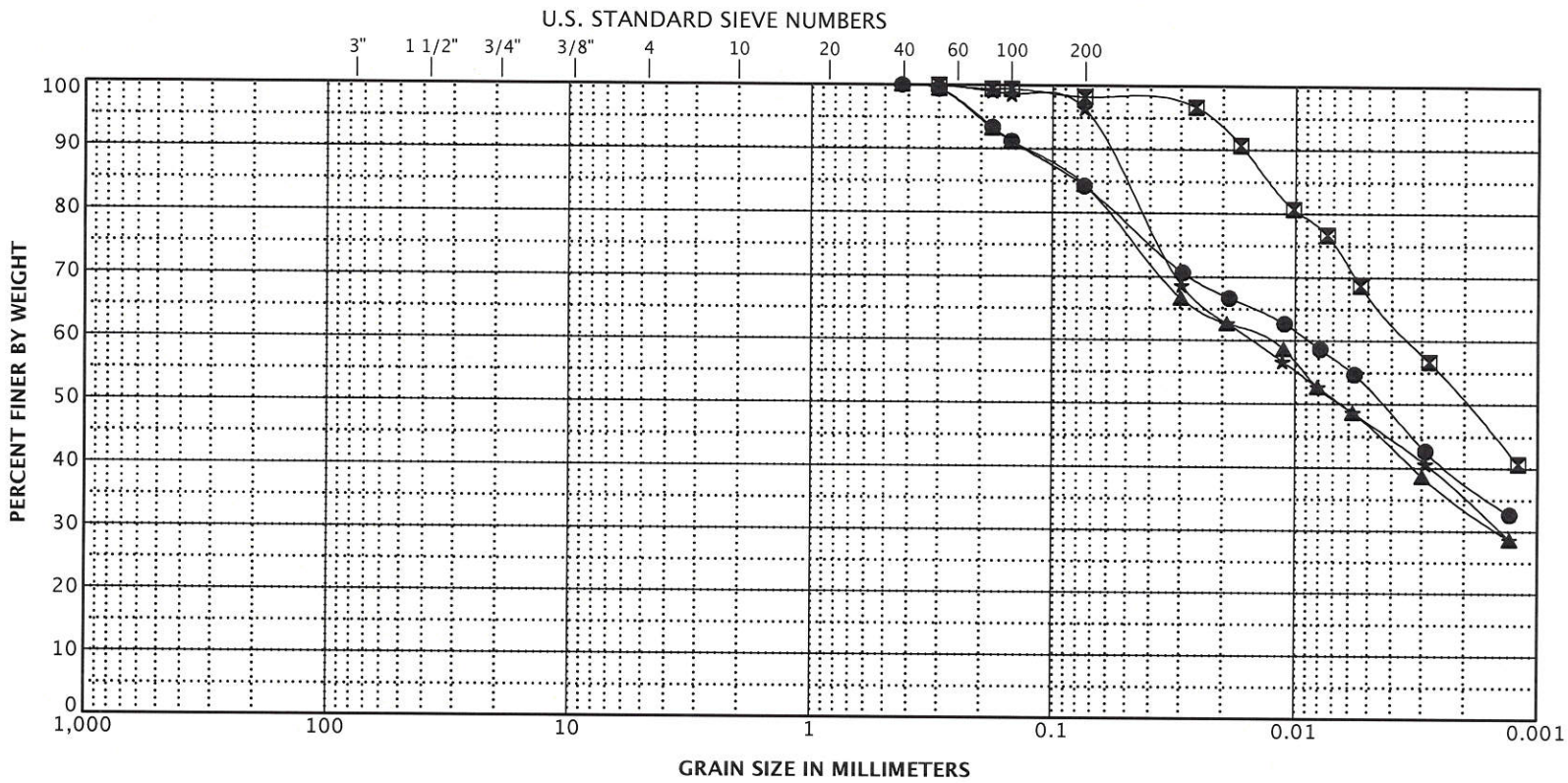

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

KEY	EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	MOISTURE CONTENT (PERCENT)	D60	D50	D30	D10	D5	GRAVEL (PERCENT)	SAND (PERCENT)	SILT (PERCENT)	CLAY (PERCENT)
●	B-1	15.0		0.01	0.00				0	16	32	52
⊠	B-2	20.0		0.00	0.00				0	2	31	67
▲	B-3	15.0		0.01	0.01	0.00			0	16	38	46
★	B-4	20.0		0.02	0.01	0.00			0	4	49	47

L&G Engineering Laboratory
Construction Material Testing
Geotechnical Engineering

GRAIN-SIZE TEST RESULTS

PHARR-MCALLEN DRAIN
HIDALGO COUNTY

FIGURE

Appendix C

APPENDIX C – GLOBAL STABILITY (SIDE SLOPES)

Pharr-McAllen Drain (Short Term Condition - Undrained)

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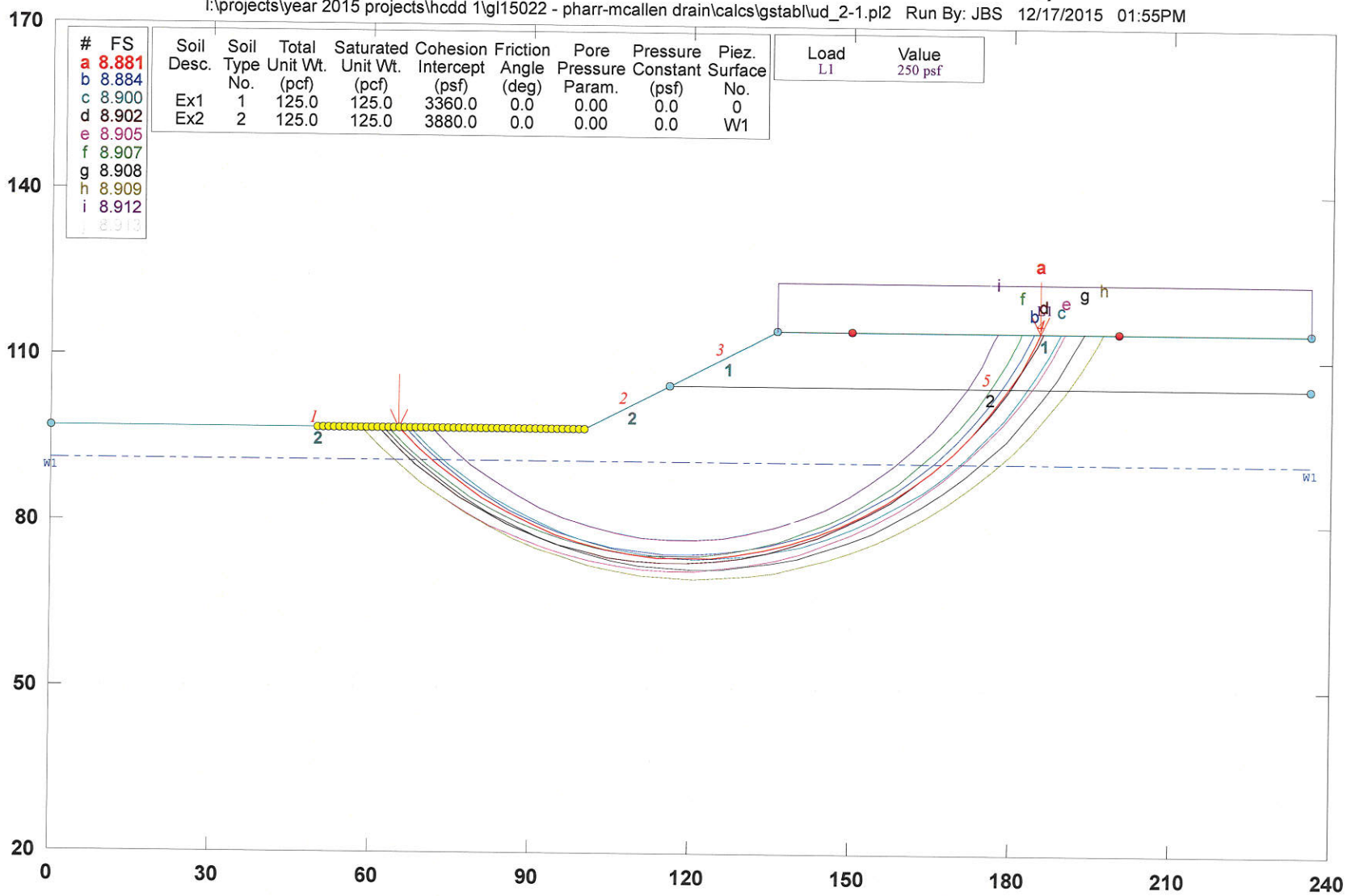


GSTABL7 v.2 FSmin=8.881

Safety Factors Are Calculated By The Modified Bishop Method

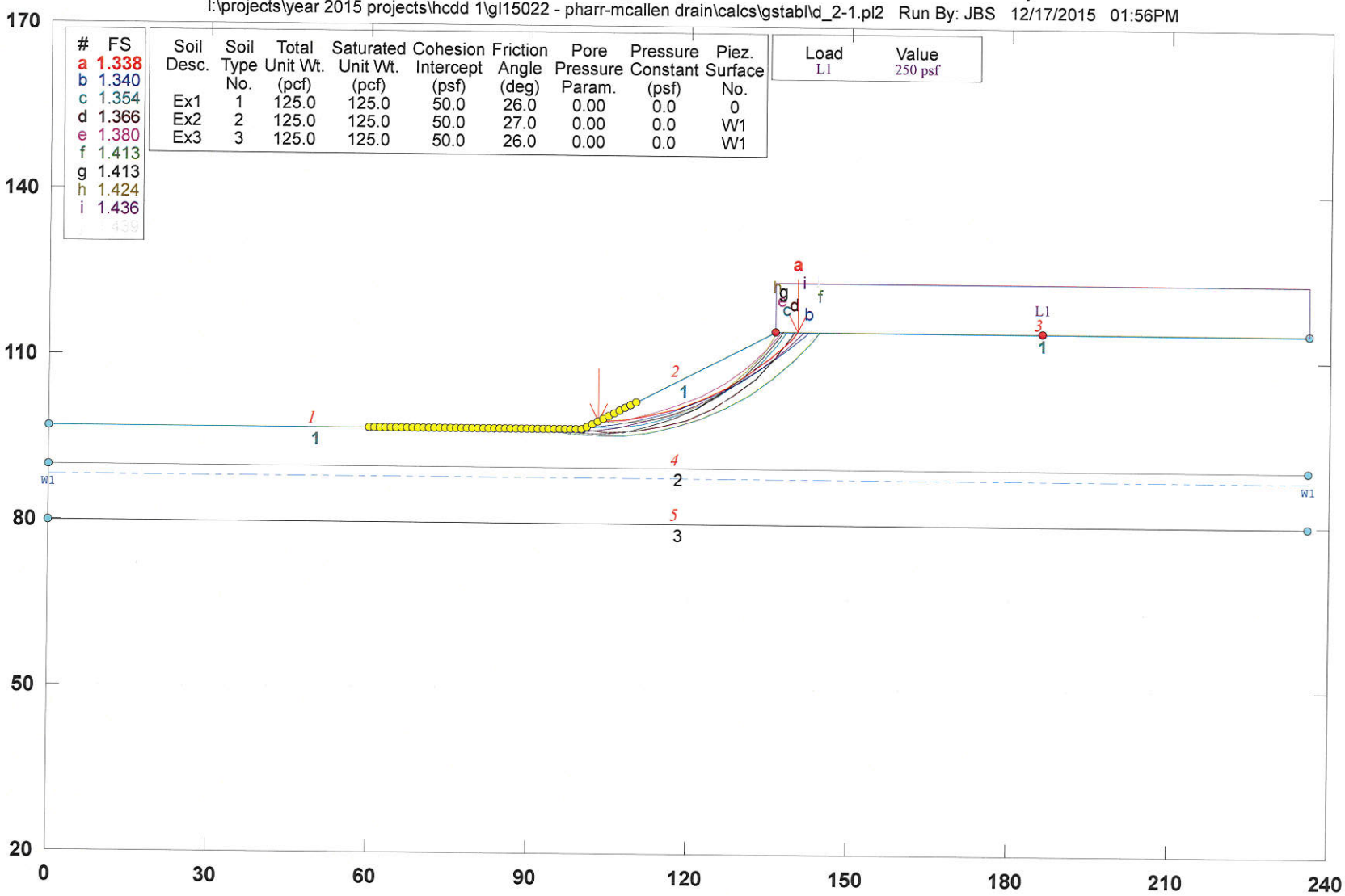
Pharr-McAllen Drain (Long Term Condition - Drained)

I:\projects\year 2015 projects\hcdd 1\gl15022 - pharr-mcallen drain\calcs\gstabl\d_2-1.pl2 Run By: JBS 12/17/2015 01:56PM

#	FS
a	1.338
b	1.340
c	1.354
d	1.366
e	1.380
f	1.413
g	1.413
h	1.424
i	1.436

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Ex1	1	125.0	125.0	50.0	26.0	0.00	0.0	0
Ex2	2	125.0	125.0	50.0	27.0	0.00	0.0	W1
Ex3	3	125.0	125.0	50.0	26.0	0.00	0.0	W1

Load	Value
L1	250 psf



GSTABL7 v.2 FSmin=1.338

Safety Factors Are Calculated By The Modified Bishop Method

APPENDIX D – PLANS & SPECS (PROVIDED BY CLIENT)

Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.

HIDALGO COUNTY
DRAINAGE DISTRICT NO. 1

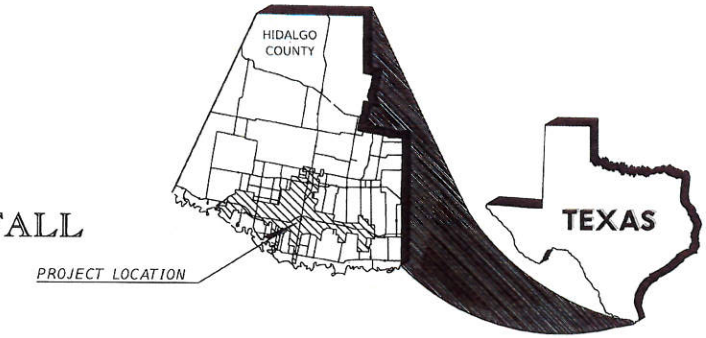
PLANS OF PROPOSED DRAINAGE IMPROVEMENT

NET LENGTH OF PROJECT: 1,191.50 FT. = 0.23 MI.

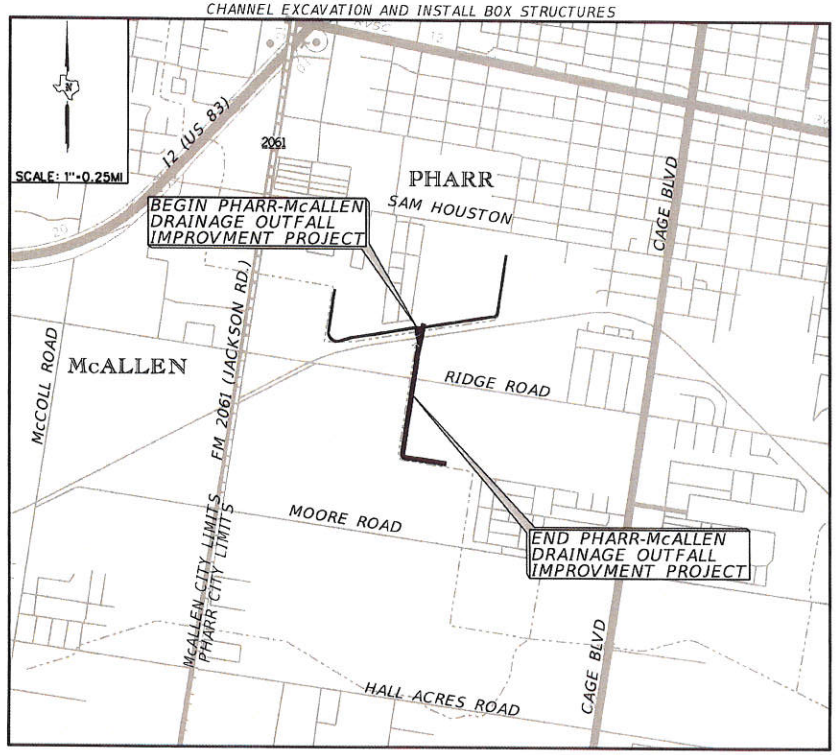
HIDALGO COUNTY

PHARR-McALLEN DRAINAGE OUTFALL IMPROVMENTS

LIMITS FROM: 0.18 MILES N. OF RIDGE RD ALONG PHARR-McALLEN DRAIN
TO: 0.05 MILES S. OF RIDGE RD ALONG PHARR-McALLEN DRAIN



CHANNEL EXCAVATION AND INSTALL BOX STRUCTURES



HIDALGO COUNTY DRAINAGE DISTRICT No.1 HCDD1

L&G Engineering
Highway / Civil
Structural / Bridge
Environmental
Firm No. : F-4105

2100 W. Expressway 83
Mercedes, TX. 78570
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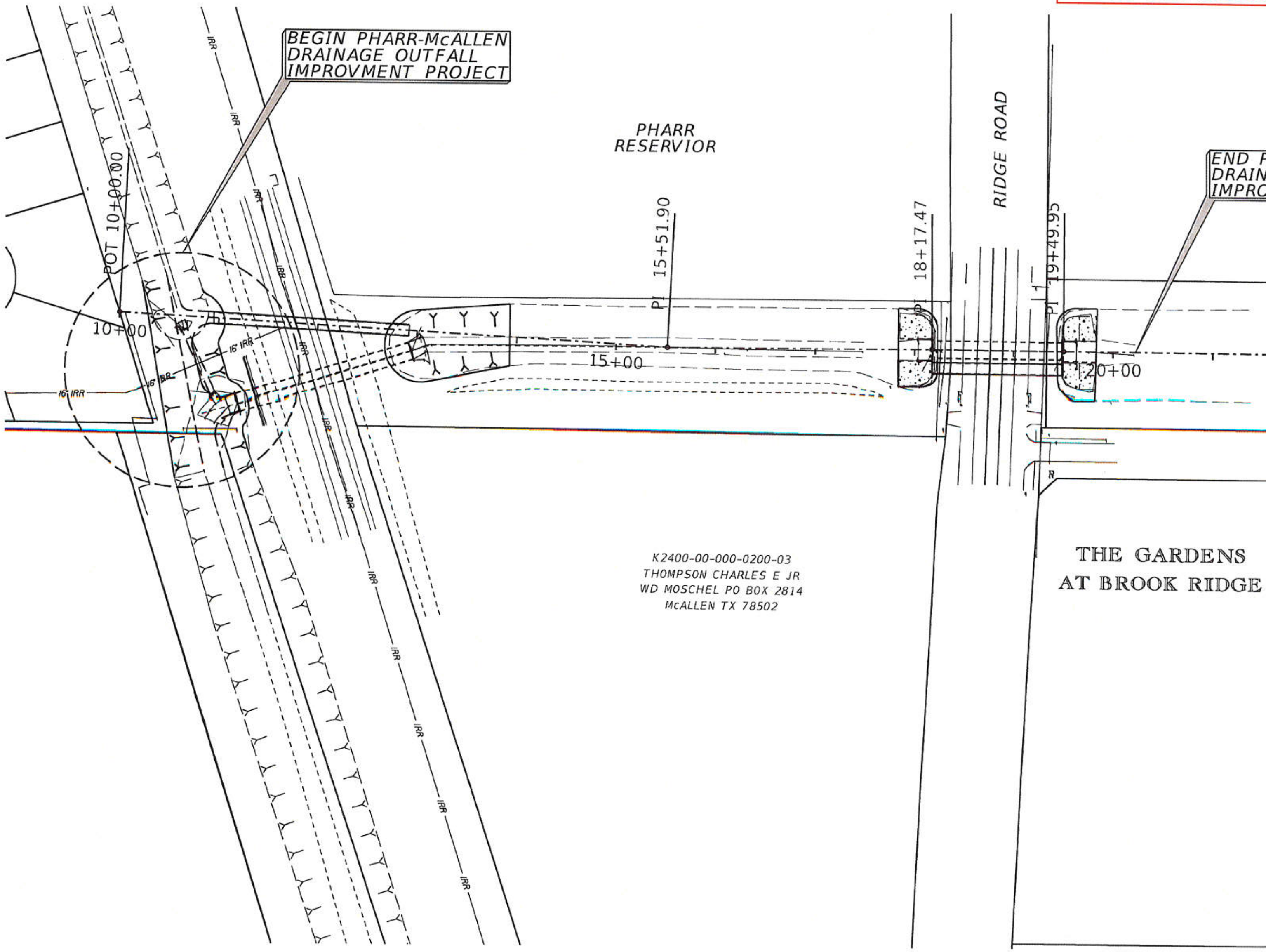
Fax : (956) 565-9018

900 S. Stewart Rd., Ste. 10
Mission, TX. 78572
Phone : (956) 585-1909
Fax : (956) 585-1927

RAMON GARCIA
COMMISSIONER EDDIE CANTU

COUNTY JUDGE
PRECINCT No. 2

Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.



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JORGE A. MADRIGAL
P.E. 97243

10/30/2015
DATE

HIDALGO COUNTY DRAINAGE DISTRICT No. 1

L&G Engineering
Highway / Civil
Structural / Bridge
Environmental
Firm No. : F-4105

2100 W. Expressway 83
Mercedes, TX 78570
Phone (956) 565-9813
Fax (956) 565-9018

900 S. Stewart Rd., Ste. 10
Mission, TX 78572
Phone (956) 585-1909
Fax (956) 585-1927

PROJECT LAYOUT
PHARR-McALLEN DRAINAGE OUTFALL IMPROVEMENT PROJECT

DN: JAM	FED. RD. DIV. NO.	STATE	PROJECT NO.				SHEET NO.
CK DN:	6	TEXAS					
DW: DG	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
CK DW: JAM	PHR	HIDALGO					LJWI
TR:							
CK TR:							

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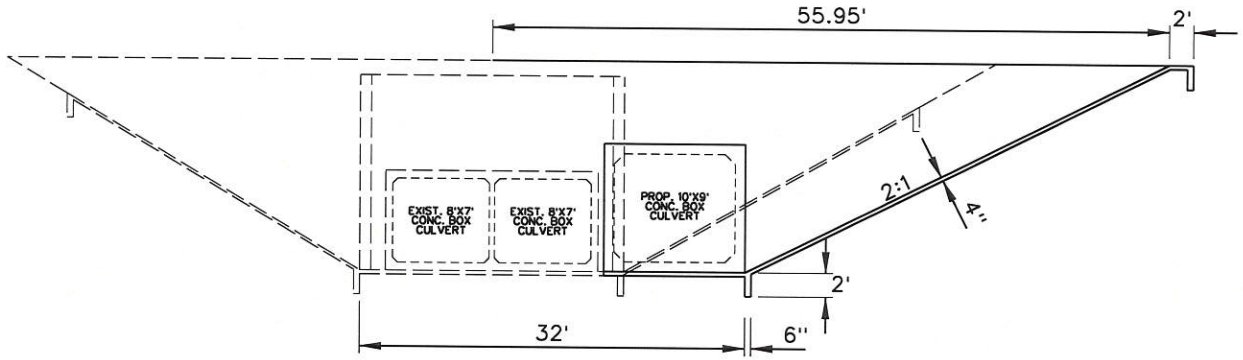
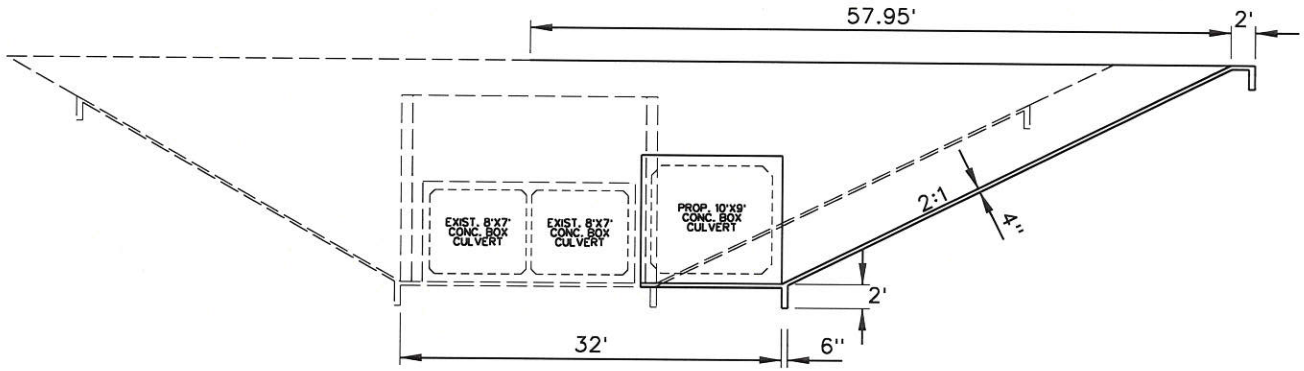
Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.





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L&G Engineering
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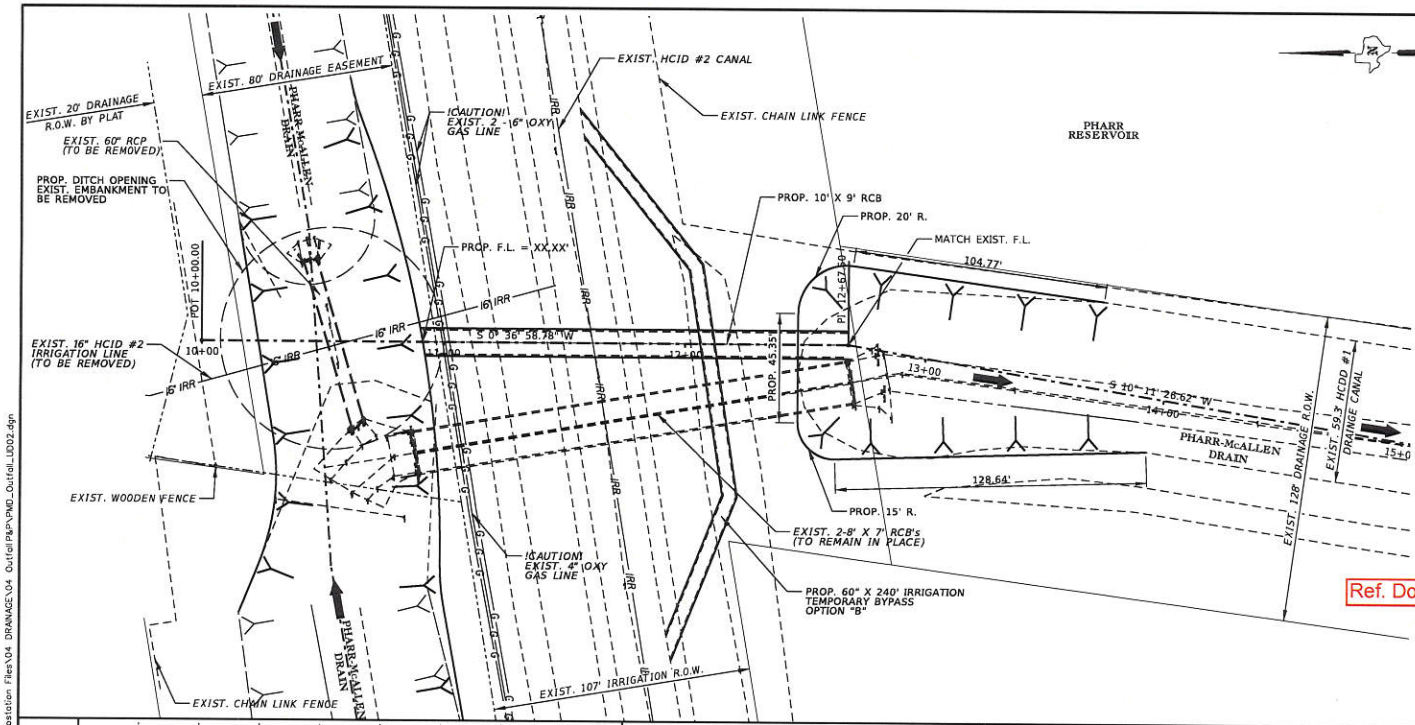
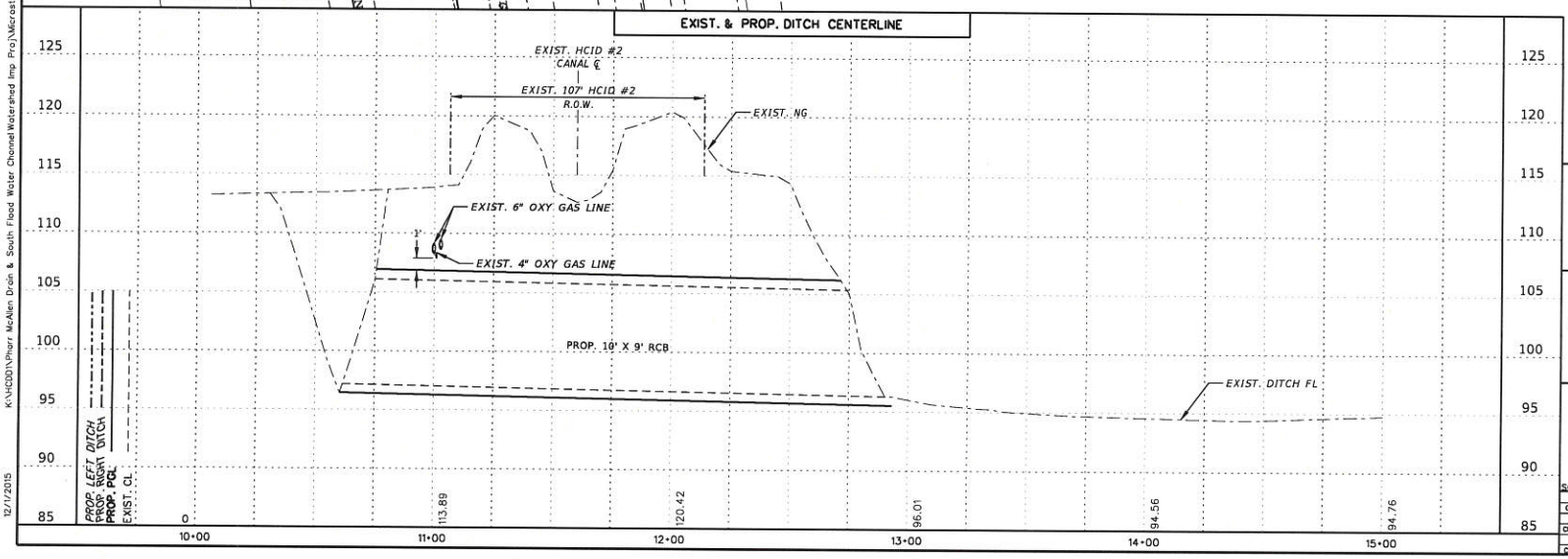
Mission, TX. 78572
Phone : (956) 585-1909
Fax : (956) 585-1927

TYPICAL SECTIONS
PHARR-McALLEN DRAINAGE OUTFALL PROJECT

DN: JAM		FED. RD. DIV. NO.	STATE	PROJECT NO.				SHEET NO.
CK DN:		6	TEXAS					
DN: DG		STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
CK DN: JAM		PHR	HIDALGO					LJWI
TR:								
CK TR:								





SHEET SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY

LEGEND:

- "W" — EXIST. " (DIAM INCH) WATER LINE
- "FM" — EXIST. " (DIAM INCH) FORCE MAIN SANITARY SEWER LINE
- "SS" — EXIST. " (DIAM INCH) SANITARY SEWER LINE
- "G" — EXIST. " (DIAM INCH) GAS PIPELINE
- UFO — EXIST. UNDEGROUND FIBER OPTIC CABLE
- UT — EXIST. UNDERGROUND CABEL/TELE LINE
- OHE — EXIST. OVERHEAD ELECTRIC LINE
- HVTL — EXIST. HIGH VOLTAGE TRANSMISSION LINE
- UE — EXIST. UNDERGROUND ELECTRIC LINE
- OHEC — EXIST. OVERHEAD ELECTRIC LINE WITH CABLE LINE ATTACHED
- OHEFC — EXIST. OVERHEAD ELECTRIC LINE WITH FIBER OPTIC AND CABLE LINE ATTACHED

- SEE P&P SHEETS
- EXIST. ITEM TO BE REMOVED UNDER ITEM 496
- PROP. CONC. PLUG (NON-PAY ITEM)
- DIRECTION OF FLOW
- OUTFALL CHANNEL FLOW

NOTES:

1. SEE ALIGNMENT DATA SHEET FOR PROPOSED CENTERLINE DATA.
2. SEE SURVEY DATA SHEET FOR BM STATIONS, OFFSET, ELEV. ETC.
3. ALL RCP SHALL BE CL III UNLESS OTHERWISE NOTED.
4. SEE DRAINAGE STRUCTURE STANDARD SHEETS FOR DESCRIPTION OF OFFSET IN STORM DRAIN TABLE.
5. RECONNECTION OF EXISTING STORM DRAIN SHALL BE SUBSIDIARY TO PERTINENT BID ITEMS.
6. SEE "HYDRAULIC DATA SHEETS FOR PAYMENT OF ALL PROPOSED DRAINAGE STRUCTURES.
7. FOR OTHER DITCH GRADES SEE DITCH PROFILE SHEETS
8. CONTRACTOR SHALL COORDINATE WITH HCID * X & HCDD * 172 HR PRIOR TO ANY WORK DONE ON OR NEAR IRRIGATION STRUCTURES. (CONCTACT NAME AND NUMBER)

Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.

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DAVID A. SAENZ
P.E. 102365
12/1/2015
DATE

HIDALGO COUNTY DRAINAGE DISTRICT No. 1

L&G Engineering
Highway / Civil
Structural / Bridge
Environmental
Firm No. : F-4105

2100 W. Expressway 83
Mercedes, TX. 78570
Phone : (956) 565-9813
Fax : (956) 565-9018

900 S. Stewart Rd., Ste. 10
Mission, TX. 78572
Phone : (956) 585-1909
Fax : (956) 585-1927

UTILITY AND DRAINAGE
PHARR-McALLEN DRAINAGE PROJECT
STA. 40+00 TO STA. 40+00

SCALE: 1" = 50' SHEET 2 OF 3

DSN: JAM	DIST. NO. DIV. NO.	STATE	PROJECT NO.	SHEET NO.
CK: DW	6	TEXAS		XX
DW: DG	STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	HIGHWAY NO.
CK: DW: JAM	PHR	HIDALGO		LJWI
TR:				
CK: TR:				

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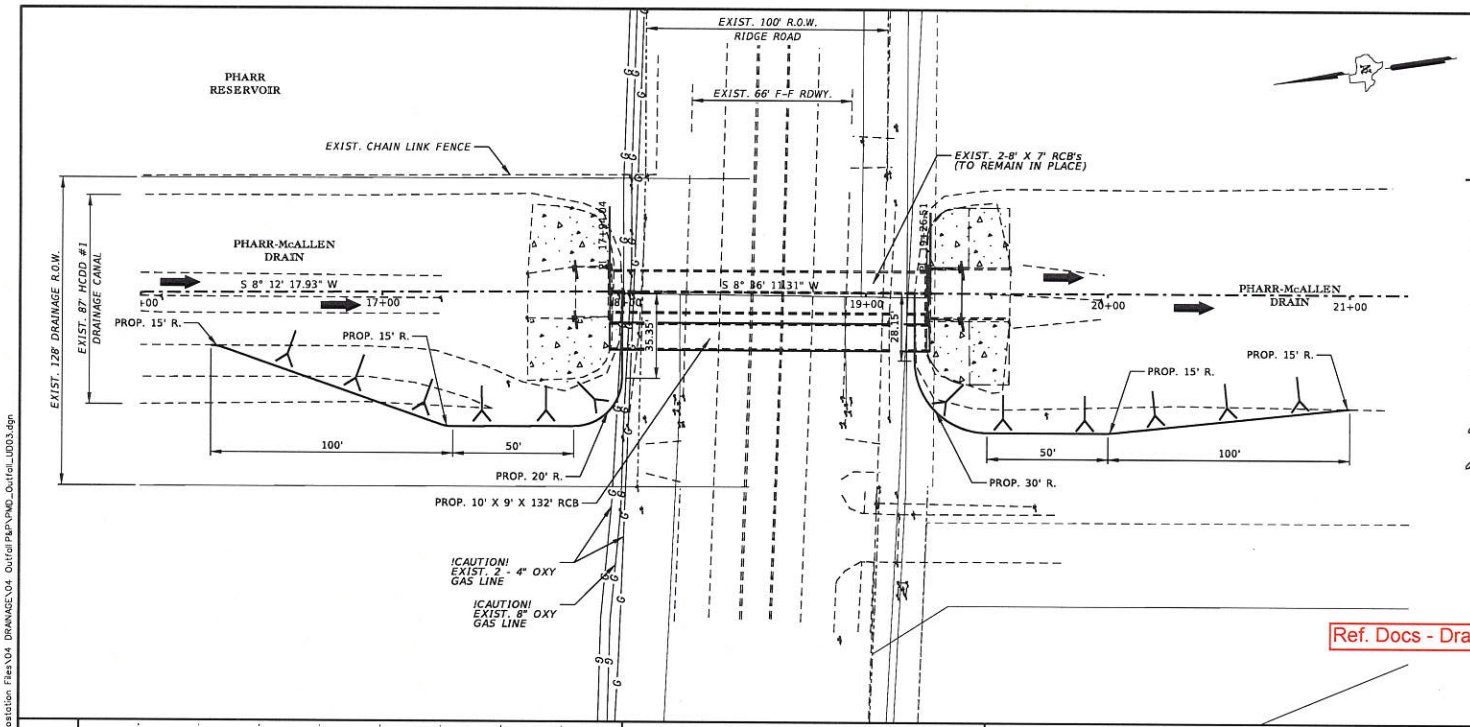

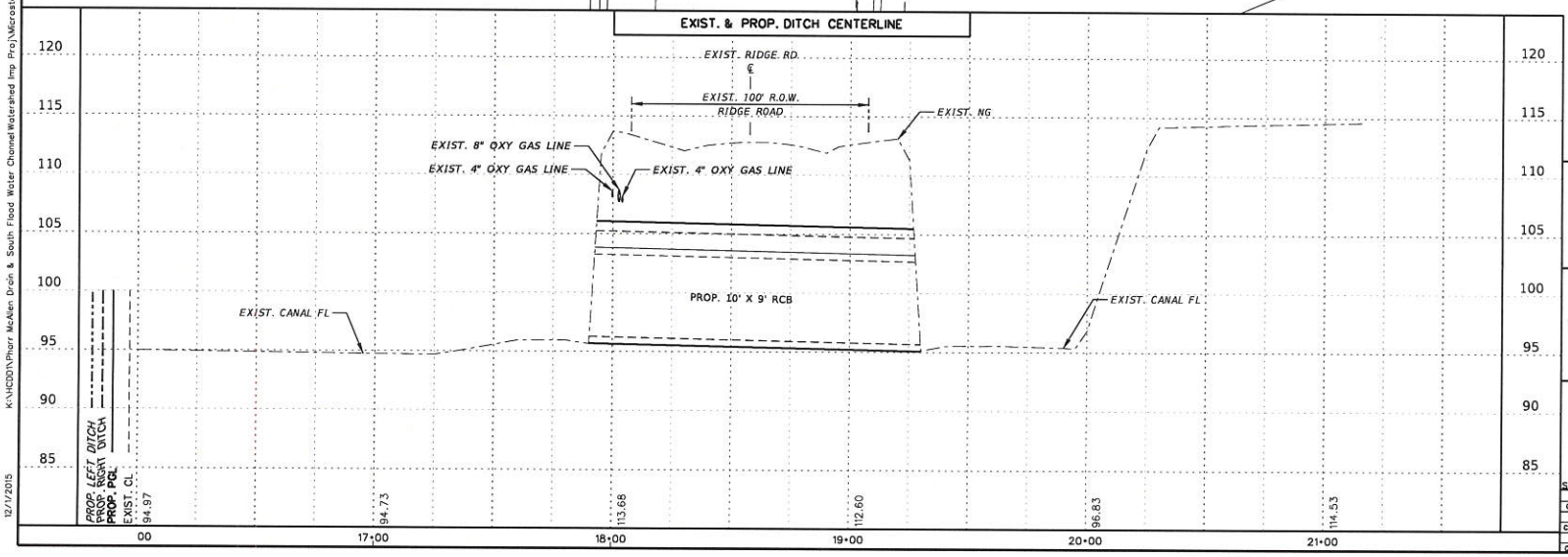

SHEET SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY

LEGEND:

- *W — EXIST. * (DIAM INCH) WATER LINE
- *FM — EXIST. * (DIAM INCH) FORCE MAIN SANITARY SEWER LINE
- *SS — EXIST. * (DIAM INCH) SANITARY SEWER LINE
- *G — EXIST. * (DIAM INCH) GAS PIPELINE
- UFO — EXIST. UNDERGROUND FIBER OPTIC CABLE
- UT — EXIST. UNDERGROUND CABEL/TELE LINE
- OHE — EXIST. OVERHEAD ELECTRIC LINE
- HVTL — EXIST. HIGH VOLTAGE TRANSMISSION LINE
- UE — EXIST. UNDERGROUND ELECTRIC LINE
- OHEC — EXIST. OVERHEAD ELECTRIC LINE WITH CABLE LINE ATTACHED
- OHEFC — EXIST. OVERHEAD ELECTRIC LINE WITH FIBER OPTIC AND CABLE LINE ATTACHED

- SEE P&P SHEETS
- EXIST. ITEM TO BE REMOVED UNDER ITEM 496
- PROP. CONC. PLUG (NON-PAY ITEM)
- DIRECTION OF FLOW
- OUTFALL CHANNEL FLOW

NOTES:

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DAVID A. SAENZ
P.E. 102365
12/1/2015
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L&G Engineering
Highway / Civil
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Firm No. : F-4105

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UTILITY AND DRAINAGE
PHARR-McALLEN DRAINAGE PROJECT
RIDGE RD DRAINAGE CROSSING

SCALE: 1" = 50' SHEET 3 OF 3

DRN: JAM	FED. RD. DIV. NO.	STATE	PROJECT NO.	SHEET NO.
CK. DRN:	6	TEXAS		XX
DRN: DG	STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	HIGHWAY NO.
CK. DRN: JAM	PHR	HIDALGO		LJWI
TR:				
CK. TR:				

12/1/2015 K:\HCDD\Pharr McAllen Drain & South Flood Water Channel\Watershed Imp Proj\Microstation Files\04 DRAINAGE\04 Outfall\P&P\PMD_Outfall_L003.dgn

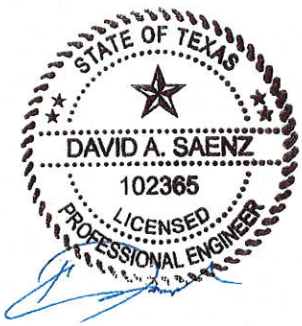
L&G Engineering
Transportation Consultants

GEOTECHNICAL INVESTIGATION
FOR THE
PHARR-MCALLEN DRAIN – DRAINAGE IMPROVEMENTS PROJECT
HIDALGO COUNTY, TEXAS

Prepared For:
Hidalgo County Drainage District No. 1

Prepared By:
L&G Consulting Engineers, Inc.
(L&G Engineering Laboratory – A Division of L&G)
Mercedes, Texas 78570
[Texas Registered Engineering Firm F-4105]

L&G Project No. GL15022
December 31, 2015



David A. Saenz, P.E., C.F.M.
Project Manager / Project Engineer

12/31/2015

INTRODUCTION

L&G Consulting Engineers, Inc. (L&G Engineering Laboratory – A Division of L&G (L&G)) was contracted by **Hidalgo County Drainage District No. 1 (HCDD#1)** to perform a subsurface geotechnical investigation and engineering analysis to assist in the preparation of Plans, Specifications, and Estimates (PS&E) for the proposed Pharr-McAllen Drain drainage improvements. This report addresses bearing capacity of structure locations (culvert crossings), global stability of ditch side slopes (slope stability), soil sulfate content and soil scour parameters. Also included in the report are boring logs, figures addressing the existing geology and general contour of the proposed construction site, and general construction recommendations.

GENERAL PROJECT OVERVIEW

Project Description

L&G is pleased to submit this document presenting our findings as the result of a subsurface geotechnical exploration performed at the request of **HCDD#1**. It is our understanding that the project involves increasing flow capacity of the existing Pharr-McAllen Drain crossings at Hidalgo County Irrigation District No. 2's elevated irrigation canal, 'Lateral E,' (Location 1) and Ridge Rd. (Location 2) through the construction of an additional 10ft x 9ft box culvert at each location. A general illustration of the project site is shown in Figure 1 (additional figures can be found in Appendix A). It is further our understanding that the existing ditch will need to be reshaped and re-graded just upstream and downstream of the proposed crossing improvements to account for the larger overall width of the crossings. The reworked sections will generally be a trapezoidal shape with maximum side slopes of 2 horizontal units to 1 vertical unit (2:1). A preliminary schematic for the proposed structures was provided by the Client (**HCDD#1**). No detailed grading plans or structural loads for the structures were provided; thus all foundation and site improvement recommendations as provided in this report are based on the geotechnical properties of the soils and generalized assumptions as noted.

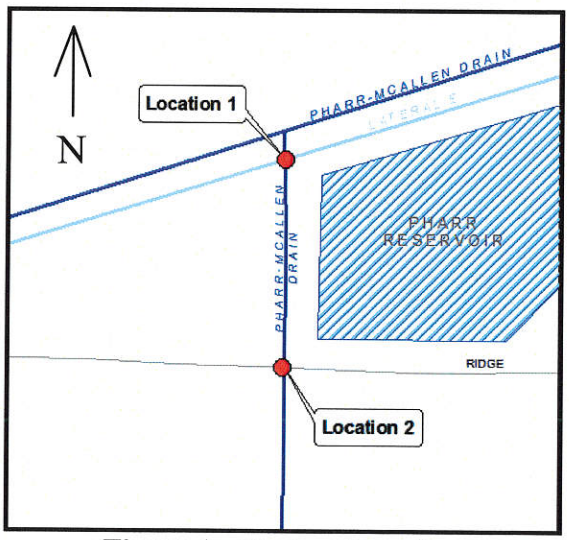


Figure 1 – Project Location

Scope and Limitations of Investigation

This report has been prepared in general accordance with accepted geotechnical engineering practices for the subject project site and the anticipated construction. No specific warranty program or other special standards, except acceptable industry standards for the general South Texas area, were followed during the course of this investigation and analysis. This geotechnical report is intended for use by **HCDD#1** and any direct representatives or affiliates. This geotechnical report may not contain sufficient information for purposes of other parties, or other uses in determining construction means and methods.

The strata, shown on the boring logs (included in Appendix B), represent the subsurface conditions at the boring locations at the time of our investigation. These strata designate approximate boundaries between subsurface materials; however, their actual transition may be gradual or may occur at varying depths. Variations may occur due to unexpected deposits of soft clays, silts or other undesirable soil material not detected through our investigation. It should be noted that the exploratory borings were performed within the limits of the proposed project as approved and agreed upon by all previously noted parties prior to the commencement of our field operations.

The benchmarks of this geotechnical study are to:

1. *explore the general existing subsurface conditions at the site*
2. *evaluate the relevant engineering properties of the subsurface materials*
3. *evaluate settlement parameters and calculate site specific allowable bearing capacity*
4. *develop global stability models and analyses for verification of proposed slope stability*
5. *provide soil scour parameters for use in scour analysis at structure locations*
6. *provide general construction recommendations regarding all aspects of the project*

The scope of this geotechnical engineering study does not include an environmental assessment of the air, soil, rock or water conditions on or adjacent to the site. No environmental opinions are presented in this report. If environmental clearances are needed prior to construction, please contact our offices for assistance in this matter.

EXISTING SURFACE AND SUB-SURFACE CONDITIONS

Site Location / Description

The project site is located within Pharr, Texas (Hidalgo Co, TX), approximately one-half (0.5) miles east of FM2061 (Jackson Rd) at the existing Pharr-McAllen Drain crossings at Ridge Rd and Hidalgo County Irrigation District No. 2's (HCID2) elevated irrigation canal, 'Lateral E'. The proposed 10ft x 9ft box culvert structure will be placed adjacent to the existing twin 8ft x 6ft box culvert structures at both locations. The boring locations were drilled at the locations specified by the Client as shown on Figure 2 in Appendix A. No surveyor was contracted to determine the exact coordinates for the boring, as this was not a part of the scope of work for the project. However, field handheld GPS coordinates were verified and are noted on the boring logs in Appendix B. No clearing was required for site access.

Geology

The Geologic Atlas of Texas (McAllen - Brownsville Sheet dated 1976), created by the Bureau of Economic Geology, indicates that the subject site is located within the *Beaumont Formation* of the Quatenary Period Recent (Pleistocene Epoch). The *Beaumont Formation* is described as "mostly clay, silt, sand, and gravel; includes mainly stream channel, point bar, natural levee, and backswamp deposits; concretions and massive accumulations of calcium carbonate (caliche) and concretions of iron oxide and iron-manganese oxides in zone of weathering." Specifically, the project lies within a specific area of the *Beaumont Formation* that is described as "dominantly clay and mud of low permeability, high water-holding capacity, high compressibility, high to very high shrink-swell potential, poor drainage, level to depressed relief, low shear strength, and high plasticity; geologic units include interdistributary muds, abandoned channel-fill muds, and fluvial overbank muds." See Figure 5 in Appendix A for Geologic Atlas Map.

Soil Survey Description

According to the Soil Survey of Hidalgo County, Texas, published by the United States Department of Agriculture, the proposed facility is located within the Hidalgo Sandy Clay Loam, 0 to 1 percent slopes (28). The description of this soil map unit is as follows (see Figure 3 in Appendix A for USDA Soils Map):

Hidalgo Sandy Clay Loam, 0 to 1 percent slopes (28) – This very deep, gently sloping soil is on convex uplands. The soil map unit is well drained with medium surface runoff, moderate available water capacity (about 7.8 inches), and moderate permeability. The soil is non-saline to slightly saline (0.0 to 4.0 mmhos/cm) with no frequency of flooding or ponding. The typical soil profile is 0 to 16 inches: dark grayish brown fine sandy loam; 16 to 27 inches: grayish brown sandy clay loam; 27 to 37 inches: brown sandy clay loam; and 37 to 65 inches: pale brown sandy clay loam. The soil is calcareous throughout.

Rainfall

The mean annual precipitation for this area of Hidalgo County is approximately twenty (20) to twenty-four (24) inches, as reported by the U.S. Department of Agriculture Soil Conservation Service. For the purpose of this report, our geotechnical investigation, performed in December of 2015, was conducted during a non-drought condition (none, as noted by the National Weather Service), with moisture and precipitation levels around annual averages. The National Oceanic and Atmospheric Administration (NOAA) reports for the subject date indicated that no significant rainfall observations (at least one inch) occurred prior to or during our exploration that could have significant effects on any groundwater levels.

SITE INVESTIGATION

Soil Borings and Laboratory Tests

Subsurface conditions at the site were evaluated through four (4) structural borings (designated as B-#) drilled to a depth of forty (40) feet below natural ground at the locations shown on Figure 2 of Appendix A. The soil borings were drilled and sampled in general accordance with American Society of Testing Materials Procedures (ASTM) D420 and D1452 using a truck mounted drilling rig (Simco 2800 HS (HT)) and solid stem augers.

As part of the drilling procedure, Texas Cone Penetration (TCP) field tests were performed at various depth intervals for use in determination of soil strength parameters. TCP tests were executed in compliance with TxDOT test procedures (Tex-132-E, Texas Cone Penetration) and results were reported as blows per increment on the boring logs. A 170 pound hammer was used to drive the conical driving point through three (3) - six inch increments. The first six inch increment (or 12 blows, whichever was reached first), typically referred to as the seating drive, was not included in the blow count as per the test procedure. The number of blows required to drive the sampler through the subsequent two (2) - six inch increments were recorded as the TCP results (and were included on the boring logs in Appendix B). Where very dense or hard material was encountered (resulting in less than 6 inches of movement per 50 blows) the cone was driven for a minimum 100 blows, and the depth of penetration for the first and second 50 blows was recorded as the TCP results.

As part of the sampling procedure, auger samples were collected through general grab sampling during the drilling process (auger cuttings were collected at drilling intervals between TCP tests). Representative portions of the samples were identified, packaged, sealed in containers (to reduce moisture loss) and transported to our laboratory for subsequent testing. In the laboratory, each sample was evaluated and visually classified by a member of our Geotechnical Engineering staff. The properties of the strata were evaluated by a series of laboratory index tests (Tex-142-E, Laboratory Classification of Soils for Engineering Purposes and ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)). A summary of the laboratory data and their corresponding depths are presented on the boring logs in Appendix B.

Samples will be retained in our laboratory for 30 days after submittal of this report. Other arrangements may be provided at the request of the Client.

Subsurface Stratigraphy

Based on the results of the field and laboratory sample analyses, the subsurface stratigraphy at the project location can be characterized as follows (Tables 1a and 1b):

Location 1 - Irrigation Canal (Borings B-01 & B-02)			
Description	*Approximate Depth Range (ft.)	Material Type	Consistency / Density
Stratum I	0 to 7	Sandy Clay[1]	Stiff
Stratum II	7 to 32	Clay w/ Sand, Clay[2]	Medium Stiff to Hard
Stratum III	32 to 40	Clay[3]	Medium Stiff to Very Stiff

1. This stratum contained dark brown sandy lean clay (CL) with moderate plasticity indices (PI = 26). These soils contained approximately 67% fine soil particle contents (clays & silts). TCP N-values ranged from 30 to 31 blows per foot. Samples were noted as dry.

2. This stratum contained brown fat clay w/ sand (CH) and lean clay (CL) with low to high plasticity indices (PI ranging from 9 to 43). These soils contained approximately 84 to 98% fine soil particle contents (clays & silts). TCP N-values ranged from 19 to 73 blows per foot. Samples were noted as dry.

3. This stratum contained brown lean and fat clays (CL/CH) with low to high plasticity indices (PI ranging from 9 to 42). These soils contained approximately 95 to 96% fine soil particle contents (clays & silts). TCP N-values ranged from 20 to 46 blows per foot. Samples were noted as moist to wet.

Table 1a – Existing Soil Strata & Description (Location 1 - Irrigation Canal)
**all depths are referenced from existing natural ground*

Location 2 - Ridge Rd (Borings B-03 & B-04)			
Description	*Approximate Depth Range (ft.)	Material Type	Consistency / Density
Stratum I	0 to 12	Sandy Clay, Clay w/ Sand[1]	Medium Stiff to Hard
Stratum II	12 to 40	Clay w/ Sand, Clay[2]	Medium Stiff to Hard
1. This stratum contained brown sandy fat clay (CH) and lean clay w/ sand (CL) with moderate to high plasticity indices (PI ranging from 24 to 40). These soils contained approximately 69 to 72% fine soil particle contents (clays & silts). TCP N-values ranged from 25 to 82 blows per foot. Samples were noted as dry.			
2. This stratum contained brown lean and fat clays (CL/CH) and fat clay w/ sand (CH) with moderate to high plasticity indices (PI ranging from 20 to 40). These soils contained approximately 84 to 99% fine soil particle contents (clays & silts). TCP N-values ranged from 19 to 57 blows per foot. Samples were noted as dry to wet.			

Table 1b – Existing Soil Strata & Description (Location 2 - Ridge Rd)
**all depths are referenced from existing natural ground*

It should be noted, the Soil Strata and Description illustrated in Tables 1a and 1b, are typical summarized representation of the site stratigraphy. The lines designating the interfaces between strata on the boring logs represent approximate boundaries. Transitions between strata may be gradual and may occur at varying depths.

Water Strikes

During the drilling operations, water strikes were encountered at all boring locations. It should be noted that fluctuations in groundwater levels are influenced by variations in rainfall and surface water run-off from season to season. The construction process itself may also cause variations in the groundwater level. If the water level is critical to the construction process, **L&G** recommends that the Contractor check the subsurface water conditions immediately prior to construction excavation through the installation of piezometer wells. Table 2 shows a summary of the initial water strike depth and 24 hour water level readings for each boring.

Boring No.	*Initial Water Strike	*24 Hr. Water Reading
Location 1 – Irrigation Canal		
B-01	37.00ft	24.67ft (Cave-In Depth = 27.75ft)
B-02	No Waterstrike Encountered	25.00ft (Cave-In Depth = 28.33ft)
Location 2 – Ridge Rd.		
B-03	27.00ft	21.00ft (Cave-In Depth = 25.00ft)
B-04	24.00ft	19.67ft (Cave-In Depth = 25.33ft)

Table 2: Water Strike Depth Summary
**all depths are referenced from existing natural ground*

GEOTECHNICAL BORING ANALYSIS

Moisture Content

The moisture content of a soil is defined as the ratio of the weight of the water in the sample to the dry weight of the soil sample. The moisture contents for the samples obtained as part of our geotechnical exploration were performed in compliance with ASTM procedure D2216. The results varied from ten (10) percent to forty-seven (47) percent. The variance in percentages within a given exploratory boring can be attributed to a multitude of issues including, range in depth, distance between samples, location of groundwater table and seasonal moisture zone. The variation could also be caused by differences in soil classifications, as some soils such as loose gravels and sands are made up of larger particles and thus exhibit more voids as a soil structure (higher capability to hold water than fine grained soils). Finer grained denser soils, though, due to high impermeability, may also exhibit high moisture contents in certain instances due to the slower movement of water through the soil structure. Most samples in this geotechnical exploration exhibited dry field moisture conditions. A list of all the moisture contents by corresponding depth can be found on the boring logs.

Plasticity Index

The Plasticity Index (PI) is defined as the difference between the liquid limit and the plastic limit of a soil. These limits are commonly referred to as the Atterberg limits, which describe the consistency of soils with respect to their varying moisture contents. The liquid limit is defined as the moisture content at which soil begins to transition from a plastic to a liquid state and begins to behave as a liquid material by beginning to flow. The plastic limit refers to the water content of a soil at the point of transition from a semisolid to a plastic state where soil starts to exhibit plastic behavior. A soils behavior can be divided into four basic states: liquid, plastic, semisolid and solid. The plasticity index shows the range in which a soil acts in a plastic state. Experience has shown that the more plastic a soil is the more expansive and compressive it will act. The plasticity indices for the samples obtained as part of our geotechnical exploration were performed in compliance with ASTM procedure D4318. PI values for the borings performed for this report range from nine (9) (low plasticity clays) to forty-three (43) (high plasticity clays).

Particle Size Analysis (Determination of Fines Content)

The standard grain size analysis is used to determine the relative proportions of different grain sizes as they are distributed along a range of different sized sieves. The minus 200 sieve analysis is used commonly as a tool for soil classification and identification using the Unified Soils Classification System. Results for this test are reported as a percentage of soil passing the No. 200 sieve, which has openings 0.075 mm wide. This test is also used to determine the suitability of soil for construction purposes and to estimate probable seepage through soils. Generally a % -200 greater than 50% indicates a non-granular cohesive soil with large amounts of fines in the soil composition. The particle size analyses for the samples obtained as part of our geotechnical exploration were performed in compliance with ASTM procedure D1140. The % -200 values for the samples collected range from 67% to 99%.

Particle Size Analysis (Gradation Curves – D50 & D90)

Full standard gradation analysis is necessary to establish soil gradation curves. Standard gradation analysis involves two parts, the sieve analysis and the hydrometer analysis. The sieve analysis consists of stacking progressively finer sieves and passing a soil mass through. The sieve sizes correspond to different particle sizes within a soil. Hydrometer analyses are used primarily in fine grained soils but are also very useful in establishing the 'tail-end' of a gradation curve for soils having a mixture of coarse grained and fine grained soil constituents. The diameter of soil particles corresponding to 50% (D50) and 90% (D90) finer in the soil sample were derived from sieve and hydrometer analyses (establishment of particle-size distribution curve) for use in Hydraulic Scour Analysis. The results are presented in Table 3:

**Boring #	*Sample Depth (ft.)	D50 (mm)	D90 (mm)
Location 1 – Irrigation Canal			
B-01	15	**0.004	0.130
B-02	20	**0.002	0.017
Location 2 – Ridge Rd.			
B-03	15	**0.007	0.130
B-04	20	**0.007	0.058

Table 3 – D50 & D90 Values for Scour Analysis

**all depths are referenced from existing natural ground*

***D50 values should be limited to 0.10 millimeters in cohesive material (see following paragraph)*

In accordance with the TxDOT Geotechnical Manual (2012), **L&G Lab** recommends D50 values be limited to 4 x 10^{-3} inches (0.10 millimeters) for this channel in cohesive material. In addition (and if required), it should be noted, the TxDOT Geotechnical Manual (2012) recommends Pier Scour utilize equations in HEC-18 with a reduction factor of 0.5 for soils with 11% or more clay.

Sulfate Content of Soil (Concrete Structures)

The presence of high concentrations of water-soluble sulfates (SO_4) in soils can be detrimental to concrete structures in direct contact. Concrete exposed to these sulfate rich soils (buried concrete structures, foundations, slabs-on-grade) are highly vulnerable to deterioration typically in the form of expansion, extensive cracking and spalling. In the long-term, sulfates causing micro-cracks in concrete structures can form areas of additional ettringite (calcium sulfoaluminate) formation that can potentially penetrate the structures and lead to weakening of the cement paste and structure as a whole. In order to detect levels of water-soluble sulfates in the soils, we performed testing on these soils in accordance with Tex-145-E (Determining Sulfate Content in Soils – Colorimetric Method). To ensure we got an accurate reading with regard to the water levels impacting the soils, we performed these tests at various depths feet below top of natural ground at the locations of the borings. The general site specific results are presented in Table 4.

Boring	*Sample Depth (ft.)	Water-Soluble Sulfate Level (Parts Per Million)
Location 1 – Irrigation Canal		
B-01	20	480
B-02	15	560
Location 2 – Ridge Rd.		
B-03	20	320
B-04	15	520

Table 4 – Summary of Sulfate Contents
**all depths are referenced from existing natural ground*

It should be noted, Texas Department of Transportation (TxDOT) Pharr District Master General Notes specifies the use of Sulfate Resistant Concrete when sulfate concentrations in the soil are greater than 1,000 ppm. In accordance with this and based our test results, **L&G** does not note the specific need for Sulfate Resistant Concrete at culvert locations and at any other structural components in direct contact with the existing soil.

GEOTECHNICAL ENGINEERING ANALYSES

Global Stability of Channel Side Slopes

It is the understanding of **L&G** that the proposed reworked and regraded ditch sections will be a trapezoidal shaped channel with maximum side slopes of 2 horizontal units to 1 vertical unit (2:1) as previously noted in this report (See 'Project Description').

This report includes complete Global Stability Analysis as the means to evaluate channel side slope geometry with regard to existing top strata (proposed slope sections), section geometry and underlying foundation soils. The Factor of Safety requirements utilized in this analysis are referenced from the 2012 TxDOT Geotechnical Manual. For this project, we will utilize the threshold value of FS = 1.3 for all analyses.

The limit equilibrium method of analysis is the most commonly used method of analyzing the overall stability of both natural and manmade slopes as well as retaining wall structures. The fundamental principles behind this method are that the soil mass above a potential failure surface acts as a rigid body, and the shear strength of the material is fully engaged at all points along the surface at the moment of initial movement. A failure criterion is adopted and the conditions for static equilibrium are applied to analyze the problem. This method of analysis assumes that no strain takes place until the failure condition is reached. The results of the analyses are expressed in terms of a safety factor in the form of a ratio of the available shear strength along the potential failure surface to the shear stress required to maintain equilibrium of the failure mass under the applied loads. This method has traditionally been used in the analysis of man-made earth structures such as embankments, levees and retaining wall structures.

The Global Stability Analyses of the channel bank sections (slopes) was performed using ***GSTABL with STEDwin*** Version 7 software program. Analyses were performed using the Modified Bishop Method of slices for circular surfaces (random surfaces were not investigated in this report). It should be noted that the possibility of undetected anomalies in the soil, such as

remnants of previous sliding, tension cracks or water-bearing seams of sand, could potentially alter or negate the findings of the stability analysis. Through the utilization of the GSTABL software program, conservative modeling techniques, and engineering judgment we present what we believe are the most accurate factors of safety.

Input parameters such as shear strength (cohesion and angle of friction) were correlated from the results of the TCP testing and laboratory soil classification testing (unit weight was assumed based on material properties from laboratory tests). Both short-term (undrained) and long-term (drained) conditions were analyzed in accordance with the TxDOT Geotechnical Manual. Correlations for undrained parameters were based on the most current TxDOT Geotechnical Manual and supplemented with a Technical Report from the FHWA and TxDOT titled "Improved Correlation between Texas Cone Penetrometer Blow Count and Undrained Shear Strength of Soft Clays." Correlations for drained parameters were based on correlation equations of Holtz & Kovacks (1981), Bjerrum and Simons (1960), and Gibson (1953). It should be noted; only total shear strengths of soils were input into the GSTABL models for the short-term (undrained) condition, as opposed to individual cohesions and friction angles to maintain consistency with the strength correlations. In addition it should be noted, a minimum residual cohesion value of 50 pounds per square foot (psf) was incorporated into the long-term (drained) condition models.

The geometric model of the Drainage Ditch Side Slopes utilized for analysis consisted of maximum height (approximated as 18 feet) assumed at all boring locations along the proposed drainage ditch for a worst case analysis. Traffic surcharge loading was incorporated into the modeling considered equivalent to two (2) feet of soil (approximately 250 psf) placed atop the slopes (to model the access road). Piezometric surfaces (groundwater surfaces) were modeled at depths noted in boring logs. The model was analyzed as follows (See Appendix C for Global Stability Runs):

- Worst Case Analysis – Maximum Ht. Ditch, Maximum Side Slope, Worst Boring
    - The global stability analysis for this side slope was completed utilizing an assumed overall ditch height of 18 feet with 2:1 side slopes.
    - The global stability analysis was completed using boring B-04 (undrained) and B-03 (drained). The resulting critical Factors of Safety were equal to **8.881** for the short-term condition (undrained) and **1.338** for the long-term condition (drained). It should be noted, the FOS values are above the project threshold minimum of 1.3.

Bearing Capacity of Soils

The bearing capacity of the existing natural ground is defined as the ability of a foundation to safely support the imposed loadings (surcharge), without experiencing any form of shear failure. The ultimate bearing capacity is a measure of the soil's maximum resistance immediately prior to a bearing capacity failure. The ultimate bearing capacity was estimated using the methods and equations, as recommended by the USACE in Manual EM 1110-1-1905 titled "Bearing Capacity of Soils":

$$q_u = c\,N_c\zeta_c + \tfrac{1}{2}\,B\,\gamma_h\,N_\gamma\zeta_\gamma + \sigma\,N_q\zeta_q$$

where:
- q_u = ultimate bearing capacity
- c = soil cohesion
- B = effective width of foundation
- γ_h = effective unit weight of soil within failure zone
- σ = effective soil surcharge pressure at depth
- N_c, N_γ, N_q = dimensionless bearing capacity factors
- $\zeta_c\ \zeta_\gamma\ \zeta_q$ = dimensionless correction factors for cohesion, soil unit weight, and surcharge

Nc, Nγ, and Nq are the dimensionless bearing capacity factors developed by Meyerhof, Hansen, and Vesic for general shear failure listed in Table 4-4 of EM 1110-1-1905. Cohesion and angle of friction values were estimated using a correlation with the Texas Cone Penetration Tests performed in the field. All correlations used were in accordance with the applicable USACE manuals.

The factor of safety used in our analysis was equal to 3.0, as recommended by Chapter 1 of EM 1110-1-1905. The absolute minimum factor of safety, as recommended by Chapter 1 of EM 1110-1-1905 for this construction is 2.0. The maximum allowable bearing capacity was calculated by dividing the ultimate bearing capacity by the factor of safety. All recommendations reflect the maximum allowable bearing capacity in pounds per square foot.

- Bearing Capacity of Soils (Culvert Crossings)
  - **The maximum allowable bearing capacity at culvert location 1 (Irrigation Canal) is 7,000 pounds per square foot**. This value was calculated using a **factor of safety equal to 3**. It should be noted, bearing capacity was calculated for the most critical rectangular foundation geometry with a width to length ratio of 1:3.
  - **The maximum allowable bearing capacity at proposed culvert location 2 (Ridge Rd) is 5,250 pounds per square foot**. This value was calculated using a **factor of safety equal to 3**. It should be noted, bearing capacity was calculated for the most critical rectangular foundation geometry with a width to length ratio of 1:3.

GENERAL CONSTRUCTION RECOMMENDATIONS

Excavation and Trenching Recommendations

L&G recommends drain ditches be constructed in accordance with details shown on plans and approved working drawings, and to the pertinent requirements of the following TxDOT 2014 Standard Specification Items: Item 110 "Excavation", and Item 132 "Embankment." Excavate to the lines and grades shown on the plans or as directed. Where trenches or shallow excavations are to extend to or below a depth of five (5) feet, the Contractor or persons performing the trenching or shallow excavations should adhere to the current Occupational Health and Safety Administration (OSHA) guidelines on trench excavation safety and protection measures. Other industry standards may be applicable. If proposed trenching is to require excavation protection,

L&G recommends protection is provided in accordance with the requirements of TxDOT 2014 'Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges', Item 402 – Trench Excavation Protection and/or Item 403 – Temporary Special Shoring.

Culvert & Backfill Recommendations

L&G recommends box culverts be constructed in accordance with the requirements of TxDOT 2014 Standard Specification Items: Item 462 "Concrete Box Culverts and Drains". In addition, **L&G** recommends shaping, bedding and backfill for the structures are completed in accordance with Item 400 "Excavation and Backfill for Structures".

Drainage / Dewatering Recommendations

Drainage is one of the most important aspects to be addressed to ensure the successful construction, installation and longevity of construction projects. Positive surface drainage should be implemented prior to and during construction to prevent water ponding in all construction areas (especially at trench locations and bedding area of the proposed entrance and exit culverts). If water is present at the construction area, **L&G** recommends that dewatering techniques be used (bailing, point wells, pumping wells, cofferdam structures, or other approved methods) to ensure proper construction of the proposed culvert crossing(s) on a firm dry surface. This will reduce the probability of maintenance problems in the future at these locations. If the culvert areas cannot be de-watered, stabilizing material (lean concrete or cement stabilized fill) may be used to establish a working platform. This material should meet the requirements of Items 400 and 401 of the TxDOT 2014 Standard Specifications.

Channel Side Slope Recommendations

While **L&G** has shown minimum recommended side slopes for channels in this report to include utilizing 2(horizontal) to 1(vertical) slopes based on satisfactory factors of safety with regard to slope stability, we generally recommend utilizing 3(horizontal) to 1(vertical) slopes or flatter for the banks of the drainage channels, where possible. Slopes steeper than our typical recommended 3:1 may have the potential to cause problems with erosion, minor slope stability (in the form of surface sloughing), and general maintenance of the slopes. If steeper slopes become a requirement of this project, **L&G** should be notified to provide updated Slope Stability modeling and calculations. The construction of the channel slopes should include the installation of vegetation to assist in reducing erosion, preventing slough failures, and increasing the general slope stability. In the areas of anticipated inlet/outlet structures, as well as any other areas where turbulent or rapid flows may occur (at channel bends or turns), we recommend the use of additional erosion protection such as concrete riprap, rock riprap, geotextiles, or hydraulic energy dissipaters to minimize erosion.

Erosion Protection of Inlet & Outlet Structures

Erosion protection is essential in prolonging the life of the proposed drainage structures due to the higher velocities and water forces caused by these structures. Though no locations investigated noted very loose sands in the upper soils, we recommend general good practice measures to counteract any potential problems with future erosion. **L&G** recommends utilizing multiple erosion protection measures at channel entrance and exit locations (culverts, pipes, etc.):

- **L&G** recommends general good practice measures such as good embedment and compaction of supporting soils surrounding these structures to help ensure stability.
- **L&G** recommends that if concrete box culverts or pipes are utilized they include concrete headwalls, wingwalls and riprap at inlet/outlet points with two (2) foot minimum toe walls along all structures for enhanced stability and protection of culvert/pipe bedding and subgrade.
- **L&G** recommends that any circular pipe inlet points to the channel provide a concrete splash-pad (or outlet to concrete riprap or flexible erosion protection system) to avoid localized erosion points.
- **L&G** recommends utilizing flexible erosion protection on the channel side slopes such as rock riprap (in accordance with Article 432.3 of the TxDOT Standard Specifications) at inlet/outlet locations (alternatively erosion protection measures such as articulated block or rigid erosion protection systems (concrete riprap) may be utilized). In areas where bank protection will not (or cannot) be used, vegetation of earthen slopes and topsoil should be utilized as a minimum to reduce erosion problems.

Embankment Recommendations (If Required)

L&G Lab recommends that Embankment Fill Sections utilized on this project be constructed in accordance with the requirements of TxDOT 2014 'Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges', Item 132 – Embankment. Furthermore, L&G recommends the following controls be followed in accordance with TxDOT Pharr District Master General Notes:

- 'Embankment (DENS CONT) shall be Type C with a max. PI of 40. Material used as embankment material in the top two feet below the bottom of Flexible Base shall meet the following requirements based on preliminary tests and such other tests found necessary by the Engineer.
    - The material shall be such as to produce a well-bonded embankment and shall have a minimum PI of 8 and a maximum PI of 30.'

Compaction method is recommended for Embankment Fill Sections and shall be Density Controlled in accordance with the requirements of TxDOT 2014 'Standard Specifications', Item 132 – Embankment.

REFERENCES

1. Jacobs, Jerry L., 1981, "Soil Survey of Hidalgo County, Texas", Washington, D.C.

2. Bureau of Economic Geology, 1976, "Geologic Atlas of Texas, McAllen-Brownsville Datasheet", Austin, TX.

3. TxDOT, 2014, "Standard Specification for the Construction of Highways, Streets, and Bridges", Austin, TX.

4. TxDOT, 2000, 2006, 2012 "Geotechnical Manual", Austin, TX

5. TxDOT, 2014, "TxDOT Pharr District Master General Notes" (Updated Sept. 2015)

6. TxDOT, 2005, "100-E, Soils & Aggregates Test Procedures", Austin, TX.

7. American Society of Testing Materials, Volume 04.08, Soil and Rock (I): D420- D5779 March 2003.

8. United Facilities Criteria (UFC), "Soils & Geology Procedures for Foundation Design of Building and Other Structures", UFC 3-220-03FA, (January 2004).

9. Das, Braja M., "Principles of Foundation Engineering, 6th Edition", July 2006.

APPENDIX A – FIGURES

Figure 1

HCDD #1
Pharr-McAllen Drain
Location Map

Legend

- Project Location
- HCDD1 Ditch
- HCID2 Canal
- Minor Arterial
- Local Street

1,000 Feet

1 inch = 1,000 feet

L&G Engineering Laboratory, LLC.
Construction Material Testing
Geotechnical Engineering

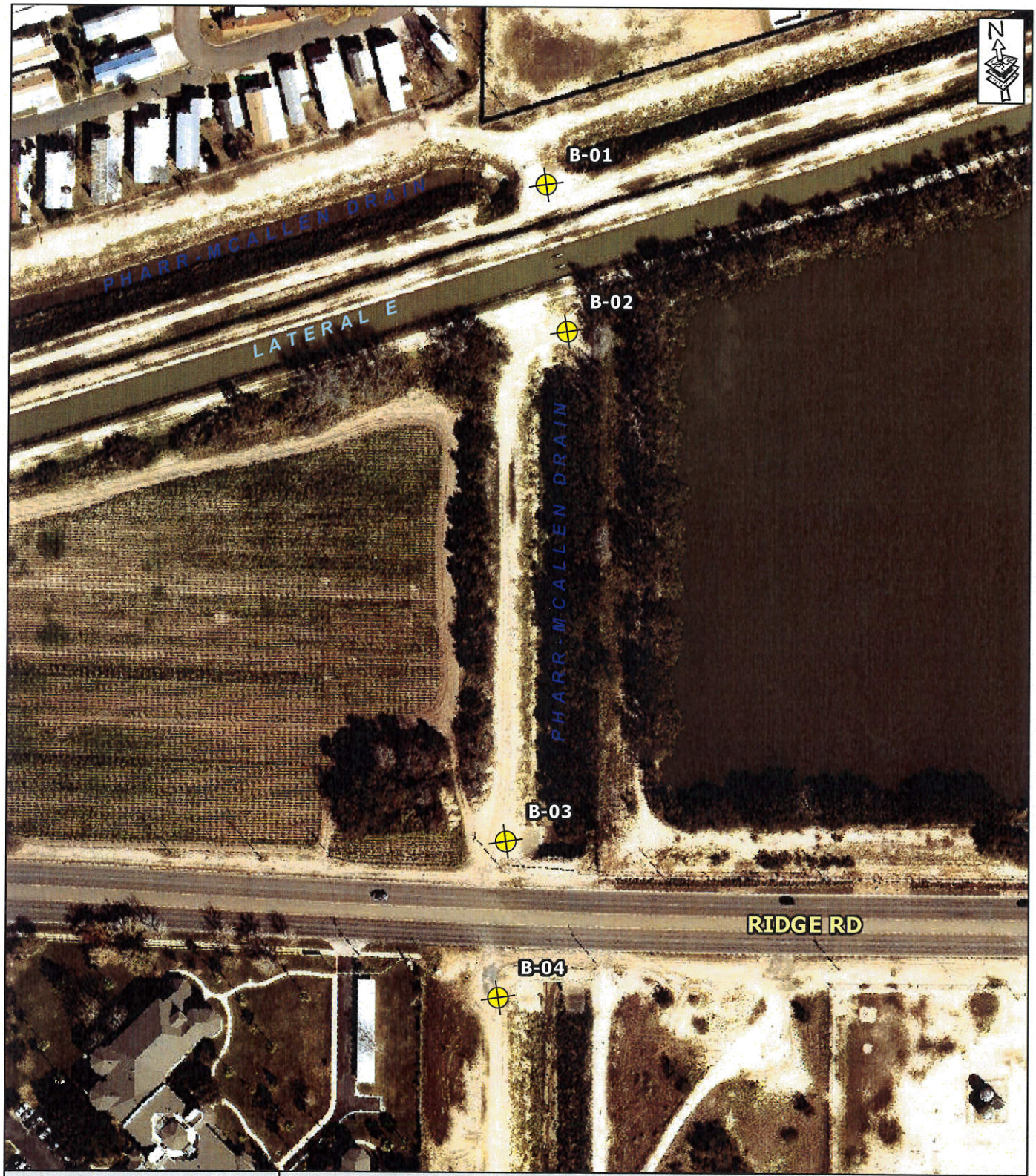


Figure 2

HCDD #1
Pharr-McAllen Drain

Boring Location Map

Legend

Boring Locate

150 Feet

1 inch = 150 feet

L&G Engineering Laboratory, LLC.
Construction Material Testing
Geotechnical Engineering

Figure 3

HCDD #1
Pharr-McAllen Drain

Soil Classification Map
USDA SOIL CONSERVATION SERVICE

Legend

Project Location

28 Hidalgo Sandy Clay Loam, 0 to 1 Percent Slopes

600
Feet
1 inch = 600 feet

LLG Engineering Laboratory, LLC.
Construction Material Testing
Geotechnical Engineering

Figure 4

HCDD #1
Pharr-McAllen Drain

Digital Elevation Map

Legend

Project Location

5 ft Contour

High

Low

600 Feet

1 inch = 600 feet

LCG Engineering Laboratory, LLC.
Construction Material Testing
Geotechnical Engineering

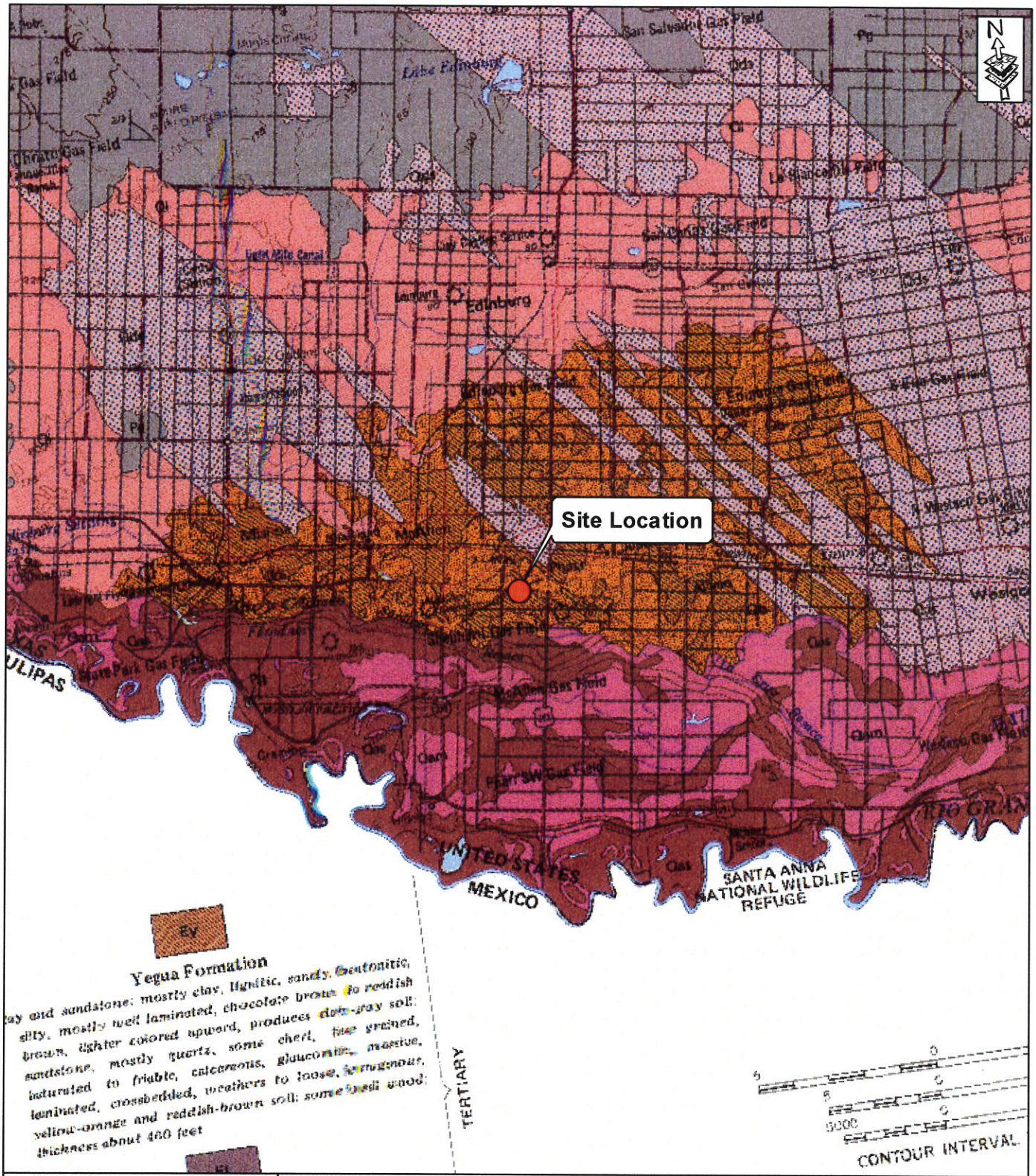


Figure 5

HCDD #1
Pharr-McAllen Drain
Location Map

Legend

- Project Location
- Qb — Beaumont Formation

20,000 Feet
1 inch = 20,000 feet

LLG Engineering Laboratory, LLC.
Construction Material Testing
Geotechnical Engineering

APPENDIX B – BORING LOGS & GRADATION CURVES

DRILLING LOG

WinCore Version 3.1

County Hidalgo
Highway
CSJ

Hole B-01
Structure
Station
Offset

District
Date 12-02-15
Grnd. Elev. 120.00 ft
GW Elev. 83.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, Sandy Lean Clay, Dark Brown, Stiff, Dry (CL)							
5		13 (6) 17 (6)				11.3				-200 = 67.2%
113.			CLAY, Fat Clay w/ Sand, Brown, Medium Stiff to Very Stiff, Dry (CH)							
10		8 (6) 11 (6)				17.2	52	35		
15		8 (6) 11 (6)				18.3				-200 = 84.0%
20		11 (6) 18 (6)				18.9	59	40		
25		19 (6) 27 (6)				19.8				-200 = 83.9%
30		21 (6) 30 (6)				19.1	59	43		
88.			CLAY, Lean Clay, Brown, Medium Stiff to Stiff, Moist to Wet (CL)							
35		12 (6) 14 (6)				27.5				-200 = 95.7%
80. 40		9 (6) 11 (6)				28	30	9		

Remarks: Sulfate Tests Performed at 20 ft. Results Provided on Seperate Document. Boring Locate - N 26°11'03.90", W 98°11'51.84". Assumed Natural Ground Elevation.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: B. Gonzalez **Logger: O. Garcia** **Organization: L&G Consulting Engineers**

L:\Projects\Year 2015 Projects\HCDD 1\GL15022 - Pharr-McAllen Drain\Borings\PMD.CLG

DRILLING LOG

WinCore Version 3.1

County Hidalgo
Highway
CSJ

Hole B-02
Structure
Station
Offset

District
Date 12-02-15
Grnd. Elev. 125.00 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, Sandy Lean Clay, Dark Brown, Stiff, Dry (CL)							
5		13 (6) 18 (6)				9.6	36	22		
118.			CLAY, Lean Clay, Brown, Stiff to Hard, Dry (CL)							
10		35 (6) 38 (6)				12.4				-200 = 86.1%
15		27 (6) 26 (6)				13.2	48	33		
20		18 (6) 22 (6)				17.2				-200 = 98.0%
25		18 (6) 20 (6)				23.7	30	9		
30		19 (6) 22 (6)				25				-200 = 94.6%
93.			CLAY, Fat Clay, Brown, Very Stiff, Dry (CH)							
35		21 (6) 24 (6)				22.7	61	42		
85. 40		22 (6) 24 (6)				19.8				-200 = 94.8%

Remarks: Sulfate Tests Performed at 15 ft. Results Provided on Seperate Document. Boring Locate - N 26°11'02.34", W 98°11'51.84". Assumed Natural Ground Elevation.

The ground water elevation was not determined during the course of this boring.

Driller: B. Gonzalez **Logger: O. Garcia** **Organization: L&G Consulting Engineers**

DRILLING LOG

WinCore Version 3.1

County Hidalgo
Highway
CSJ

Hole B-03
Structure
Station
Offset

District
Date 12-01-15
Grnd. Elev. 117.00 ft
GW Elev. 90.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, Sandy Fat Clay, Brown, Hard, Dry (CH)							
5		27 (6) 45 (6)				10.1				-200 = 69.1%
10		39 (6) 43 (6)				10.1	56	40		
105.			CLAY, Fat Clay w/ Sand, Brown, Hard, Dry (CH)							
15		24 (6) 33 (6)				10.5				-200 = 84.0%
100.			CLAY, Fat Clay, Brown, Stiff, Dry to Wet (CH)							
20		15 (6) 12 (6)				17	59	39		
25		16 (6) 21 (6)				22.8				-200 = 97.3%
30		15 (6) 17 (6)				28.2	52	34		
35		11 (6) 19 (6)				26.6				-200 = 99.2%
77. 40		14 (6) 17 (6)				46.5	67	40		

Remarks: Sulfate Tests Performed at 20 ft. Results Provided on Seperate Document. Boring Locate - N 26°10'57.12", W 98°11'53.40". Assumed Natural Ground Elevation.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: B. Gonzalez **Logger: O. Garcia** **Organization: L&G Consulting Engineers**

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DRILLING LOG

WinCore Version 3.1

County Hidalgo
Highway
CSJ

Hole B-04
Structure
Station
Offset

District
Date 12-01-15
Grnd. Elev. 117.00 ft
GW Elev. 93.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, Lean Clay w/ Sand, Brown, Medium Stiff to Stiff, Dry (CL)							
5		14 (6) 17 (6)				12.9	39	24		
10		10 (6) 15 (6)				12.8				-200 = 71.9%
105.			CLAY, Lean Clay, Brown, Medium Stiff to Stiff, Dry to Wet (CL)							
15		15 (6) 26 (6)				15.9	44	27		
20		8 (6) 11 (6)				20.6				-200 = 96.0%
25		15 (6) 20 (6)				23.6	37	20		
30		16 (6) 19 (6)				31.6				-200 = 97.2%
35		12 (6) 17 (6)				25.7	49	30		
77. 40		16 (6) 19 (6)				37.7				-200 = 99.1%

Remarks: Sulfate Tests Performed at 15 ft. Results Provided on Seperate Document. Boring Locate - N 26°10'55.50", W 98°11'53.76". Assumed Natural Ground Elevation.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: B. Gonzalez **Logger: O. Garcia** **Organization: L&G Engineering Laboratory**

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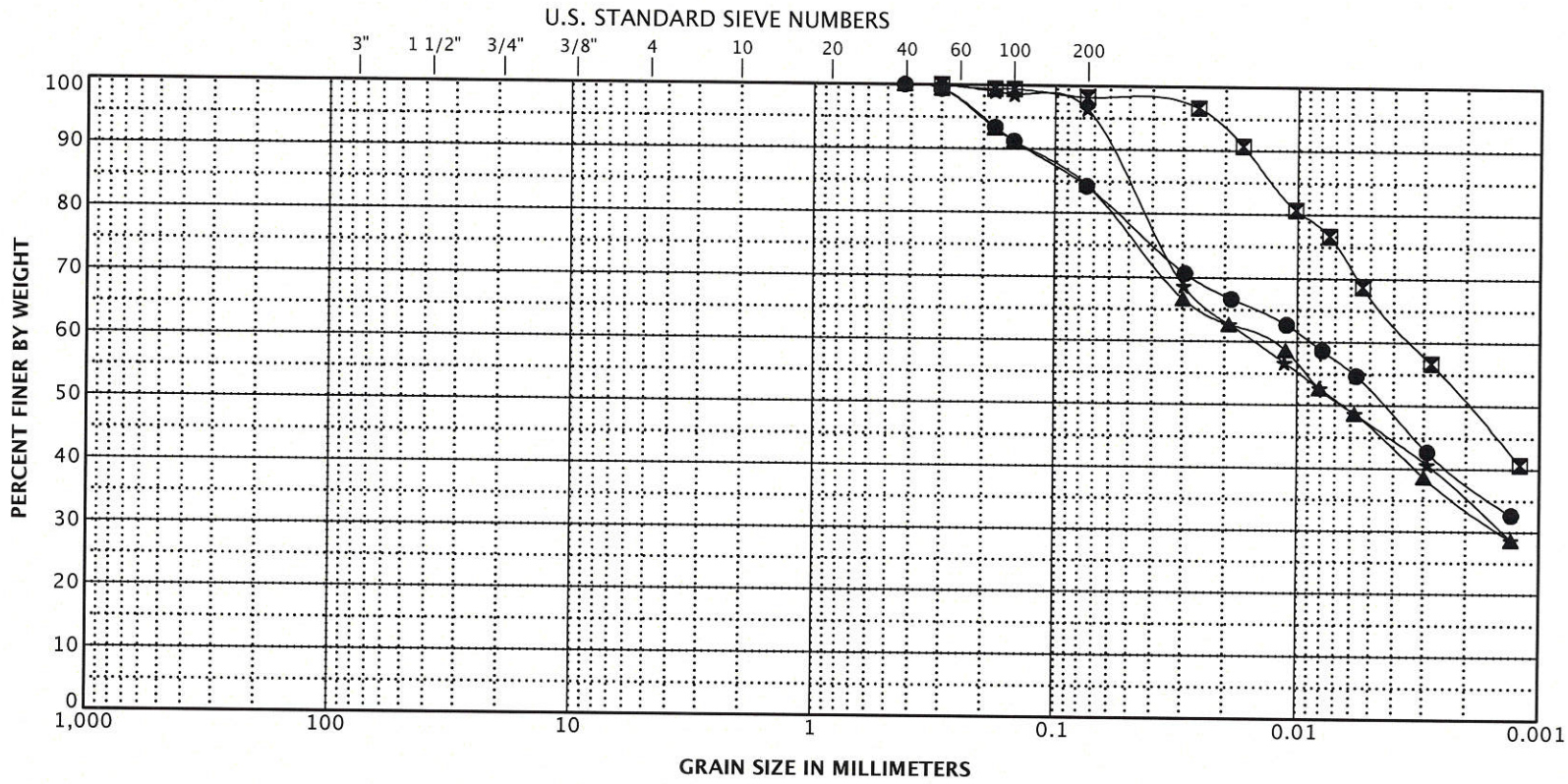


BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

KEY	EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	MOISTURE CONTENT (PERCENT)	D60	D50	D30	D10	D5	GRAVEL (PERCENT)	SAND (PERCENT)	SILT (PERCENT)	CLAY (PERCENT)
●	B-1	15.0		0.01	0.00				0	16	32	52
⊠	B-2	20.0		0.00	0.00				0	2	31	67
▲	B-3	15.0		0.01	0.01	0.00			0	16	38	46
★	B-4	20.0		0.02	0.01	0.00			0	4	49	47

L&G Engineering Laboratory
Construction Material Testing
Geotechnical Engineering

GRAIN-SIZE TEST RESULTS

PHARR-MCALLEN DRAIN
HIDALGO COUNTY

FIGURE

Appendix C

APPENDIX C – GLOBAL STABILITY (SIDE SLOPES)

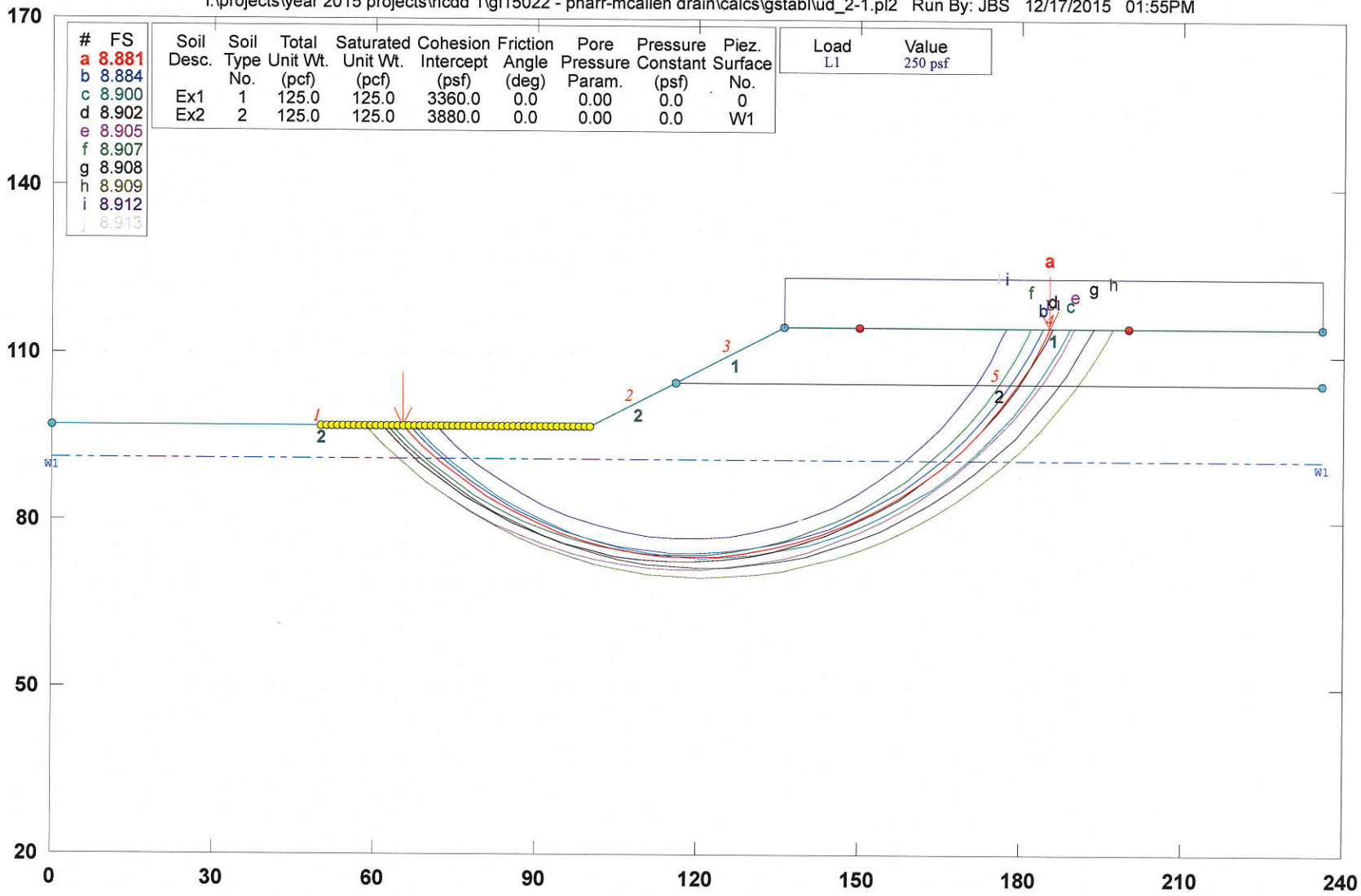
Pharr-McAllen Drain (Short Term Condition - Undrained)

I:\projects\year 2015 projects\hcdd 1\gl15022 - pharr-mcallen drain\calcs\gstabl\ud_2-1.pl2 Run By: JBS 12/17/2015 01:55PM

#	FS
a	8.881
b	8.884
c	8.900
d	8.902
e	8.905
f	8.907
g	8.908
h	8.909
i	8.912
j	8.913

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Ex1	1	125.0	125.0	3360.0	0.0	0.00	0.0	0
Ex2	2	125.0	125.0	3880.0	0.0	0.00	0.0	W1

Load	Value
L1	250 psf



GSTABL7 v.2 FSmin=8.881

Safety Factors Are Calculated By The Modified Bishop Method

Pharr-McAllen Drain (Long Term Condition - Drained)

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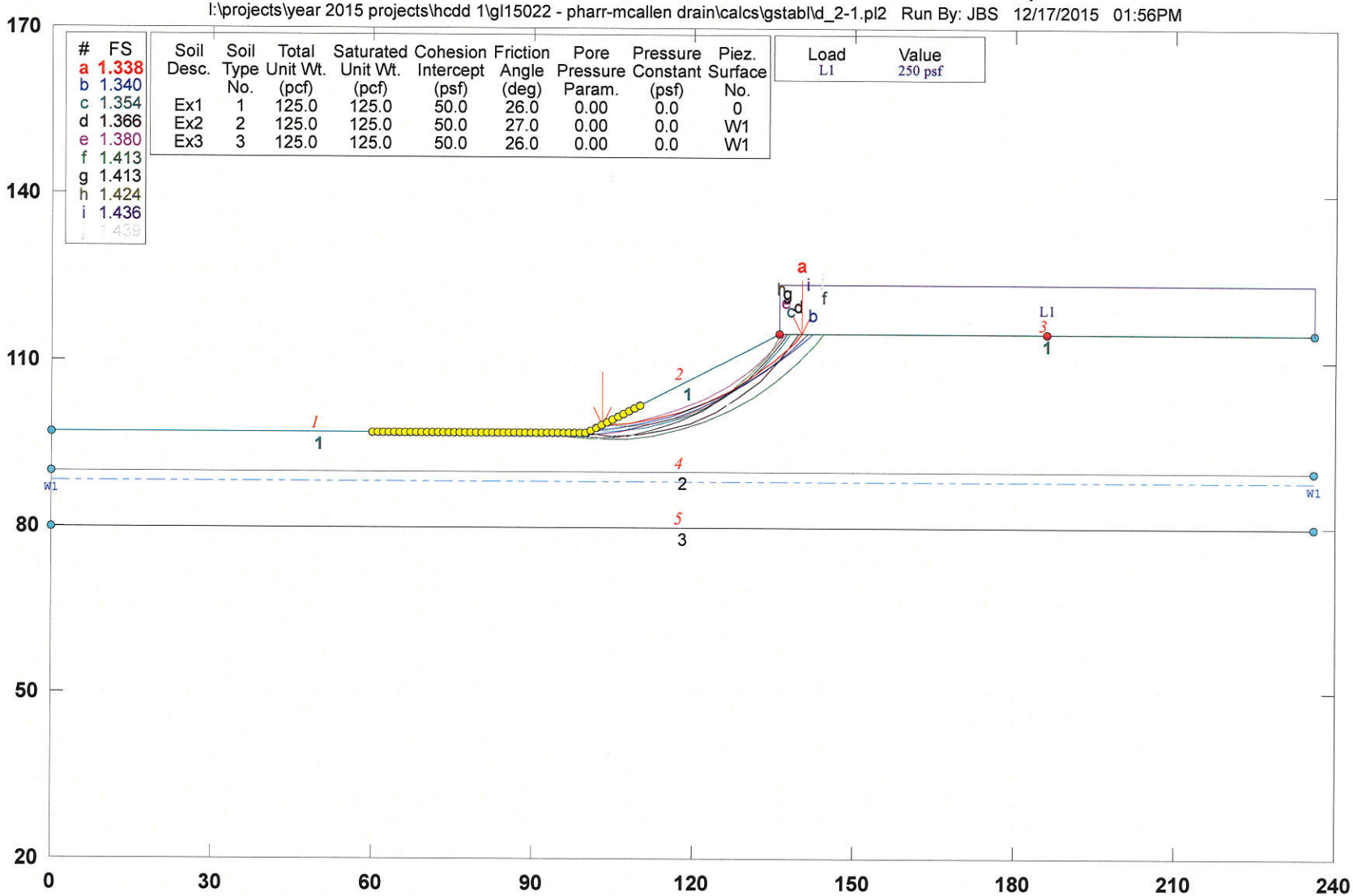


GSTABL7 v.2 FSmin=1.338

Safety Factors Are Calculated By The Modified Bishop Method

APPENDIX D – PLANS & SPECS (PROVIDED BY CLIENT)

Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.

HIDALGO COUNTY
DRAINAGE DISTRICT NO. 1

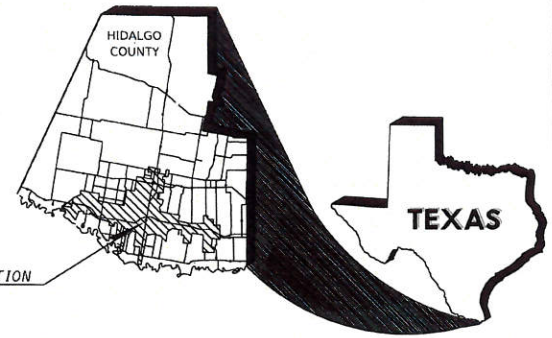
PLANS OF PROPOSED DRAINAGE IMPROVEMENT

NET LENGTH OF PROJECT: 1,191.50 FT. = 0.23 MI.

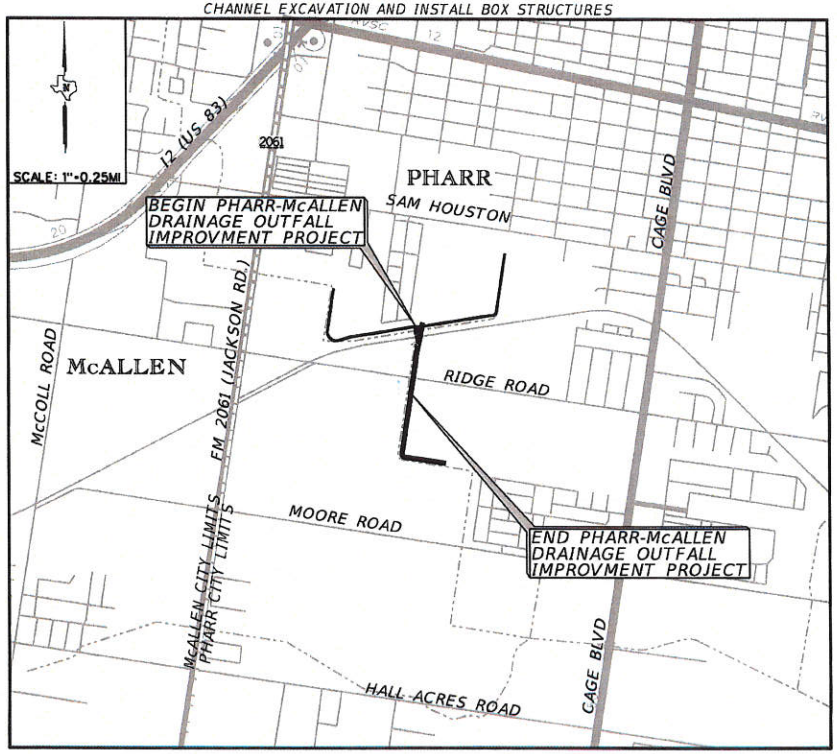
HIDALGO COUNTY

PHARR-McALLEN DRAINAGE OUTFALL IMPROVMENTS

LIMITS FROM: 0.18 MILES N. OF RIDGE RD ALONG PHARR-McALLEN DRAIN
TO: 0.05 MILES S. OF RIDGE RD ALONG PHARR-McALLEN DRAIN



CHANNEL EXCAVATION AND INSTALL BOX STRUCTURES



HIDALGO COUNTY DRAINAGE DISTRICT No.1 HCDD1

L&G Engineering

Highway / Civil
Structural / Bridge
Environmental
Firm No. : F-4105

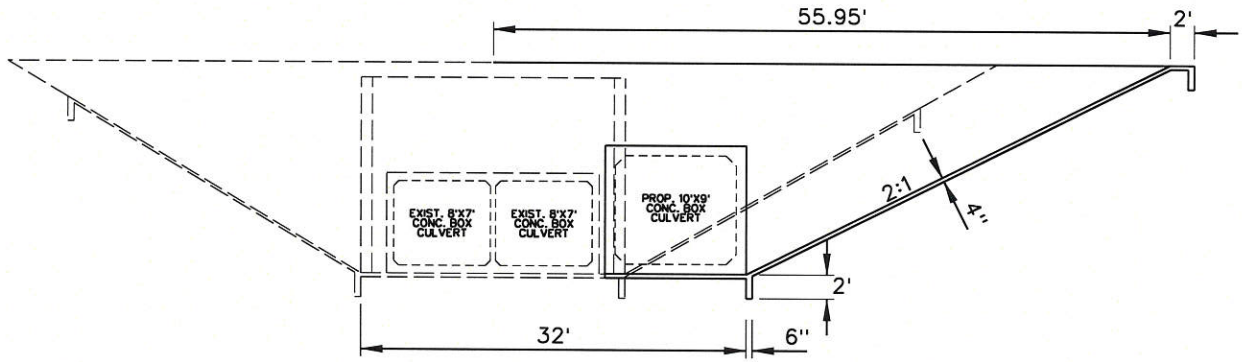
2100 W. Expressway 83
Mercedes, TX. 78570
Phone : (956) 565-9813
Fax : (956) 565-9018

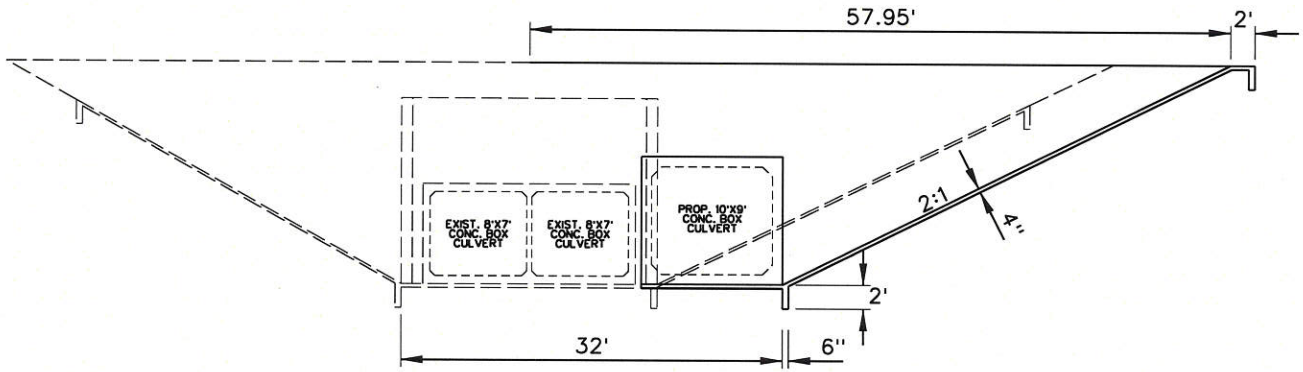
900 S. Stewart Rd., Ste. 10
Mission, TX. 78572
Phone : (956) 585-1909
Fax : (956) 585-1927

RAMON GARCIA
COUNTY JUDGE

COMMISSIONER EDDIE CANTU
PRECINCT No. 2

Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.





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HIDALGO COUNTY DRAINAGE DISTRICT NO. 1

L&G Engineering

Highway / Civil
Structural / Bridge
Environmental
Firm No. : F-4105

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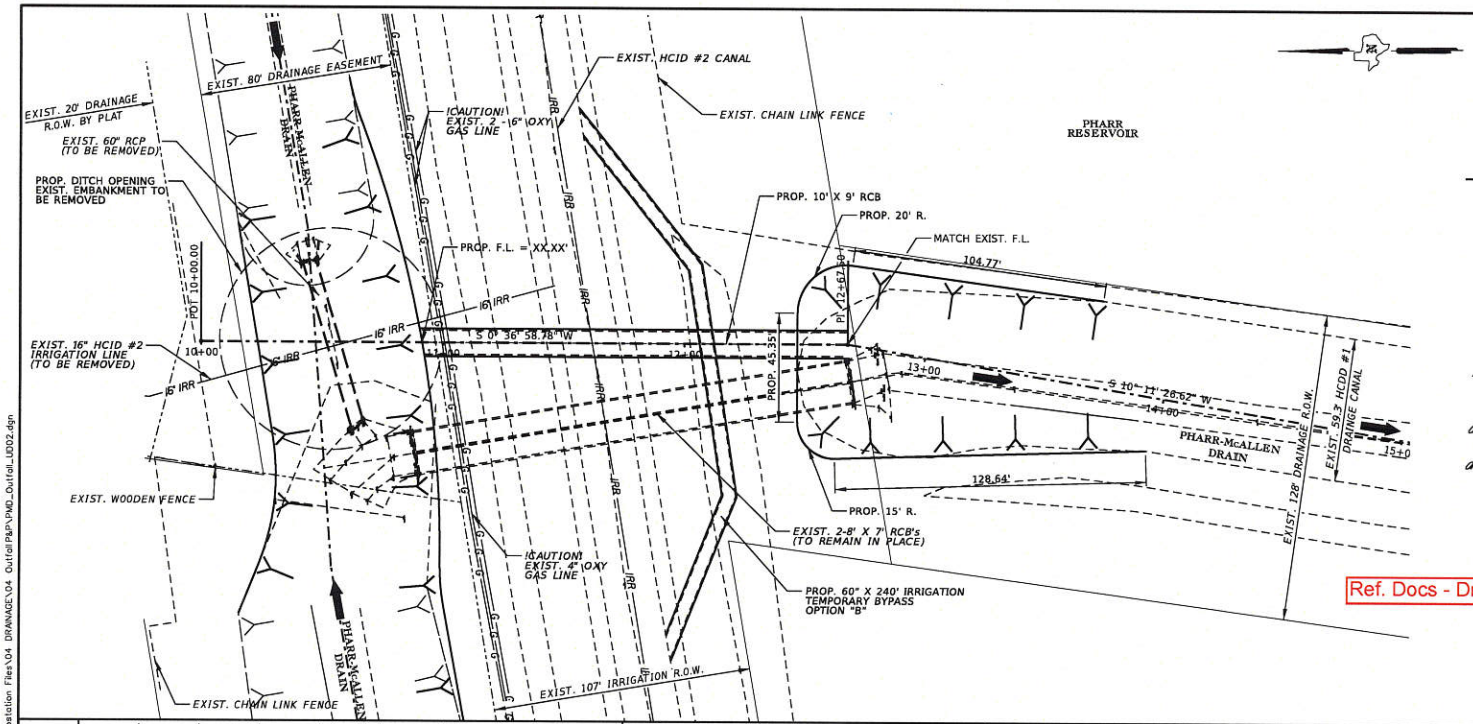
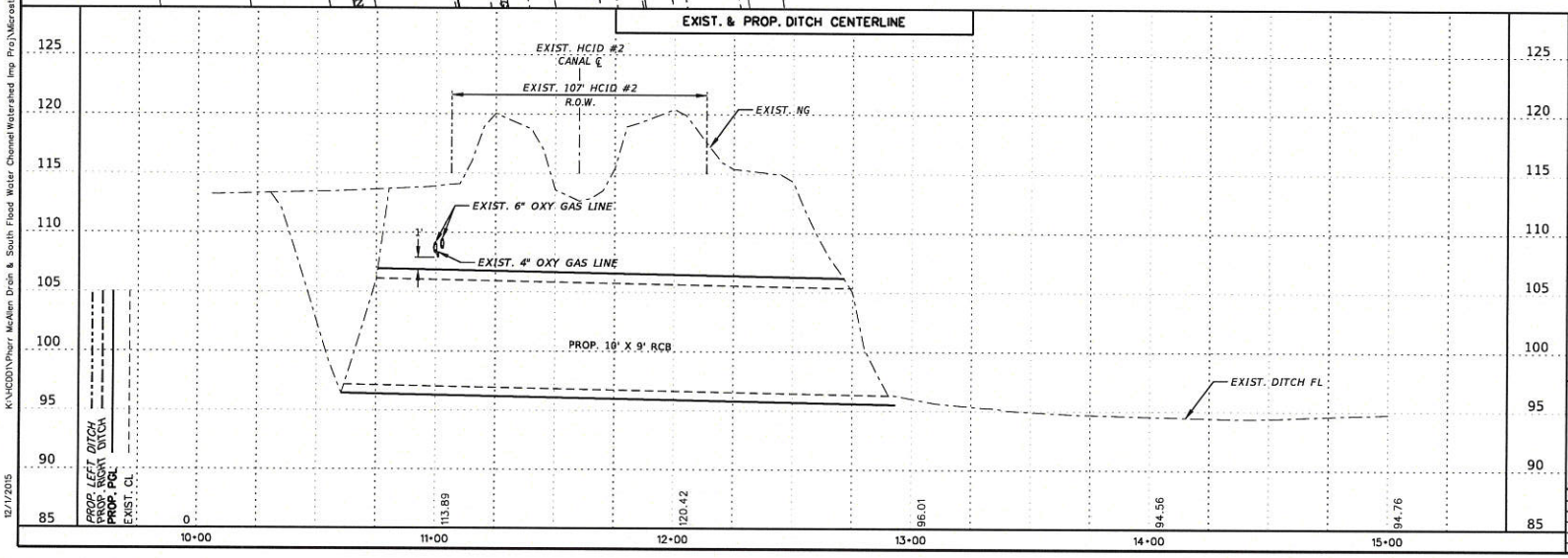
TYPICAL SECTIONS

PHARR-McALLEN DRAINAGE OUTFALL PROJECT

DN: JAM	FED. RD. DIV. NO.	STATE	PROJECT NO.				SHEET NO.
CK DN:	6	TEXAS					
DW: DC	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.	
CK DW: JAM	PHR	HIDALGO				LJWI	
TR:							
CK TR:							





SHEET SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY

LEGEND:

- "W" — EXIST. " (DIAM INCH) WATER LINE
- "FM" — EXIST. " (DIAM INCH) FORCE MAIN SANITARY SEWER LINE
- "SS" — EXIST. " (DIAM INCH) SANITARY SEWER LINE
- "G" — EXIST. " (DIAM INCH) GAS PIPELINE
- UFO — EXIST. UNDEGROUND FIBER OPTIC CABLE
- UT — EXIST. UNDERGROUND CABEL/TELE LINE
- OHE — EXIST. OVERHEAD ELECTRIC LINE
- HVTL — EXIST. HIGH VOLTAGE TRANSMISSION LINE
- UE — EXIST. UNDERGROUND ELECTRIC LINE
- OHEC — EXIST. OVERHEAD ELECTRIC LINE WITH CABLE LINE ATTACHED
- OHEFC — EXIST. OVERHEAD ELECTRIC LINE WITH FIBER OPTIC AND CABLE LINE ATTACHED

- SEE P&P SHEETS
- EXIST. ITEM TO BE REMOVED UNDER ITEM 496
- PROP. CONC. PLUG (NON-PAY ITEM)
- DIRECTION OF FLOW
- OUTFALL CHANNEL FLOW

NOTES:

1. SEE ALIGNMENT DATA SHEET FOR PROPOSED CENTERLINE DATA.
2. SEE SURVEY DATA SHEET FOR BM STATIONS, OFFSET, ELEV. ETC.
3. ALL RCP SHALL BE CL III UNLESS OTHERWISE NOTED.
4. SEE DRAINAGE STRUCTURE STANDARD SHEETS FOR DESCRIPTION OF OFFSET IN STORM DRAIN TABLE.
5. RECONNECTION OF EXISTING STORM DRAIN SHALL BE SUBSIDIARY TO PERTINENT BID ITEMS.
6. SEE "HYDRAULIC DATA SHEETS FOR PAYMENT OF ALL PROPOSED DRAINAGE STRUCTURES.
7. FOR OTHER DITCH GRADES SEE DITCH PROFILE SHEETS
8. CONTRACTOR SHALL COORDINATE WITH HCID # X & HCDD # 1 72 HR PRIOR TO ANY WORK DONE ON OR NEAR IRRIGATION STRUCTURES. (CONCTACT NAME AND NUMBER)

Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.

NOT A BIDDING DOCUMENT

THIS DOCUMENT IS FOR INTERIM REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES.

DAVID A. SAENZ
P.E. 102365
12/1/2015
DATE

L&G Engineering
Highway / Civil
Structural / Bridge
Environmental
Firm No. : F-4105

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UTILITY AND DRAINAGE
PHARR-McALLEN DRAINAGE PROJECT
STA. 40+00 TO STA. 40+00

SCALE: 1" = 50' SHEET 2 OF 3

DSN: JAM	FED. RD. DIV. NO.	STATE	PROJECT NO.	SHEET NO.
CK DN:	6	TEXAS		XX
DSN: DG	STATE DIST. NO	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	HIGHWAY NO.
CK DN: JAM	PHR	HIDALGO		LJW1
TR:				
CK TR:				

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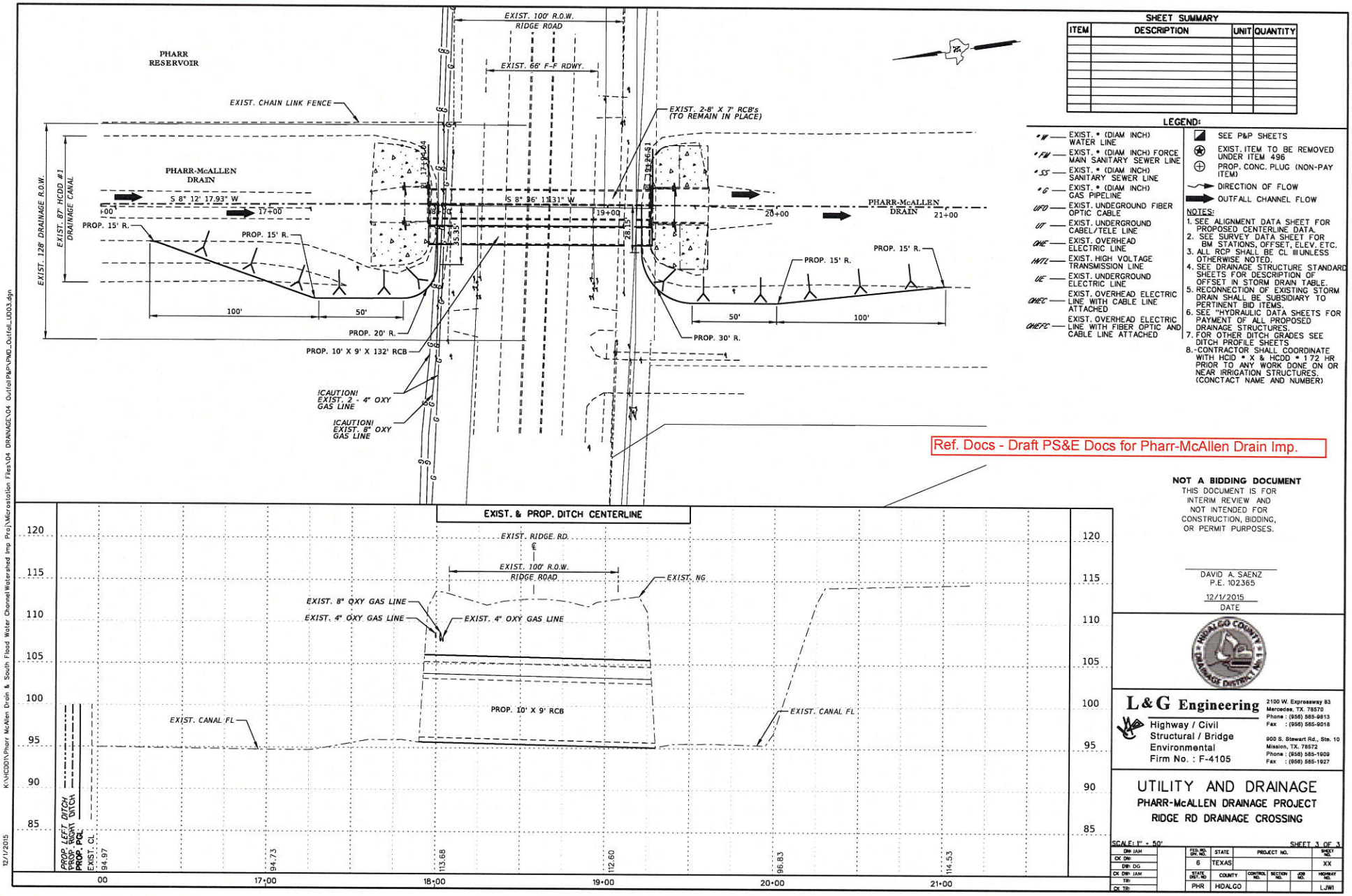

Ref. Docs - Draft PS&E Docs for Pharr-McAllen Drain Imp.

SHEET SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY

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- "FM" — EXIST. " (DIAM INCH) FORCE MAIN SANITARY SEWER LINE
- "SS" — EXIST. " (DIAM INCH) SANITARY SEWER LINE
- "G" — EXIST. " (DIAM INCH) GAS PIPELINE
- UFO — EXIST. UNDEGROUND FIBER OPTIC CABLE
- UT — EXIST. UNDERGROUND CABEL/TELE LINE
- OHE — EXIST. OVERHEAD ELECTRIC LINE
- HVTL — EXIST. HIGH VOLTAGE TRANSMISSION LINE
- UE — EXIST. UNDERGROUND ELECTRIC LINE
- OHEC — EXIST. OVERHEAD ELECTRIC LINE WITH CABLE LINE ATTACHED
- OHEFC — EXIST. OVERHEAD ELECTRIC LINE WITH FIBER OPTIC AND CABLE LINE ATTACHED

- SEE P&P SHEETS
- EXIST. ITEM TO BE REMOVED UNDER ITEM 496
- PROP. CONC. PLUG (NON-PAY ITEM)
- DIRECTION OF FLOW
- OUTFALL CHANNEL FLOW

NOTES:
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7. FOR OTHER DITCH GRADES SEE DITCH PROFILE SHEETS
8. CONTRACTOR SHALL COORDINATE WITH HCID • X & HCDD • 172 HR PRIOR TO ANY WORK DONE ON OR NEAR IRRIGATION STRUCTURES. (CONCTACT NAME AND NUMBER)

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DAVID A. SAENZ
P.E. 102365
12/1/2015
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Firm No. : F-4105

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900 S. Stewart Rd., Ste. 10
Mission, TX. 78572
Phone : (956) 585-1909
Fax : (956) 585-1927

UTILITY AND DRAINAGE
PHARR-McALLEN DRAINAGE PROJECT
RIDGE RD DRAINAGE CROSSING

SCALE: 1" = 50'

SHEET 3 OF 3

DSN: JAM	FED. RD. DIV. NO.	STATE	PROJECT NO.	SHEET NO.
CK DSN:	6	TEXAS		XX
DSN: DG	STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	HIGHWAY NO.
CK DSN: JAM	PHR	HIDALGO		LJWI
TR:				
CK TR:				

12/1/2015 K:\HCDD\Pharr McAllen Drain & South Flood Water Channel\Watershed Imp Pro\Microstation Files\04 DRAINAGE\04 Outfall P&P\PMD_Outfall_LJD03.dgn

Hidalgo County Drainage District No. 1

902 North Doolittle Road Edinburg, Texas 78542 Office: (956) 292-7080

Invoice Processing Checklist/Routing Slip

Invoice/ Backup

Date Received: 1/5/2016

Engineer/Firm Name: L&G Engineering

Project Name/Number: La Joya Watershed Imp. WA No. 6A

Invoice No.: 11325443

Purchase Order No.: 627201

Received By: Rosa Arce

Forwarded to: Nora D. Cavazos _____ Date: _____
Claudette Guerrero _____ Date: _____

Total # of Pages Submitted: 11

Attachments: CD is for WA No. 6

Forwarded to: Jose N. Saldivar _____ Date: _____

Forwarded to: Lora Briones _____ Date: _____

Additional Comments: $3,457.55

THIS ROUTING SLIP MUST BE KEPT WITH ORIGINAL INVOICE

L&G Engineering
Transportation Consulting Engineers

2100 W. Expressway 83
Mercedes, TX 78570
Phone: (956) 565-9813
Fax: (956) 565-9018
Toll Free: (888) 565-9813

900 S. Stewart Rd., Ste. 10
Mission, TX 78572
Phone: (956) 585-1909
Fax: (956) 585-1927
Toll Free: (866) 585-1909

Firm No. F-4105

Letter of Transmittal

Mr. Raul E. Sesin, P.E. – Drainage District Manager
Attn: Ms. Lora Briones – Chief Financial Manager
Hidalgo County Drainage District #1
902 N. Doolittle Rd.
Edinburg, Texas 78542

DATE: January 4, 2016

REF.: Work Authorization #6A on La Joya Watershed Improvement Project
P.O. #627201 ✓
Invoice 11325443

L&G PROJECT NO.: 130106

TRANSMITTED:

☒	For Your Use	☐	Please comment	☐	Approved as Noted
☐	As Requested	☐	Reply ASAP	☐	As Noted Below

VIA:

☐	US Mail	☐	Courier	☒	Hand Carry
☐	E-Mail	☐	Lonestar Overnight	☐	Pick up

COPIES	DESCRIPTION
	✗ WALE?
1	CD for Invoice # 11325443 $ 3,457.55

REMARKS:
Attached is CD that contains the back up information for invoice #11325443 for the month of December.

If you have any questions or comments, please feel free to contact me or Mr. Damien B. Tijerina, P.E. at 956-585-1909.

Thank you,

Armando J. Sandoval, P.E.
Project Manager

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 4 0 2015
1:45 AM / PM
BY:

_____
Received By

L&G Engineering
Transportation Consultants

January 4, 2016

Mr. Raul Sesin, P.E. – District Manager
Hidalgo County Drainage District #1
902 N. Doolittle
Edinburg, Texas 78542

RE: Work Authorization #6A on La Joya Watershed Improvement Project
Job # 130106
P.O. # 626941

Dear Mr. Sesin,

Attached for your review is our progress report for the month of December 2015 on the subject referenced project.
The following is attached:

- L & G's Invoice 1132543
- CD w/ Electronic Files of Data

		% COMPL
TASK #1 – FC 102 – Feasibility Studies		
FC 10201 ~ Preliminary Design Values	L&G	100%
Task is complete – See progress report dated 06-10-2015		
FC 10202 ~ Preliminary Route Location on Uncontrolled Mapping	L&G	100%
Task is complete – See progress report dated 06-10-2015		
FC 10203 ~ Uncontrolled Mapping	L&G	100%
Task is complete – See progress report dated 06-10-2015		
FC 10204 ~ Preliminary Hydrologic Map	L&G	100%
Task is complete – See progress report dated 06-10-2015		
FC 10205~ Preliminary ROW Requirements	L&G	100%
Task is complete – See progress report dated 06-10-2015		
FC 10206~ Preliminary Cost Estimates	L&G	100%
Task is complete – See progress report dated 06-10-2015		

2100 W. Expressway 83 • Mercedes, TX 78570 • Office (956) 565-9813 • Fax (956) 565-9018
900 S. Stewart Rd., Ste. 9 • Mission, TX 78572 • Office (956) 585-1909 • Fax (956) 585-1927

FC 10207 ~ Preliminary Environmental Analysis	L&G	100%
Task is complete – See progress report dated 06-10-2015		
FC 10208 ~ Project Fact Sheet with Est. Local Cost vs. Total Project Cost	L&G	100%
Task is complete – See progress report dated 06-10-2015		
FC 10209 ~ Meetings, Coordination & Support for Project Development	L&G	100%
Task is complete – See progress report dated 06-10-2015		
TASK #2 – FC 110 – Route and Design Studies		
FC 11004 ~ Preliminary Cost Estimates	L&G	100%
Task is complete – See progress report dated 06-10-2015		
FC 11005 ~ Design Schematic	L&G	100%
Task is complete – See progress report dated 06-10-2015		
FC 11006 ~ Preliminary ROW Requirements	L&G	100%
Task is complete – See progress report dated 06-10-2015		
TASK #3 - FC 130 – Right-of-Way Data		
FC 13008 ~ Coordination and Management of Right-of-Way Data (FC 130) and Field Surveying (FC 150)	L&G	85%
L&G Engineering has been in constant coordination with the Surveyor on determination of the Right-of-way and in receipt of various levels of completion of the Field Surveying. L&G has received a copy of the ROW map. L&G ROW agents have reviewed the ROW Map and have provided comments to ROWSS. The geometry of the ROW map was checked by the engineering staff.**No Update.**		
FC 13020 ~ ROW Mapping / SUB	ROWSS	60%
See attached progress report from ROWSS dated 9-30-2015		
TASK #4 – FC 150 – Field Surveying		
FC 15030 ~ Field Surveying (Control Horizontal and Vertical Ties)	ROWSS	94.2%
See attached progress report from ROWSS dated 9-30-2015		
FC 15040 ~ Determine Topography, Cross Sections and Pot Holing	ROWSS	92.5%
See attached progress report from ROWSS dated 9-30-2015		
FC 15060 ~ Final Reports and Deliverables	ROWSS	65%

See attached progress report from ROWSS dated 9-30-2015		
FC 15070 ~ Project Management and Oversight	ROWSS	65%
See attached progress report from ROWSS dated 9-30-2015		
TASK #5 - FC 161 – Drainage		
FC 16101 ~ Hydrologic Map	L&G	100%
Task is complete – See progress report dated 07-2015		
FC 16102 ~ Hydraulic Drainage Study - Culverts	L&G	100%
Task is complete – See progress report dated 07-2015		
FC 16103 ~ Hydraulic Drainage Study - Channels	L&G	100%
Task is complete – See progress report dated 07-2015		
FC 16104 ~ Hydraulic Drainage Study – Irrigation Canals/Siphons	L&G	100%
Task is complete – See progress report dated 09-2015		
FC 16105 ~ Layout, Structural Design and Detailing of Drainage Features - Culverts	L&G	100%
Task is complete – See progress report dated 07-2015		
FC 16106 ~ Layout, Structural Design and Detailing of Drainage Features – Storm Sewers	L&G	100%
Task is complete – See progress report dated 07-2015		
FC 16107 ~ Layout, Structural Design and Detailing of Drainage Features – Outfall Channel(s) Outside of ROW	L&G	100%
Task is complete – See progress report dated 07-2015		
FC 16108 ~ Layout, Structural Design and Detailing of Drainage Features – Summary of Qtys	L&G	100%
Task is complete – See progress report dated 07-2015		

FC 16109 ~ Layout, Structural Design and Detailing of Drainage Features – Storm Water Management Facilities	L&G	100%
Task is complete – See progress report dated 07-2015		
FC 16111 ~ Storm Water Pollution Prevention Plan (SW3P)	L&G	100%
Task is complete – See progress report dated 07-2015		
TASK #6 - FC 163 – Miscellaneous Roadway		
FC 16306 ~ Special Utility Details (Irrigation Lines)	L&G	100%
Task is complete – See progress report dated 08-2015		
FC 16307 ~ Miscellaneous Structures	L&G	100%
Task is complete – See progress report dated 07-2015		
FC 16301 ~ Foundation Studies	L&G	100%
Task is complete – See progress report dated 11-02-2015		
FC 16302 ~ Utility Agreements and Exhibits	L&G	95.1%
The irrigation district supplied L&G with comments regarding the design of the culverts crossing underneath the Edinburg Main Canal. Those comments are being addressed in the plan sheets as necessary. We have requested clarification on several of the irrigation district's comments. The Irrigation District has not responded to L&G's request for information. A meeting was held with the Irrigation District to discuss the comments to the proposed culvert layout and to discuss the proposed bypass that will be used during construction of the proposed culvert. The irrigation district was not prepared to answer any questions. We were told that we would be supplied with answers to our comments in a timely manner, but have yet to receive any response from the Irrigation District. E-mails were sent to the irrigation district and to the irrigation district's engineer asking for clarification on the comments that were submitted to them. **No Invoice.**		
FC 16303 ~ Railroad Sketches	L&G	100%
Task is complete – See progress report dated 06-10-2015		

FC 16304 ~ Traffic Signal Agreement Sketches	L&G	100%
Task is complete – See progress report dated 11-02-2015		
FC 16305 ~ Estimate	L&G	100%
Task is complete – See progress report dated 11-02-2015		
FC 16308 ~ Specifications and General Notes	L&G	100%
Task is complete – See progress report dated 11-02-2015		
TASK #7 - FC 600 – Right-of-Way Acquisition Services – Compensable Utilities		
FC 60000 ~ Right of Way Administration Acquisition	L&G	55%
Project presence has been established at 900 S. Stewart Road in Mission, Texas 78572 @ L&G Engineering-Transportation Consulting Engineers Right of Way Office. The office is open during normal County and State work hours with available personnel to answer questions about the project. One staff member is a current commissioned notary. Coordination for the acquisition continues by meeting with the surveyor, county personnel, TXDOT and Irrigation District. The title commitments have been requested in order to clear title when the acquisition begins. **No Invoice.**		
FC 60001 ~ Title Services	L&G	0%
No update		
FC 60002 – Appraisal Services	L&G	0%
No update		
FC 60003 ~ Appraisal Review	L&G	0%
No update		
FC 60004 ~ Parcel Negotiations	L&G	0%
No update		
FC 60005 ~ Closing Services	L&G	0%
No update		
FC 60030 ~ Appraisal Services / SUB	L&G	0%
No update		

FC 60040 – Appraisal Review / SUB	L&G	0%
No update		
FC 60101 ~ Preliminary Design Consultations	L&G	100%
Task is complete – See progress report dated 11-02-2015		
FC 60102 ~ Field Observations and Verifications	L&G	100%
Task is complete – See progress report dated 11-02-2015		
FC 60103 ~ Exchange of Information with Utility Providers	L&G	80%
Exchange of information continues concerning the road right of way and railroad right of way. Meeting with Enterprise Products, 12-01-15. Met with Utility representative. She picked up project map, plans and layout sheets which she will forward to her Houston offices to get started on PS&E for adjustments. Also provided was County's SUA process. Meeting with TxDOT (@ Pct 3 offices), 12-16-15. Most interested parties were in attendance. All gave status.		
FC 60104 ~ Confirmation of Property Interests	L&G	70%
Meeting with Enterprise Products, 12-01-15. Met with Utility representative. She said she is going to research all relevant easements and provide proof of property interests. Phone call contact with Rusty McDaniel, GM HCID#1, 12-15-15. He indicated that they had completed their research of property interests for their ditch. It was easement and they would work to acquire in fee from property owner.		
FC 60105 ~ Develop and Execute Release of Easements	L&G	0%
No update		
FC 60106 ~ Coordination and Development of Joint Use Agreements	L&G	100%
Task is complete – See progress report dated 11-02-2015		
FC 60107 ~ Utility Meetings Throughout Project Development	L&G	70%
L&G Right of Way Staff met with various team members to gather information. Contact with District, 12-03-15 to discuss District's approval process. Needs to be placed on agenda for formal adoption by Board of Directors. Meeting with TxDOT (@ Pct 3 offices), 12-16-15. Most interested parties were in attendance. All gave status.		

Should you have any questions regarding this submittal or would like clarification on any aspect of the project, please do not hesitate to call me at (956) 585-1909.

Sincerely,

_____

Armando J. Sandoval, P.E.
Project Manager
L&G Engineering

L &G Consulting Engineers Inc
2100 W. Expressway 83
Mercedes, TX 78570
(956)565-9813 Fax (956)565-9018

INVOICE#: 11325443
INVOICE DATE: 12/31/2015

BILL TO:
Hidalgo County Drainage District#1
902 N. Doolittle
Edinburg, TX 78542

JOB:130106
La Joya Watershed Imp
WA#6A P.O #627201

Engineering services for the month of December 2015.

DESCRIPTION	CONTRACT	PREVIOUS APPLICATIONS	CURRENT COMPLETED	TOTAL COMPLETED	% COMPL	BALANCE TO FINISH
FC 102 - Feasibility Studies						
10201-Preliminary Design Values	1,575.64	1,575.64		1,575.64	100.0	-
10202-Preliminary Route Location on Uncontrolld Mapping	1,575.64	1,575.64		1,575.64	100.0	-
10203-Uncontrolled Mapping	1,575.64	1,575.64		1,575.64	100.0	-
10204-Preliminary Hydrologic Map	1,575.64	1,575.64		1,575.64	100.0	-
10205-Preliminary ROW Requirements	1,575.64	1,575.64		1,575.64	100.0	-
10206-Preliminary Cost Estimates	1,575.64	1,575.64		1,575.64	100.0	-
10207-Preliminary Environmental Analysis	1,575.64	1,575.64		1,575.64	100.0	-
10208-Proj. Fact Sheet w/Est. Local Cost vs. Total Proj. Cost	1,575.64	1,575.64		1,575.64	100.0	-
10209-Meetings, Coord. & Support for Project Dvlpment	1,575.64	1,575.64		1,575.64	100.0	-
FC 110 - Route and Design Studies						
11004-Preliminary Cost Estimates	5,627.30	5,627.30		5,627.30	100.0	-
11005-Design Schematic	8,103.29	8,103.29		8,103.29	100.0	-
11006-Preliminary ROW Requirements	7,503.05	7,503.05		7,503.05	100.0	-
FC 130 - Right-of-Way Data						
13008-Coordination and Management of Right-of-Way Data	6,330.75	5,381.14		5,381.14	85.0	949.61
13020-ROW Map / SUB	11,200.00	6,720.00		6,720.00	60.0	4,480.00
FC 150 - Field Surveying						
15030-Horizontal and Vertical Ties	12,784.00	12,041.00		12,041.00	94.2	743.00
15040-Determine Changes in Topogrophy	30,257.00	27,996.00		27,996.00	92.5	2,261.00
15060-Final Reports	3,364.00	2,186.00		2,186.00	65.0	1,178.00
15070-Project Management Oversight	1,246.00	810.00		810.00	65.0	436.00
FC 161 - Drainage						
16101-Hydrologic Map	7,228.00	7,228.00		7,228.00	100.0	-
16102-Hydraulic Drainage Study - Culverts	5,352.16	5,352.16		5,352.16	100.0	-
16103-Hydraulic Drainage Study - Channels	5,352.16	5,352.16		5,352.16	100.0	-
16104-Hydraulic Drianage Study - Irrigation Canals / Siphons	6,602.72	6,602.72		6,602.72	100.0	-
16105-Layout, Struc. Dsgn and Detail. Drainage Features-Culvert	6,602.72	6,602.72		6,602.72	100.0	-
16106-Layout, Struc. Dsgn and Detail. Drainage Features-Storm S	6,602.72	6,602.72		6,602.72	100.0	-
16107-Layout, Struc. Dsgn and Detail. Drainage Features-Outfall	6,602.72	6,602.72		6,602.72	100.0	-
16108-Layout, Struc. Dsgn and Detail. Drainage Features-Summary	6,602.72	6,602.72		6,602.72	100.0	-
16109-Layout, Struc. Dsgn and Detail. Drainage Features-Storm W	6,602.72	6,602.72		6,602.72	100.0	-
16111-Storm Water Pollution Prevention Plan (SW3P)	7,228.00	7,228.00		7,228.00	100.0	-

L &G Consulting Engineers Inc
2100 W. Expressway 83
Mercedes, TX 78570
(956)565-9813 Fax (956)565-9018

INVOICE#: 11325443
INVOICE DATE: 12/31/2015

BILL TO:
Hidalgo County Drainage District#1
902 N. Doolittle
Edinburg, TX 78542

JOB:130106
La Joya Watershed Imp
WA#6A P.O #627201

DESCRIPTION	CONTRACT	PREVIOUS APPLICATIONS	CURRENT COMPLETED	TOTAL COMPLETED	% COMPL	BALANCE TO FINISH
FC 163 - Miscellaneous Roadway						
16306-Special Utility Details (Irrigation Lines)	4,301.76	4,301.76		4,301.76	100.0	-
16307-Miscellaneous Structures	4,301.76	4,301.76		4,301.76	100.0	-
16301-Foundation Studies	4,301.76	4,301.76		4,301.76	100.0	-
16302-Utility Agreements and Exhibits	4,301.76	4,089.17		4,089.17	95.1	212.59
16303-Railroad Sketches	4,301.76	4,301.76		4,301.76	100.0	-
16304-Traffic Signal Agreement Sketches	4,301.76	4,301.76		4,301.76	100.0	-
16305-Estimate	4,301.76	4,301.76		4,301.76	100.0	-
16308-Specifications and General Notes	4,301.76	4,301.76		4,301.76	100.0	-
FC 600 - Right-of-Way Acquisition Services						
60000-ROW Acquisition Administration	23,800.00	13,090.00		13,090.00	55.0	10,710.00
60001-Title Services Fees	2,400.00			0.00	0.0	2,400.00
60002-Appraisal Services Fees	3,000.00			0.00	0.0	3,000.00
60003-Appraisal Services Review Fees	1,400.00			0.00	0.0	1,400.00
60004-Parcel Negotiations	14,000.00			0.00	0.0	14,000.00
60005-Closing Sevices Fees	800.00			0.00	0.0	800.00
60030-Appraisal Services Fees / SUB	8,000.00			0.00	0.0	8,000.00
60040-Appraisal Review Fees / SUB	1,800.00			0.00	0.0	1,800.00
Compensable Utilities						
60101-Preliminary Design Consultations	5,877.20	5,877.20		5,877.20	100.0	-
60102-Field Observations and Verifications	5,877.20	5,877.20		5,877.20	100.0	-
60103-Exchange of Information with Utility Providers	14,630.48	10,241.34	1,463.05	11,704.39	80.0	2,926.09
60104-Confirmation of Property Interests	14,630.48	8,778.30	1,463.05	10,241.35	70.0	4,389.13
60105-Develop and execute release of Easements	14,630.48			0.00	0.0	14,630.48
60106-Coordination and Development of Joint Use Agreements	6,552.44	6,552.44		6,552.44	100.0	-
60107-Utility meetings throughout project development	5,314.50	3,188.70	531.45	3,720.15	70.0	1,594.35
TOTALS:	322,499.65	243,131.85	3,457.55	246,589.40	76.5	75,910.25

ORIGINAL CONTRACT SUM	$	322,499.65
CHANGE BY CHANGE ORDER	$	0.00
CONTRACT SUM TO DATE	$	322,499.65
TOTAL COMPLETED TO DATE	$	246,589.40
LESS PREVIOUS INVOICES	$	243,131.85
CURRENT PAYMENT DUE	$	3,457.55

PROJECT MANAGER'S SIGNATURE

L&G Consulting Engineers, Inc
2100 W. Expressway 83
Mercedes, Texas 78570
(956) 565-9813

Project Workhour Report
La Joya Watershed Improvements WA#6A
Reference:Inv#11325443
Date: 12/31/15
P.O.#627201

	Hrs		Rate	Total
Senior Project Manager	0.00	X	212.59	$0.00
Senior Engineer	0.00	X	175.07	$0.00
Project Engineer	0.00	X	121.92	$0.00
ROW Administrator	30.20	X	106.29	$3,209.96
Environmental Scientis/Specialist	0.00	X	78.16	$0.00
Seinior Engineer Tech	0.00	X	78.16	$0.00
Engineer Tech	0.00	X	75.03	$0.00
Admin/Clerical	4.40	X	56.27	$247.59

Grand Total of Hours		$ 3,457.55
	(Difference due to rounding hours)	$ -

Invoice Summary

Man Hours	$ 3,457.55
Right-of Way Acquisitions	
Sub Contract (See Attached Sub Invoice for Man Hour Breakdown)	$ -

Total Per Invoice Submitted **$ 3,457.55**

L & G Engineering Electronic Data & CAD Disclaimer

By opening the attached files, the user agrees that data provided by this electronic file is for information purposes only and should be used at one's own risk. L & G Engineering, makes no representations, written or verbal, that the information contained in these CAD files are complete or accurate or should be relied upon for construction except to the extent that they are labeled, dimensioned or otherwise noted and reflect exactly what is on the approved and sealed preliminary or final drawings. Any conflict between the information reflected on the sealed plan sheets and that provided via this electronic data file shall be resolved in favor of the sealed plan sheets. Any reproduction of these sheets without the appropriate preliminary stamp, or professional engineering seal and signature, and the express written approval of L & G Engineering, is a violation of the Professional Engineering Practice Act.

HCDD#1

12/30/2015

La Joya Watershed Improvement Project (WA#6)

FC: 60103, 60104, 60107

L & G Engineering

Highway / Civil
Structural / Bridge
Environmental
Construction Material Testing

900 S. Stewart Rd. Ste 5
Mission, TX. 78572
Phone : (956) 585-1909
Fax : (956) 585-1927

Hidalgo County Drainage District No. 1

902 North Doolittle Road Edinburg, Texas 78542 Office: (956) 292-7080

Invoice Processing Checklist/Routing Slip

Invoice/ Backup

Date Received: 1/5/2016

Engineer/Firm Name: L&G Engineering

Project Name/Number: La Joya Watershed Improvement WA No. 4

Invoice No.: 11325402

Purchase Order No.: 625396

Received By: Rosa Arce

Forwarded to: Nora D. Cavazos _____ Date: _____
Claudette Guerrero _____ Date: _____

Total # of Pages Submitted: 5

Attachments: CD

Forwarded to: Jose N. Saldivar _____ Date: _____

Forwarded to: Lora Briones _____ Date: _____

Additional Comments: $1,020.00

THIS ROUTING SLIP MUST BE KEPT WITH ORIGINAL INVOICE

1 of 5

L&G Engineering

Transportation Consultants

January 4, 2016

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1

JAN 04 2016

4:30 AM / PM

BY: Rosa Arce

Mr. Raul Sesin, P.E. – District Manager
Hidalgo County Drainage District #1
902 N. Doolittle
Edinburg, Texas 78542

RE: Work Authorization #4 on La Joya Watershed Improvement Project
Job # 130104
P.O. # 625396

Dear Mr. Sesin,

Attached for your review and approval is our invoice for the services rendered during the month of December 2015 on the subject referenced project.

The following is attached:

- L&G's Invoice #11325402
- CD w/ Electronic Files of Data for:
  - Task B (Task 4b)

TASK		% COMPL
Task A **Construction Plans for Liberty Pit Detention Facility**		
Task 1a ~ Coordination & Management of ROW and Design Survey, & Geotechnical	L&G	100%
Task Complete – See progress report dated June 1, 2015		
Task 2a ~ (SUB): Field and Design Survey (Utility Locates) - #3 (FC150)	ROW SS	100%
Task Complete – See progress report (#R15-032) from R.O.W. S.S dated May 31, 2015		
Task 3a ~ (SUB): ROW Map, Parcel Sketches & Field Notes - #3 (FC130)	ROW SS	100%
Task Complete – See progress report (#R15-032) from R.O.W. S.S dated May 31, 2015		
Task 4a ~ Acquisition of ROW for Proposed Facility; Negotiation with Land Owner(s)	L&G ROW	92.9%
No Update – See progress report dated December 1, 2015		
Task 5a ~ (SUB): Geotechnical Exploration & Analyses for Proposed Facility - #2	L&G LAB	100.0%
Task Complete – See progress report from L&G Lab dated April 30, 2015		

2100 W. Expressway 83 • Mercedes, TX 78570 • Office (956) 565-9813 • Fax (956) 565-9018
900 S. Stewart Rd., Ste. 9 • Mission, TX 78572 • Office (956) 585-1909 • Fax (956) 585-1927

Task 6a ~ Conceptual Site Plan Identifying 60% of Recovered ROW & Design Surveys (Prior to PS&E Release)	L&G	100.0%
Task Complete – See progress report dated January 2, 2015		
Task 7a ~ Plans, Specifications & Estimates (PS&E) for Proposed Facility & 400ft. Zone for Commercial Development	L&G	80.0%
No Update – See progress report dated March 2, 2015		
Task B **Construction Plan for South Basin Pit Detention Facility**		
Task 1b ~ Coordination & Management of ROW and Design Survey, & Geotechnical	L&G	100%
Task Complete – See progress report dated June 1, 2015		
Task 2b ~ (SUB): Field and Design Survey (Utility Locates) - #3 (FC150)	ROW SS	100%
Task Complete – See progress report (#R15-031) from R.O.W. S.S dated May 31, 2015		
Task 3b ~ (SUB): ROW Map, Parcel Sketches & Field Notes - #3 (FC130)	ROW SS	100%
Task Complete – See progress report (#R15-031) from R.O.W. S.S dated May 31, 2015		
Task 4b ~ Acquisition of ROW for Proposed Facility; Negotiation with Land Owner(s)	L&G ROW	82.7%
Update – The closing documents have been sent to HCDD#1 for legal review before the formal closing. Conveyance Authority issues have been resolved.		
Task 5b ~ (SUB): Geotechnical Exploration & Analyses for Proposed Facility - #2	L&G LAB	100.0%
Task Complete – See progress report from L&G Lab dated April 30, 2015		
Task 6b ~ Conceptual Site Plan Identifying 60% of Recovered ROW & Design Surveys (Prior to PS&E Release)	L&G	100.0%
Task Complete – See progress report dated January 2, 2015		
Task 7b ~ Plans, Specifications & Estimates (PS&E) for Proposed Facility	L&G	90.0%
No Update – See progress report dated December 1, 2015		
Task C **Phase I Outfall Development of La Joya Watershed Drainage Master Plan**		
Task 1c ~ Coordination & Mgmt of ROW Base Map, Design Survey & Geotechnical	L&G	92.6%
No Update – See progress report dated August 3, 2015		
Task 2c ~ (SUB): Design Surveys (Utility Locates) - #3 (FC150)	ROW SS	85.0%
No Update – See progress report (#R15-053) from R.O.W. S.S dated June 30, 2015		

Task 3c ~ (SUB): Geotechnical Exploration & Analyses for Proposed Facility	L&G LAB	100.0%
Task Complete – See Progress Report from L&G Lab dated July 24, 2015		
Task 4c ~ Preliminary Detailed Schematic for Proposed Phase I Outfall	L&G	100.0%
Task Complete – See progress report dated February 2, 2015		
Task 5c ~ Plans, Specifications & Estimates (PS&E) for Proposed Facility	L&G	90.0%
No Update – See progress report dated December 1, 2015		

Should you have any questions regarding this submittal or would like clarification on any aspect of the project, please do not hesitate to call me at (956) 585-1909.

Sincerely,

David Saenz, P.E., C.F.M.
Project Manager
L&G Engineering

L &G Consulting Engineers Inc
2100 W. Expressway 83
Mercedes, TX 78570
(956)565-9813 Fax (956)565-9018

INVOICE#: 11325402
INVOICE DATE: 12/31/2015

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
JAN 04 2016
4:30 AM / PM
BY: Rosa Arie

BILL TO:
Hidalgo County Drainage District#1
902 N. Doolittle
Edinburg, TX 78542

JOB:130104
La Joya Watershed Imp
WA#4
PO #625396

DESCRIPTION	CONTRACT	PREVIOUS APPLICATIONS	CURRENT COMPLETED	TOTAL COMPLETED	% COMPL	BALANCE TO FINISH
Engineering services for the month of December 2015.						
Task A - Construction Plans for Liberty Pit Detention Facility						
13001-Task 1a - Coord. & Management of ROW & Design Survey	10,704.28	10,704.28		10,704.28	100.0	-
15010-Task 2a - SUB: Field & Design Survey (Utlity Locates	27,168.00	27,168.00		27,168.00	100.0	-
13010-Task 3a - SUB: ROW Map Parcel Sketches & Field Notes	22,400.00	22,400.00		22,400.00	100.0	-
60001-Task 4a - Acquisition of ROW for Proposed Facility	28,100.00	26,115.00		26,115.00	92.9	1,985.00
33010-Task 5a - SUB: Geotech. Exploration & Analysis	27,538.64	27,538.64		27,538.64	100.0	-
11006-Task 6a - Conceptual Site Plan Identify 60% of Reco	11,498.80	11,498.80		11,498.80	100.0	-
16001-Task 7a - Plans, Specification & Estimates (PS&E)	50,384.04	40,317.32		40,317.32	80.0	10,066.72
Task B - Construction Plans for South Basin Pit Detention Facility						
13002-Task 1b - Coord. & Management of ROW & Design Survey	7,928.16	7,928.16		7,928.16	100.0	-
15020-Task 2b - SUB: Field & Design Survey (Utlity Locates	24,935.00	24,935.00		24,935.00	100.0	-
13020-Task 3b - SUB: ROW Map Parcel Sketches & Field Notes	7,488.00	7,488.00		7,488.00	100.0	-
60003-Task 4b - Acquisition of ROW for Proposed Facility	14,800.00	11,220.00	1,020.00	12,240.00	82.7	2,560.00
33320-Task 5b - SUB: Geotech. Exploration & Analysis	21,162.28	21,162.28		21,162.28	100.0	-
11007-Task 6b - Conceptual Site Plan Identify 60% of Reco	8,966.44	8,966.44		8,966.44	100.0	-
16002-Task 7b - Plans, Specification & Estimates (PS&E)	33,589.36	30,241.05		30,241.05	90.0	3,348.31
Task C - Phase I Outfall Development of La Joya Watershed Drainage Master Plan						
13003-Task 1c - Coord. & Management of ROW Base Map. Desig	13,030.24	12,067.36		12,067.36	92.6	962.88
15030-Task 2c - SUB: Desgin Survey (Utlitiy Locates	67,062.00	57,002.50		57,002.50	85.0	10,059.50
33030-Task 3c - SUB: Geotechnical Exploration & Analysis	29,301.96	29,301.96		29,301.96	100.0	-
11008-Task 4c - Preliminary Detailed Schematic for Propose	37,866.28	37,866.28		37,866.28	100.0	-
16003-Task 5c - Plans, Specfications & Estimates (PS&E)	200,524.00	180,471.60		180,471.60	90.0	20,052.40
	644,447.48	594,392.67	1,020.00	595,412.67	92.4	49,034.81
TOTALS:	644,447.48	594,392.67	1,020.00	595,412.67	92.4	49,034.81

ORIGINAL CONTRACT SUM	$	644,447.48
CHANGE BY CHANGE ORDER	$	0.00
CONTRACT SUM TO DATE	$	644,447.48
TOTAL COMPLETED TO DATE	$	595,412.67
LESS PREVIOUS INVOICES	$	594,392.67
CURRENT PAYMENT DUE	$	1,020.00

PROJECT MANAGER'S SIGNATURE

L&G Consulting Engineers, Inc
2100 W. Expressway 83
Mercedes, Texas 78570
(956) 565-9813

Project Workhour Report
La Joya Watershed Improvements WA#4
Reference: Inv# 11325402
Date: 12/31/2015
P.O. #625396

	Hrs		Rate	Total
Senior Project Manager	0.00	X	212.59	$0.00
Senior Engineer	0.00	X	175.07	$0.00
Design Engineer	0.00	X	112.55	$0.00
Senior Engineer Tech	0.00	X	78.16	$0.00
Admin/Clerical	0.00	X	56.27	$0.00

Grand Total of Hours	$	-
(Difference due to rounding hours)	$	-

Invoice Summary

Man Hours	$	-
Right-of-Way Acquisition	$	1,020.00
Sub Contract (See Attached Sub Invoice for Man Hour Breakdown)	$	-
	$	-
(Difference due to rounding)	$	-
Total Per Invoice Submitted	**$**	**1,020.00**

L&G Engineering
Transportation Consulting Engineers

2100 W. Expressway 83
Mercedes, TX 78570
Phone: (956) 565-9813
Fax: (956) 565-9018
Toll Free: (888) 565-9813

900 S. Stewart Rd., Ste. 10
Mission, TX 78572
Phone: (956) 585-1909
Fax: (956) 585-1927
Toll Free: (866) 585-1909

Firm No. F-4105

Letter of Transmittal

Mr. Raul Sesin, P.E. – District Manager
Hidalgo County Drainage District #1
902 N. Doolittle Rd.
Edinburg, Texas 78542

DATE: January 4, 2015

Project: Progress Report & Invoice Package for Various Work Authorizations
La Joya Watershed Improvement Project
Pharr McAllen Drain & South Floodwater Channel Watershed Improvement Project

L&G PROJECT NO.:

TRANSMITTED:

☒ For Your Use	☐ Please comment	☐ Approved as Noted
☐ As Requested	☐ Reply ASAP	☐ As Noted Below

VIA:

☐ US Mail	☐ Courier	☒ Hand Carry
☐ E-Mail	☐ Lonestar Overnight	☐ Pick up

COPIES	DESCRIPTION
1	Progress Report and Invoice Package (including CD w/Electronic Files) for the following Project:
	• Work Authorization #4 on La Joya Watershed Improvement Project ✓
	○ P.O. #625396, Invoice #11325402 $1,020.00
	• Work Authorization #2 on Pharr McAllen Drain & South Floodwater Channel
	○ P.O. #626939, Invoice #11325408 $15,215.49
	▪ 3 Copies of CSE South Pharr-Las Milpas Lateral Drainage Study ✓
	▪ 3 Copies of Overall Drainage Area Map for South Floodwater Channel ✓
	• Work Authorization #3 on Pharr McAllen Drain & South Floodwater Channel
	○ P.O. #627892, Invoice #11325418 $34,538.01
	• 1 Original & 2 Copies of Geotechnical Report for Pharr-McAllen Drain ✓

REMARKS:

If you have any questions or comments, please feel free to contact me, Mr. David Saenz, P.E. at (956) 585-1909.

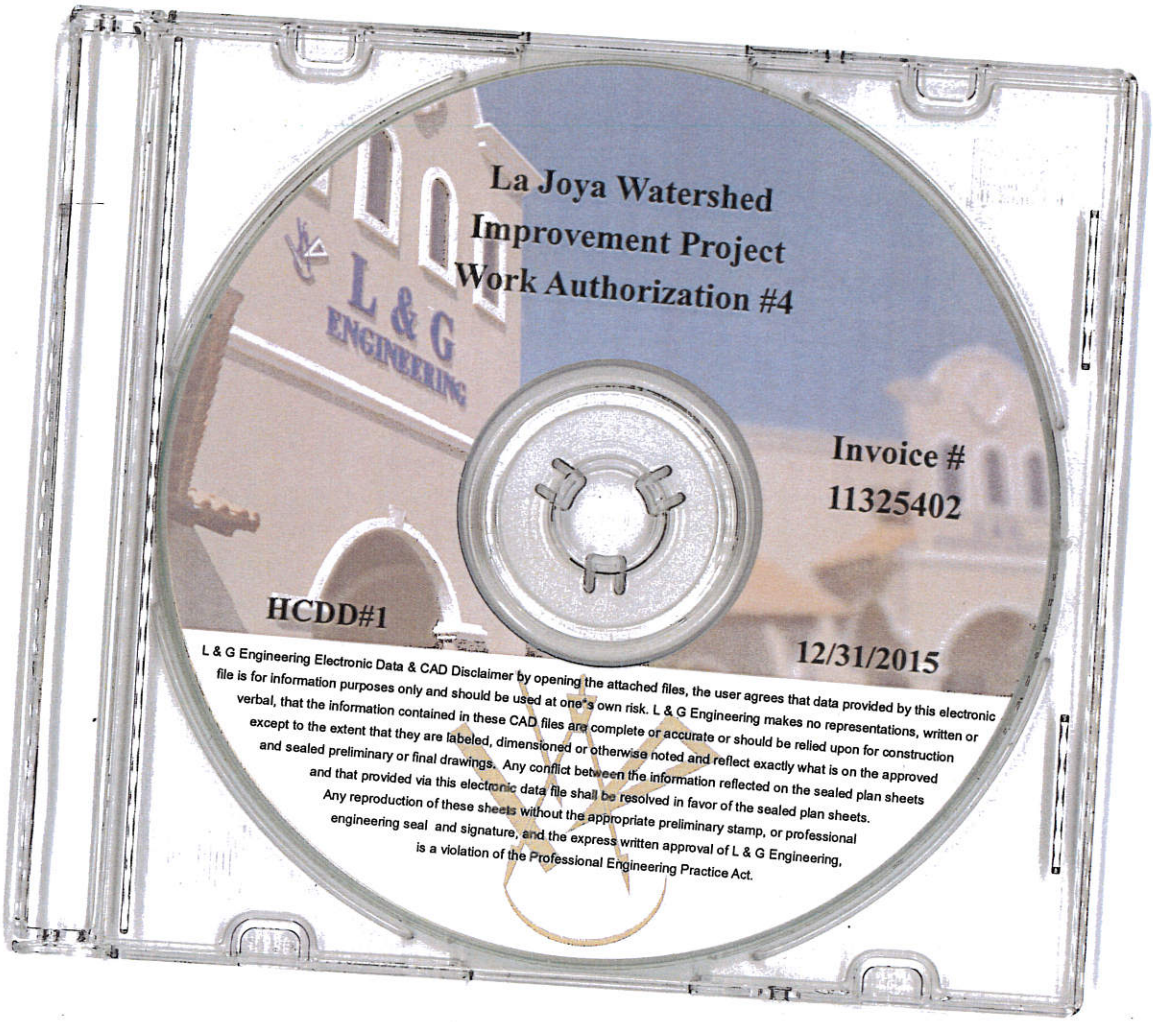
Thank you,

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 4 0 2015
1:40 AM PM
BY:

Signed:_____

Date:_____ **Time:**_____

If enclosures are not as stated, please notify us.


La Joya Watershed
Improvement Project
Work Authorization #4
L & G
ENGINEERING
Invoice #
11325402
HCDD#1
12/31/2015
L & G Engineering Electronic Data & CAD Disclaimer by opening the attached files, the user agrees that data provided by this electronic file is for information purposes only and should be used at one's own risk. L & G Engineering makes no representations, written or verbal, that the information contained in these CAD files are complete or accurate or should be relied upon for construction except to the extent that they are labeled, dimensioned or otherwise noted and reflect exactly what is on the approved and sealed preliminary or final drawings. Any conflict between the information reflected on the sealed plan sheets and that provided via this electronic data file shall be resolved in favor of the sealed plan sheets.
Any reproduction of these sheets without the appropriate preliminary stamp, or professional engineering seal and signature, and the express written approval of L & G Engineering, is a violation of the Professional Engineering Practice Act.

Hidalgo County Drainage District No. 1

902 North Doolittle Road Edinburg, Texas 78542 Office: (956) 292-7080

Invoice Processing Checklist/Routing Slip

Invoice/ Backup

Date Received: 12/2/2015

Engineer/Firm Name: L&G Engineering

Project Name/Number: La Joya Watershed Imp. Project WA No. 4

Invoice No.: 11325375

Purchase Order No.: 625396

Received By: Rosa Arce

Forwarded to: Nora D. Cavazos _____ Date: _____
Claudette Guerrero _____ Date: _____

Total # of Pages Submitted: 6

Attachments: Project Work Hour Report & CD

Forwarded to: Jose N. Saldivar _____ Date: _____

Forwarded to: Lora Briones _____ Date: _____

Additional Comments: $14,536.89

THIS ROUTING SLIP MUST BE KEPT WITH ORIGINAL INVOICE

L&G Engineering
Transportation Consultants

December 1, 2015

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 02 2015
8:00 AM / PM
BY: R. Sesin

Mr. Raul Sesin, P.E. – District Manager
Hidalgo County Drainage District #1
902 N. Doolittle
Edinburg, Texas 78542

RE: Work Authorization #4 on La Joya Watershed Improvement Project
Job # 130104
P.O. # 625396

Dear Mr. Sesin,

Attached for your review and approval is our invoice for the services rendered during the month of December 2015 on the subject referenced project.

The following is attached:

- L&G's Invoice #11325375 ✓
- CD w/ Electronic Files of Data for:
  - Task A (Task 4a)
  - Task B (Task 4b & 7b)
  - Task C (Task 5c)

TASK		% COMPL
Task A **Construction Plans for Liberty Pit Detention Facility**		
Task 1a ~ Coordination & Management of ROW and Design Survey, & Geotechnical	L&G	100%
Task Complete – See progress report dated June 1, 2015		
Task 2a ~ (SUB): Field and Design Survey (Utility Locates) - #3 (FC150)	ROW SS	100%
Task Complete – See progress report (#R15-032) from R.O.W. S.S dated May 31, 2015		
Task 3a ~ (SUB): ROW Map, Parcel Sketches & Field Notes - #3 (FC130)	ROW SS	100%
Task Complete – See progress report (#R15-032) from R.O.W. S.S dated May 31, 2015		
Task 4a ~ Acquisition of ROW for Proposed Facility; Negotiation with Land Owner(s)	L&G ROW	92.9%
Update – One parcel has been submitted for condemnation but discussions with the property owners and Atlas & Hall continue. The property owners want to settle.		

2100 W. Expressway 83 • Mercedes, TX 78570 • Office (956) 565-9813 • Fax (956) 565-9018
900 S. Stewart Rd., Ste. 9 • Mission, TX 78572 • Office (956) 585-1909 • Fax (956) 585-1927

Task 5a ~ (SUB): Geotechnical Exploration & Analyses for Proposed Facility - #2	L&G LAB	100.0%
Task Complete – See progress report from L&G Lab dated April 30, 2015		
Task 6a ~ Conceptual Site Plan Identifying 60% of Recovered ROW & Design Surveys (Prior to PS&E Release)	L&G	100.0%
Task Complete – See progress report dated January 2, 2015		
Task 7a ~ Plans, Specifications & Estimates (PS&E) for Proposed Facility & 400ft. Zone for Commercial Development	L&G	80.0%
No Update – See progress report dated March 2, 2015		
Task B **Construction Plan for South Basin Pit Detention Facility**		
Task 1b ~ Coordination & Management of ROW and Design Survey, & Geotechnical	L&G	100%
Task Complete – See progress report dated June 1, 2015		
Task 2b ~ (SUB): Field and Design Survey (Utility Locates) - #3 (FC150)	ROW SS	100%
Task Complete – See progress report (#R15-031) from R.O.W. S.S dated May 31, 2015		
Task 3b ~ (SUB): ROW Map, Parcel Sketches & Field Notes - #3 (FC130)	ROW SS	100%
Task Complete – See progress report (#R15-031) from R.O.W. S.S dated May 31, 2015		
Task 4b ~ Acquisition of ROW for Proposed Facility; Negotiation with Land Owner(s)	L&G ROW	75.8%
Update – The parcel acquisition was delayed due to paperwork needed before acquisition. The parcel is ready to be acquired, preparing closing documents by the Title Company.		
Task 5b ~ (SUB): Geotechnical Exploration & Analyses for Proposed Facility - #2	L&G LAB	100.0%
Task Complete – See progress report from L&G Lab dated April 30, 2015		
Task 6b ~ Conceptual Site Plan Identifying 60% of Recovered ROW & Design Surveys (Prior to PS&E Release)	L&G	100.0%
Task Complete – See progress report dated January 2, 2015		
Task 7b ~ Plans, Specifications & Estimates (PS&E) for Proposed Facility	L&G	90.0%
Update – L&G has continued project development of PS&E including Title Sheet, Overall Project Layout, Preliminary Grading Plan, Typical Sections & has included pertinent Design Standards. Additionally, earthwork quantities are being calculated using Geopak.		
Task C **Phase I Outfall Development of La Joya Watershed Drainage Master Plan**		

Task 1c ~ Coordination & Mgmt of ROW Base Map, Design Survey & Geotechnical	L&G	92.6%
No Update – See progress report dated August 3, 2015		
Task 2c ~ (SUB): Design Surveys (Utility Locates) - #3 (FC150)	ROW SS	85.0%
No Update – See progress report (#R15-053) from R.O.W. S.S dated June 30, 2015		
Task 3c ~ (SUB): Geotechnical Exploration & Analyses for Proposed Facility	L&G LAB	100.0%
Task Complete – See Progress Report from L&G Lab dated July 24, 2015		
Task 4c ~ Preliminary Detailed Schematic for Proposed Phase I Outfall	L&G	100.0%
Task Complete – See progress report dated February 2, 2015		
Task 5c ~ Plans, Specifications & Estimates (PS&E) for Proposed Facility	L&G	90.0%
Update – L&G has continued project development of PS&E including Title Sheet, Overall Project Layout, Plan & Profile (P&P) Sheets, Culvert Crossings, cross sections and incorporation of pertinent Design Standards.		

Should you have any questions regarding this submittal or would like clarification on any aspect of the project, please do not hesitate to call me at (956) 585-1909.

Sincerely,

David Saenz, P.E., C.F.M.
Project Manager
L&G Engineering

L &G Consulting Engineers Inc
2100 W. Expressway 83
Mercedes, TX 78570
(956)565-9813 Fax (956)565-9018

INVOICE#: 11325375
INVOICE DATE: 11/30/2015

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 02 2015
8:00 AM / PM
BY: R. Ince

BILL TO:
Hidalgo County Drainage District#1
902 N. Doolittle
Edinburg, TX 78542

JOB:130104
La Joya Watershed Imp
WA#4
PO #625396

DESCRIPTION	CONTRACT	PREVIOUS APPLICATIONS	CURRENT COMPLETED	TOTAL COMPLETED	% COMPL	BALANCE TO FINISH
Engineering services for the month of November 2015.						
Task A - Construction Plans for Liberty Pit Detention Facility						
13001-Task 1a - Coord. & Management of ROW & Design Survey	10,704.28	10,704.28		10,704.28	100.0	-
15010-Task 2a - SUB: Field & Design Survey (Utlity Locates	27,168.00	27,168.00		27,168.00	100.0	-
13010-Task 3a - SUB: ROW Map Parcel Sketches & Field Notes	22,400.00	22,400.00		22,400.00	100.0	-
60001-Task 4a - Acquisition of ROW for Proposed Facility	28,100.00	24,300.00	1,815.00	26,115.00	92.9	1,985.00
33010-Task 5a - SUB: Geotech. Exploration & Analysis	27,538.64	27,538.64		27,538.64	100.0	-
11006-Task 6a - Conceptual Site Plan Identify 60% of Reco	11,498.80	11,498.80		11,498.80	100.0	-
16001-Task 7a - Plans, Specification & Estimates (PS&E)	50,384.04	40,317.32		40,317.32	80.0	10,066.72
Task B - Construction Plans for South Basin Pit Detention Facility						
13002-Task 1b - Coord. & Management of ROW & Design Survey	7,928.16	7,928.16		7,928.16	100.0	-
15020-Task 2b - SUB: Field & Design Survey (Utlity Locates	24,935.00	24,935.00		24,935.00	100.0	-
13020-Task 3b - SUB: ROW Map Parcel Sketches & Field Notes	7,488.00	7,488.00		7,488.00	100.0	-
60003-Task 4b - Acquisition of ROW for Proposed Facility	14,800.00	10,200.00	1,020.00	11,220.00	75.8	3,580.00
33320-Task 5b - SUB: Geotech. Exploration & Analysis	21,162.28	21,162.28		21,162.28	100.0	-
11007-Task 6b - Conceptual Site Plan Identify 60% of Reco	8,966.44	8,966.44		8,966.44	100.0	-
16002-Task 7b - Plans, Specification & Estimates (PS&E)	33,589.36	28,565.36	1,675.69	30,241.05	90.0	3,348.31
Task C - Phase I Outfall Development of La Joya Watershed Drainage Master Plan						
13003-Task 1c - Coord. & Management of ROW Base Map. Desig	13,030.24	12,067.36		12,067.36	92.6	962.88
15030-Task 2c - SUB: Desgin Survey (Utlitiy Locates	67,062.00	57,002.50		57,002.50	85.0	10,059.50
33030-Task 3c - SUB: Geotechnical Exploration & Analysis	29,301.96	29,301.96		29,301.96	100.0	-
11008-Task 4c - Preliminary Detailed Schematic for Propose	37,866.28	37,866.28		37,866.28	100.0	-
16003-Task 5c - Plans, Specfications & Estimates (PS&E)	200,524.00	170,445.40	10,026.20	180,471.60	90.0	20,052.40
	644,447.48	579,855.78	14,536.89	594,392.67	92.2	50,054.81
TOTALS:	644,447.48	579,855.78	14,536.89	594,392.67	92.2	50,054.81

PROJECT MANAGER'S SIGNATURE

ORIGINAL CONTRACT SUM	$	644,447.48
CHANGE BY CHANGE ORDER	$	0.00
CONTRACT SUM TO DATE	$	644,447.48
TOTAL COMPLETED TO DATE	$	594,392.67
LESS PREVIOUS INVOICES	$	579,855.78
CURRENT PAYMENT DUE	$	14,536.89

L&G Consulting Engineers, Inc
2100 W. Expressway 83
Mercedes, Texas 78570
(956) 565-9813

Project Workhour Report
La Joya Watershed Improvements WA#4
Reference: Inv# 11325375
Date: 11/30/2015
P.O. #625396

	Hrs		Rate	Total
Senior Project Manager	8.00	X	212.59	$1,700.72
Senior Engineer	18.00	X	175.07	$3,151.26
Design Engineer	29.00	X	112.55	$3,263.95
Senior Engineer Tech	43.00	X	78.16	$3,360.88
Admin/Clerical	4.00	X	56.27	$225.08

Grand Total of Hours	$	11,701.89
(Difference due to rounding hours)	$	-

Invoice Summary

Man Hours	$	11,701.89
Right-of-Way Acquisition	$	2,835.00
Sub Contract (See Attached Sub Invoice for Man Hour Breakdown)	$	-
	$	-
(Difference due to rounding)	$	-
Total Per Invoice Submitted	**$**	**14,536.89**

L&G Engineering
Transportation Consulting Engineers

2100 W. Expressway 83
Mercedes, TX 78570
Phone: (956) 565-9813
Fax: (956) 565-9018
Toll Free: (888) 565-9813

900 S. Stewart Rd., Ste. 10
Mission, TX 78572
Phone: (956) 585-1909
Fax: (956) 585-1927
Toll Free: (866) 585-1909

Firm No. F-4105

Letter of Transmittal

DATE: December 1, 2015

Mr. Raul Sesin, P.E. – District Manager
Hidalgo County Drainage District #1
902 N. Doolittle Rd.
Edinburg, Texas 78542

Project: Progress Report & Invoice Package for Various Work Authorizations
La Joya Watershed Improvement Project
Pharr McAllen Drain & South Floodwater Channel Watershed Improvement Project

L&G PROJECT NO.:

TRANSMITTED:

☒ For Your Use	☐ Please comment	☐ Approved as Noted
☐ As Requested	☐ Reply ASAP	☐ As Noted Below

VIA:

☐ US Mail	☐ Courier	☒ Hand Carry
☐ E-Mail	☐ Lonestar Overnight	☐ Pick up

COPIES	DESCRIPTION
1	Progress Report and Invoice Package (including CD w/Electronic Files) for the following Project:
	• Work Authorization #4 on La Joya Watershed Improvement Project
	o P.O. #625396, Invoice #11325375
	• Work Authorization #3 on Pharr McAllen Drain & South Floodwater Channel
	o P.O. #627892, Invoice #11325372

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 02 2015
800 AM / PM
BY: Rosa Arce

REMARKS:

If you have any questions or comments, please feel free to contact me, Mr. David Saenz, P.E. at (956) 585-1909.

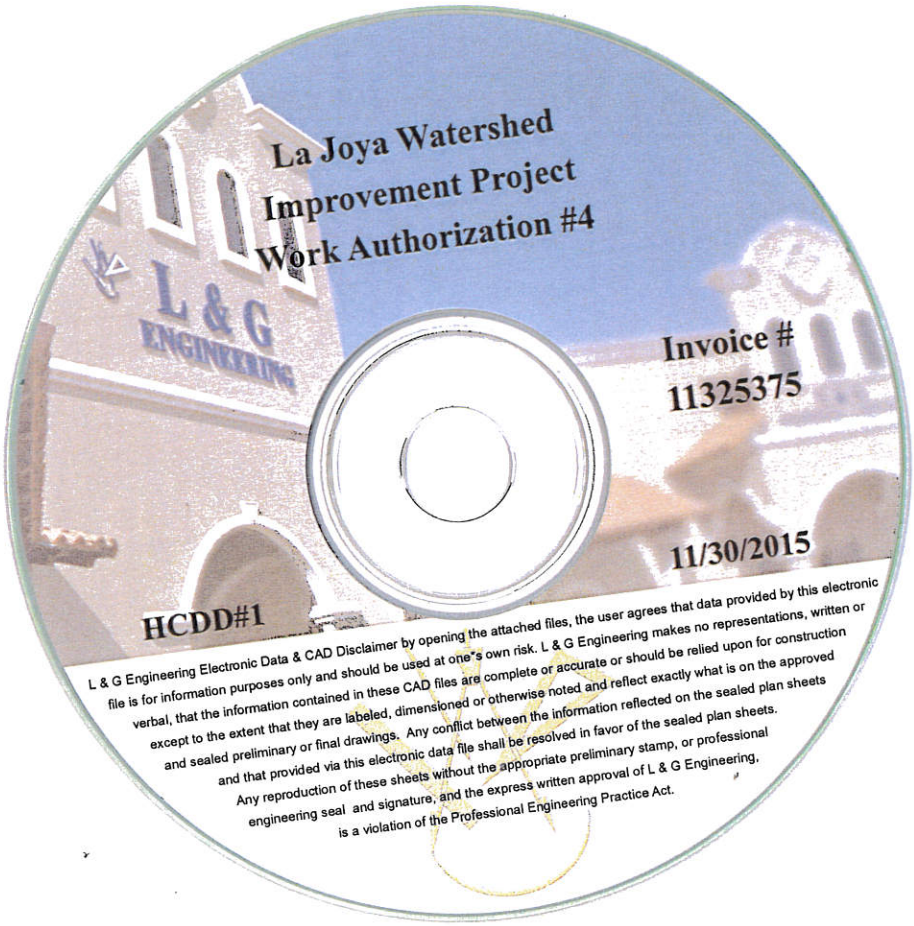
Thank you,

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 01 2015
4:55 AM (PM)
BY: Esther Layton

Signed: Esther Layton

Date: 12/1/15 Time: 4:55

If enclosures are not as stated, please notify us.


La Joya Watershed
Improvement Project
Work Authorization #4
L & G
ENGINEERING
Invoice #
11325375
11/30/2015
HCDD#1
L & G Engineering Electronic Data & CAD Disclaimer by opening the attached files, the user agrees that data provided by this electronic file is for information purposes only and should be used at one"s own risk. L & G Engineering makes no representations, written or verbal, that the information contained in these CAD files are complete or accurate or should be relied upon for construction except to the extent that they are labeled, dimensioned or otherwise noted and reflect exactly what is on the approved and sealed preliminary or final drawings. Any conflict between the information reflected on the sealed plan sheets and that provided via this electronic data file shall be resolved in favor of the sealed plan sheets.
Any reproduction of these sheets without the appropriate preliminary stamp, or professional engineering seal and signature, and the express written approval of L & G Engineering, is a violation of the Professional Engineering Practice Act.

Hidalgo County Drainage District No. 1

902 North Doolittle Road Edinburg, Texas 78542 Office: (956) 292-7080

Invoice Processing Checklist/Routing Slip

Invoice/ Backup

Date Received: 11/3/2015

Engineer/Firm Name: L&G Engineering

Project Name/Number: La Joya Watershed Imp WA No. 6A

Invoice No.: CD ONLY

Purchase Order No.:

Received By: Rosa Arce

Forwarded to: Nora D. Cavazos Date:
Claudette Guerrero Date:

Total # of Pages Submitted: 11

Attachments: CD's: Invoice NO. 11325330 & 11325297

Forwarded to: Jose N. Saldivar Date:

Forwarded to: Lora Briones Date:

Additional Comments:

THIS ROUTING SLIP MUST BE KEPT WITH ORIGINAL INVOICE

L&G Engineering
Transportation Consulting Engineers

2100 W. Expressway 83
Mercedes, TX 78570
Phone: (956) 565-9813
Fax: (956) 565-9018
Toll Free: (888) 565-9813

900 S. Stewart Rd., Ste. 10
Mission, TX 78572
Phone: (956) 585-1909
Fax: (956) 585-1927
Toll Free: (866) 585-1909

Firm No. F-4105

Letter of Transmittal

Mr. Raul E. Sesin, P.E. – Drainage District Manager
Attn: Ms. Lora Briones – Chief Financial Manager
Hidalgo County Drainage District #1
902 N. Doolittle Rd.
Edinburg, Texas 78542

DATE: November 2, 2015

REF.: Work Authorization #6A on La Joya Watershed Improvement Project
P.O. **#627201**
Invoice **11325330**

L&G PROJECT NO.: 130106

TRANSMITTED:

☒ For Your Use	☐ Please comment	☐ Approved as Noted
☐ As Requested	☐ Reply ASAP	☐ As Noted Below

VIA:

☐ US Mail	☐ Courier	☒ Hand Carry
☐ E-Mail	☐ Lonestar Overnight	☐ Pick up

COPIES	DESCRIPTION
1	CD for Invoice # 11325330
1	CD for Invoice #11325297

REMARKS:
Attached are two CDs. One CD contains the back up information for invoice #11325330 for the month of October. The second CD contains the back up information that was requested for Invoice #11325297 for the month of September.

If you have any questions or comments, please feel free to contact me or Mr. Damien B. Tijerina, P.E. at 956-585-1909.

Thank you,

P.E.

Armando J. Sandoval, P.E.
Project Manager

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
NOV 03 2015
8:00 AM PM
BY: Rosa Ana

Received By

If enclosures are not as stated, please notify us.

L & G Engineering Electronic Data & CAD Disclaimer

By opening the attached files, the user agrees that data provided by this electronic file is for information purposes only and should be used at one's own risk. L & G Engineering, makes no representations, written or verbal, that the information contained in these CAD files are complete or accurate or should be relied upon for construction except to the extent that they are labeled, dimensioned or otherwise noted and reflect exactly what is on the approved and sealed preliminary or final drawings. Any conflict between the information reflected on the sealed plan sheets and that provided via this electronic data file shall be resolved in favor of the sealed plan sheets. Any reproduction of these sheets without the appropriate preliminary stamp, or professional engineering seal and signature, and the express written approval of L & G Engineering, is a violation of the Professional Engineering Practice Act.

HCDD#1

11/2/2015

La Joya Watershed Improvement Project (WA#6)
Task 3,4,&7 Inv. # 11325297

L & G Engineering
Highway / Civil
Structural / Bridge
Environmental
Construction Material Testing
900 S. Stewart Rd. Ste 5
Mission, TX. 78572
Phone : (956) 585-1909
Fax : (956) 585-1927

L & G Engineering Electronic Data & CAD Disclaimer

By opening the attached files, the user agrees that data provided by this electronic file is for information purposes only and should be used at one's own risk. L & G Engineering, makes no representations, written or verbal, that the information contained in these CAD files are complete or accurate or should be relied upon for construction except to the extent that they are labeled, dimensioned or otherwise noted and reflect exactly what is on the approved and sealed preliminary or final drawings. Any conflict between the information reflected on the sealed plan sheets and that provided via this electronic data file shall be resolved in favor of the sealed plan sheets. Any reproduction of these sheets without the appropriate preliminary stamp, or professional engineering seal and signature, and the express written approval of L & G Engineering, is a violation of the Professional Engineering Practice Act.

HCDD#1

11/2/2015

La Joya Watershed Improvement Project (WA#6)
Task 6&7 Inv. # 11325330

L & G Engineering
Highway / Civil
Structural / Bridge
Environmental
Construction Material Testing
900 S. Stewart Rd. Ste 5
Mission, TX. 78572
Phone : (956) 585-1909
Fax : (956) 585-1927

AI -52992 4.

DRAINAGE - CONSENT

Meeting Date: 01/19/2016

Submitted By: Claudette Guerrero, DRAINAGE DISTRICT

Department: DRAINAGE DISTRICT

Information

CAPTION

2013 Bonds:
Budget 360
Lower Rio Grande Valley Regional Water Management Program (Delta Lake)
Engineering Firm: Tedsi Infrastructure Group.

Approval to issue payment on the following items:

A. Inv#20152594 in the amount of $737.18 related to Work Authorization No. 14-LRGVRWMP-Preliminary Planning & Development. PO#623576.

B. Inv#20152598 in the amount of $90.00 related to Work Authorization No. 12-LRGVRWMP-Legal Services. PO#623665.

C. Inv#20152593 in the amount of $5350.03 related to Work Authorization No. 13-LRGVRWMP-Preliminary Planning & Development. PO#623666.

D. Inv#20152561 in the amount of $7,443.28 related to Work Authorization No. 12-LRGVRWMP-Legal Services. PO#623665.

2013 Bonds:
Budget 365
Rural Drainage Development Pct.1

E. Inv#20152602 in the amount of $13,619.59 related to Work Authorization No. 18-Rural Drainage Improvement for Lucero Del Norte. PO#628010.

2013 Bonds:
Budget 370
Control Structures

F. Inv#20152608 in the amount of $28,147.74 related to Work Authorization No. 19-Donna North Lateral & FM 495 Control Structure. PO#628016.

2008 Bonds:

Budget 039
Consulting Management Services

G. Inv#20152581 in the amount of $10,790.97 related to Work Authorization No. 05-Pct.1 Rural Drainage Review. PO#623010.

BACKGROUND

Fiscal Impact

Attachments

Tedsi Inv#20152594
Tedsi Inv#20152598
Tedsi Inv#20152593
Tedsi Inv#20152561
Tedsi Inv#20152602
Tedsi Inv#20152581
Tedsi Inv#20152608

Form Review

Inbox	Reviewed By	Date
Budget & Management	Veronica Ortiz	01/15/2016 10:06 AM
Final Approval	Monica Badillo	01/15/2016 05:39 PM

Form Started By: Claudette Guerrero Started On: 01/14/2016 05:27 PM
Final Approval Date: 01/15/2016

Hidalgo County Drainage District No. 1

902 North Doolittle Road Edinburg, Texas 78542 Office: (956) 292-7080

Invoice Processing Checklist/Routing Slip

Invoice/ Backup

Date Received: 12/15/2015

Engineer/Firm Name: TEDSI Infrastructure Group

Project Name/Number: LRGVRWMP- Preliminary Planning Dev. WA No. 14

Invoice No.: 20152594

Purchase Order No.: 623576

Received By: Rosa Arce

Forwarded to: Nora D. Cavazos _____ Date: _____
Claudette Guerrero _____ Date: _____

Total # of Pages Submitted: 5

Attachments: CD

Forwarded to: Jose N. Saldivar _____ Date: _____

Forwarded to: Lora Briones _____ Date: _____

Additional Comments: $737.18

THIS ROUTING SLIP MUST BE KEPT WITH ORIGINAL INVOICE

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 E. Expressway 83 ♦ Mission, Texas 78572
(956) 424-7898

Letter of Transmittal

TO:
Mr. Noe Saldivar
Hidalgo County Drainage District No. 1
902 N. Doolittle Road
Edinburg, Texas 78542

le23576

DATE: December 14, 2015

REF.: ~~Delta Watershed PPD November Invoice~~ LRGVRWMP-PreliminaryPlanning & Dev. WA#14

TEDSI PROJECT NO.: 2013-1128-14

TRANSMITTED:

☒	For Your Use	☐	Please comment	☐	Approved as Noted
☐	As Requested	☐	Reply ASAP	☐	As Noted Below

VIA:

☐	US Mail	☐	Courier	☐	Hand Carry
☐	E-Mail	☒	LoneStar Overnight	☐	FedEx

COPIES	DESCRIPTION
	✓
1	Invoice No. 20152594 for Project No. 2013-1128-14
1	Progress Report No. 019 ✓
1	CD (digital files) ✓
1	Labor Detail ✓
1	Project Progress Report ✓
	. $737.18

REMARKS:

Thank you,

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 15 2015
11:30 AM / PM
BY: Rosa Ortiz

Signed: for: Clay
Mark W. Lupher, P.E., RPLS

If enclosures are not as stated, please notify us.

TEDSI INFRASTRUCTURE GROUP
TEDSI
TBPE F-1640
Consulting Engineers
1201 East Expressway 83 ♦ Mission, Texas 78572
Tel: (956) 424-7898
Fax: (956) 424-7022

December 14, 2015
Project No: 2013-1128-14
Invoice No: 20152594

Ms. Claudette Guerrero
Hidalgo County Drainage District No. 1
902 North Doolittle Road
Edinburg, TX 78542

Project 2013-1128-14 LRGVRWMP - Preliminary Planning & Development

Precinct No. 1 2012 Bond Referendum
Field Surveying, Water Quality and Architectural Services
Account No. 13-133-433-360-010-000-43340
P. O. No. 623576
Work Authorization No. 14

Professional Services from November 01, 2015 to November 30, 2015

Billing Phase	Fee	Percent Complete	Earned	Previous Fee Billing	Current Fee Billing	
Field Surveying-TEDSI	81,571.20	40.5107	33,045.06	33,045.06	0.00	
Water Quality Samples & Analysis *	140,280.76	68.1921	95,660.40	94,923.22	737.18	
Architectural Services	70,128.10	0.00	0.00	0.00	0.00	
Total Fee	291,980.06		128,705.46	127,968.28	737.18	
		Total Fee				**737.18**
				Total this Phase		**$737.18**

Billing Summary	Current	Prior	To-Date
Total Billings	737.18	127,968.28	128,705.46
Total Fee			291,980.06
Remaining Fee			163,274.60

Total this Invoice **$737.18**

Outstanding Invoices

Number	Date	Balance
20152564	11/16/2015	1,843.01
Total		**1,843.01**

Total Now Due **$2,580.19**

*Supplemental Agreement No. 1 to Work Authorization No. 14 - $75,987.00

PLEASE REMIT PAYMENT TO:
TEDSI Infrastructure Group, Inc.
738 Highway 6 South, Suite 430
Houston, Texas 77079

Authorized By: _____ Date: 12.14.15
Mark W. Lupher, P.E., RPLS
Executive Vice President

PROJECT: Lower Rio Grande Valley Regional Water Management Program
CLIENT: Hidalgo County Drainage District No. 1

TEDSI JOB NUMBER: 2013-1128-14

PROGRESS REPORT NO. 019

Progress Period November 01, 2015 Through November 30, 2015

DESCRIPTION	ESTIMATED COST	PERCENT COMPLETE	INVOICE TO DATE	PREVIOUS INVOICE	AMOUNT DUE
II. GCM FOR PRELIMINARY PROJECT PLANNING AND DEVELOPMENT					
(5) Architect Services	$70,128.10	0.00%	$0.00	$0.00	**$0.00**
SUB TOTAL II	$70,128.10	0.00%	$0.00	$0.00	**$0.00**
III. PRELIMINARY ENGINEERING, DESIGN AND CONSTRUCTION					
(A) PRELIMINARY ENGINEERING					
(1) Preliminary Field Surveying	$81,571.20	40.51%	$33,045.06	$33,045.06	**$0.00**
(7) Raw Water Sampling and Analysis	$64,293.76	73.55%	$47,288.53	$46,551.35	**$737.18**
Water Analysis Sub	$75,987.00	63.66%	$48,371.87	$48,371.87	**$0.00**
SUB TOTAL III.A	$221,851.96	58.01%	$128,705.46	$127,968.28	**$737.18**
TOTAL LABOR EXPENSES	$291,980.06	44.08%	$128,705.46	$127,968.28	**$737.18**

TOTAL INVOICE AMOUNT DUE: $737.18

WORK AUTHORIZATION #14
LABOR DETAIL
DELTA AREA WATERSHED

Nov. 2015	Principal Engineer	Project Manager (VIII)	Sr. Engineer (V)	Sr. Engineer (V)	Project Engineer (III)	Project Engineer (II)	Engr. In Training (E.I.T.)	Sr. Engr. Designer	Engr. Designer	CADD Operator	Sr. GIS Designer	GIS Designer	GIS System Manager	IT System Manager	Project Admin	Assistant Admin
	J. Salinas	M. Lupher	M. Corbitt	J. Sanchez	E. Dietrich		S. DeLeon/J.Adams		R. Cavazos	J. Adams/R. Villarreal	J. Perez		M. Manzano	A. Bray	D. Castillo	C. Garza
	$266.62	$232.61	$187.37	$187.37	$159.15	$144.56	$122.87	$117.57	$109.24	$104.61	$135.00	$90.00	$175.00	$180.00	$178.37	$73.13
Dates:																
11/23/2015							6									
Total	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$737.22	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0

	Total This Month **$737.22**

TEDSI INFRASTRUCTURE GROUP *Consulting Engineers* TEDSI TBPE F-1640	Project Progress Report
TO: Hidalgo County Drainage District No. 1	**DATE:** December 14, 2015
FROM: Mr. Mark Lupher, P.E., Project Manager	**TEDSI PROJECT NO.:** 2013-1128-14
REFERENCE: Hourly Progress Report	
Progress Report for Invoice No. 20152594, November 01, 2015 to November 30, 2015	

- Week Report by Week for Samantha DeLeon
  - Week of: 11-28-15
    - Collection of Water Samples at Proposed Reservoir, Lake Edinburg, and Engleman Reservoir


Project TEDSI
Inv # 2013-1128-14
DVD-R
201525594
Nov.
2015
120 min
4.7 GB
16x speed
1x - 16x compatible
import-staples.com

Hidalgo County Drainage District No. 1

902 North Doolittle Road Edinburg, Texas 78542 Office: (956) 292-7080

Invoice Processing Checklist/Routing Slip

Invoice/ Backup

Date Received: 12/16/2015

Engineer/Firm Name: TEDSI Infrastructure Group

Project Name/Number: LRGVRWMP-Legal

Invoice No.: 20152598

Purchase Order No.: 623665

Received By: Rosa Arce

Forwarded to: Nora D. Cavazos _____ Date: _____
Claudette Guerrero _____ Date: _____

Total # of Pages Submitted: 4

Attachments: _____

Forwarded to: Jose N. Saldivar _____ Date: _____

Forwarded to: Lora Briones _____ Date: _____

Additional Comments: $90.00

THIS ROUTING SLIP MUST BE KEPT WITH ORIGINAL INVOICE

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 E. Expressway 83 ♦ Mission, Texas 78572
(956) 424-7898

Letter of Transmittal

TO:
Mr. Noe Saldivar
Hidalgo County Drainage District No. 1
902 N. Doolittle Road
Edinburg, Texas 78539

le 23 lecs
LRGVRWMP-Legal

DATE: December 15, 2015

REF.: ~~Delta Watershed Legal Water Rights Project November Invoice~~

TEDSI PROJECT NO.: 2013-1128-12

TRANSMITTED:

☒ For Your Use	☐ Please comment	☐ Approved as Noted
☐ As Requested	☐ Reply ASAP	☐ As Noted Below

VIA:

☐ US Mail	☐ Courier	☐ Hand Carry
☐ E-Mail	☒ LoneStar Overnight	☐ FedEx

COPIES	DESCRIPTION
	✓
1	TEDSI Invoice No. 20152598 for Project No. 2013-1128-12
	$90.00

REMARKS:

Thank you,

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 16 2015
11:48 AM / PM
BY: RosaAne

Signed: for: _____
Mark W. Lupher, P.E., RPLS

If enclosures are not as stated, please notify us.

TEDSI INFRASTRUCTURE GROUP
TEDSI
TBPE F-1640
Consulting Engineers
1201 East Expressway 83 • Mission, Texas 78572
Tel: (956) 424-7898
Fax: (956) 424-7022

December 15, 2015
Project No: 2013-1128-12
Invoice No: 20152598

Ms. Claudette Guerrero
Hidalgo County Drainage District No. 1
902 North Doolittle Road
Edinburg, TX 78542

Project 2013-1128-12 Lower Rio Grande Valley Regional Water Management Program - Legal

Precinct No. 1 - 2012 Bond Referendum
Account No. 13-133-433-360-43340-010-000
P.O. No. 623665

Professional Services from November 01, 2015 to November 30, 2015

Phase 300 Water Rights - BHDA, LLP

Consultants

Reimbursable Consultants Expense

11/30/2015	Bickerstaff Heath Delgado Acosta LLP	Invoice No. 99307	90.00	
	Total Consultants		**90.00**	**90.00**

Billing Summary	**Current**	**Prior**	**To-Date**
Consultants	90.00	61,780.10	61,870.10
Total Fee			65,400.00
Remaining Fee			3,529.90

Total this Phase **$90.00**

Total this Invoice **$90.00**

Outstanding Invoices

Number	**Date**	**Balance**
20152561	11/16/2015	7,443.28
Total		**7,443.28**

Total Now Due **$7,533.28**

PLEASE REMIT PAYMENT TO:
TEDSI Infrastructure Group, Inc.
738 Highway 6 South, Suite 430
Houston, Texas 77079

Authorized By: _____ Date: 12.15.15
Mark W. Lupher, P.E., RPLS
Executive Vice President

POSTED

Bickerstaff Heath Delgado Acosta LLP

3711 S. Mo-Pac Expy. Building One, Suite 300 Austin, Texas 78746 (512) 472-8021 Fax (512) 320-5638 Tax ID No 74-2153894

Hidalgo County Drainage District No. 1
c/o TEDSI Infrastructure Group, Inc.
1201 E. Expressway 83
Mission, TX 78572

December 10, 2015
Client: 003978
Matter: 000001
Invoice #: 99307
Bill Atty: DM

Page: 1

RE: Drainage Improvements

For Professional Services Rendered Through November 30, 2015

SERVICES

Date	Person	Description of Services	Hours	
11/3/2015	EWR	Review and comment on response to RFI.	0.2	
11/17/2015	EWR	Emails and telephone calls with K. Alexander.	0.1	
		Total Professional Services	0.3	$90.00

BILLING RECAP

		Level	Hours	Rate	Amount
EWR	Emily Rogers	Partner	0.3	$300.00	$90.00
		Total Services		$90.00	
		Total Current Charges			$90.00

TEDSI INFRASTRUCTURE GROUP
Project No. 2013-1128-12 Phase No. 300
☐ Lump Sum ☑ Approved ☐ Hold
☑ Hourly ☐ Rejected ☐ Process
Sign MWL Date 12/15/15

PAY THIS AMOUNT **$90.00**

PROJECT: Lower Rio Grande Valley Regional Water Supply Program - Legal
CLIENT: HCDD#1

TEDSI JOB NUMBER: 2013-1128-12

PROGRESS REPORT NO. 025

Progress Period November 01, 2015 Through November 30, 2015

DESCRIPTION	ESTIMATED COST	PERCENT COMPLETE	INVOICE TO DATE	PREVIOUS INVOICE	AMOUNT DUE
II. GCM FOR PRELIMINARY PROJECT PLANNING AND DEVELOPMENT					
(5) Water Rights, TEDSI	$39,063.14	99.99%	$39,060.95	$39,060.95	**$0.00**
(6) Water Rights Sub Consultant BBS, PC	$80,000.00	99.47%	$79,575.00	$79,575.00	**$0.00**
(7) Water Rights Sub Consultant BHDA, LLP	$65,400.00	94.60%	$61,870.10	$61,780.10	**$90.00**
Additional Expenses	$22,000.00	3.12%	$686.73	$686.73	**$0.00**
SUB TOTAL II	$206,463.14	87.76%	$181,192.78	$181,102.78	**$90.00**

TOTAL LABOR EXPENSES	$206,463.14	87.76%	$181,192.78	$181,102.78	**$90.00**

TOTAL INVOICE AMOUNT DUE: $90.00

Hidalgo County Drainage District No. 1

902 North Doolittle Road Edinburg, Texas 78542 Office: (956) 292-7080

Invoice Processing Checklist/Routing Slip

Invoice/ Backup

Date Received: 12/17/2015

Engineer/Firm Name: TEDSI Infrastructure Group

Project Name/Number: LRGVRWMP-Preliminary Eng. Report

Invoice No.: 20152593-R

Purchase Order No.: 623666, 623958, 625152, 626144

Received By: Rosa Arce

Forwarded to: Nora D. Cavazos _____ Date: _____

Claudette Guerrero _____ Date: _____

Total # of Pages Submitted: 7

Attachments: CD

Forwarded to: Jose N. Saldivar _____ Date: _____

Forwarded to: Lora Briones _____ Date: _____

Additional Comments: $6,610.03

THIS ROUTING SLIP MUST BE KEPT WITH ORIGINAL INVOICE

TEDSI INFRASTRUCTURE GROUP
TEDSI
Consulting Engineers
1201 E. Expressway 83 ♦ Mission, Texas 78572
(956) 424-7898

Letter of Transmittal

TO:
Mr. Noe Saldivar 623446, 623958, 625152, 626144
Hidalgo County Drainage District No. 1
902 N. Doolittle Road
Edinburg, Texas 78542 LRGVRWMP- Preliminary Eng. Report.

DATE: December 16, 2015

REF.: ~~Delta Watershed~~ PER Revised November Invoice

TEDSI PROJECT NO.: 2013-1128-13

TRANSMITTED:

☒ For Your Use	☐ Please comment	☐ Approved as Noted
☐ As Requested	☐ Reply ASAP	☐ As Noted Below

VIA:

☐ US Mail	☐ Courier	☐ Hand Carry
☐ E-Mail	☒ LoneStar Overnight	☐ FedEx

COPIES	DESCRIPTION
	Revised ✓
1	Invoice No. 20152593-R for Project No. 2013-1128-13
1	Progress Report No. 022 Revised ✓
1	CD PDF Files (Invoice Backup) ✓
1	Monthly Progress Report ~~#14~~ #08 For WA #13-May 2015 (2pg.)
	$626,626.03

REMARKS:

Thank you,

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 17 2015
4:44 AM / PM
BY: Rosa Ice

Signed: for: _____
Mark W. Lupher, P.E., RPLS

If enclosures are not as stated, please notify us.

TEDSI INFRASTRUCTURE GROUP
TEDSI
TBPE F-1640
Consulting Engineers
1201 East Expressway 83 ♦ Mission, Texas 78572
Tel: (956) 424-7898
Fax: (956) 424-7022

December 16, 2015
Project No: 2013-1128-13
Invoice No: 20152593-R

REVISED INVOICE

Ms. Claudette Guerrero
Hidalgo County Drainage District No. 1
902 North Doolittle Road
Edinburg, TX 78542

Project 2013-1128-13 Lower Rio Grande Valley Regional Water Management Program - Preliminary Engineering Report

Precinct No. 1 - 2012 Bond Referendum
P.O. Numbers 623666, 623958, 625152, 626144
Account Number 13-133-433-360-4330-010-000

Professional Services from November 01, 2015 to November 30, 2015

Billing Phase	Fee	Percent Complete	Earned	Previous Fee Billing	Current Fee Billing
P.O. 623666					
Preliminary Engineering Report	71,922.36	100.00	71,922.36	71,922.36	0.00
Data Collection	42,610.70	100.00	42,610.70	42,610.70	0.00
Geographical Information	80,256.16	100.00	80,256.16	80,256.16	0.00
Hydrologic Analysis Verification	68,952.49	100.00	68,952.49	68,952.49	0.00
Hydraulic Analysis Verification	68,952.49	100.00	68,952.49	68,952.49	0.00
H&H Subconsultant - CSE	685,957.00	91.1237	625,069.48	625,069.48	0.00
Flood Plain Mapping Verification	100,097.80	93.5238	93,615.27	93,615.27	0.00
Water Treatment & Distribution	161,061.24	100.00	161,061.24	161,061.24	0.00
Alternate Solutions	70,599.48	67.4104	47,591.39	47,591.39	0.00
Final Report	150,648.64	47.7652	71,957.67	66,607.64	5,350.03
P.O. 623958 – S.A. No. 1					
Field Surveying	9,854.44	45.3286	4,466.88	4,466.88	0.00
Geotechnical Investigations Report	51,639.65	100.00	51,639.65	51,639.65	0.00
P.O. 625152 – S.A. No. 2					
WAM Willicy County	163,471.94	95.00	155,298.34	155,298.34	0.00
WAM Hidalgo County	171,876.14	95.00	163,282.33	163,282.33	0.00
P.O. 626177 – S.A. No. 3					
Sub Surface Boring - TEDSI	23,500.00	5.9388	1,395.62	1,395.62	0.00
Sub Surface Boring - RABA	117,395.00	94.8098	111,302.00	110,042.00	1,260.00
Total Fee	2,038,795.53		1,819,374.07	1,812,764.04	6,610.03

Total Fee **6,610.03**

Project	2013-1128-13	LRGVRWMP - P.E.R.	Invoice	20152593-R

Billing Summary	Current	Prior	To-Date
Total Billings	6,610.03	1,812,764.04	1,819,374.07
Total Fee			2,038,795.53
Remaining Fee			219,421.46

Total this Invoice **$6,610.03**

Outstanding Invoices

Number	Date	Balance
20152563	11/16/2015	11,165.32
Total		**11,165.32**

Total Now Due **$17,775.35**

PLEASE REMIT PAYMENT TO:
TEDSI Infrastructure Group, Inc.
738 Highway 6 South, Suite 430
Houston, Texas 77079

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 17 2015
4:41 AM / PM
BY: Rosa Lee

Authorized By: _____ Date: 12.16.15
Mark W. Lupher, P.E., RPLS
Executive Vice President

VISIT OUR WEBSITE AT:
www.rkci.com

INVOICE

INVOICE # :R025942

CONSULTANTS * ENVIRONMENTAL * FACILITIES * INFRASTRUCTURE

BILLING DATE :
11/22/2015

PROJECT :
AMA1406100
Delta Watershed - Geo

CLIENT :
12C05931 TEDSI Infrastructure Group

RABA KISTNER

Mr. Mark W. Lupher, P.E., RPLS
TEDSI Infrastructure Group
738 Highway 6 South
Suite 430
Houston, TX 77079

REMITTANCE ADDRESS:
RABA KISTNER, INC.
P.O. BOX 971037
DALLAS, TX 75397-1037

PHONE (210) 699-9090

CONSULTING SERVICES

RKCI Proposal No. PMA14-082-00

FOR PROFESSIONAL SERVICES RENDERED THROUGH: 11/14/2015

TOTAL FEE AUTHORIZED	114,567.00
PERCENT COMPLETE AS OF 11/14/2015	97.15%
FEE EARNED TO DATE	111,302.00
LESS PREVIOUS BILLINGS	110,042.00
AMOUNT DUE THIS INVOICE **	1,260.00

RK PROJECT MANAGER: KATRIN M LEONARD
CLIENT PHONE: 832-619-1000

RECEIVED DEC 16 2015

TEDSI INFRASTRUCTURE GROUP
Project No. 2013-1128-03 Phase No. 965
☒ Lump Sum ☒ Approved ☐ Hold
☐ Hourly ☐ Rejected ☐ Process
Sign MWL Date 12/16/15

PROJECT ACCOUNTS RECEIVABLE SUMMARY		
Amount Due This Invoice	$	1,260.00
Total of Previous Invoices - Currently Unpaid		0.00
Total Due And Payable	$	1,260.00

* Invoices are submitted monthly and are due on receipt. * Carrying charges may be assessed on invoices unpaid beyond 30 days from billing date.
AP Nov-15

PLEASE PAY FROM THIS INVOICE.

PROJECT: Lower Rio Grande Valley Regional Water Management Program - Preliminary Engineering
INVOICE No. 20152593-R

TEDSI JOB NUMBER: 2013-1128-13

PROGRESS REPORT NO. 022 Revised

Progress Period Nov. 1, 2015 Through Nov. 30, 2015

DESCRIPTION	ESTIMATED COST	PERCENT COMPLETE	INVOICE TO DATE	PREVIOUS INVOICE	AMOUNT DUE
III. PRELIMINARY ENGINEERING, DESIGN AND CONSTRUCTION					
(A) PRELIMINARY ENGINEERING					
(1) Preliminary Field Surveying	$71,922.36	100.00%	$71,922.36	$71,922.36	**$0.00**
(2) Data Collection	$42,610.70	100.00%	$42,610.70	$42,610.70	**$0.00**
(3) Geographical Information System	$80,256.16	100.00%	$80,256.16	$80,256.16	**$0.00**
(4) Hydrologic Analysis Verification	$68,952.49	100.00%	$68,952.49	$68,952.49	**$0.00**
(5) Hydraulic Analysis Verification	$68,952.49	100.00%	$68,952.49	$68,952.49	**$0.00**
H&H Sub Consultants - CSE	$685,957.00	91.12%	$625,069.48	$625,069.48	**$0.00**
(6) Flood Plain Mapping Verification	$100,097.80	93.52%	$93,615.27	$93,615.27	**$0.00**
(7) Water Treatment and Distribution	$161,061.24	100.00%	$161,061.24	$161,061.24	**$0.00**
(9) Alternate Solutions & Recommendations	$70,599.48	67.41%	$47,591.39	$47,591.39	**$0.00**
(10) Final Report- ***"Preliminary Engineering***	$150,648.64	47.77%	$71,957.67	$66,607.64	**$5,350.03**
SA # 1 Geotechnical Investigations	$61,494.09	91.24%	$56,106.53	$56,106.53	**$0.00**
SA #2 WAM Willacy County	$163,471.94	95.00%	$155,298.34	$155,298.34	**$0.00**
SA #2 WAM Hidalgo County	$171,876.14	95.00%	$163,282.33	$163,282.33	**$0.00**
SA # 3 Sub Surface Boring	$140,895.00	79.99%	$112,697.62	$111,437.62	**$1,260.00**
SUB TOTAL III.A	$2,038,795.53	89.24%	$1,819,374.07	$1,812,764.04	**$6,610.03**

TOTAL (LABOR AND DIRECT EXPENSES)	$2,038,795.53	89.24%	$1,819,374.07	$1,812,764.04	**$6,610.03**

TOTAL LABOR AND DIRECT EXPENSES	$2,038,795.53	89.24%	$1,819,374.07	$1,812,764.04	**$6,610.03**

TOTAL INVOICE AMOUNT DUE: $6,610.03

LRGVWMP – WA#13
Monthly Progress Report No. #08 – May 2015

Period of Coverage: May 01, 2015 to May 31, 2015
Date of Submittal: June 29, 2015
Submitted To: Claudette Guerrero, HCDD #1
PREPARED BY: Mark Lupher, P.E., TEDSI Infrastructure, Inc.
This study covers the following activities:

1. Coordination and meetings
2. Data collection and assimilation
3. Site visits/field reconnaissance
4. LiDAR topographic data processing
5. Watershed & subbasin delineations
6. Estimation of subwatershed & hydrologic parameters
7. Land use data processing
8. HEC-HMS modeling analysis
9. Main Floodwater Channel topographic data manipulation/ preparation
10. GeoRAS processing for HEC-RAS development
11. HEC-RAS model development and modeling analysis
12. Downstream flow requirements (downstream of Pachita Flood Gate).
13. Floodwater diversion and detention alternative analysis
14. Risk based economic analysis of flood damage analysis
15. Floodplain delineation/mapping
16. Water sources and water availability analysis.
17. Hydraulic analysis of preliminary alternative water development strategy
18. Draft H&H Report

PROGRESS TO REPORT FOR THIS PERIOD

Activity 1 – Coordination and Meetings

Coordination with project team members /Irrigation Districts/Region M & TWDB for discussions on collection & storage of Water. Attended Public Hearing on Region M -2012 SWP

Activity 2 – Data Collection and Assimilation

Activity 3 – Site Visits

Activity 4 – LiDAR topographic data processing

Activity 5 – Watershed & subbasin delineations

Activity 6 – Estimation of subwatershed & hydrologic parameters

Activity 7 – Land use data processing

Activity 8 –HEC-HMS Modeling Analysis

Activity 9 – Main Floodwater Channel cross section topographic data manipulation and preparation

Activity 10 – GeoRAS processing for HEC-RAS development

Activity 11 – HEC-RAS model development and modeling analysis

Activity 12 – Downstream flow requirements (downstream of Pachita Flood Gate).

Activity 13 – Floodwater diversion and detention alternative analysis

Activity 14 – Risk based economic analysis of flood damage analysis

Activity 15 – Floodplain delineation/mapping

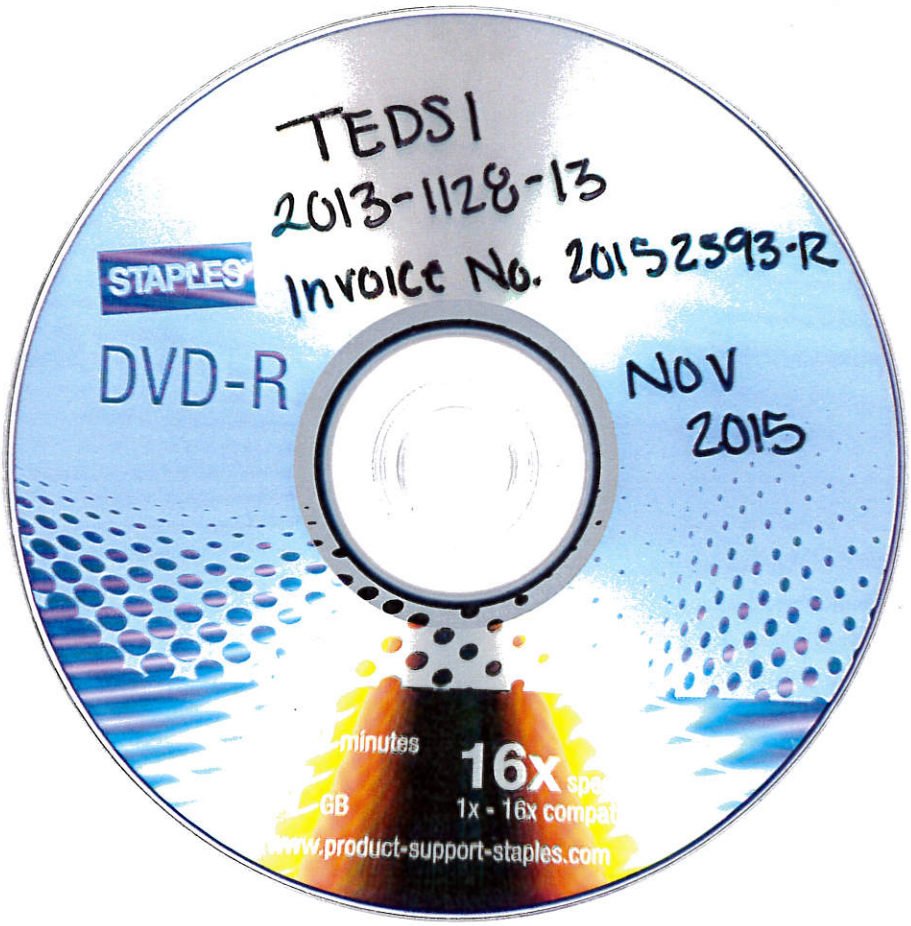
Continued efforts on delineating floodplain mapping

Activity 16 – Water sources and water availability analysis.

Activity 17 – Hydraulic analysis of preliminary alternative water development strategy

Continued alternative solutions and recommendations for capturing and storing water in various locations such as Santa Cruz Irrigation Reservoir, Engleman Irrigation Reservoir and the Proposed HCDD#1 Delta Reservoir. Also evaluation of Alternative Solutions needed to implement Phase I to begin pumping Raw Water quickly into the existing reservoirs both for recapturing and flood control measures. Coordinating Lease Agreement with Santa Cruz for long term Water storage lease

Activity 18 – Draft H&H report.


TEDSI
2013-1128-13
Invoice No. 20152593-R
STAPLES
DVD-R
NOV
2015
minutes
16x
GB
1x - 16x compat
www.product-support-staples.com

Hidalgo County Drainage District No. 1

902 North Doolittle Road Edinburg, Texas 78542 Office: (956) 292-7080

Invoice Processing Checklist/Routing Slip

Invoice/ Backup

Date Received: 12/9/2015

Engineer/Firm Name: TEDSI Infrastructure Group

Project Name/Number: LRGVRWMP-Legal

Invoice No.: 20152561

Purchase Order No.: 623665

Received By: Rosa Arce

Forwarded to: Nora D. Cavazos _____ Date: _____

Claudette Guerrero _____ Date: _____

Total # of Pages Submitted: 13

Attachments: CD

Forwarded to: Jose N. Saldivar _____ Date: _____

Forwarded to: Lora Briones _____ Date: _____

Additional Comments: $7,443.28

THIS ROUTING SLIP MUST BE KEPT WITH ORIGINAL INVOICE

TEDSI INFRASTRUCTURE GROUP
TEDSI
Consulting Engineers
1201 E. Expressway 83 ♦ Mission, Texas 78572
(956) 424-7898

Letter of Transmittal

TO:
Mr. Noe Saldivar
Hidalgo County Drainage District No. 1
902 N. Doolittle Road
Edinburg, Texas 78539 LRGVRWMP-Legal

DATE: December 10, 2015

REF.: ~~Delta Watershed Legal Water Rights~~ Project October Invoice

TEDSI PROJECT NO.: 2013-1128-12

TRANSMITTED:

☒ For Your Use	☐ Please comment	☐ Approved as Noted
☐ As Requested	☐ Reply ASAP	☐ As Noted Below

VIA:

☐ US Mail	☐ Courier	☐ Hand Carry
☐ E-Mail	☒ LoneStar Overnight	☐ FedEx

COPIES	DESCRIPTION
	✓
1	TEDSI Invoice No. 20152561 for Project No. 2013-1128-12
1	CD-Digital Files ✓

REMARKS:

Thank you,

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 09 2015
400 AM / PM
BY: RosaAne

Signed: for: Clay
Mark W. Lupher, P.E., R.P.L.S

If enclosures are not as stated, please notify us.

TEDSI INFRASTRUCTURE GROUP
TEDSI
TBPE F-1640
Consulting Engineers
1201 East Expressway 83 ♦ Mission, Texas 78572
Tel: (956) 424-7898
Fax: (956) 424-7022

November 16, 2015
Project No: 2013-1128-12
Invoice No: 20152561

Ms. Claudette Guerrero
Hidalgo County Drainage District No. 1
902 North Doolittle Road
Edinburg, TX 78542

Project 2013-1128-12 Lower Rio Grande Valley Regional Water Management Program - Legal

Precinct No. 1 - 2012 Bond Referendum
Account No. 13-133-433-360-43340-010-000
P.O. No. 623665

Professional Services from October 01, 2015 to October 31, 2015

Phase 200 Water Rights - BBS, PC

Consultants

Reimbursable Consultants Expense

10/31/2015	Beatty Bangle Strama, PC	Invoice No. 18428	1,500.00	
	Total Consultants		**1,500.00**	**1,500.00**

Billing Summary	**Current**	**Prior**	**To-Date**
Consultants	1,500.00	78,075.00	79,575.00
Total Fee			80,000.00
Remaining Fee			425.00

Total this Phase **$1,500.00**

Phase 300 Water Rights - BHDA, LLP

Consultants

Reimbursable Consultants Expense

10/31/2015	Bickerstaff Heath Delgado Acosta LLP	Invoice No. 99090	5,943.28	
	Total Consultants		**5,943.28**	**5,943.28**

Billing Summary	**Current**	**Prior**	**To-Date**
Consultants	5,943.28	55,836.82	61,780.10
Total Fee			65,400.00
Remaining Fee			3,619.90

Total this Phase **$5,943.28**

Total this Invoice **$7,443.28**

Outstanding Invoices

Number	Date	Balance
20152449	8/17/2015	960.00
Total		**960.00**

Total Now Due **$8,403.28**

PLEASE REMIT PAYMENT TO:
TEDSI Infrastructure Group, Inc.
738 Highway 6 South, Suite 430
Houston, Texas 77079

Authorized By: _____ Date: 11/16/15
Mark W. Lupher, P.E., RPLS
Executive Vice President

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1

DEC 09 2015
400 AM / PM
BY: Rosa Ane

POSTED

BBS BEATTY BANGLE STRAMA PC

October 31, 2015

Jesse Salinas
TEDSI Infrastructure Group
1201 East Expressway 83
Mission, TX 78572

Invoice No. 18428

In Reference To: *Hidalgo County Delta Watershed Project and Hidalgo County Drainage District No. 1*

Professional Services

			Hours	Rate	Amount
10/08/15	ELIII	Correspondence with client regarding status.	0.25	300.00/hr	75.00
10/13/15	ELIII	Correspondence with client, review status of water rights application, call with TCEQ, review correspondence regarding pending items needed by Region M for amendment process, call with TCEQ and Tedsi team.	1.25	300.00/hr	375.00
10/15/15	ELIII	Review correspondence from TCEQ requesting additional information and correspondence with team.	0.50	300.00/hr	150.00
10/29/15	ELIII	Water brief	3.00	300.00/hr	900.00
		For professional services rendered		5.00	$1,500.00

Previous balance $16,050.00

Accounts receivable transactions

10/9/2015 Payment - Thank You(No. 50179) ($8,400.00)

TEDSI INFRASTRUCTURE GROUP
Project No. 2013-112 P-12 Phase No. 200
☐ Lump Sum ☑ Approved ☐ Hold
☒ Hourly ☐ Rejected ☐ Process
Sign MLWL Date 11/16/15

400 West 15th Street | Suite 1450 | Austin, Texas 78701

T (512) 879-5050 | F (512) 879-5040 | bbsfirm.com

	Amount
Balance due	$9,150.00

Bickerstaff Heath Delgado Acosta LLP
3711 S. Mo-Pac Expy. Building One, Suite 300 Austin, Texas 78746 (512) 472-8021 Fax (512) 320-5638 Tax ID No 74-2153894

POSTED

Hidalgo County Drainage District No. 1
c/o TEDSI Infrastructure Group, Inc.
1201 E. Expressway 83
Mission, TX 78572

November 10, 2015
Client: 003978
Matter: 000001
Invoice #: 99090
Bill Atty: DM

Page: 1

TEDSI INFRASTRUCTURE GROUP
Project No. 2015-1128-12 Phase No. 300
☐ Lump Sum ☒ Approved ☐ Hold
☒ Hourly ☐ Rejected ☐ Process
Sign MWL Date 11/16/15

RE: Drainage Improvements

For Professional Services Rendered Through October 31, 2015

SERVICES

Date	Person	Description of Services	Hours	
10/15/2015	EWR	Review TCEQ's RFI; telephone call with S. DeLeon; email team regarding status of application.	1.5	
10/20/2015	EWR	Review and respond to emails regarding TCEQ's RFIs.	0.1	
10/21/2015	EWR	Review response to RFI; prepare revisions to same; conference call with team; prepare agenda item; prepare letter regarding coordination; telephone call to TCEQ.	4.1	
10/22/2015	EWR	Finalize coordination letter.	0.3	
10/26/2015	EWR	Prepare for Commissioners' meeting and travel to the Valley.	3.8	
10/27/2015	EWR	Attend County Commissioners' meeting; return travel.	7.0	
10/28/2015	EWR	Review letter to TCEQ responding to RFI and email team regarding same.	0.4	
		Total Professional Services	17.2	$5,160.00

BILLING RECAP

		Level	Hours	Rate	Amount
EWR	Emily Rogers	Partner	17.2	$300.00	$5,160.00

DISBURSEMENTS

Description of Disbursements	Amount
Emily Rogers- Travel- Car rental expense to attend Commissioners' meeting, Harlingen, TX, 10/26/2015	$127.38
Emily Rogers- Travel- Fuel expense to attend Commissioners' meeting, Harlingen, TX, 10/26/2015	$7.05
Emily Rogers- Travel- Parking expense to attend Commissioners' meeting, Harlingen, TX, 10/26/2015	$12.50
Emily Rogers- Travel- Airfare expense to attend Commissioners' meeting, Harlingen, TX, 10/26/2015	$524.48
Emily Rogers- Travel- Hotel expense to attend Commissioners' meeting, Harlingen, TX, 10/26/2015	$111.87
Total Disbursements	$783.28

Total Services	$5,160.00	
Total Disbursements	$783.28	
Total Current Charges		$5,943.28

PAY THIS AMOUNT **$5,943.28**

Please Remit Payment to:
Bickerstaff Heath Delgado Acosta LLP
3711 S. Mo-Pac Expy
Building One, Suite 300
Austin, Texas 78746-8023

Hertz

#01 RN **RR 113681433**
RES G7320627495

EMILY ROGERS **CC**

INITIAL CHARGES

RENT RT $ 73.11 / DAY	@ 1 / DAYS	$	73.11
SUBTOTAL 1		$	73.11
DISCOUNT - T 10%		$	7.31
SUBTOTAL LESS DISCOUNT		T$	65.80

CHARGES ADDED DURING RENTAL

LDW	DECLINED		
LIS	DECLINED		
PAI, PEC	DECLINED		
PREM RD SVC	DECLINED		
FUEL & SERVICE $ .454 PER MILE $ 9.99 PER GAL		$	40.41

* ADDITIONAL CHARGES

SERVICE CHARGES/TAXES

CONCESSION FEE RECOVERY	10.00%	T$	6.92
CUST FAC CHG		T$	3.00
ENERGY SURCHARGE		T$	1.49
VEHICLE LICENSE COST RECOVERY		T$	1.85
TAX 10.000% ON TAXABLE TTL OF $ 79.06		$	7.91
TOTAL AMOUNT DUE		$	127.38

CHARGED ON VISA XXXXXXXXXXXX6026

FOR EXPLANATION OF THE ABOVE CHARGES, PLEASE ASK A REPRESENTATIVE OR GO TO WWW.HERTZ.COM/CHARGEEXPLAINED

VEHICLE: 01294 / 1915420 14 MAZDA5 SPORT 2N
LICENSE: OR337GTJ
FUEL: NOT FULL 8/8 OUT 0/8 IN
MILEAGE IN: 31116 TR-X MILES:
MILEAGE OUT: 31027 MILES ALLOWED:
MILES DRIVEN 89 MILES CHARGED:
CDP: 273398 - BICKERSTAFF HEATH DELGADO

RENTED: HARLINGEN INT'L AP
RENTAL: 10/26/15 17:26
RETURN: 10/27/15 10:59
RETURNED: HARLINGEN INT'L AP
COMPLETED BY: 2846/TXHAR10

PLAN IN: TMDD RATE CLASS: D
PLAN OUT TMDD

STATEMENT OF CHARGES - NOT VALID FOR RENTAL

WELCOME TO
STRIPES #2203
2426 E Loop 499
Harlingen Tx.78550
956-425-4430

DATE 10/27/15 10:50
TRAN# 9029693
PUMP# 02
SERVICE LEVEL: SELF
PRODUCT: UNLD
GALLONS: 3.636
PRICE/G: $ 1.939
FUEL SALE $ 7.05
CREDIT $7.05

VISA
XXXXXXXXX6026
Auth #: 07249D
Resp Code: 0
Stan: 04251621717
Invoice #: 222812
SITE ID: TP485706160
01

Diesel Fuel Contains
Up To 20% BioDiesel
or Renewable Diesel
State Diesel Tax
0.19 per Gallon Incl

Austin - AUS - FP&R
2300 Spirit of TX Drive
Del Valle, 78617

EXPRESS 1 10/27/15 15:18
Receipt 081788

Excess Time
R2 - Public
Austin Fast Park
10/26/15 14:25
10/27/15 15:18
Period 1d0h54'
(TAX) $12.50

Sub Total $12.50
TAX $0.00
Total $12.50

Payment Received
VISA $12.50
XXXXXXXXXXXX6026
Merch:215051401994
Auth:05688D
Type: Swiped

Deliv. Date=Receipt Date

Includes 8.25% sales tax
and 10% airport fee.

1/1
08173291

Denise Fregeolle-Burk

From: Southwest Airlines <SouthwestAirlines@luv.southwest.com>
Sent: Friday, October 23, 2015 12:54 PM
To: Denise Fregeolle-Burk
Subject: Flight reservation (HQ437R) | 26OCT15 | AUS-HRL | Rogers/Emily

Thanks for choosing Southwest® for your trip

Southwest

Log in | View my itinerary

Check In Online | Check Flight Status | Change Flight | Special Offers | Hotel Offers | Car Offers

Ready for takeoff!

Thanks for choosing Southwest® for your trip. You'll find everything you need to know about your reservation below. Happy travels!

Air itinerary

AIR Confirmation: HQ437R

Confirmation Date: 10/23/2015

Passenger(s)	Rapid Rewards #	Ticket #	Expiration	Est. Points Earned
ROGERS/EMILY		5262153658562	Oct 22, 2016	5444

Rapid Rewards points earned are only estimates. Visit your (MySouthwest, Southwest.com or Rapid Rewards) account for the most accurate totals - including A-List & A-List Preferred bonus points.

Date	Flight	Business Select	Departure/Arrival
Mon Oct 26	756	✓	Depart **AUSTIN, TX** (AUS) on Southwest Airlines at **4:00 PM** Arrive in **HARLINGEN, TX** (HRL) at **5:00 PM** Travel Time 1 hrs 0 mins Business Select

Date	Flight	Business Select	Departure/Arrival

Tue Oct 27	32		Depart **HARLINGEN, TX** (HRL) on Southwest Airlines at **12:20 PM** Arrive in HOUSTON (HOBBY), TX (HOU) at 1:20 PM Business Select
	375		Change planes to Southwest Airlines in HOUSTON (HOBBY), TX (HOU) at 2:20 PM Arrive in **AUSTIN, TX** (AUS) at **3:05 PM** Travel Time 2 hrs 45 mins Business Select

Bags fly free®: First and second checked bags. Weight and size limits apply. One small bag and one personal item are permitted as carryon items, free of charge.

30 minutes before departure: We encourage you to arrive in the gate area no later than 30 minutes prior to your flight's scheduled departure as we may begin boarding as early as 30 minutes before your flight.

10 minutes before departure: You must obtain your boarding pass(es) and be in the gate area for boarding at least 10 minutes prior to your flight's scheduled departure time. If not, Southwest may cancel your reserved space and you will not be eligible for denied boarding compensation.

If you do not plan to travel on your flight: In accordance with Southwest's No Show Policy, you must notify Southwest at least 10 minutes prior to your flight's scheduled departure if you do not plan to travel on the flight. If not, Southwest will cancel your reservation and all funds will be forfeited.

Air Cost: 524.48

Fare Rule(s): 5262153658562: NONTRANSFERABLE.
Valid only on Southwest Airlines. All travel involving funds from this Confirmation Number must be completed by the expiration date. Unused travel funds may only be applied toward the purchase of future travel for the individual named on the ticket. Any changes to this itinerary may result in a fare increase.

AUS WN HRL226.87KZBP WN X/HOU WN AUS226.87KZBP 453.74 END ZPAUSHRLHOU XT11.20AY13.50XFAUS4.5HRL4.5HOU4.5

Learn about our boarding process

Learn about inflight WiFi & entertainment

Cost and Payment Summary

AIR - **HQ437R**

Base Fare	$ 453.74	**Payment Information**

Excise Taxes	$ 34.04	Payment Type: Visa XXXXXXXXXXXX6026
Segment Fee	$ 12.00	Date: Oct 23, 2015
Passenger Facility Charge	$ 13.50	Payment Amount: $524.48
September 11th Security Fee	$ 11.20	
Total Air Cost	**$ 524.48**	

Useful Tools

Check In Online
Early Bird Check-In
View/Share Itinerary
Change Air Reservation
Cancel Air Reservation
Check Flight Status
Flight Status Notification
Book a Car
Book a Hotel

Know Before You Go

In the Airport
Baggage Policies
Suggested Airport Arrival Times
Security Procedures
Customers of Size
In the Air
Purchasing and Refunds

Special Travel Needs

Traveling with Children
Traveling with Pets
Unaccompanied Minors
Baby on Board
Customers with Disabilities

Legal Policies & Helpful Information

Privacy Policy
Notice of Incorporated Terms
Customer Service Commitment
FAQs
Contact Us

Book Air Book Hotel Book Car Book Vacation Packages See Special Offers Manage My Account

COURTYARD Marriott

Courtyard Harlingen

1725 W. Filmore Ave
Harlingen, Tx 78550
T 956.412.7800

E. Rogers

Room: 221
Room Type: KSOF
Number of Guests: 1
Rate: $99.00 Clerk:

Arrive: 26Oct15 Time: 05:44PM Depart: 27Oct15 Time: Folio Number: 99631

Date	Description	Charges	Credits
26Oct15	Restaurant Room Charge	50.73	firm
26Oct15	Room Charge	99.00	
26Oct15	State Occupancy Tax	5.94	
26Oct15	City Tax	6.93	
27Oct15	Visa		162.60
	Card #: VIXXXXXXXXXXXX6026/XXXX		- 50.73
	Amount: 162.60 Auth: 04375D Signature on File		$111.87
	This card was electronically swiped on 26Oct15		
	Balance:	**0.00**	

As a Rewards Member, you could have earned points toward your free dream vacation today. Start earning points and elite status. plus enjoy exclusive member offers. Enroll today at the front desk.

Want your final hotel bill by email? Just ask the Front Desk! See "Internet Privacy Statement" on Marriott.com.

PROJECT: Lower Rio Grande Valley Regional Water Supply Program - Legal
CLIENT: HCDD#1

TEDSI JOB NUMBER: 2013-1128-12

PROGRESS REPORT NO. 024

Progress Period October 01, 2015 Through October 31, 2015

DESCRIPTION	ESTIMATED COST	PERCENT COMPLETE	INVOICE TO DATE	PREVIOUS INVOICE	AMOUNT DUE
II. GCM FOR PRELIMINARY PROJECT PLANNING AND DEVELOPMENT					
(5) Water Rights, TEDSI	$39,063.14	99.99%	$39,060.95	$39,060.95	**$0.00**
(6) Water Rights Sub Consultant BBS, PC	$80,000.00	99.47%	$79,575.00	$78,075.00	**$1,500.00**
(7) Water Rights Sub Consultant BHDA, LLP	$65,400.00	94.46%	$61,780.10	$55,836.82	**$5,943.28**
Additional Expenses	$22,000.00	3.12%	$686.73	$686.73	**$0.00**
SUB TOTAL II	$206,463.14	87.72%	$181,102.78	$173,659.50	**$7,443.28**

TOTAL LABOR EXPENSES	$206,463.14	87.72%	$181,102.78	$173,659.50	**$7,443.28**

TOTAL INVOICE AMOUNT DUE: **$7,443.28**


TEDSI
Inv # 2015 2561
STAPLES
DVD-R
Oct. 2015 Backup
120 minutes
4.7 GB
16
1x - 16x
www.product-support-stap

Hidalgo County Drainage District No. 1

902 North Doolittle Road Edinburg, Texas 78542 Office: (956) 292-7080

Invoice Processing Checklist/Routing Slip

Invoice/ Backup

Date Received: 12/17/2015

Engineer/Firm Name: TEDSI Infrastructure Group

Project Name/Number: Lucero Del Norte Rural Drainage Imp. WA NO. 18

Invoice No.: 20152602

Purchase Order No.: 628010

Received By: Rosa Arce

Forwarded to: Nora D. Cavazos _____ Date: _____

Claudette Guerrero _____ Date: _____

Total # of Pages Submitted: 2

Attachments: CD

Forwarded to: Jose N. Saldivar _____ Date: _____

Forwarded to: Lora Briones _____ Date: _____

Additional Comments: $13,619.59

THIS ROUTING SLIP MUST BE KEPT WITH ORIGINAL INVOICE

TEDSI INFRASTRUCTURE GROUP
TEDSI
Consulting Engineers
1201 E. Expressway 83 ♦ Mission, Texas 78572
(956) 424-7898

Letter of Transmittal

TO:
Mr. Noe Saldivar
Hidalgo County Drainage District No. 1
902 N. Doolittle Road
Edinburg, Texas 78542
PO#628010

DATE: December 16, 2015

REF.: WA#18
Lucero Del Norte Rural Drainage Improvements November 2015 Invoice

TEDSI PROJECT NO.: 2013-1128-18

TRANSMITTED:

☒ For Your Use	☐ Please comment	☐ Approved as Noted
☐ As Requested	☐ Reply ASAP	☐ As Noted Below

VIA:

☐ US Mail	☐ Courier	☐ Hand Carry
☐ E-Mail	☒ LoneStar Overnight	☐ FedEx

COPIES	DESCRIPTION
1	Invoice No. 20152602 for Project No. 2013-1128-18 ✓
1	CD Digital Backup ✓
	$13,619.59

REMARKS:

Thank you,

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 17 2015
4:48 AM PM
BY: Rosalva

Signed: for: Clay
Mark D. Corbitt, P.E., CFM

If enclosures are not as stated, please notify us.

TEDSI INFRASTRUCTURE GROUP
TEDSI
TBPE F-1640
Consulting Engineers
1201 East Expressway 83 ♦ Mission, Texas 78572
Tel: (956) 424-7898
Fax: (956) 424-7022

December 16, 2015
Project No: 2013-1128-18
Invoice No: 20152602

Ms. Claudette Guerrero
Hidalgo County Drainage District No. 1
902 North Doolittle Road
Edinburg, TX 78542

Project 2013-1128-18 Lucero Del Norte Rural Drainage Improvements

Precinct 1 2012 Bond Referendum Professional Agreement - W.A. No. 18
P.O. No. 628010
Account No. 15-133-433-365-010-005-43340

Professional Services from November 01, 2015 to November 30, 2015

Billing Phase	Fee	Percent Complete	Earned	Previous Fee Billing	Current Fee Billing
Basic Services	34,478.34	70.00	24,134.84	15,515.25	8,619.59
Construction Inspection & Contract Management	4,000.00	0.00	0.00	0.00	0.00
Field Survey	5,000.00	100.00	5,000.00	0.00	5,000.00
Total Fee	43,478.34		29,134.84	15,515.25	13,619.59

Total Fee **13,619.59**

Billing Summary	Current	Prior	To-Date
Total Billings	13,619.59	15,515.25	29,134.84
Total Fee			43,478.34
Remaining Fee			14,343.50

Total this Invoice $13,619.59

Outstanding Invoices

Number	Date	Balance
20152566	11/16/2015	8,619.58
20152541-A	10/29/2015	6,895.67
Total		**15,515.25**

Total Now Due **$29,134.84**

PLEASE REMIT PAYMENT TO:
TEDSI Infrastructure Group, Inc.
738 Highway 6 South, Suite 430
Houston, Texas 77079

Authorized By: Mark Corbitt Date: 12-16-2015
Mark D. Corbitt, P.E.
Project Manager


TEDSI
November 2015
Lucero del Norte
Invoice Backup

Hidalgo County Drainage District No. 1

902 North Doolittle Road Edinburg, Texas 78542 Office: (956) 292-7080

Invoice Processing Checklist/Routing Slip

Invoice/ Backup

Date Received: 12/11/2015

Engineer/Firm Name: TEDSI Infrastructure

Project Name/Number: Rural Drainage Plan Review WA No. 5

Invoice No.: 20152581

Purchase Order No.: 623010

Received By: Rosa Arce

Forwarded to: Nora D. Cavazos _____ Date: _____
Claudette Guerrero _____ Date: _____

Total # of Pages Submitted: 9

Attachments: _____

Forwarded to: Jose N. Saldivar _____ Date: _____

Forwarded to: Lora Briones _____ Date: _____

Additional Comments: $10,790.97

THIS ROUTING SLIP MUST BE KEPT WITH ORIGINAL INVOICE

TEDSI INFRASTRUCTURE GROUP
TEDSI
Consulting Engineers
1201 E. Expressway 83 ♦ Mission, Texas 78572
(956) 424-7898

Letter of Transmittal

TO:
Mr. Noe Saldivar
Hidalgo County Drainage District No. 1
902 N. Doolittle
Edinburg, Texas 78542

DATE: December 10, 2015

REF.: Rural Drainage Plan Review September 27, 2015 to November 28, 2015

TEDSI PROJECT NO.: 2013-1128-05

TRANSMITTED:

☒ For Your Use	☐ Please comment	☐ Approved as Noted
☐ As Requested	☐ Reply ASAP	☐ As Noted Below

VIA:

☐ US Mail	☐ Courier	☐ Hand Carry
☐ E-Mail	☒ LoneStar Overnight	☐ FedEx

COPIES	DESCRIPTION
1	Invoice # 20152581 for Project # 2013-1128-05 with Timesheet(s) and Project Progress Report

REMARKS:

Thank you,

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 11 2015
2:58 AM / PM
BY: Rosalee

Signed: for: Clay
Mark D. Corbitt, P.E.

If enclosures are not as stated, please notify us.

TEDSI INFRASTRUCTURE GROUP
TEDSI
TBPE F-1640
Consulting Engineers
1201 East Expressway 83 ♦ Mission, Texas 78572
Tel: (956) 424-7898
Fax: (956) 424-7022

December 08, 2015
Project No: 2013-1128-05
Invoice No: 20152581

Ms. Claudette Guerrero
Hidalgo County Drainage District No. 1
902 North Doolittle Road
Edinburg, TX 78542

Project 2013-1128-05 Rural Drainage Plan Review

2008 Bond Referendum
Precinct No. 1 Drainage Improvements
Account No. 13-132-433-039-43340
Purchase Order No. 623010
Work Authorization No. 5

Professional Services from September 27, 2015 to November 28, 2015

Phase 100 HCDD #1 Plan Review

Professional Personnel

	Hours	Rate	Amount	
Senior Engineer (V)				
Corbitt, Mark	13.00	187.37	2,435.81	
Engineer in Training				
Adams, Jason	45.00	122.87	5,529.15	
DeLeon, Samantha	23.00	122.87	2,826.01	
Totals	81.00		10,790.97	
Total Labor				**10,790.97**
			Total this Phase	**$10,790.97**

Billing Summary	**Current**	**Prior**	**To-Date**
Total Billings	10,790.97	117,643.29	128,434.26
Total Fee			250,000.00
Remaining Fee			121,565.74

Total this Invoice **$10,790.97**

PLEASE REMIT PAYMENT TO:
TEDSI Infrastructure Group, Inc.
738 Highway 6 South, Suite 430
Houston, Texas 77079

Authorized By: _____ Date: 12-10-15
Mark D. Corbitt, P.E.
Project Manager

Billing Backup

TEDSI Infrastructure Group Invoice 20152581

Project 2013-1128-05 Rural Drainage Plan Review

Phase 100 HCDD #1 Plan Review

Professional Personnel

		Hours	Rate	Amount	
Senior Engineer (V)					
200 - Corbitt, Mark	11/18/2015	9.00	187.37	1,686.33	
200 - Corbitt, Mark	11/20/2015	4.00	187.37	749.48	
Engineer in Training					
590 - Adams, Jason	11/17/2015	6.00	122.87	737.22	
590 - Adams, Jason	11/18/2015	7.00	122.87	860.09	
590 - Adams, Jason	11/19/2015	9.00	122.87	1,105.83	
590 - Adams, Jason	11/20/2015	2.00	122.87	245.74	
590 - Adams, Jason	11/23/2015	5.00	122.87	614.35	
590 - Adams, Jason	11/24/2015	7.00	122.87	860.09	
590 - Adams, Jason	11/25/2015	9.00	122.87	1,105.83	
700 - DeLeon, Samantha	11/18/2015	4.00	122.87	491.48	
700 - DeLeon, Samantha	11/23/2015	3.00	122.87	368.61	
700 - DeLeon, Samantha	11/24/2015	7.00	122.87	860.09	
700 - DeLeon, Samantha	11/25/2015	9.00	122.87	1,105.83	
Totals		81.00		10,790.97	
Total Labor					**10,790.97**

Total this Phase **$10,790.97**

Total this Project **$10,790.97**

Total this Report **$10,790.97**

Detailed Timesheet for the Period Ending 11/21/2015

TEDSI Infrastructure Group

Tuesday, December 8, 2015
1:11:03 PM

Employee **MDC** **Corbitt, Mark D.**

Signed _____

Approved _____
Castillo, Diane S.

Posted

Office **MIS**

			Total Hr	Sun 11/15	Mon 11/16	Tue 11/17	Wed 11/18	Thu 11/19	Fri 11/20	Sat 11/21
2013-1128-05	Rural Drainage Plan Review									
100	HCDD #1 Plan Review									
		Reg	13.0				9.0		4.0	
2013-1128-18	Lucero Del Norte Rural Drainage Imp									
100	Basic Services									
		Reg	9.0			9.0				
2014-1167-01	Erie Ave - Ware Rd to Bentsen Rd									
250	Miscellaneous (Roadway)									
		Reg	9.0		9.0					
84000-2	Project Development									
		Reg	9.0					9.0		

		Total Hr	Sun 11/15	Mon 11/16	Tue 11/17	Wed 11/18	Thu 11/19	Fri 11/20	Sat 11/21
DAILY TOTALS	Reg	40.0		9.0	9.0	9.0	9.0	4.0	

Detailed Timesheet for the Period Ending 11/21/2015

TEDSI Infrastructure Group

Tuesday, December 8, 2015
1:11:03 PM

Employee JMA **Adams, Jason M.**

Signed Jason M. Adams

Approved Diane S. Castillo

Castillo, Diane S.

Posted

Office MIS

			Total Hr	Sun 11/15	Mon 11/16	Tue 11/17	Wed 11/18	Thu 11/19	Fri 11/20	Sat 11/21
2013-1128-05	Rural Drainage Plan Review									
100	HCDD #1 Plan Review									
		Reg	24.0			6.0	7.0	9.0	2.0	
2013-1128-18	Lucero Del Norte Rural Drainage Imp									
100	Basic Services									
		Reg	16.0		9.0	3.0	2.0		2.0	

		Total Hr	Sun 11/15	Mon 11/16	Tue 11/17	Wed 11/18	Thu 11/19	Fri 11/20	Sat 11/21
DAILY TOTALS	Reg	40.0		9.0	9.0	9.0	9.0	4.0	

Detailed Timesheet for the Period Ending 11/28/2015

TEDSI Infrastructure Group

Tuesday, December 8, 2015
1:09:30 PM

Employee JMA **Adams, Jason M.**

Signed Jason M. Adams

Approved Diane S Castillo

Castillo, Diane S.

Posted

Office MIS

			Total Hr	Sun 11/22	Mon 11/23	Tue 11/24	Wed 11/25	Thu 11/26	Fri 11/27	Sat 11/28
2013-1128-05	Rural Drainage Plan Review									
100	HCDD #1 Plan Review									
		Reg	21.0		5.0	7.0	9.0			
2013-1128-18	Lucero Del Norte Rural Drainage Imp									
100	Basic Services									
		Reg	6.0		4.0	2.0				
84000-3	Holiday Leave									
		Reg	13.0					9.0	4.0	

		Total Hr	Sun 11/22	Mon 11/23	Tue 11/24	Wed 11/25	Thu 11/26	Fri 11/27	Sat 11/28
DAILY TOTALS	Reg	40.0		9.0	9.0	9.0	9.0	4.0	

Detailed Timesheet for the Period Ending 11/21/2015

TEDSI Infrastructure Group

Tuesday, December 8, 2015
1:11:03 PM

Employee **SLD** **DeLeon, Samantha L.**

Signed

Approved

Castillo, Diane S.

Posted

Office **MIS**

			Total Hr	Sun 11/15	Mon 11/16	Tue 11/17	Wed 11/18	Thu 11/19	Fri 11/20	Sat 11/21
2013-1128-05	Rural Drainage Plan Review									
100	HCDD #1 Plan Review									
		Reg	4.0				4.0			
2013-1139-22	2013 Misc. Uptown Streets - WA No. 22									
100	PS&E-Final Design-Hollyhurst									
		Reg	13.0		4.5			4.5	4.0	
	11/20 *westbriar*									
2014-1167-01	Erie Ave - Ware Rd to Bentsen Rd									
250	Miscellaneous (Roadway)									
		Reg	23.0		4.5	9.0	5.0	4.5		

		Total Hr	Sun 11/15	Mon 11/16	Tue 11/17	Wed 11/18	Thu 11/19	Fri 11/20	Sat 11/21
DAILY TOTALS	Reg	40.0		9.0	9.0	9.0	9.0	4.0	

Detailed Timesheet for the Period Ending 11/28/2015

TEDSI Infrastructure Group

Tuesday, December 8, 2015
1:09:30 PM

Employee SLD **DeLeon, Samantha L.**

Signed

Approved Diane S. Castillo

Castillo, Diane S.

Posted

Office MIS

			Total Hr	Sun 11/22	Mon 11/23	Tue 11/24	Wed 11/25	Thu 11/26	Fri 11/27	Sat 11/28
2013-1128-05	Rural Drainage Plan Review									
100	HCDD #1 Plan Review									
		Reg	19.0		3.0	7.0	9.0			
2013-1128-14	LRGVRWMP - PPD									
200	Water Quality Samples									
		Reg	6.0		6.0					
2013-1139-24	S. Post Oak Lane-Doliver to Tilbury									
100	PS&E									
		Reg	2.0			2.0				
84000-3	Holiday Leave									
		Reg	13.0					9.0	4.0	

		Total Hr	Sun 11/22	Mon 11/23	Tue 11/24	Wed 11/25	Thu 11/26	Fri 11/27	Sat 11/28
DAILY TOTALS	Reg	40.0		9.0	9.0	9.0	9.0	4.0	

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 East Expressway 83 ♦ Mission, Texas 78572
Tel: (956) 424-7898
Fax: (956) 424-7022
TBPE F-1640

Project Progress Report

TO: Claudette Guerrero

DATE: December 10, 2015

FROM: Mark Corbitt, P.E.

TEDSI PROJECT NO.: 2013-1128-05

REFERENCE: Project No. 2013-1128-05 - Pct.1 Drainage Improvements – Rural Drainage Review

Progress Report for Services from September 27, 2015 to November 28, 2015

Invoice Period	Description of Work Performed & Status
GLO Round 2 – Bernal & Bar Subd	Completed. Comments and revisions have been received and verified/approved.
GLO Round 2 - Olivarez 4, 10, 7, 9, 18, Puesta Del Sol, Sunrise, Tijerina & Mesquite	Completed. Comments and revisions have been received and verified/approved. Met with HCDD No. 1. Addressed additional comments from HCDD No. 1. Met with QH&A to discuss comments and appropriate actions. Final Review and generate final letter of recommendation. Meeting held with Precinct No 1, Hidalgo County Engineering Dept, and HCDD No. 1. Coordination with district and Irrigation district are ongoing Review of Revised plans and comments
GLO - East Lateral	Meeting with Steve Crain and Drainage District to review Inter local for GLO East Lateral. Meeting at Urban County with Antonio Barco, Raul Sesin, and others. Meeting with Delta Irrigation district for approval of GLO East Lateral Inter Local Agreement.
Lucero Del Norte	Review comments submitted to HCDD No. 1 and the project consultant. Meeting was held with HCDD No. 1 and project consultant to discuss comments. Pending Re-submittal of Revisions from Guzman & Munoz. Preliminary plans to address the outfall issue are currently being developed.
Proposed pump location South of Engleman Irrigation district Reservoir	Reviewed the revisions made due to previous comments provided to Engleman Irrigation District's consultant.
Project Meetings/Status Meetings	Meetings at Hidalgo County Precinct No. 1 to discuss various projects including: Old River Rd., Lucero Del Norte, East Lateral, Adams & Black, etc…
Pavement Management Assessment	Assessment of drainage damages to roadways withing Hidalgo County Precinct No. 1 and development of PMS ratings for pavements.
Precinct 1 Drainage Assistance	Drainage Assessment/estimates for Border Rd. Outfalls and other flooding areas impacted by rain events. Site visits to Weslaco and Hidalgo County Precinct 1 to collect drainage information related to flood events.

Hidalgo County Drainage District No. 1

902 North Doolittle Road Edinburg, Texas 78542 Office: (956) 292-7080

Invoice Processing Checklist/Routing Slip

Invoice/ Backup

Date Received: 12/22/2015

Engineer/Firm Name: TEDSI

Project Name/Number: Donna North Lateral & FM495 Drain WA No. 19

Invoice No.: 20152608

Purchase Order No.: 628016

Received By: Rosa Arce

Forwarded to: Nora D. Cavazos _____ Date: _____
Claudette Guerrero _____ Date: _____

Total # of Pages Submitted: 5

Attachments: CD

Forwarded to: Jose N. Saldivar _____ Date: _____

Forwarded to: Lora Briones _____ Date: _____

Additional Comments: $28,147.74

THIS ROUTING SLIP MUST BE KEPT WITH ORIGINAL INVOICE

1 of 5
w/CD

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 E. Expressway 83 ♦ Mission, Texas 78572
(956) 424-7898

Letter of Transmittal

TO:
Mr. Noe Saldivar
Hidalgo County Drainage District No. 1
902 N. Doolittle Road
Edinburg, Texas 78542

DATE: December 21, 2015

REF.: Donna North Lateral Control Structure & FM 495 Drain Control Structure Invoice

TEDSI PROJECT NO.: 2013-1128-19

TRANSMITTED:

☒ For Your Use	☐ Please comment	☐ Approved as Noted
☐ As Requested	☐ Reply ASAP	☐ As Noted Below

VIA:

☐ US Mail	☐ Courier	☐ Hand Carry
☐ E-Mail	☒ LoneStar Overnight	☐ FedEx

COPIES	DESCRIPTION
1	Invoice No. 20152608 for Project No. 2013-1128-19
1	CD Digital Backup

REMARKS:

Thank you,

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 22 2015
4:28 AM / PM
BY: Rosa Diaz

Signed: for: _____
Jose A. Sanchez, P.E.

If enclosures are not as stated, please notify us.

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 East Expressway 83 ♦ Mission, Texas 78572
Tel: (956) 424-7898
Fax: (956) 424-7022
TBPE F-1640

December 17, 2015
Project No: 2013-1128-19
Invoice No: 20152608

Ms. Claudette Guerrero
Hidalgo County Drainage District No. 1
902 North Doolittle Road
Edinburg, TX 78542

Project 2013-1128-19 Donnal North Lateral Control Structure & FM 495 Drain Control Structure

Precinct One 2012 Bond Referendum
P.O. No. 628016
Account No. 15-133-433-370-010-006-43340
W.A. No. 19

Professional Services from Notice to Proceed to November 30, 2015

Phase 100 Donna North Lateral Control Structure

Fee

Billing Phase	Fee	Percent Complete	Earned	Previous Fee Billing	Current Fee Billing	
Basic Services	23,690.29	0.00	0.00	0.00	0.00	
Topographic Survey	6,500.00	100.00	6,500.00	0.00	6,500.00	
Geotechnical Report (TEDSI)	1,267.52	100.00	1,267.52	0.00	1,267.52	
Geotechnical Report (RABA)	6,337.61	100.00	6,337.61	0.00	6,337.61	
Total Fee	37,795.42		14,105.13	0.00	14,105.13	
		Total Fee				**14,105.13**
				Total this Phase		**$14,105.13**

Phase 200 FM 495 Drain Control Structure

Fee

Billing Phase	Fee	Percent Complete	Earned	Previous Fee Billing	Current Fee Billing
Basic Services	23,690.29	0.00	0.00	0.00	0.00
Topographic Survey	6,500.00	100.00	6,500.00	0.00	6,500.00
Geotechnical Report (TEDSI)	1,257.10	100.00	1,257.10	0.00	1,257.10
Geotechnical Report (RABA)	6,285.51	100.00	6,285.51	0.00	6,285.51
Total Fee	37,732.90		14,042.61	0.00	14,042.61

Project	2013-1128-19	Donna North Lateral and FM 495	Invoice	20152608

Total Fee		**14,042.61**
Total this Phase		**$14,042.61**

Billing Summary	**Current**	**Prior**	**To-Date**
Total Billings	28,147.74	0.00	28,147.74
Total Fee			75,528.32
Remaining Fee			47,380.58

Total this Invoice **$28,147.74**

PLEASE REMIT PAYMENT TO:
TEDSI Infrastructure Group, Inc.
738 Highway 6 South, Suite 430
Houston, Texas 77079

RECEIVED
HIDALGO COUNTY
DRAINAGE DISTRICT #1
DEC 22 2015
4:28 AM / PM
BY: Rosa

Authorized By: _____ Date: 12-17-15
SOV Jose A. Sanchez, P.E.
Project Manager

VISIT OUR WEBSITE AT:
www.rkci.com

INVOICE

INVOICE # :R025978

CONSULTANTS * ENVIRONMENTAL * FACILITIES * INFRASTRUCTURE

PROJECT :
AMA1504900
Prop. Control Structure -DONNA

BILLING DATE :
12/3/2015

CLIENT :
12C05931 TEDSI Infrastructure Group

RABA KISTNER

Mr. Jose Sanchez, P.E.
TEDSI Infrastructure Group
1201 E. Expressway 83
Mission, TX 78572

REMITTANCE ADDRESS:
RABA KISTNER, INC.
P.O. BOX 971037
DALLAS, TX 75397-1037

PHONE (210) 699-9090

CONSULTING SERVICES

RKCI Proposal NO. PMA15-062-00
TEDSI WA # 10 Exhibit D-1

FOR PROFESSIONAL SERVICES RENDERED THROUGH: 11/28/2015

TOTAL FEE AUTHORIZED	6,337.61
PERCENT COMPLETE AS OF 11/28/2015	100.00%
FEE EARNED TO DATE	6,337.61
LESS PREVIOUS BILLINGS	0.00
AMOUNT DUE THIS INVOICE **	6,337.61

RK PROJECT MANAGER: KATRIN M LEONARD
CLIENT PHONE: 956-424-7898

Internal use only–do not submit to client
TEDSI INFRASTRUCTURE GROUP
Project No. 2013-1128-19
Phase No:
☒ 100 Donna N Lateral Control Structure
☐ 200 FM 495 Control Structure

☒ Lump Sum ☒ Approved ☒ Hold
☐ Hourly ☐ Rejected ☐ Process

Sign _____ **Date 12-16-2015**

PROJECT ACCOUNTS RECEIVABLE SUMMARY

Amount Due This Invoice	$ 6,337.61
Total of Previous Invoices - Currently Unpaid	0.00
Total Due And Payable	$ 6,337.61

* Invoices are submitted monthly and are due on receipt. * Carrying charges may be assessed on invoices unpaid beyond 30 days from billing date.

AP Nov-15

PLEASE PAY FROM THIS INVOICE.

VISIT OUR WEBSITE AT:
www.rkci.com

INVOICE

INVOICE # :R025979

CONSULTANTS * ENVIRONMENTAL * FACILITIES * INFRASTRUCTURE

PROJECT :
AMA1505000
Prop. Control Structure - Edinburg

BILLING DATE :
12/3/2015

CLIENT :
12C05931 TEDSI Infrastructure Group

RABA KISTNER

Mr. Jose Sanchez, P.E.
TEDSI Infrastructure Group
1201 E. Expressway 83
Mission, TX 78572

REMITTANCE ADDRESS:
RABA KISTNER, INC.
P.O. BOX 971037
DALLAS, TX 75397-1037

PHONE (210) 699-9090

CONSULTING SERVICES

RKCI Proposal No. PMA15-063-00
TEDSI WA # 10 Exhibit D-2

FOR PROFESSIONAL SERVICES RENDERED THROUGH: 11/28/2015

TOTAL FEE AUTHORIZED	6,285.51
PERCENT COMPLETE AS OF 11/28/2015	100.00%
FEE EARNED TO DATE	6,285.51
LESS PREVIOUS BILLINGS	0.00
AMOUNT DUE THIS INVOICE **	6,285.51

RK PROJECT MANAGER: KATRIN M LEONARD
CLIENT PHONE: 956-424-7898

Internal use only–do not submit to client
TEDSI INFRASTRUCTURE GROUP
Project No. 2013-1128-19
Phase No:
☐ 100 Donna N Lateral Control Structure
☒ 200 FM 495 Control Structure

☒ Lump Sum ☒ Approved ☒ Hold
☐ Hourly ☐ Rejected ☐ Process

Sign _____ Date 12-16-2015

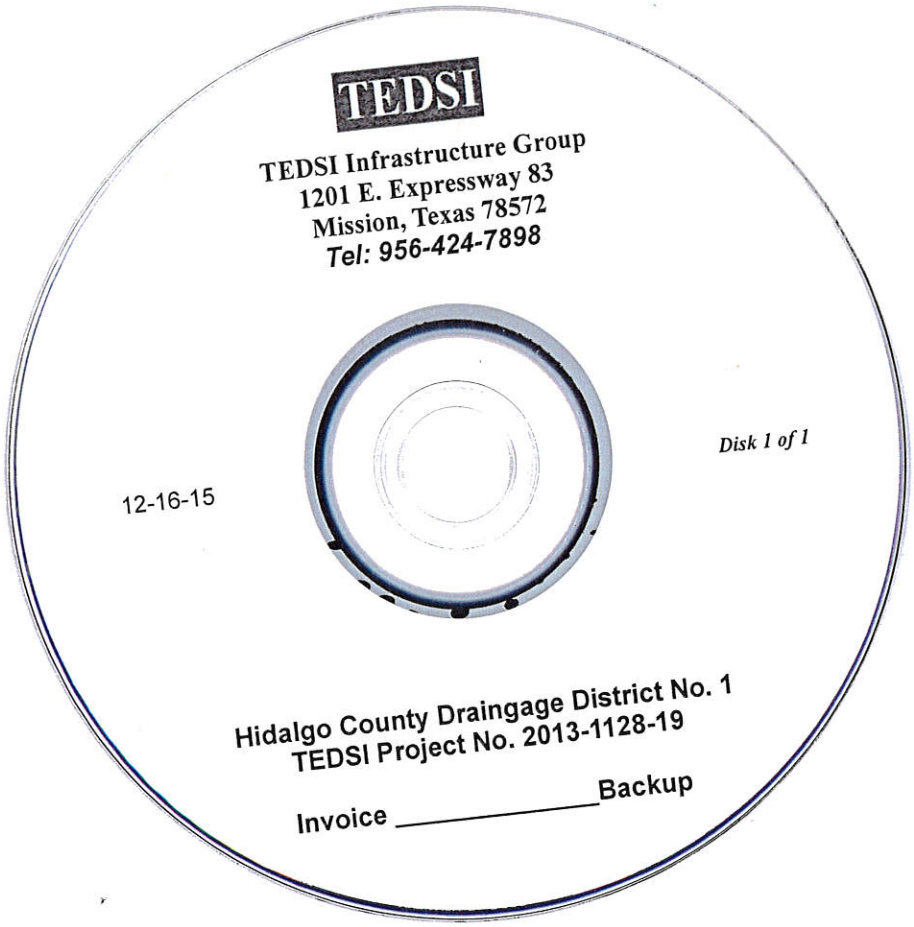
PROJECT ACCOUNTS RECEIVABLE SUMMARY

Amount Due This Invoice	$ 6,285.51
Total of Previous Invoices - Currently Unpaid	0.00
Total Due And Payable	$ 6,285.51

* Invoices are submitted monthly and are due on receipt. * Carrying charges may be assessed on invoices unpaid beyond 30 days from billing date.

AP Nov-15

PLEASE PAY FROM THIS INVOICE.


TEDSI
TEDSI Infrastructure Group
1201 E. Expressway 83
Mission, Texas 78572
Tel: 956-424-7898
12-16-15
Disk 1 of 1
Hidalgo County Draingage District No. 1
TEDSI Project No. 2013-1128-19
Invoice _____Backup