

Texas Commission on Environmental Quality Request for Authorization to Disturb Final Cover Over Closed Municipal Solid Waste Landfill for Non-Enclosed Structure

Application Tracking Information

Applicant Name:	
Facility Name:	
Initial Submission Date:	
Revision Date:	
waste (MSW) landfill, includin over a closed MSW landfill are Subchapter T. Instructions for Include a Core Data Form, av application. If you have quest	orization to disturb final cover over a closed municipal solid of test borings and other excavations. Rules about use of land in Title 30, Texas Administrative Code ¹ , Chapter 330, recompleting this form are provided in form 20787-instr ² . ailable at www.tceq.texas.gov/goto/coredata with the cions, contact the Municipal Solid Waste Permits Section by gov, or by phone at 512-239-2335.
1. Application Type	
☐ New Authorization	Revision to Existing Authorization Number
2. Submission Type	
☐ Initial Submission	☐ Response to Notice of Deficiency (NOD)
3. Confidential Docum	ents
Does the application contain o	confidential documents?
	tial documents in the application, but submit the confidential in a separate binder marked CONFIDENTIAL.

¹ www.tceq.texas.gov/goto/view-30tac

² www.tceq.texas.gov/downloads/permitting/waste-permits/msw/forms/20787-instr.pdf

4. Enrollment in Other TCEQ Programs
Is the site enrolled in other TCEQ programs?
☐ Yes ☐ No
If Yes, indicate the program(s) and program ID numbers:
5. Landfill Permit Status [30 TAC 330.954]
Indicate if the landfill has an existing municipal solid waste (MSW) permit, and the physical status of the landfill:
☐ Unpermitted Landfill
☐ Revoked MSW Permit
☐ Existing MSW Permit, Landfill Active
☐ Existing MSW Permit, Landfill in Post-Closure Care
If the landfill has an existing MSW permit, this Subchapter T disturbance application must be submitted as an attachment to an application to modify or amend the existing permit.
6. Project Description
Briefly describe the proposed disturbance of the final cover of the closed landfill.
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Briefly describe the proposed disturbance of the final cover of the closed landfill. 7. Facility Information Facility Name: Regulated Entity Reference Number: RN

8. Contact Information			
Applicant			
Name:			
Customer Reference Number: (-	
Mailing Address:			
City:			Zip Code:
Phone Number:			·
Email Address:			
Property Owner (if different			
Name:		_	
Customer Reference Number:			
Mailing Address:			
City:			Zip Code:
Phone Number:			
Email Address:			
Consultant (if applicable)			
Firm Name:			
Texas Board of Professional Eng	gineers and Land Surveyors Fir	m Number:	
Mailing Address:		-	
City:		State:	Zip Code:
Consultant Name:			- · <u></u>
Phone Number:			
Email Address:			
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9. Soil Test Required be	efore Development [30 Ta	AC 330.953	1
Was the existence of a closed N			ssional engineer
during the development of a tra	act of land greater than one ac	cre?	
☐ Yes ☐ No			
If Yes, did the engineer who de			
following persons of that deterr the TCEQ executive director, lo			
application for development, ar			a alcappione are
☐ Yes ☐ No			

10. Notice to Real Property Records [30 TAC 330.962]
Has the property owner filed for record in the real property records in the county where the land is located a written notice stating: (1) the former use of the facility; (2) the legal description of the tract of land that contains the closed MSW landfill; (3) notice that restrictions on the development or lease of the land exist in Texas Health and Safety Code, Chapter 361, Subchapter R and Subchapter T; and (4) and the name of the owner? Yes \text{No}
11. Notice to Buyers, Lessees, and Occupants [30 TAC 330.963]
Are there any lessees or occupants of structures overlying a closed MSW landfill unit on the property? ☐ Yes ☐ No
If Yes, has the property owner notified each lessee and each occupant of a structure that overlies the landfill unit of: (1) the land's former use as a landfill; and (2) the structural controls in place to minimize potential future danger posed by the closed MSW landfill? Yes No
12. Lease Restrictions [30 TAC 330.964]
Is the property leased or offered for lease?
☐ Yes ☐ No
If Yes, is existing development on the land in compliance with 30 TAC Chapter 330, Subchapter T?
Yes No
Previous Subchapter T approval number(s):
Was each lessee or prospective lessee given notice of what is required to bring the property and any development on the property into compliance with Subchapter T and the prohibitions or requirements for future development imposed by Subchapter T and by any development permit issued for development of the property under Subchapter T?
☐ Yes ☐ No

13. Certification by Professional Engineer

A professional engineer (PE) licensed in Texas must completed the following Certification of No Potential Threat to Public Health or the Environment required by 30 TAC 330.960(1) and according 330.957(b):

I. Mike Schultz

_____, Texas PE Number 68765

__, certify that

the proposed development is necessary to reduce a potential threat to public health or the environment, or that the proposed development will not increase or create a potential threat to public health or the environment. Further, I certify that the proposed development will not damage the integrity or function of any component of the Closed Municipal Solid Waste Landfill Unit, including, but not limited to, the final cover, containment systems, monitoring system, or liners. This certification includes all documentation of all studies and data on which I relied in making these determinations.

Engineer's seal, with signature and date:



Engineering Firm Name: SKA Consulting, L.P.

Texas Board of Professional Engineers and Land Surveyors Firm Number: F-005009

Signature Page

Both signatures on this page must be notarized.

Applicant Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing Name. Mark Lester

Title: Applicant
Signature: Date: Date: Date: Date:
Email Address: mlester@landcorealestate.com
SUBSCRIBED AND SWORN to before me by the said Mark Lester
On this 20 day of 2 CMM20 7077
A all mall
My commission expires on the day of
Notary's Name:
Notary Public in and for SHRUTI BHALLA
County, Texas
Property Owner Authorization COUNTY OF SAN MATEO My commission expires August 29, 2027 Wy commission expires August 29, 2027
To be completed by the property owner if the property owner is not the applicant.
I, the owner of the property identified by
applicant to proceed with the project described in this and it will be project described in the project described in
owner, I am responsible for maintaining the integrity of the final cover over the closed MSW landfill.
Property Owner Name:
Signature: Date:
Email Address:
SUBSCRIBED AND SWORN to before me by the said
On this day of,
My commission expires on the day of
Notary's Name:
Notary Public in and for
County, Texas

Attachments

Attachments for New Authorization Request

Attachments Table—Required attachments.

Required Attachments	Attachment Number
Existing Conditions Summary [330.960(2)]	
Project description [330.960(3)]	
Construction/investigation process [330.960(4)]	
Water, methane, and excavated material management [330.960(5)]	
Maps and drawings [330.960(6)]	
Engineering plans [330.960(7)]	
Notice to Real Property Records [330.962(a)]	

Attachments Table—Additional attachments that may be required.

Additional Attachments (select all that apply and add others as needed)	Attachment Number
☐ Confidential Documents	
☐ TCEQ Core Data Form(s)	
☐ Notices of Landfill Determination [330.953(d)]	
☐ Notice(s) to Buyers, Lessees, and Occupants [330.963(b)]	
☐ Notice(s) of Lease Restrictions [330.964(b)]	
Soil Test Procedures and Results	
☐ Methane Monitoring Documentation	
Groundwater Monitoring Documentation	
☐ Waste Disposal Documentation	
☐ Other (describe):	
☐ Other (describe):	

Attachments for Revision to Existing Authorization or Revision to Pending Authorization Request

Attachments Table—Required attachments.

Required Attachments	Attachment Number
Description of Proposed Revisions to Existing Authorization	
Set of Marked (Redline/Strikeout) Revised Pages	
Set of Unmarked Revised Pages	

ATTACHMENT 1 NARRATIVE



Environmental Engineering and Consulting Excellence Since 2001

Request for Authorization to Disturb Final Cover Over Closed Municipal Solid Waste Landfill for Non-Enclosed Structure

Doty Sand Pit Venture Landfill (MSW 1247) and Olshan Demolishing Landfill (MSW 1259, revoked) 12000 Bissonnet Street Houston, Harris County, Texas 77099

Prepared for:

Bissonnet 136, LLC Twenty Park Road, Suite G Burlingame, California 94010

December 22, 2023

SKA Project No. 5019-0001

SKA Consulting, L.P. 1888 Stebbins Drive, Suite 100 Houston, Texas 77043

P: 713.266.6056 | F: 713.266.0996

www.skaconsulting.com



AUTHORIZATION TO DISTURB FINAL COVER OVER CLOSED MUNICIPAL SOLID WASTE LANDFILL FOR NON-ENCLOSED STRUCTURE

DOTY SAND PIT VENTURE LANDFILL (MSW PERMIT 1247)
OLSHAN DEMOLISHING LANDFILL (MSW PERMIT 1259, REVOKED)
12000 BISSONNET STREET
HOUSTON, HARRIS COUNTY, TEXAS 77099

SKA PROJECT NO. 5019-0001

Prepared for:

BISSONNET 136, LLC TWENTY PARK ROAD, SUITE G BURLINGAME, CALIFORNIA 94010

Submitted by:

SKA CONSULTING, L.P. 1888 STEBBINS DRIVE, SUITE 100 HOUSTON, TEXAS 77043

Prepared by:

MANDI HAWKINS
PROJECT ENVIRONMENTAL ENGINEER

Signature

Reviewed by:

MIKE SCHULTZ, P.E. EXECUTIVE VICE PRESIDENT AND PARTNER

Signature

DECEMBER 22, 2023

TEXAS REGISTERED ENGINEERING FIRM NO. F-005009 TEXAS REGISTERED GEOSCIENCE FIRM NO. 50011 TEXAS ASBESTOS CONSULTANCY 100525

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1.0 Introduction

This Application to Disturb Final Cover Over Closed Municipal Solid Waste Landfill for Non-Enclosed Structure has been prepared by SKA Consulting, L.P. (SKA) on behalf of Bissonnet 136, LLC (Bissonnet and Applicant). Bissonnet is a Delaware corporation registered to do business in Texas. The Texas Secretary of State registration is provided in *Appendix 1*. A Core Data form for Bissonnet is provided in *Appendix 1*.

1.1 Project Description

The Subject Property is approximately 136.888 acres located at 12000 Bissonnet Street in Houston, Harris County, Texas (*Figure 1*). The Subject Property includes the closed 118.778-acre Doty Sand Pit Venture (DSPV) Landfill [Municipal Solid Waste (MSW) Permit No. 1247] and the closed Olshan Demolishing Landfill (MSW Permit No. 1259, revoked). The DSPV Landfill is currently in post-closure care while the Olshan Demolishing Landfill completed post closure care and MSW Permit No. 1259 was revoked in 2002. See *Figure 1* for Subject Property location.

This Application to Disturb Final Cover Over Closed Municipal Solid Waste Landfill for Non-Enclosed Structure pertains to the development of site infrastructure (roads, utilities, drainage, and detention) needed to support further development of the Subject Property. The proposed infrastructure does not contain any structures suitable for human occupancy.

1.2 Existing Site Conditions and History

The DSPV Landfill was vacant land since at least 1939 until development of the property began in the 1960's as a sand mining operation. As the sand was mined out, the property was converted to a Type IV construction and demolition debris landfill in the 1970's. The DSPV Landfill operated from the 1970s to 1999 and has been in post closure care since closed. The landfill is currently capped with an original compacted clay layer to isolate the waste and prevent infiltration of precipitation. The Sugar Hills Golf Course operated on the DSPV Landfill from 2000 to 2005. Over a million cubic yards of fill soil was brought on site to shape the golf course. The clay cap is covered by up to 15 feet of soil (golf course soil) that was placed to shape the golf course in 2000. The DSPV Landfill property has been vacant land since the closing of the Sugar Hills Golf Course in 2005. The DSPV Landfill property still exhibits evidence of being developed as a golf course. The existing surface cover is fully vegetated and semi-annually maintained. A general topographic map of the Subject Property is provided as *Figure 2*. The surrounding land use is shown on *Figure 3*. The prevailing wind direction is shown on *Figure 4*.

On July 17, 1977, the Harris County Health Department issued a license to Doty Sand Pit, Inc. to operate a sanitary landfill. On May 11, 1981, the Texas Department of Health (TDH) issued a Type IV MSW Landfill permit to Doty Sand Pit, Inc. On March 13, 1985, the Texas Health Department transferred the Type IV MSW Landfill permit to Doty Sand Pit Venture. Based on the April 28, 1999, letter from ENSR to the Texas Natural Resource Conservation Commission (TNRCC, currently named the TCEQ), final cover was documented as being in place and the landfill was closed.

The Olshan Demolishing Landfill is a closed Type IV landfill (formerly Municipal Solid Waste [MSW]) Permit No. 1259 [revoked]) that received waste from September 1976 until July 1987.

In 2002, the Olshan Landfill ended post closure care, and the permit was revoked. The Sugar Hills Golf Course operated from approximately 2000 to 2005 on top of the landfill. Since the Sugar Hills Golf Course closed, the closed landfill has remained undeveloped. The DSPV Landfill (MSW Permit No. 1247) is located adjacently south and west of the Olshan landfill.

The extent of waste disposal as documented by ENSR in both landfills is provided on the site plan in *Figure 5*.

On June 26, 2019, Bissonnet 136, LLC acquired the DSPV Landfill property and adjacent Olshan Demolishing Landfill property. See property deed in *Appendix 1*. In June 2020, MSW Permit No. 1247 was transferred to Northwest Metro Holding CS 34, Ltd (Northwest Metro), a related entity to Bissonnet 136, LLC. Northwest Metro has installed additional gas vents, repaired the gas monitoring probe network, and removed ponded surface water. As property owner, Bissonnet 126, LLC has obtained a Municipal Setting Designation (MSD) for the DSPV Landfill property, the Olshan Demolishing Landfill property, and adjacent City of Houston rights-of-way. Northwest Metro has an MSW permit revocation request for MSW Permit No. 1247 pending before the TCEQ.

2.0 Authority and Coordination _

This Application to Disturb Final Cover Over Closed Municipal Solid Waste Landfill for Non-Enclosed Structure is submitted for the proposed development of civil infrastructure improvements such as roads, grading, utilities, drainage, and detention on the Subject Property.

2.1 Legal Authority

Bissonnet 136, LLC was incorporated in the State of Texas Partners, LLC on June 13, 2019. Bissonnet 136, LLC is in good standing with the State of Texas. Please see *Appendix 1* for the certificate of incorporation and certificate of good standing.

2.2 Notice of Engineer Appointment

The Applicant has appointed Mike Schultz, P.E. (TX PE 68765) of SKA Consulting, L.P. as the Applicant's Environmental Engineer for this Application for Development Permit. SKA Consulting, L.P. is licensed Texas engineering firm F-5009.

The Applicant's Geotechnical Engineer for the Application for Development Permit is Gary Goodheart, P.E. (TX PE 141883) of Goodheart & Associates, LLC. Goodheart & Associates, LLC is licensed Texas engineering firm F-21548.

The Applicant's Civil Engineer for the Application for Development Permit is Rosie Kaetzer, P.E. (TX PE 110833) of Kimley-Horn and Associates, Inc. Kimley-Horn and Associates, Inc. is licensed Texas engineering firm F-928.

2.3 Subject Property Legal Description

The Subject Property legal description is provided with the deed in *Appendix 1*. A site survey is included in *Appendix 1*.

2.4 Notice to Real Property Records

A Notice to Real Property Records, Buyers, Lessees and Occupants Regarding Land Which Overlies a Closed Municipal Solid Waste Landfill was filed in the real property records of Harris County, Texas by Bissonnet 136, LLC on May 20, 2022. A copy of the Notice is provided in *Appendix 1*.

An environmental notice to future buyers, lessees, and occupants is also provided in *Appendix 1*.

2.5 Surrounding Land Uses

The land uses surrounding the Subject Property are shown on *Figure 3* along with schools, licensed day care facilities, hospitals, parks, and health care facilities.

2.6 Permit Fees

The permit modification to MSW No. 1247 fee is \$150. A copy of the fee payment for the permit modification is also provided in *Appendix 1*.

2.7 Public Involvement Plan

A public participation plan (TCEQ Form 20960) has been completed and is included in *Appendix 1*. It appears that an Authorization to Disturb Final Cover Over Closed Municipal Solid Waste Landfill for Non-enclosed Structures is not a permit requiring public participation.

3.0 Subsurface Description

This Application to Disturb Final Cover Over Closed Municipal Solid Waste Landfill for Non-Enclosed Structure is submitted for the proposed development of site infrastructure such as roads, utilities, grading and drainage, and detention ponds.

3.1 Soil Tests

A preliminary geotechnical investigation was performed on the Subject Property by Civil and Environmental Consultants, Inc. (CES) in 2006 in which 53 soil borings were installed. The depth of the soil borings ranged from 2.8 feet to 62 feet. Five soil boring fully penetrated the waste. The thickness of the cap and golf course fill soil over the landfill waste ranged from 2.8 feet to 16.5 feet with an average cap and golf course fill soil thickness of 7.8 feet. Of the soil borings that fully penetrated the landfill, the waste thickness ranged from 11.5 to 54 feet with an average waste thickness of 37.5 feet. The preliminary CES geotechnical report is provided in *Appendix 2*. CES has provided permission to utilize its geotechnical report in this Application to Disturb Final Cover Over Closed Municipal Solid Waste Landfill for Non-Enclosed Structure.

A more focused geotechnical investigation was performed on a 12-acre parcel in the south-central area of the Subject Property by Goodheart & Associates, PLLC (Goodheart) for Impact Residential Development (Impact) in 2022. Goodheart installed 12 soil borings to evaluate the soil conditions beneath five planned apartment buildings and a clubhouse. The depth of the soil borings ranged from 10 feet to 75 feet. Five of the soil borings fully penetrated the landfill. The thickness of the cap and fill soil ranged from 2.5 to 13.5 feet with an average thickness of 7.1 feet. Of the soil borings that fully penetrated the landfill, the waste thickness ranged from 45 to 68.5 feet thick with an average thickness of 51.5 feet. The Goodheart geotechnical report for Impact is provided in *Appendix 2*. This report was previously provided to TCEQ as part of Impact's Application for Development Permit for Proposed Enclosed Structure over a Closed Municipal Solid Waste Landfill dated September 22, 2023, and as such this geotechnical report is a public document.

Goodheart performed another focused geotechnical investigation on an 11-acre parcel in the southwest corner of the Subject Property for Lincoln Avenue Capital (LAC) in 2023. Goodheart installed 19 soil borings to evaluate the soil conditions beneath seven planned apartment buildings and a clubhouse. The depth of the soil borings ranged from 10 feet to 60 feet. All but five of the soil borings fully penetrated the landfill. The thickness of the cap and fill soil ranged from 6.5 to 14.5 feet with an average thickness of 8.1 feet. Of the soil borings that fully penetrated the landfill, the waste thickness ranged from 16 to 51 feet thick with an average thickness of 30.6 feet. The Goodheart geotechnical report for LAC is provided in *Appendix 2*. LAC has provided permission to utilize its geotechnical report in this Application to Disturb Final Cover Over Closed Municipal Solid Waste Landfill for Non-Enclosed Structure. LAC plans to submit an Application for Development Permit for Proposed Enclosed Structure over a Closed Municipal Solid Waste Landfill in the near future.

SKA also performed soil and groundwater assessments of the Subject Property for an Affected Property Assessment Report (APAR) dated October 3, 2022, that has been submitted to TCEQ. The affected property assessment included the installation of 35 soil borings and 18 first groundwater-bearing unit (GWBU) monitoring wells and three second GWBU monitoring wells.

Soil borings and monitoring wells are shown on *Figure 6* and *Figure 7*, respectively. Boring logs for these soil borings and monitoring wells are included in *Appendix 3*. In addition, SKA developed three cross sections across the Subject Property that are also included in drawings *Appendix 3-1, 3-2*, and *3-2*.

In addition to the geotechnical studies described above, SKA also performed a focused geotechnical investigation of the proposed detention pond areas and installed a total of 15 soil borings (SB-49 through SB-63) as shown in drawing Appendix 3-4. Boring logs for soil borings SB-49 through SB-63 are provided in *Appendix 3*. Five soil borings (SB-59 through SB-63) were installed on the south side of the DSPV Landfill in the proposed location of Ponds 1 and 2. In this area the cap and golf course fill soil ranged from 6 to 18 feet thick with an average thickness of 14 feet. The waste thickness ranged from 10 feet to 38 feet with an average thickness of 26 feet. Detention Pond 3 will be located on the DSPV Landfill and the Olshan Landfill. Three soil boring (SB-49 through SB-51) were located in the DSPV Landfill portion of Pond 3 while six soil borings (SB-52 through SB-58) were located in the Olshan Landfill portion of Pond 3. In this area the cap and golf course fill soil ranged from 0 to 12.5 feet thick with an average thickness of 7.4 feet. The waste thickness ranged from 30 feet to 51 feet with an average thickness of 36 feet. As shown on the boring logs, these borings were also temporarily cased as piezometers to measure depth to leachate. Four of the piezometers were sampled to characterize the leachate in the event leachate would ever need to be managed. In 2015, a prior property owner/permittee removed the cap and golf course soil from a portion of the Olshan Landfill in anticipation of mining the landfill as evidenced by the logs for soil borings SB-52, SB-55, and SB-56. A landfill mining registration was obtained from TCEQ in 2016, but landfill mining never commenced and the landfill mining registration was canceled by TCEQ in 2018. These areas will be lined with a minimum of 2 feet of compacted clay during the construction of Pond 3.

Goodheart recently performed a geotechnical investigation of the perimeter ditch and roadways to assess the geotechnical properties of the soils in these areas and the expected depth of waste. Goodheart's report on this investigation is not yet complete.

3.2 Geology and Soil Statements

Sampling of surface soil [0 to 15 feet below ground surface(ft-bgs)] was performed across the DSPV Landfill and Olshan Landfill and the results were provided to the TCEQ MSW Permits Section in an Affected Property Assessment Report (APAR) dated October 3, 2022. The affected property in the APAR fully encompassed the Subject Property. The APAR was reviewed and acknowledged by the TCEQ MSW Permits Section by letter dated December 16, 2022.

A Municipal Setting Designation (MSD) for the DSPV Landfill, the Olshan Landfill, and associated City of Houston rights-of-way was certified by the TCEQ on October 12, 2022. The MSD restricts the groundwater from potable use and closes the groundwater-protective soil pathway and the groundwater ingestion exposure pathway. The MSD fully encompasses the Subject Property.

The Subject Property contains permitted waste control units (the DSPV Landfill and Olshan Landfill); therefore, no subsurface soil samples (greater than 15 ft-bgs) were collected for analytical testing.

Chemicals of concern (COCs) detected in surface soil (0 to 15 ft-bgs) include the following:

- Metals arsenic, barium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc,
- VOCs methylene chloride and total xylenes.

Only arsenic and methylene chloride were identified in surface soil at concentrations exceeding their residential assessment levels (RALs) without an MSD in place, as discussed below. The remaining COCs detected in surface soils are below their RALs without an MSD in place.

- Arsenic was detected in two surface soil samples collected from soil borings SB-14 and SB-18 at concentrations exceeding its RAL of 5.9 mg/kg without an MSD in place.
 However, the detected arsenic concentrations do not exceed the RAL of 24 mg/kg with an MSD in place.
- Methylene chloride was detected in four surface soil samples collected from soil borings SB-20, SB-23A, SB-24A and SB-29 at concentrations exceeding its RAL of 0.0065 mg/kg without an MSD in place. Groundwater was not affected by methylene chloride; as such, the slightly elevated methylene chloride concentrations identified in surface soils appear to be protective of groundwater and methylene chloride may potentially be a laboratory contaminant. The detected methylene chloride concentrations do not exceed the RAL of 1,500 mg/kg with an MSD in place.

In addition, no evidence of NAPL was identified in surface soils and no potential ecological receptors were identified on or within ¼ mile of the DSPV Landfill and Olshan Landfill properties.

A surface soil concentration map is included as *Figure 6*. A summary of laboratory soil sample analytical results for the DSPV Landfill are included in *Table 1*.

In summary, the Subject Property has an MSD certificate from TCEQ that prevents exposure to the designated groundwater for potable purposes (i.e., groundwater ingestion). With the MSD, the ^{GW}Soil_{Ing} exposure pathway is no longer considered complete, and the RALs are based on the ^{Tot}Soil_{Comb} exposure pathway for surface soils (0-15 ft-bgs). Based on the results of the affected property assessment, concentrations detected in surface soils are below their RALs with an MSD in place. Subsurface soils were not analyzed as part of the affected property assessment due to the presence of the landfills.

3.3 Groundwater and Surface Water Statements

The Subject Property has an MSD certificate from TCEQ to prevent exposure to, through use of, designated groundwater for potable purposes (i.e., groundwater ingestion). Therefore, the $^{GW}GW_{Ing}$ exposure pathway will no longer be considered complete, and the RALs for groundwater will only be based on the $^{Air}GW_{Inh-V}$ exposure pathway. Based on the groundwater analytical data and with the approval of an MSD, the COCs in groundwater at the Subject Property do not exceed their respective RALs with an MSD in place.

The compiled results from the groundwater assessment and a discussion of the nature and extent of COCs in groundwater are provided for the first and second groundwater-bearing units

(GWBUs). No direct or indirect evidence of NAPL was encountered in groundwater during this affected property assessment.

According to groundwater level measurements collected by SKA in January 2020 through October 2020, the groundwater flow direction at the Subject Property is generally to the north or northeast with an average hydraulic gradient of approximately 0.0015 feet per foot (ft/ft). The October 2020 groundwater gradient map is provided as *Figure 7*.

A water well search was performed for the Subject Property and the mapped water wells are shown on *Figure 8*. The water well search results are provided in *Appendix 4*.

3.3.1 First Groundwater-Bearing Unit

COCs detected in the first GWBU include the following:

- Metals –arsenic, barium, chromium, iron, lead, manganese, selenium, and zinc;
- VOCs acetone, benzene, chlorobenzene, chloroform, chloromethane, 1,2dichlorobenzene, 1,4-dichlorobenzene, ethylbenzene, p-isopropyltoluene, MEK, MTBE, toluene, and total xylenes;
- SVOCs benzoic acid; and
- TPH the C₆ to C₁₂ carbon range.

COC concentrations detected in the first GWBU exceeding their respective RALs without an MSD are arsenic, chromium, manganese, and TPH, as described in detail below.

- Arsenic was detected in the first GWBU groundwater samples at concentrations exceeding its RAL of 0.010 mg/L in on-site monitoring wells MW-9 and MW-10 and in off-site monitoring wells MW-1, MW-2, MW-5, MW-7, and MW-15. However, the most recent groundwater sample collected from monitoring well MW-9 did not exhibit arsenic concentrations exceeding its RAL. The arsenic groundwater contaminant plume is delineated in the hydrogeologically downgradient direction by monitoring wells MW-6, MW-8, MW-9, MW-11, MW-12, MW-16, and MW-18. The arsenic groundwater contaminant plume is also vertically delineated by monitoring wells MW-1D, MW-2D, and MW-3D installed in the second GWBU.
- Chromium was detected in the first GWBU in March 2019 at a concentration exceeding
 its RAL of 0.10 mg/L in off-site monitoring well MW-1. Subsequent groundwater
 samples collected from monitoring wells MW-1 through MW-18 between September
 2019 and October 2020, however, did not contain concentrations of chromium
 exceeding its RAL. Based on the extensive groundwater sampling, chromium is not
 considered a COC in groundwater.
- Manganese was detected in the first GWBU at concentrations exceeding its RAL of 1.1 mg/L in on-site monitoring well MW-10 and off-site monitoring wells MW-1, MW-2, MW-5, and MW-7. However, groundwater samples collected from monitoring well MW-10 between January and July 2020 did not exhibit concentrations of manganese exceeding its RAL. The manganese groundwater contaminant plume is delineated in the hydrogeologically downgradient direction by monitoring wells MW-9, MW-11, MW-12, MW-16, and MW-18. The manganese groundwater contaminant plume is also vertically

delineated by monitoring wells MW-1D, MW-2D, and MW-3D installed in the second GWBU.

• TPH (C₆ to C₁₂) was detected in the uppermost GWBU in July 2019 at a concentration exceeding its RAL of 0.98 mg/L in off-site monitoring well MW-8. However, groundwater samples collected from this monitoring well between September 2019 and July 2020 reported no concentrations of TPH (C₆ to C₁₂) exceeding its RAL. Further, no other onsite or off-site monitoring wells have exhibited detectable concentration of TPH. Based on this extensive groundwater sampling, TPH is not considered a COC in groundwater.

Only arsenic and manganese consistently exceeded their RALs in the groundwater sampled from the first GWBU. There are no known anthropogenic sources of arsenic or manganese in site soils or groundwater. Concentrations of arsenic and manganese in soil minerals tend to mobilize due to the reducing geochemical conditions (low oxidation-reduction potential) in the landfill leachate and surrounding groundwater caused by decomposition of organic waste in the landfill and the consumption of dissolved oxygen and other electron acceptors. The reducing geochemical conditions have caused naturally-occurring arsenic and manganese in the soil minerals to become more soluble in groundwater.

In summary, the Subject Property has an MSD certificate from TCEQ that prevents exposure to the designated groundwater for potable purposes (i.e., groundwater ingestion). With the MSD, the ^{GW}GW_{Ing} exposure pathway (groundwater ingestion) is no longer considered complete, and the groundwater RALs are based on the ^{Air}GW_{Inh-v} exposure pathway (inhalation of volatile compounds off-gassing from groundwater). There were no volatile compounds found in groundwater and thus no RAL exceedances with an MSD in place. A first GWBU COC concentration map is provided as *Figure 9*. A summary of laboratory first GWBU sample analytical results for the DSPV Landfill are included in *Table 2*.

3.3.2 Second Groundwater-Bearing Unit

COCs detected in the second GWBU near the Subject Property include the following:

- Metals arsenic, barium, chromium, iron, lead, manganese, selenium, and zinc;
- VOCs chlorobenzene, chloroform, 1,2-dichlorobenzene, MTBE, and toluene; and
- SVOCs bis(2-ethylhexyl)phthalate and 1,2-dichlorobenzene.

A second GWBU COC concentration map is provided as *Figure 10*. A summary of laboratory second GWBU sample analytical results for the DSPV Landfill are included in *Table 2*.

COC concentrations were not detected in the second GWBU exceeding their respective RALs with or without an MSD. In summary, COC concentrations in the first and second GWBU do not exceed RALs with an MSD in place.

3.3.3 Surface Water

The only surface water on the Subject Property is former borrow pit at the northwest boundary of the Subject Property outside of the waste deposition footprint. The off-site nearest surface water body is Harris County Flood Control District (HCFCD) Drainage Ditch D120-00-00 which is located adjacent to norther boundary of the Subject Property as shown on *Figure 2*. This HCFCD ditch flows into Brays Bayou, a tidal stream located approximately 1.8 miles northeast

SKA Consulting, L.P. Houston, TX

Project No. 5019-0001 December 22, 2023 of the Subject Property. Brays Bayou is TCEQ classified stream Segment 1007B with a use classification as navigation and industrial water supply.

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map Panel No. 48201C0840L (dated June 18, 2007) indicates that the subject property is classified as Zone X (unshaded) except for along the western boundary near Cook Road that is classified as Zone AE. Zone X (unshaded) consists of areas determined by FEMA to be outside the 0.2% annual chance floodplain (see *Figure 11*). Zone AE consists of areas determined by FEMA to be subject to inundation by a 1% annual chance flood. It should be noted that FEMA has been updating Flood Insurance Rate Maps in Harris County after record flooding during Hurricane Harvey in 2017, but no update to Panel 48201C0840L has been published.

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4.0 Construction Plans

A complete copy of the as-built construction plans for the proposed development will be maintained at the property manager's office at the Subject Property. The overall site development plan is provided in **Sheet C-06 Overall Development Plan** in the civil drawing set in **Appendix 5**.

4.1 Ground Improvement

The Applicant does not anticipate any special ground improvement plans for the proposed infrastructure construction. In areas where construction is not immediately planned, surcharging with surplus fill soil may be used to enhance compaction. During infrastructure constructure, traditional ground improvement techniques such as proof rolling and roller compacting will be used to prepare the subgrade. However, the effect of these techniques is generally limited to no more than two feet. Therefore, these techniques are not likely to result in any waste compaction or to significantly affect the cap.

4.2 Grading and Drainage Plan

The mass grading plan is provided on **Sheet C-20 Mass Grading Overall** of the civil drawing set in **Appendix 5.** The cut-and-fill balance on **Sheet C-20** indicates a cut of 381,123 cubic yards (cy) and fill of 45,833 cy. The balance of 335,290 cy will be temporarily stockpiled on 18.23 acres in the northern part of the Subject Property. This will create an average surcharge depth of about 11 feet in the stockpile area. The stockpiled soil will be used as future parcels are developed. The cut-and-fill balance is shown graphically on **Figure 12**. The cut and fill volumes shown on **Figure 12** indicate the infrastructure development volumes and the initial 12-acre developed parcel volumes.

The cut areas are largely in the perimeter drainage ditch and in the detention pond areas as shown on **Sheet C-20** and **Sheet C-21 Clay Cap Excavation** of the civil drawing set in **Appendix 5**. If waste is encountered in these areas, the bottom of the excavation will be overexcavated by 2 feet and backfilled with 2 feet of compacted clay. The side slopes will also be over-excavated by 2 feet up to an elevation 2 feet above the waste occurrence and the side slopes will be lined with 2 feet of compacted clay.

Final side slopes for the proposed development will be no steeper than a maximum of 4h:1v (25%) and will comply with 30 TAC 330.453(c) except that detention basin side slopes will be 3h:1v. The developed areas will have an overall slope of less than 6% as required in 30 TAC 330.453(c). Steeper temporary slopes may be used in the stockpile areas. Slopes will be terraced as needed, and promptly revegetated to minimize erosion. Stormwater pollution prevention plan (SWPPP) procedures are described on **Sheet C-19 Stormwater Pollution Prevention Plan** of the civil drawing set in **Appendix 5**.

Chapter 47, Article XII of the City of Houston Code of Ordinances requires the proposed development to have a stormwater quality permit and prescribes the requirements including structural controls such as detention. The City of Houston does not provide regional detention, so every development where detention is required must provide its detention. Stormwater detention for the Subject Property is provided by three detention basins developed in series as shown on **Sheet C-06 Detention Service Area Map** in the civil drawing set in **Appendix 5**.

The final detention basin, Basin 3, discharges to HCFCD Drainage Ditch D120-00-00 at the northeast corner of the Subject Property.

Sheet C-07, Sheet C-08, and Sheet C-09 in the civil drawing set in Appendix 5 shows the layout of Basins 1, 2, and 3, respectively. Sheet C-10 shows the cross-section of each basin. As shown each basin will have a 2-foot-thick compacted clay liner, overlain by a minimum 30-mil geomembrane liner, and then overlain by a 2-foot-thick layer of protective loamy soil suitable for vegetation. The compacted clay liner and geomembrane will extend vertically two feet above the 100-year design event water surface elevation in each basin. It is very likely that waste will be encountered during basin construction. The table below compares basin liner bottom elevations with top of waste elevations from previous borings in the detention basin areas:

Basin	Approximate. Clay Liner Bottom Elevation (MSL)	100-Year Water Surface Elevation	Soil Borings	Top of Waste Elevation (MSL)
			SB-59	84.0
1	69.5	81.0	SB-60	82.5
			SB-61	79.3
			SB-62	70.0
2	69.5	81.0	SB-63	81.3
			SB-53	75.7
			SB-54	73.9
3	63.5	80.0	SB-55	77.3
			SB-56	77.9
			SB-57	71.4
			SB-58	69.7

The logs for the soil borings referenced above are provided in *Appendix 3*. Where waste is encountered and removed, the waste will be managed and the excavation backfilled as described in *Section 4.8*.

The basins are designed to pass the run-off from a 100-year design rainfall event and to drain as quickly as possible to minimize the occurrence of ponded water. Table 13 on **Sheet C-06** contains the runoff volumes, rates, and elevations for the three basins. Note the drain time for the 100-year event is 8.89 hours. The detention basins are not intended to hold water on a permanent basis. The detention basins will be inspected annually for erosion and exposure or damage to the liner. Any repairs needed will be performed promptly. The detention basins may be used for recreational purposes when not in use for detention.

The Subject Property will be developed with a perimeter ditch on the east, south, and west sides near the property boundary as shown on **Sheet C-20 Mass Grading Overall** of the civil drawing set in **Appendix 5**. The majority of the property drainage will be captured by the perimeter ditch as shown on **Sheet C-05.2 Existing Drainage Area Map** of the civil drawing set in **Appendix 5**. North flowing drainage will be captured by a swale and re-directed eastward to detention basin 3. The perimeter ditch segments are discussed further in **Section 4.3**.

4.3 Water, Sewer, Drainage, and Paving Plans

The water, sewer, drainage, and paving plans are provided in *Appendix 6*. All potable water plumbing and sanitary sewer piping on the Subject Property will be in secondary containment using membrane-lined utility trenches as shown in *Detail B6* of *Sheet C29.0 Construction Details (6 of 6)* in the water, sewer, drainage, and paving plan set in *Appendix 6*. Storm sewer piping is wetted only a fraction of the time; therefore, secondary containment for storm sewers will be compacted clay lined trenches.

Open ditch drainage plans are provided in the civil drawing set in *Appendix 5*. There are three ditch segments. Channel 1 is in the northwest portion of the subject property north of the future Lima Drive. Channel 1 will not be constructed until Subject Property development proceeds north of future Lima Drive. Channel 2 generally runs along the southwest and southern property line south of the future Lima Drive to Detention Basin 1. Channel 3 runs along the southeast and eastern property lines from Detention Basin 2 to Detention Basin 3. Channels 2 and 3 will contain a pilot channel for low flows. See *Sheet C-06 Detention Service Area Map* in *Appendix 5* for the locations of each channel segment.

The proposed flow line of the perimeter ditch ranges from elevation 73.7 (**Sheet C-11** in **Appendix 5**) to elevation 70.9 (**Sheet C-16** in **Appendix 5**). Goodheart recently performed a geotechnical investigation of the perimeter ditch and roadways to assess the geotechnical properties of the soils in these areas and the expected depth of waste. Goodheart's report on this investigation is not yet complete; however, boring logs indicate that only five of the ten boings installed in the footprint of the perimeter ditch found waste. Where the waste was encountered in the perimeter ditch borings, the waste was sufficiently deep (shallowest waste occurrence was elevation 67) that waste is unlikely to be encountered in ditch construction and at least two feet of compacted clay will exist between the ditch flow line and the waste. Channel cross sections are provided on **Sheet C-18 Channel Cross Sections** of **Appendix 5**.

The proposed roadways (Lima Drive and Hilltop Lookout Way) may encounter waste where these proposed roadways connect to existing roads (Cook Road and Kirkwood Road) because of the reduced grade of the roadways compared to the slope of the landfill (**Sheet C-13.0** and **Sheet C-16.0** of **Appendix 6**). Within the interior of the Subject Property, the roadways are built on fill placed atop the existing surface (**Sheet C-14.0**, **Sheet C-15.0** and **Sheet 17.0** of **Appendix 6**) so no waste is expected to be encountered during this portion of the roadway construction.

4.4 Landscape and Irrigation Plans

The unimproved areas of the Subject Property will be landscaped with a mixture of shrubs, small shallow-rooted trees, and grasses. Landscaped and grassy areas of the developed Subject Property will be irrigated from the municipal water supply. All subsurface piping in the irrigation system that is continuously pressurized will be installed in lined trenches as shown in in **Detail B6** of **Sheet C29.0 Construction Details (6 of 6)** in the water, sewer, drainage, and paving plan set in **Appendix 6**. Any leaks in the irrigation system piping or broken irrigation fixtures will be repaired promptly.

4.5 Closure Plan

The entire DSPV Landfill and Olshan Landfill have been closed and capped for more than 20 years. In addition, more than a million cubic yards of soil was imported to the site and deposited over the compacted clay cap to shape the Sugar Hills Golf Course which operated from 2000 to 2005. There are no areas of waste deposition that require closure. Any areas where waste is exposed during the proposed construction will be backfilled with 2 feet of compacted clay consistent with the original landfill cap. Where previously described, additional measures such as utility trench lining or detention basin lining will also be put in place.

Any waste that must be excavated during the proposed construction will be stockpiled and protected as described in **Section 4.8** until the waste can be removed for off-site disposal at an approved facility. Detention basin cross sections are provided on **Sheet C-10 Basin Cross Section** in **Appendix 5**. A typical utility installation is shown on **Detail B6** of **Sheet C29.0 Construction Details (6 of 6)** in the water, sewer, drainage and paving plan set in **Appendix 6**.

4.6 Landfill Gas Management During Construction

A site-specific health and safety plan shall be prepared and implemented prior to any work activities at the site. A Landtec GEM 5000 Landfill Gas Monitor (GEM 5000) will be used to monitor the methane concentrations in the ambient air of the project site during any subsurface work or grading activities where waste may be exposed. If ambient methane concentrations exceed 1% [20% of the lower explosive limit (LEL)], the work area will be evacuated until methane concentrations dissipate to below 20% of the LEL. Similarly, the GEM 5000 will be used to monitor for hydrogen sulfide in the ambient air during subsurface work or grading activities where waste may be exposed. If ambient hydrogen sulfide concentrations exceed 10 ppm [OSHA time-weighted average (TWA) concentration], the work area will be evacuated until hydrogen sulfide concentrations dissipate to below the TWA.

4.7 Water Management During Construction

The depth to leachate/groundwater will be assessed during any excavation activity or the installation of utilities. If leachate/groundwater is encountered, the planned activity will be evaluated to determine if the activity can be performed without removing the leachate/groundwater. Leachate/groundwater that requires removal shall be containerized in drums, totes, or tanks. Containerized leachate/groundwater will be sampled and tested. Previous sample results indicate that containerized leachate/groundwater may be disposed to the City of Houston sanitary sewer system through a temporary discharge authorization. If sanitary sewer disposal is not an option, leachate/groundwater will be disposed at the appropriate off-site facility.

4.8 Waste Management During Construction

If waste must be excavated during construction, the waste shall be stored on plastic sheeting and covered by plastic sheeting. Waste that is exposed but not excavated shall be covered with plastic during construction activities. No waste will be left exposed overnight. Exposed waste areas will be backfilled with a minimum of 2 feet of compacted clay after completion of construction activities. No waste that is removed from an excavation is proposed to be redeposited at the site. The excavated and stockpiled waste will be sampled, profiled, and disposed at an approved off-site landfill facility. Previous waste materials excavated during site

investigative activities were profiled as a Class 2 industrial waste and disposed at the Waste Corporation of America (WCA) Fort Bend Regional Landfill in Needville, TX.

5.0 Operating Plans

The DSPV Landfill is no longer operating though at the time of this submittal, MSW Permit No. 1247 for the DSPV Landfill is still active. The MSW permittee has engaged SKA Consulting, L.P. to continue the post-closure care activities required under MSW Permit No. 1247.

5.1 Ponded Water

Ponded water, except as permitted in properly designed detention basins, will be eliminated as soon as practical in accordance with 30 ATC 330.961(d) through filling and re-grading of the ponded areas.

5.2 Surface Water

Surface water pollution will be prevented through the implementation of SWPPP plans as shown on **Sheet C-19** of **Appendix 5** and **Sheet C-22.0** and **Sheet C-23.0** of **Appendix 6**.

5.3 Landfill Gas Monitoring

The DSPV Landfill and the adjacent Olshan Demolishing Landfill have a perimeter gas collection and control system (GCCS) consisting of more than 120 gas vents and more than 50 gas monitoring probes. This GCCS was installed in approximately 2005 and is currently monitored quarterly in accordance with MSW Permit No, 1247. The GCCS reduces the potential for landfill gas accumulation on the Subject Property.

Closed subgrade non-enclosed structures, such as utility vaults, will have vent holes in the lids to prevent the accumulation of landfill gases.



TABLE 1

SUMMARY OF SOIL ANALYTICAL RESULTS - METALS & pH

AUTHORIZATION TO DISTURB FINAL COVER OVER CLOSED MUNICIPAL SOLID WASTE LANDFILL FOR NON-ENCLOSED STRUCTURE

DOTY SAND PIT VENTURE LANDFILL (MSW PERMIT NO. 1247)

OLSHAN DEMOLISHING LANDFILL (MSW PERMIT NO. 1259, REVOKED)

12000 BISSONNET STREET

HOUSTON, HARRIS COUNTY, TEXAS 77099

			RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 8 METALS + COPPER, MOLYBDENUM, NICKEL, & ZINC												
					RESOURCE CO	JNSERVATION	AND RECOVE	KT ACT (KCK	A) O WIETALS	COPPER, MIC	LIBDENOW, P	IICKEL, & ZINC	, 		1
Sample Name	Sample Depth (ft-bgs)	Sample Date	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	Н
Sam	Sam ff-b	Sam	Method 6020A mg/kg	Method 6020A mg/kg	Method 6020A mg/kg	Method 6020A mg/kg	Method 6020A mg/kg	Method 6020A mg/kg	Method 7471A mg/kg	Method 6020A mg/kg	Method 6020A mg/kg	Method 6020A mg/kg	Method 6020A	Method 6020A mg/kg	Method 9045C SU
	<u> </u>	•	mg/kg	ilig/kg	Пулу		PIT VENTURE			ilig/kg	ilig/kg	ilig/kg	mg/kg	тід/кд	
SB-1	1-2	06/18/19	1.09 J	129	<0.139	13.6	5.71	9.07	0.00748 J	<0.388	8.24	<0.594	<0.190	28.4 J	-
SB-2	2-3	06/20/19	3.31	94.2	<0.135	14.5	4.71	6.30	0.00495 J	0.454 J	10.4	<0.580	<0.186 UJL	37.6	_
SB-3	1-2	06/20/19	1.75 J	130	<0.134	12.0	6.25	8.49	0.00942 J	<0.374	8.77	<0.573	<0.183 UJL	33	-
SB-4	0.5-1.5	06/18/19	3.58	159	<0.132	19.0	6.55	12.2	0.00510 J	<0.368	12.9	<0.563	<0.180	33.5 J	7.45
SB-5	1-2	06/20/19	3.42	135	0.152 J	10.2	4.02 J	9.78	0.00820 J	0.482 J	9.56	0.870 J	<0.178 UJL	27.3 J	-
SB-6	1-2	06/20/19	2.08 J	288	0.133 J	15.5	5.37	11.4	0.00496 J	0.424 J	24.8	<0.515	<0.165 UJL	35.5	-
SB-7	0-1	06/18/19	2.84	112	<0.111	11.2	4.90	17.1	0.00609 J	<0.311	8.31	<0.476	<0.152	20.5 J	-
SB-8	2-3	06/21/19	1.06 J	55.4	<0.138	15.9	6.42	9.45	0.00590 J	<0.384	9.59	0.604 J	<0.189	39.5	-
SB-9	0-1	06/18/19	3.23	328	<0.120	17.9	6.16	7.66	<0.00444	0.949 J	15.7	<0.514	<0.165	41.0	-
SB-10	0.5-1.5	06/18/19	1.57 J	90.2	<0.134	9.38	2.92 J	5.81	<0.00389	<0.373	5.77	<0.572	<0.183	14.7 J	-
SB-11	3-4	06/18/19	3.13	43.5	<0.135	7.59	6.28	21.5	0.00584 J	<0.378	6.71	<0.579	<0.185	19.3 J	-
SB-12	3-4	06/21/19	1.04 J	104	<0.142	11.3	6.04	11.8	0.0132 J	<0.397	8.04	0.708 J	<0.195	58.7	-
SB-13	3-4	06/18/19	2.61	205	<0.128	15.7	6.30	9.56	<0.00463	0.424 J	16.7	<0.545	<0.175	33.7	7.85
SB-14	4-5	06/18/19	6.68	167	<0.144	21.6	8.17	10.0	0.0106 J	0.642 J	17.1	<0.614	<0.197	38.9	-
SB-15	2-3	06/18/19	2.91	163	<0.130	15.6	6.32	12.5	0.00827 J	<0.363	9.57	<0.555	<0.178	28.3 J	-
SB-16	1-2	06/21/19	0.902 J	161	<0.136	13.7	6.32	10.0	0.00619 J	<0.379	8.80	0.588 J	<0.186	44.3	-
SB-17	2-3	06/20/19	2.43	111	<0.112	7.07	6.28	15.9	0.00930 J	0.314 J	7.52	<0.480	<0.154	74.6	-
3B-17	10-11	06/20/19	5.68	120	<0.120	13.6	6.06	9.08	0.00719 J	<0.335	13.2	<0.513	<0.164	28.1 J	-
SB-18	2-3	06/21/19	1.59 J	73.6	<0.130	9.39	6.85	6.36	0.00725 J	<0.362	8.53	<0.554	<0.178	26.3 J	-
OB-10	14-15	06/21/19	10.6	217	<0.118	11.1	15.9	25.8	<0.00428	0.566 J	28.5	1.36 J	<0.162	23.9 J	-
SB-19	3-4	06/21/19	2.70	73.9	<0.114	11.0	4.24	7.65	0.00716 J	0.870 J	5.45	0.620 J	<0.157	21.0 J	8.97
	9-10	06/21/19	2.66	117	<0.130	11.4	7.15	7.11	<0.00441	<0.364	19.4	<0.558	<0.179	27.8 J	
SB-20	4-5	06/21/19	3.44	140	<0.112	10.1	4.80	11.5	0.00541 J	<0.313	10.1	0.484 J	<0.154	26.1 J	-
	12-13	06/21/19	4.93	140	<0.136	18.1	8.16	14.0	<0.00396	<0.379	12.9	0.787 J	<0.186	43.3	-
SB-21	3-4	06/21/19	1.44 J	100	<0.125	6.75	5.54	10.0	0.0144 J	<0.349	5.41	<0.534	<0.171	25.4 J	-
	7-8	06/21/19	<0.614	24.0	<0.115	3.66 J	1.54 J	4.13	0.00422 J	<0.322	3.29	<0.493	<0.158	17.5 J	-
SB-22	2-3	06/18/19	1.91 J	105 JL	<0.115	11.4	5.71	7.68	0.0137 J	<0.320	6.67	<0.490	<0.157 UJL	23.8 JH	-
	12-13	06/18/19	2.18 J	140	<0.128	9.01	5.17	4.39	0.00450 J	<0.358	9.83	<0.548	<0.175	19.5 J	-
SB-23	4-5	06/18/19	1.37 J	112	<0.131	9.82	5.17	6.70	0.0166 J	<0.366	10.2	<0.560	<0.179	21.4 J	-
	12-13	06/18/19	1.76 J	71.0	<0.119	9.76	3.21 J	3.08	<0.00448	<0.333	8.26	<0.510	<0.163	21.0 J	8.65
SB-24	3-4	06/18/19	1.14 J	67.6	<0.116	7.22	5.61	8.43	0.0113 J	<0.324	4.76	<0.496	<0.159	14.3 J	-
	10-11	06/18/19	3.67	46.4	<0.128	9.54	5.46	2.99	<0.00449	<0.358	8.49	<0.548	<0.175	20.0 J	-

TABLE 1

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DOTY SAND PIT VENTURE LANDFILL (MSW PERMIT NO. 1247)

OLSHAN DEMOLISHING LANDFILL (MSW PERMIT NO. 1259, REVOKED)

12000 BISSONNET STREET

HOUSTON, HARRIS COUNTY, TEXAS 77099

					RESOURCE CO	ONSERVATION	I AND RECOVE	RY ACT (RCR	A) 8 METALS ·	+ COPPER. MC	DLYBDENUM, N	IICKEL. & ZINO	2		
Sample Name	Sample Depth (ff-bgs)	Sample Date	Arse nic Wethod 6020A mg/kg	E RE	Bagger Bagger Method 6020A mg/kg	Enimo O Wethod 6020A mg/kg	Copper	Pead Method 6020A mg/kg	Method 7471A mg/kg	Molybdenum	Wethod 6020A mg/kg	Eniculary Services Se	Method 6020A mg/kg	DEIN IN Method 6020A mg/kg	も Method 9045C SU
	-					DOTY SAND	PIT VENTURE	LANDFILL SO							
						OLSHAN D	EMOLISHING I	LANDFILL SOIL	BORINGS						
SB-25	0-2	06/21/19	3.88	105	<0.130	13.6	10.8	23.9	0.151	0.473 J	9.49	<0.557	<0.179	61.2	-
SB-26	0-2	06/21/19	1.98	92.3	0.181 J	10.9	6.71	73.7	0.0237	<0.315	8.12	<0.482	<0.154	148	-
SB-27	0-2	06/21/19	3.54	110	0.275 J	14.4	18.2	28.4	0.0837	0.499 J	8.28	<0.527	<0.169	186	-
SB-28	0-2	06/21/19	7.08	208	<0.138	23.3	9.26	12.8	0.00508 J	0.608 J	15.8	0.884 J	<0.190	57.2	-
OD-20	2-4	06/21/19	2.00 J	136	<0.126	7.35	4.79	8.72	0.0114 J	< 0.352	5.84	0.586 J	<0.173	23.7 J	-
SB-29	0-2	06/21/19	2.78	133	<0.135	9.55	6.86	9.64	0.00707 J	<0.378	7.60	<0.580	<0.186	24.8 J	-
3D-29	4-6	06/21/19	4.80	158	<0.130	11.2	8.09	13.1	0.00876 J	<0.364	11.3	0.776 J	<0.178	34.9	-
SB-30	0-2	06/21/19	1.89 J	150	<0.115	10.6	6.38	15.4	<0.00416	<0.321	9.46	0.525 J	<0.157	26.3 J	-
OB-30	4-6	06/21/19	1.55 J	169	<0.136	10.5	6.71	10.8	0.00835 J	<0.381	9.22	0.586 J	<0.187	34.4 J	-
SB-31	0-2	06/21/19	2.33	150	<0.116	14.1	6.51	8.55	0.00683 J	<0.324	10.5	0.512 J	<0.159	38.0	-
OB-01	4-6	06/21/19	1.60 J	145	<0.132	8.51	4.54 J	6.58	0.0175 J	<0.368	7.12	0.647 J	<0.180	24.6 J	-
							REGULATORY	STANDARDS							
Resid	CEQ TRRP Tie Iential ^{GW} Soil _{Inç} -Acre Source <i>I</i>	g PCLs	2.5	220	0.75	1,200	520	1.5	1.0	25	79	1.1	0.24	1,200	
Resid	TCEQ TRRP Tier 2 Residential ^{GW} Soil _{Ing} PCLs (30-Acre Source Area)			920				270				1.6			
Reside	TCEQ TRRP Tier 1 with MSD Residential ^{Tot} Soil _{Comb} PCLs (30-Acre Source Area)		24	8,100	51	27,000	1,300	500	5.5	160	840	310	97	9,900	
	-Specific Back Concentration 0 TAC §350.51(S	5.9	300		30	15	15	0.04		10	0.3		30	

Notes:

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[&]quot;--" represents not applicable or not established.

[&]quot;ft-bgs" represents feet below ground surface.

[&]quot;mg/kg" represents milligrams per kilogram.

[&]quot;TCEQ" represents Texas Commission on Environmental Quality.

[&]quot;TRRP" represents Texas Risk Reduction Program.

[&]quot;MSW" represents Municipal Solid Waste.

[&]quot;MSD" represents Municipal Setting Designation

[&]quot;<" indicates the analyte was not identified at or above the specified laboratory Sample Detection Limit (SDL).

Bold values exhibit a concentration at or above the laboratory SDL.

[&]quot;J" indicates the target analyte was positively identified above the laboratory SDL but below the Method Quantitation Limit (MQL).

Concentrations highlighted yellow exceed the applicable Residential Assessment Level (RAL).

TCEQ TRPP Tier 1 Residential Soil Protective Concentration Levels (PCLs) (30 Texas Administrative Code [TAC] 350, Table 1: Tier 1 Residential Soil PCLs, dated January 6, 2021).

TCEQ TRRP Tier 2 Residential Soil PCLs were calculated using site-specific soil data and the equation provided in 30 TAC 350.75(b)(1).

TABLE 1 (CONTINUED) SUMMARY OF SOIL ANALYTICAL RESULTS - VOCs & TPH

AUTHORIZATION TO DISTURB FINAL COVER OVER CLOSED MUNICIPAL SOLID WASTE LANDFILL FOR NON-ENCLOSED STRUCTURE

DOTY SAND PIT VENTURE LANDFILL (MSW PERMIT NO. 1247) OLSHAN DEMOLISHING LANDFILL (MSW PERMIT NO. 1259, REVOKED) 12000 BISSONNET STREET

HOUSTON, HARRIS COUNTY, TEXAS 77099

				VOLAT	ILE ORGANIC	COMPOUNDS	(VOCs)		TOTAL	PETROLEUM H	HYDROCARBON	S (TPH)
Sample Name	Sample Depth (ff-bgs)	Sample Date	Acetone Method 8260C	Rethod 8260C	Methylene chloride	Methyl ethyl ketone (2-Butanone)	Naphthalene	Total Xylenes	77 77 77 78 78 78 79 70 70 70 70 70 70 70 70 70 70 70 70 70	7, 72 8 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7	28 27 82 7 7 TX Method 1005	TX Method 1005
<u> </u>	S £	Ø	mg/kg	mg/kg	mg/kg OTY SAND PIT	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SB-1	1-2	6/18/2019	-	-	-	-	-	-	<22.0	<28.0	<25.9	<22.0
SB-2	2-3	6/20/2019	-	-	-	-	-	_	<20.6	<26.3	<24.3	<20.6
SB-3	1-2	6/20/2019	-	-	-	-	-	-	<21.2	<27.0	<24.9	<21.2
SB-4	0.5-1.5	6/18/2019	-	-	-		-	-	<20.2	<25.7	<23.8	<20.2
SB-5	1-2	6/20/2019	-	-	-	-	-	-	<18.0	<22.9	<21.2	<18.0
SB-6	1-2	6/20/2019	-	-	-	-	-	-	<19.0	<24.2	<22.3	<19.0
SB-7	0-1	6/18/2019	-	-	-	-	-	-	<14.9	<18.9	<17.5	<14.9
SB-8 SB-9	2-3 0-1	6/21/2019 6/18/2019	-	-	-	-	-	-	<19.9 <18.1	<25.3 <23.1	<23.4 <21.3	<19.9 <18.1
SB-10	0.5-1.5	6/18/2019	-	-	-	-		-	<16.1	<21.6	<19.9	<16.1
SB-10	3-4	6/18/2019	-	<u>-</u>	<u>-</u>	-	-	-	<16.6	<21.0	<19.6	<16.6
SB-12	3-4	6/21/2019	-	-	-	-	-	-	<19.1	<24.3	<22.4	<19.1
SB-13	3-4	6/18/2019	-	-	-	-	-	-	<16.2	<20.7	<19.1	<16.2
SB-14	4-5	6/18/2019	-	-	-	-	-	-	<15.9	<20.3	<18.7	<15.9
SB-15	2-3	6/18/2019	-	-	-	-	-	-	<16.3	<20.8	<19.2	<16.3
SB-16	1-2	6/21/2019	-	-	-	-	-	-	<17.8	<22.7	<22.7	<17.8
SB-17	2-3	6/20/2019	-	-	-	-	-	-	<17.2	<21.9	<20.2	<17.2
	10-11	6/20/2019	-	-	-	-	-	-	<17.5	<22.4	<20.6	<17.5
SB-18	2-3 14-15	6/21/2019 6/21/2019	-	-	-	-	-	-	<18.8 <17.4	<24.0 <22.1	<22.1 <20.4	<18.8 <17.4
	3-4	6/21/2019	-	-	-	-	-	-	<15.8	<20.1	<18.6	<17.4
SB-19	9-10	6/21/2019	-			-	-	-	<17.8	<22.6	<20.9	<17.8
	4-5	6/21/2019	<0.0111	<0.000174	0.0102 J	<0.00365	<0.00200	<0.000437	<18.9	<24.1	<22.2	<18.9
SB-20	12-13	6/21/2019	-	-	-	-	-	-	<15.1	<19.2	<17.7	<15.1
CD 04	3-4	6/21/2019	<0.0110	<0.000172	<0.00418	<0.00361	<0.00198	<0.000433	<16.2	<20.6	<19.0	<16.2
SB-21	7-8	6/21/2019	-	-	-	-	-	-	<15.8	<20.1	<18.5	<15.8
SB-22	2-3	6/18/2019	<0.0133	<0.000209	<0.00507	<0.00438	<0.00240	0.000541 J	<14.3	<18.2	<16.8	<14.3
OB-22	12-13	6/18/2019	-	-	-	-	-	-	<15.6	<19.9	<18.4	<15.6
SB-23	4-5	6/18/2019	-	-	-	-	-	-	<16.2	<20.6	<19.0	<16.2
	12-13	6/18/2019	-	-	-	-	-	-	<16.4	<20.9	<19.3	<16.4
SB-23A	4-5	6/21/2019	<0.0126	<0.000198	0.0135 J	<0.00415	<0.00228	<0.000497	- 45.0		- 147.0	- 45.0
SB-24	3-4 10-11	6/18/2019 6/18/2019	-	-	-	-	-	-	<15.3 <16.0	<19.4 <20.3	<17.9 <18.8	<15.3
SB-24A	3-4	6/21/2019	<0.00993	<0.000156	0.00968 J	<0.00327	- <0.00179	<0.000391	<10.0	<20.3	<18.8	<16.0
3D-24A	3-4	0/21/2019	<0.00993		LSHAN DEMO				<u>-</u>			-
SB-25	0-2	6/21/2019	0.189	0.000213 J	<0.00428	0.00933 J	<0.00203	<0.000443	<17.1	<21.8	<20.1	<17.1
SB-26	0-2	6/21/2019	<0.0107	<0.000167	<0.00405	<0.00350	0.229 J	<0.000420	<16.4	<20.8	<19.2	<16.4
SB-27	0-2	6/21/2019	<0.0134	<0.000210	<0.00509	<0.00440	<0.00241	<0.000527	<19.0	72.5	32.0 J	105
SB-28	0-2	6/21/2019	<0.0113	<0.000178	0.00478 J	<0.00373	<0.00205	<0.000447	<20.6	<26.2	<24.2	<20.6
35-20	2-4	6/21/2019	-	-	-	-	-	-	<19.8	<25.2	<23.3	<19.8
SB-29	0-2	6/21/2019	0.0346 J	<0.000205	0.0120 J	<0.00429	<0.00235	<0.000514	<18.0	<22.9	<21.1	<18.0
	4-6	6/21/2019	-	0.000:	-	-	-	.0.000::::	<16.7	<21.3	<19.6	<16.7
SB-30	0-2 4-6	6/21/2019 6/21/2019	0.0187 J	<0.000160	0.00524 J	<0.00335	<0.00184	<0.000401	<14.7 <17.8	<18.8 <22.7	<17.3 <21.0	<14.7 <17.8
	0-2	6/21/2019	<0.0102	- <0.000161	<0.00389	<0.00337	- <0.00185	<0.000403	<17.8	<22.7 <20.0	<18.4	<17.8 <15.7
SB-31	4-6	6/21/2019	-	-	-	-0.00001	-0.00100	-0.000403	<19.9	<25.3	<23.4	<19.9
				<u> </u>		ULATORY STA	NDARDS	<u> </u>				
Resid	CEQ TRRP Tie Iential ^{GW} Soil _{Inç} -Acre Source <i>A</i>	PCLs	21	170	0.0065	15	16	61	33	99	99	
Reside	TRRP Tier 1 wi ential ^{Tot} Soil _{con} -Acre Source <i>P</i>	nb PCLs	59,000	3,000	1,500	33,000	120	3,700	1,100	2,000	2,000	

Notes:

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[&]quot;mg/kg" represents milligrams per kilogram.

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[&]quot;TRRP" represents Texas Risk Reduction Program. "MSW" represents Municipal Solid Waste.

[&]quot;MSD" represents Municipal Setting Designation

[&]quot;<" indicates the analyte was not identified at or above the specified laboratory Sample Detection Limit (SDL).

Bold values exhibit a concentration at or above the laboratory SDL.

[&]quot;J" indicates the target analyte was positively identified above the laboratory SDL but below the Method Quantitation Limit (MQL).

Only VOC analytes detected at or above the laboratory SDL in at least one sample are shown on this table. Concentrations highlighted yellow exceed the applicable Residential Assessment Level (RAL).

TCEQ TRPP Tier 1 Residential Soil Protective Concentration Levels (PCLs) (30 Texas Administrative Code [TAC] 350, Table 1: Tier 1 Residential Soil PCLs, dated January 6, 2021).

TABLE 1 (CONTINUED)

SUMMARY OF SOIL ANALYTICAL RESULTS - PAHs

AUTHORIZATION TO DISTURB FINAL COVER OVER CLOSED MUNICIPAL SOLID WASTE LANDFILL FOR NON-ENCLOSED STRUCTURE

DOTY SAND PIT VENTURE LANDFILL (MSW PERMIT NO. 1247) OLSHAN DEMOLISHING LANDFILL (MSW PERMIT NO. 1259, REVOKED)

12000 BISSONNET STREET **HOUSTON, HARRIS COUNTY, TEXAS 77099**

									POLYCYCI	IC AROMATIC	HYDROCARBO	ONS (PAHs)						
ple Name	ple Depth ys)	ple Date	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene
Sam	Sample (ft-bgs)	Sam	Method 8270D mg/kg	Method 8270D mg/kg	Method 8270D mg/kg	Method 8270D mg/kg	Method 8270D mg/kg	Method 8270D mg/kg	Method 8270D mg/kg	Method 8270D mg/kg	Method 8270D mg/kg	Method 8270D mg/kg	Method 8270D mg/kg	Method 8270D mg/kg				
	<u> </u>		mg/kg	mg/kg	mg/kg	mg/kg		SHAN DEMOLI				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SB-27	0-2	6/21/2019	0.450	0.0438	1.26	5.27 D	3.68	5.46 D	2.68	1.87	4.38 D	0.191	9.64 D	0.472	2.76	0.0801 J	3.96	7.19
								REGUL	ATORY STAN	DARDS								
Resid	CEQ TRRP Tiel lential ^{GW} Soil _{lnç} -Acre Source A	PCLs	120	200	3,400	65	3.8	220	23,000	2,200	5,600	17	960	150	630	16	210	560
Reside	TRRP Tier 1 wi ential ^{Tot} Soil _{Com} -Acre Source A	nb PCLs	3,000	3,800	18,000	41	1 4.1 41 1,800 420 4,100 270 2,300 2,30		2,300	42	120	1,700	1,700					

Bold values exhibit a concentration at or above the laboratory Sample Detection Limit (SDL).

Only PAH analytes detected at or above the laboratory SDL in at least one sample are shown on this table.

Concentrations highlighted yellow exceed the applicable Residential Assessment Level (RAL).

TCEQ TRPP Tier 1 Residential Soil Protective Concentration Levels (PCLs) (30 Texas Administrative Code [TAC] 350, Table 1: Tier 1 Residential Soil PCLs, dated January 6, 2021).

[&]quot;ft-bgs" represents feet below ground surface.

[&]quot;mg/kg" represents milligrams per kilogram.

[&]quot;TCEQ" represents Texas Commission on Environmental Quality.

[&]quot;TRRP" represents Texas Risk Reduction Program.

[&]quot;MSD" represents Municipal Setting Designation

[&]quot;MSW" represents Municipal Solid Waste.

[&]quot;J" indicates the target analyte was positively identified above the laboratory SDL but below the Method Quantitation Limit (MQL).

TABLE 1 (CONTINUED)
SUMMARY OF SOIL ANALYTICAL RESULTS - PCBs
AUTHORIZATION TO DISTURB FINAL COVER OVER CLOSED MUNICIPAL SOLID WASTE LANDFILL FOR NON-ENCLOSED STRUCTURE

DOTY SAND PIT VENTURE LANDFILL (MSW PERMIT NO. 1247) OLSHAN DEMOLISHING LANDFILL (MSW PERMIT NO. 1259, REVOKED)

12000 BISSONNET STREET

HOUSTON, HARRIS COUNTY, TEXAS 77099

B	
Bear Fig. 2	
Bear Fig. 2	
Bear Fig. 2 Bear Bear	
Bear Fig. 2 Bear Bear	00
Bear Fig. 2	-126
Bear Fig. 2	PCB-1260
SB-1	ethod 8082A
SB-1	mg/kg
SB-2	0.000981
SB-3	0.000957
SB-6	0.000947
SB-6	0.000965
SB-7	0.000952
SB-8 2-3 6/21/2019 <0.00205 <0.00176 <0.00109 <0.00176 <0.00154 <0.00143	0.000962
SB-9	0.000890
SB-10 0.5-1.5 6/18/2019 <0.00184 <0.00158 <0.000983 <0.00158 <0.00139 <0.00129 <	0.000992
SB-11 3-4 6/18/2019 <0.00194 <0.00166 <0.00104 <0.00166 <0.00146 <0.00135 <	0.000929
SB-12 3-4 6/21/2019 <0.00215 <0.00185 <0.00115 <0.00185 <0.00162 <0.00150	0.000938
SB-14	<0.00104
SB-15	0.000969
SB-16 1-2 6/21/2019 <0.00205 <0.00176 <0.00110 <0.00176 <0.00155 <0.00144 SB-17 2-3 6/20/2019 <0.00186	0.000975
SB-17 2-3 6/20/2019 <0.00186 <0.00159 <0.000159 <0.00159 <0.00140 <0.00130 <0.00130 <0.00111 6/20/2019 <0.00198 <0.00170 <0.00106 <0.00170 <0.00149 <0.00149 <0.00138 <0.00138 <0.00170 <0.00165 <0.00170 <0.00149 <0.00149 <0.00138 <0.00182 <0.00156 <0.000972 <0.00156 <0.00137 <0.00127 <0.00127 <0.00156 <0.00137 <0.00127 <0.00156 <0.00137 <0.00127 <0.00156 <0.00137 <0.00127 <0.00156 <0.00145 <0.00134 <0.00157 <0.00157 <0.00156 <0.00145 <0.00134 <0.00134 <0.00157 <0.00157 <0.00157 <0.00157 <0.00138 <0.00128 <0.00128 <0.00159 <0.00159 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00165 <0.00140 <0.00164 <0.00143 <0.00133 <0.00159 <0.00140 <0.00164 <0.00165 <0.00140 <0.00164 <0.00165 <0.00140 <0.00164 <0.00165 <0.00140 <0.00164 <0.00165 <0.00140 <0.00164 <0.00165 <0.00140 <0.00164 <0.00165 <0.00140 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0.00165 <0	<0.00180
SB-17	<0.000994 <0.000899
SB-18 2-3 6/21/2019 <0.00182 <0.00156 <0.000972 <0.00156 <0.00137 <0.00127 <0.00127 <0.00127 <0.00156 <0.00137 <0.00127 <0.00156 <0.00145 <0.00137 <0.00127 <0.00156 <0.00145 <0.00134 <0.00157 <0.00165 <0.00165 <0.00165 <0.00145 <0.00134 <0.00134 <0.00157 <0.00157 <0.00157 <0.00157 <0.00157 <0.00138 <0.00128 <0.00128 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00164 <0.00165 <0.00165 <0.00164 <0.00165 <0.00165 <0.00165 <0.00166 <0.00166 <0.00166 <0.00167 <0.00166 <0.00167 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.00166 <0.0	<0.000958
SB-19	0.000881
SB-19	0.000929
SB-20	0.000886
SB-20 12-13 6/21/2019 <0.00194 <0.00167 <0.00104 <0.00167 <0.00167 <0.00146 <0.00136 <sb-21 12-13="" 18="" 2-3="" 2019="" 21="" 3-4="" 4-5="" 6="" <0.000995="" <0.00101="" <0.00102="" <0.00103="" <0.00130="" <0.00131="" <0.00134="" <0.00135="" <0.00140="" <0.00141="" <0.00144="" <0.00146="" <0.00160="" <0.00161="" <0.00162="" <0.00163="" <0.00163<="" <0.00164="" <0.00166="" <0.00186="" <0.00188="" <0.00190="" <0.00194="" <sb-22="" <sb-23="" <sb-24="" td=""><td>0.000922</td></sb-21>	0.000922
SB-21 3-4 6/21/2019 <0.00189 <0.00162 <0.00101 <0.00162 <0.00142 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00132 <0.00133 <0.00133 <0.00133 <0.00133 <0.00133 <0.00133 <0.00133 <0.00133 <0.00133 <0.00133 <0.00134 <0.00134 <0.00134 <0.00134 <0.00134 <0.00134 <0.00134 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00135 <0.00	0.000898
SB-21 7-8 6/21/2019 <0.00188 <0.00161 <0.00161 <0.00141 <0.00131 SB-22 2-3 6/18/2019 <0.00186	<0.000940 <0.000915
SB-22 2-3 6/18/2019 <0.00186 <0.00160 <0.000995 <0.00160 <0.00140 <0.00130 <0.00130 12-13 6/18/2019 <0.00190	<0.000913
12-13 6/18/2019 <0.00190 <0.00163 <0.00102 <0.00163 <0.00143 <0.00143 <0.00133 <	0.000902
SB-24 12-13 6/18/2019 <0.00194 <0.00166 <0.00103 <0.00166 <0.00146 <0.00135 <	0.000921
SB-24 3-4 6/18/2019 <0.00194 <0.00166 <0.00103 <0.00166 <0.00146 <0.00135 <	0.000927
SB-24 10-11 6/18/2019 <0.00190 <0.00163 <0.00102 <0.00163 <0.00143 <0.00133 OLSHAN DEMOLISHING LANDFILL SOIL BORINGS SB-25 0-2 6/21/2019 <0.00183	0.000937
OLSHAN DEMOLISHING LANDFILL SOIL BORINGS SB-25 0-2 6/21/2019 <0.00183 <0.00157 <0.000977 <0.00157 <0.00138 <0.00128	0.000912
SB-25 0-2 6/21/2019 <0.00183 <0.00157 <0.000977 <0.00157 <0.00138 <0.00128 <	0.000922
	<0.000886
	0.000000
SB-27 0-2 6/21/2019 <0.00200 <0.00172 <0.00107 <0.00172 <0.00151 <0.00140	0.0724
SB-28 0-2 6/21/2019 <0.00198 <0.00170 <0.00106 <0.00170 <0.00149 <0.00139 <	0.000960
2-4 6/21/2019 <0.00191 <0.00164 <0.00102 <0.00164 <0.00144 <0.00133 <	0.000924
I SB-29	0.000975
	0.000955
SB-30	<0.000889 <0.000980
0-2 6/21/2019 <0.00189 <0.00162 <0.00101 <0.00162 <0.00142 <0.00132 <	<0.000900
I SB-31	0.000964
REGULATORY STANDARDS	
TCEQ TRRP Tier 1	
Residential ^{GW} Soil _{Ing} PCLs 5.3 5.3 5.3 5.3	5.3
(30-Acre Source Area)	
TCEQ TRRP Tier 1 with MSD	
Residential ^{Tot} Soil _{Comb} PCLs 1.1 1.1 1.1 1.1 1.1 1.1	1.1
(30-Acre Source Area)	

[&]quot;ft-bgs" represents feet below ground surface.

[&]quot;mg/kg" represents milligrams per kilogram.

[&]quot;TCEQ" represents Texas Commission on Environmental Quality.

[&]quot;TRRP" represents Texas Risk Reduction Program.

[&]quot;MSW" represents Municipal Solid Waste.

[&]quot;J" indicates the target analyte was positively identified above the laboratory SDL but below the Method Quantitation Limit (MQL). Concentrations highlighted yellow exceed the applicable Residential Assessment Level (RAL).

TCEQ TRPP Tier 1 Residential Soil Protective Concentration Levels (PCLs) (30 Texas Administrative Code [TAC] 350, Table 1: Tier 1 Residential Soil PCLs, dated January 6, 2021).

TABLE 2 SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - METALS AUTHORIZATION TO DISTURB FINAL COVER OVER CLOSED MUNICIPAL SOLID WASTE LANDFILL FOR NON-ENCLOSED STRUCTURE DOTY SAND PIT VENTURE LANDFILL (MSW PERMIT NO. 1247)

OLSHAN DEMOLISHING LANDFILL (MSW PERMIT NO. 1259, REVOKED)
12000 BISSONNET STREET
HOUSTON, HARRIS COUNTY, TEXAS

				RESOURCE	CONSERVATION	ON AND RECO	VERY ACT (RO	RA) 8 METAL	S + IRON, MANGA	NESE, & ZINC		
Sample Name	Sample Date	Arsenic Method 6020A	Barriu Bariu Barriu Ba	Cada Engaga Method 6020A	Chrod 6020A	E 0	Lee ad Lee and	Wethod 6020A	Wethod 7470A	Eninua S Method 6020A	io Method 6020A	Zinc Method 60
Sa	Sa	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			FIRST	UPPERMOST		MONITORING C		ONITORING V	VELLS			
MW-3	03/27/19 09/05/19 01/15/20	0.000579 J 0.000910 J 0.00103 J	0.230	<0.000147	0.0149 <0.000525 0.000534 J	0.179	0.000250 J - -	0.514 0.711 0.349	<0.0000263	0.000602 J - -	<0.000251	0.0125
	04/07/20 07/09/19	0.000796 J 0.00677 JL	0.609	- <0.000147	<0.000525 <0.000525	- 11.1	- <0.000152	0.133 0.904	<0.0000263	<0.000454	- <0.000251	0.00343
MM 0	09/04/19	<0.00336	•	-	<0.00136	-	-	0.983	-	-	-	-
MW-9	01/15/20 04/06/20	0.0129 0.0128	-	-	0.000561 J 0.000663 J	-	-	0.948 0.941	-	-	-	
	07/07/20 07/09/19	0.0098 0.0173	1.62	<0.000147	0.000544 J <0.000525	- 16.0	- <0.000152	0.776 1.34 D	<0.0000263	<0.000454	- <0.000251	0.0190
MW-10	09/04/19 01/16/20 04/06/20	0.0296 0.0326 0.0196	-		<0.00136 0.00068 J <0.000525	-		1.18 1.02 D 0.960	-	-		-
	07/07/20	0.0632	-	-	<0.000525 OFF-SITE	- MONITORING	- S WELLS	0.746	-	-	-	-
	03/27/19 09/05/19	0.0262 0.0455	0.472	<0.000147	0.185 <0.000525	5.60	0.00236	1.84 D 2.05 D	<0.0000263	0.000491 J -	<0.000251	0.154
MW-1	01/17/20 04/07/20	0.0320 0.0537	-	-	<0.000525 <0.000525	-	-	3.89 D 3.93 D	-	-	-	-
	07/08/20	0.0348	-	-	<0.000525	-	-	3.63 D	-	-	-	-
	03/27/19 09/05/19	0.0113 0.0162	0.151	<0.000147	0.0269 < 0.000525	1.14	0.000454 J	1.58 D 1.90 D	<0.0000263	<0.000454	<0.000251	0.0212
MW-2	01/17/20 04/07/20	0.0175 0.0209		-	<0.000525 <0.000525	-	-	2.37 D 2.05 D	-	-	-	
	07/08/20	0.0143	-	-	<0.000525	-	-	2.11 D	-	-	-	
MW-4	03/28/19 09/05/19	0.000794 J 0.00161 J	0.168	<0.000147	0.000815 J <0.000525	0.0671 J -	<0.000152	0.0724 0.258	<0.0000263 UJL -	0.000959 J -	<0.000251	0.00188
1V1 V V - 41	01/16/20	0.00159 J	-	-	<0.000525	-	-	0.373	-	-	9	-
	04/08/20 03/28/19	0.00106 J 0.0202	0.297	<0.000147	<0.000525 <0.000525	5.14	0.000204 J	0.118 0.593	<0.0000263 UJL	<0.000454	<0.000251	0.0178
MW-5	09/05/19 01/14/20	0.0759 0.102		-	0.000795 J 0.000547J	-	-	1.50 D 1.34 E	-	-	-	
10104-5	04/08/20	0.102	-	-	0.0003473 0.000852 J	-	-	1.24 D	-	-	-	-
	07/08/20 03/28/19	0.104 <0.000246	0.142	<0.000147	0.000664 J <0.000525	- 0.0873 J	- <0.000152	1.25 D 0.411	- <0.0000263 UJL	- 0.000931 J	- <0.000251	0.00297
	09/05/19	0.000352 J	-	-	<0.000525	-	-	0.286	-	-	-	-
MW-6	01/16/20 04/07/20	0.000363 J 0.000440 J	-	-	<0.000525 <0.000525	-	-	0.292 0.465	-	-	-	-
	07/08/20	0.000344 J	-	-	<0.000525	-	-	0.240	-	-	-	-
MW-7	07/09/19 09/04/19	0.0135 JL 0.0119	0.411	<0.000147	<0.000525 <0.00136	6.65	0.000173 J	0.904 1.18	<0.0000263	<0.000454	<0.000251	0.0351
	01/16/20 04/07/20	0.0256 0.0287	-	-	<0.000525 <0.000525	-	-	1.26 D 1.21	-	-	-	
	07/08/20	0.0287	-	-	<0.000525	-	-	1.22 D	-	-	-	
	07/09/19 09/04/19	0.00331 J <0.00336	1.25	<0.000147	0.00166 J <0.00136	31.0	0.00162 J	0.483 0.313	<0.0000263	<0.000454	<0.000251	0.0624
MW-8	01/16/20	0.00129 J	-	-	0.00132 J	-	-	0.261	-	-	-	-
	04/06/20 07/07/20	0.00108 J 0.00132 J	-	-	0.00161 J 0.00155 J	-	-	0.291 0.251	-	-	-	-
	02/06/20 04/08/20	0.000356 J 0.00139 J	-	-	<0.000525 <0.000525	-	-	0.0393 0.269	-	-	-	-
MW-11	07/08/20	0.000647 J	-	-	<0.000525	-	-	0.111	-	-	-	-
	10/14/20 01/14/20	0.000625 J 0.000421 J	-	-	- 0.000749 J	-	-	0.0917 0.387	-	-	-	-
MW-12	04/08/20	0.000426 J	-	-	<0.000525	-	-	0.029	-	-	-	-
	07/07/20 10/14/20	0.000413 J 0.000479 J	-	-	<0.000525	-	-	0.00561 0.000842 J	-	-	-	-
	02/06/20 04/08/20	0.00150 J 0.00371 J		-	<0.000525 <0.000525	-	-	0.400 0.185	-	-	-	
MW-13	07/07/20	0.003713 0.00154 J	-	-	<0.000525	-	-	0.102	-	-	-	
	10/14/20 02/06/20	0.00157 J 0.00158 J	-	-	- <0.000525	-	-	0.0936 0.264	-	-	-	-
MW-14	04/08/20	0.00301 J	-	-	<0.000525	-	-	0.881	-	-	-	-
	07/08/20 10/15/20	0.00243 J 0.00256 J	-	-	<0.000525	-	-	0.534 0.565	-	-	-	-
	01/14/20	0.00892	-	-	<0.000525	-	-	0.285	-	-	-	-
MW-15	04/08/20 07/08/20	0.0288 0.0296	-	-	<0.000525 <0.000525	-	-	0.292 0.241	-	-	-	-
	10/15/20 02/06/20	0.0208 0.00607 J	-	-	- <0.000525	-	-	0.202 0.295	-	-	-	
MW-16	04/08/20	0.00370 J	-	-	<0.000525	-	-	0.240	-	-	-	-
-	07/08/20 10/15/20	0.00587 0.00679	-	-	<0.000525	-	-	0.297 0.326	-	-	-	-
	02/06/20	0.000302 J	-	-	<0.000525	-	-	0.0478	-	-	-	-
MW-17	04/07/20 07/08/20	0.000348 J 0.000311 J	-	-	<0.000525 <0.000525	-	-	0.0249 0.0338	-	-	-	-
	10/15/20 01/14/20	0.000335 J 0.000379 J	-	-	<0.000525	-	-	0.0190 0.232	-	-	-	-
MW-18	01/14/20	<0.000379 J <0.000246		-	<0.000525 <0.000525	-	-	0.232 0.00282	-	-	-	
*****-10	07/08/20 10/15/20	0.000260 J 0.000265 J	-	-	<0.000525	-	-	0.000967 J 0.00112 J	-	-	-	
				•		VBU MONITOR	ING WELLS	-	•			
MW-3D	05/07/19	0.00106 J	0.297	<0.000147	<0.000525	0.0578 J	0.000153 J	0.0643	<0.0000263 UJL	<0.000454	<0.000251	0.00739
MW-1D MW-2D	05/07/19 05/08/19	0.00162 J 0.000894 J	0.342 0.0648	<0.000147 <0.000147	0.000789 J 0.00411	0.0341 J 0.186	0.000182 J 0.000449 J	0.973 0.015	<0.0000263 UJL <0.0000263	0.000788 J <0.000454	<0.000251 <0.000251	0.00471
TCEQ TR		0.010	2.0	0.005		ATORY STANI		1.1	0.002	0.050	0.12	7.3
		1										

- Notes:

 "." indicates not analyzed.

 ".." represents not applicable or not established.

 "mg/L" represents milligrams per liter.

 "TCEQ" represents Texas Commission on Environmental Quality.

 "TRRP" represents Texas Risk Reduction Program.

 "MSD" represents Municipal Setting Designation

- "MSD" represents Municipal Setting Designation
 "MSW" represents Municipal Solid Waste.
 "PCL" represents Protective Concentration Limit.
 "<' indicates the analyte was not identified at or above the specified laboratory Sample Detection Limit (SDL).
 Bold values exhibit a concentration at or above the laboratory SDL.
 "J" indicates the target analyte was positively identified above the laboratory SDL but below the Method Quantitation Limit (MQL).
 "U" indicates the numerical value of the SDL is estimated and may be inaccurate based on an evaluation of the data in the Data Usability Summary (DUS).
 "L" indicates the analytical result is likely bias low based on an evaluation of the data in the DUS.
 "H" indicates the analytical result is likely bias high based on an evaluation of the data in the DUS.
 "D" indicates that the sample was diluted due to an initial result that exceeded the calibration curve. The reported concentration is from the analysis of an additional dilution.
 "E" indicates the analyte data exceeds the upper calibration limit; therefore, the analyte concentration is reported as estimated.
 Concentrations highlighted yellow exceed the critical TCEQ TRRP Tier 1 Residential groundwater-ingestion (^{AW}GW_{Init}) PCL <u>without</u> a Municipal Setting Designation (MSD) in place.
 Concentrations highlighted blue exceed the critical TCEQ TRRP Tier 1 Residential groundwater-to-air inhalation (^{AW}GW_{Init}) PCL <u>with an MSD</u> in place.
 TCEQ TRPP Tier 1 Residential Groundwater PCLs (30 Texas Administrative Code [TAC] 350, Table 3: Tier 1 Residential Groundwater PCLs, dated January 6, 2021).

TABLE 2 (CONTINUED)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - VOCs, SVOCs

AUTHORIZATION TO DISTURB FINAL COVER OVER CLOSED MUNICIPAL SOLID WASTE LANDFILL FOR NON-ENCLOSED STRUCTURE

DOTY SAND PIT VENTURE LANDFILL (MSW PERMIT NO. 1247)

OLSHAN DEMOLISHING LANDFILL (MSW PERMIT NO. 1259, REVOKED)

12000 BISSONNET STREET HOUSTON, HARRIS COUNTY, TEXAS

							VOLATILE OR	GANIC COMP	OUNDS (VOCs))						SVOCs	
ple Name	Sample Date	Acetone	Benzene	Chlorobenzene	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,4-Dichlorobenzene	Ethylbenzene	p-Isopropyltoluene	Methyl ethyl ketone	Methyl tert-butyl ether (MTBE)	Toluene	Total Xylenes	Benzoic acid	Bis(2-ethylhexyl)phthalate	1,2-Dichlorobenzene
Sampl	Sam	Method 8260B	Method 8260B	Method 8260B	Method 8260B	Method 8260B	Method 8260B	Method 8260B	Method 8260B	Method 8260B		Method 8260B	Method 8260B	Method 8260B	Method 8270D	Method 8270D	Method 8270D
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L EARING UNIT (mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
						7 11101701712	THE OF THE ORDER		ITORING WEL		OTANO WELLO						
MW-3	03/27/19	<0.0200	<0.00185	<0.000110	0.000110 J	<0.00500	<0.000175	<0.000222	<0.000190	<0.000150	<0.00132	0.000660 J	<0.000500	<0.000500	<0.00129	<0.000441	<0.00100
MW-9	07/09/19	<0.0123 UJ	<0.000214	<0.000159	<0.000259	0.000330 J	<0.000236	<0.000199	<0.000146	<0.000233	0.00633 J	<0.000571	<0.000146	<0.000192	<0.00131 UJ	<0.000450 UJ	<0.00102 UJ
	07/09/19	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00130 UJL	<0.000445 UJL	<0.00101 UJL
MW-10	07/12/19	0.0171 JL	<0.000214	<0.000159	<0.000259	0.000560 J	<0.000244	<0.000199	<0.000146	0.00033 J	<0.00270	0.000830 J	<0.000146	<0.000192	-	-	-
									NITORING WEL		0.000			*******		l	I
MW-1	03/27/19	<0.0200	<0.000185	<0.000110	0.00017 J	<0.00500	<0.000175	<0.000222	0.00024 J	<0.000150	<0.00132	<0.000500	0.0184	0.00116 J	<0.00129	<0.000441	<0.00100
MW-2	03/27/19	<0.0200	<0.000185	<0.000110	<0.000107	<0.00500	<0.000175	<0.000222	<0.000190	<0.000150	<0.00132	0.000890 J	<0.000500	<0.000500	<0.00129	<0.000441	<0.00100
MW-4	03/28/19	<0.0200	<0.000185	<0.000110	0.000490 J	<0.00500	<0.000175	<0.000222	<0.000190	<0.000150	<0.00132	<0.000500	<0.000500	<0.000500	<0.00129 UJL	<0.000441 UJL	<0.00100 UJL
MW-5	03/28/19	<0.0200	<0.000185	0.000670 J	0.000200 J	<0.000190	0.000270 J	0.000560 J	<0.000190	<0.000150	<0.00132	0.000550 J	<0.000500	<0.000500	<0.00130 UJL	<0.000445 UJL	<0.00101 UJL
MW-6	03/28/19	<0.0200	<0.000185	<0.000110	0.000150 J	<0.00500	<0.000175	<0.000222	<0.000190	<0.000150	<0.00132	<0.000500	<0.000500	<0.000500	<0.00131 UJL	<0.000450 UJL	<0.00102 UJL
MW-7	07/09/19	<0.0123 UJ	<0.000214	<0.000159	<0.000259	0.000350 J	<0.000236	<0.000199	<0.000146	<0.000233	0.00808 J	<0.000571	0.000150 J	<0.000192	0.0416	<0.000445	<0.00101
	07/09/19	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00130 UJL	<0.000445 UJL	<0.00101 UJL
MW-8	07/12/19	<0.0123 UJ	0.000350 J	<0.000159	<0.000259	0.000430 J	<0.000236	<0.000199	0.000210 J	0.0333	<0.00270	<0.000571	0.000230 J	<0.000192	-	-	-
			<u> </u>				SEC	COND GWBU I	MONITORING V	VELLS			<u> </u>				
								ON-SITE MON	ITORING WEL	LS							
MW-3D	05/07/19	<0.0123	<0.000214	<0.000159	<0.000259	<0.00318	0.000250 J	<0.000199	<0.000146	<0.000233	<0.00270	<0.000571	<0.000146	<0.000192	<0.00127	<0.000436	<0.000994
								OFF-SITE MOI	NITORING WEL	LS							
MW-1D	05/07/19	<0.0123	<0.000214	0.000170 J	0.00151	<0.000318	0.0267	<0.000199	<0.000146	<0.000233	<0.00270	<0.000571	0.000210 J	<0.000192	<0.00127	0.000802 J	0.0162
MW-2D	05/08/19	<0.0123	<0.000214	<0.000159	0.000910 J	<0.00318	0.0213	<0.000199	<0.000146	<0.000233	<0.00270	0.00320 J	0.000340 J	<0.000192	<0.00129	<0.000441	0.0201
								REGULATOR	RY STANDARD	S							
	RRP Tier 1 ^{GW} GW _{ing} PCLs	22	0.0050	0.10	0.080	0.070	0.60	0.075	0.70	2.4	15	0.24	1.0	10	98	0.006	0.60
Residential ^A	Tier 1 with MSD AirGW _{Inh-V} PCLs Source Area)	1,000,000	23	150	2.6	4.7	150	2,200	3,800		620,000	520	8,200	1,300			1,200

Notes:

Bold values exhibit a concentration at or above the laboratory SDL.

Only VOC and SVOC analytes detected at or above the laboratory SDL in at least one sample are shown on this table.

[&]quot;-" indicates not analyzed.

[&]quot;--" represents not applicable or not established.

[&]quot;mg/L" represents milligrams per liter.

[&]quot;SVOCs" represents semi-volatile organic compounds.

[&]quot;TCEQ" represents Texas Commission on Environmental Quality.

[&]quot;TRRP" represents Texas Risk Reduction Program.

[&]quot;MSD" represents Municipal Setting Designation

[&]quot;MSW" represents Municipal Solid Waste.

[&]quot;PCL" represents Protective Concentration Limit.

[&]quot;<" indicates the analyte was not identified at or above the specified laboratory Sample Detection Limit (SDL).

[&]quot;UJ" indicates the numerical value of the SDL is estimated and may be inaccurate based on an evaluation of the data in the Data Usability Summary (DUS).

[&]quot;J" indicates the target analyte was positively identified above the laboratory SDL but below the Method Quantitation Limit (MQL).

[&]quot;L" indicates the analytical result is likely bias low based on an evaluation of the data in the DUS.

Concentrations highlighted yellow exceed the critical TCEQ TRRP Tier 1 Residential groundwater-ingestion (GWGW_{Ina}) PCL without a Municipal Setting Designation (MSD) in place.

Concentrations highlighted blue exceed the critical TCEQ TRRP Tier 1 Residential groundwater-to-air inhalation (AirGW_{Inb-V}) PCL with an MSD in place.

TCEQ TRPP Tier 1 Residential Groundwater PCLs (30 Texas Administrative Code [TAC] 350, Table 3: Tier 1 Residential Groundwater PCLs, dated January 6, 2021).

TABLE 2 (CONTINUED)
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - TPH
AUTHORIZATION TO DISTURB FINAL COVER OVER CLOSED MUNICIPAL SOLID WASTE LANDFILL FOR NON-

ENCLOSED STRUCTURE DOTY SAND PIT VENTURE LANDFILL (MSW PERMIT NO. 1247) OLSHAN DEMOLISHING LANDFILL (MSW PERMIT NO. 1259, REVOKED) 12000 BISSONNET STREET HOUSTON, HARRIS COUNTY, TEXAS

ше	2	7	28	35
e Na	ie Dai	6. 1.	C12-C	>C28-C35
ampl	TXMerbod 1005	TX Method 1005		
		TOTAL PETROLEUM HYDROCARBONS (TPH) PREMIOR TX Method 1005 TX Method 1005 TX Method 1005 MgL Mg	mg/L G WELLS	
		ON-SITE MONITORING	WELLS	
				<0.0894 <0.600
MW-3				<0.614
				<0.604 <0.597
				<0.615
MW-9				<0.609 <0.604
				<0.819
				<0.598
MW-10				<0.614 <0.611
				<0.602
	07/07/20			<0.813
		<0.144	<0.148	<0.0911
MW-1				<0.610 <0.629
		<0.881		<0.603
				<0.818 <0.0916
				<0.0916
MW-2				<0.615
				<0.604 <0.790
	03/28/19	<0.142	<0.146	<0.0899
MW-4				<0.604 <0.592
	04/08/20	<0.872	<0.597	<0.597
				<0.0917 <0.599
MW-5				<0.604
				<0.586 <0.806
				<0.0909
MW-6				<0.601
IVIVV-O				<0.591 <0.604
				<0.796
				<0.590 <0.619
MW-7				<0.609
				<0.600 <0.809
	07/12/19	1.22 J	<0.594	<0.594
MW-8				<0.632 <0.605
				<0.593
				<0.814 <0.614
MW-11				<0.618
				<0.801 <0.616
MW-12				<0.616
				<0.817
MW-13				<0.604 <0.623
	07/07/20	<0.835	<0.814	<0.814
MW-14				<0.605 <0.605
	07/08/20	<0.836	<0.815	<0.815
MW-15				<0.614 <0.603
	07/08/20	<0.830	<0.810	<0.810
MW-16				<0.607 <0.594
10				<0.594
M\\ 17				<0.605
MW-17				<0.607 <0.805
104/15	01/14/20	<0.894	<0.612	<0.612
MW-18	04/07/20 07/08/20	<0.881 <0.823	<0.603 <0.803	<0.603 <0.803
		SECOND GWBU MONITO	RING WELLS	. 0.000
MW-3D	05/07/19	ON-SITE MONITORING <0.857	<0.587	<0.587
		OFF-SITE MONITORIN	G WELLS	
MW-1D MW-2D	05/07/19 05/08/19	<0.965 <0.841	<0.660 <0.576	<0.660 <0.576
2.0	1 00/00/18	REGULATORY STAN		~0.370
TCEQ TR Residential ^G	RP Tier 1 ^W GW _{Ing} PCLs	0.98	0.98	0.98
TCEQ TRRP T	ier 1 with MSD			

Notes:
"mg/L" represents milligrams per liter.
"TCEQ" represents Texas Commission on Environmental Quality.
"TRRP" represents Texas Risk Reduction Program.
"MSD" represents Municipal Setting Designation
"MSW" represents Municipal Solid Waste.

[&]quot;MSW" represents Municipal Solid Waste.

PCL represents Protective Concentration Limit.

"«" indicates the analyte was not identified at or above the specified laboratory Sample Detection Limit (SDL).

Bold values exhibit a concentration at or above the laboratory SDL.

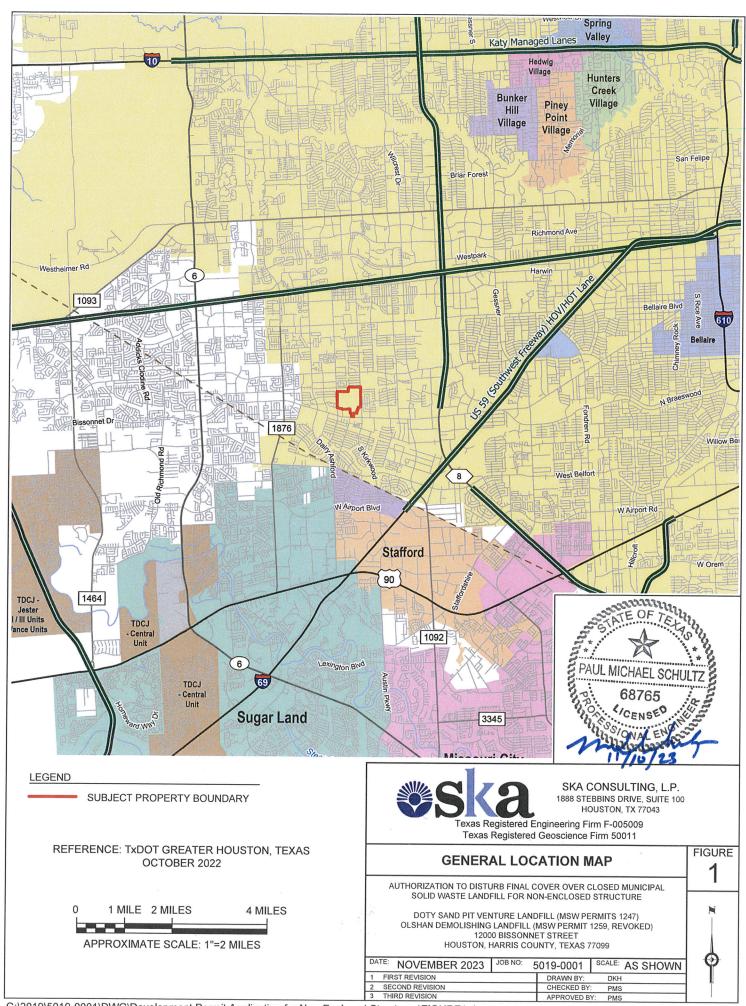
"J" indicates the target analyte was positively identified above the laboratory SDL but below the Method Quantitation Limit (MQL).

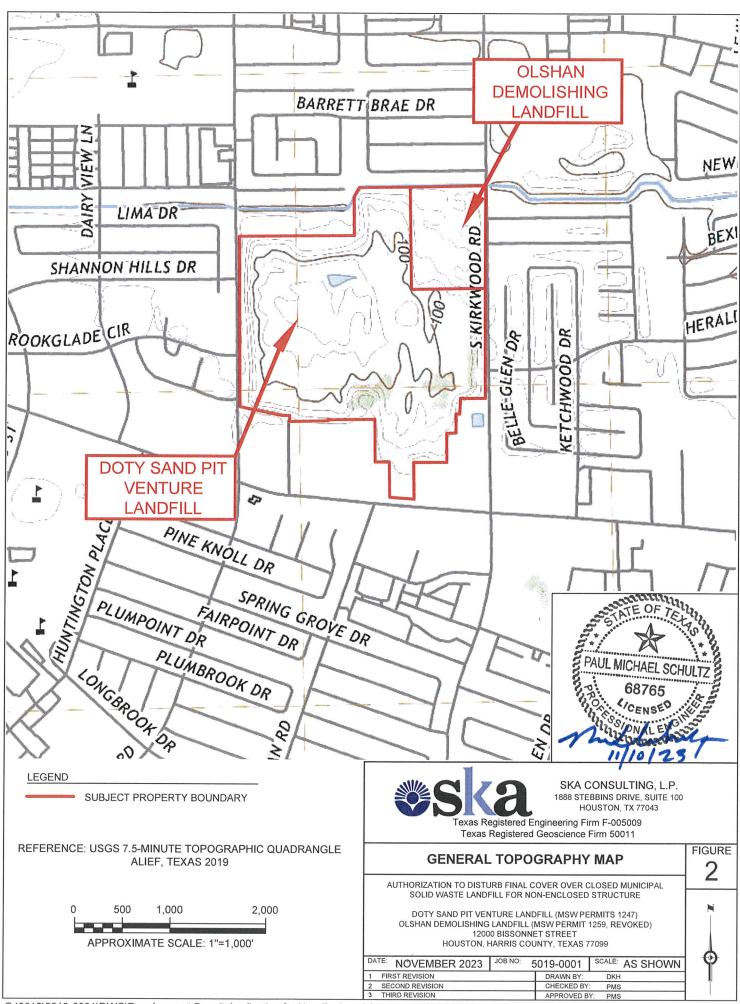
Concentrations highlighted yellow exceed the critical TCEQ TRRP Tier 1 Residential groundwater-ingestion (GWGM_{lng}) PCL without an Municipal Setting Designation (MSD) in place.

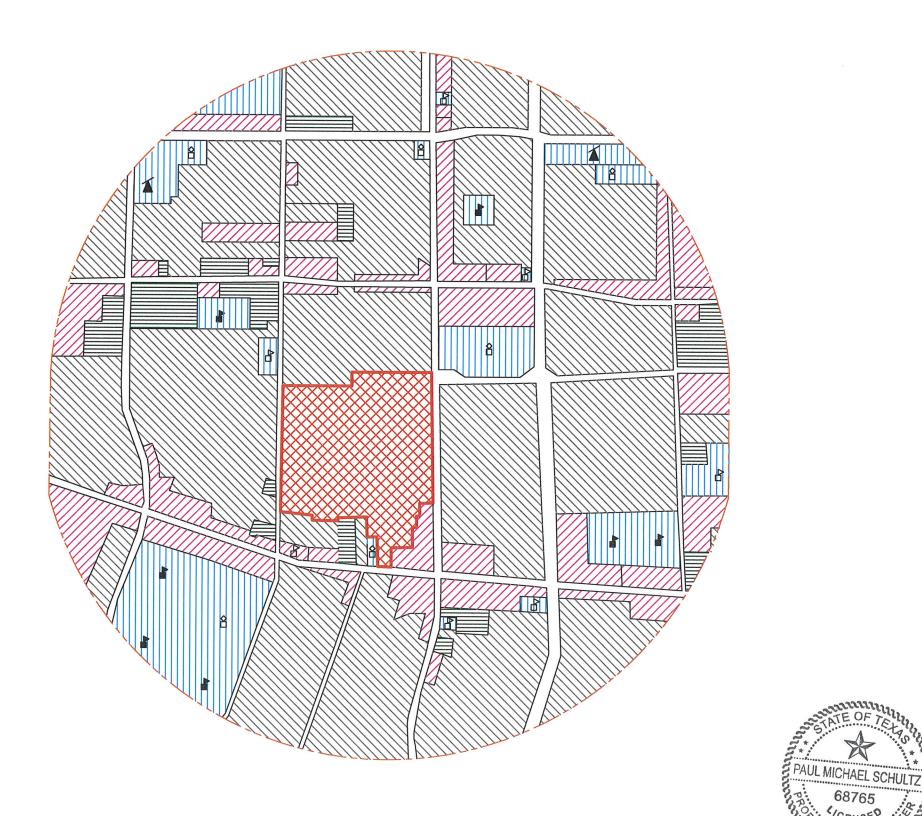
 $Concentrations \ highlighted \ blue \ exceed \ the \ critical \ TCEQ \ TRRP \ Tier \ 1 \ Residential \ groundwater-to-air \ inhalation \ (\ ^{Air}GW_{Inh-V})$ PCL with an MSD in place.

TCEQ TRPD Tier 1 Residential Groundwater PCLs (30 Texas Administrative Code [TAC] 350, Table 3: Tier 1 Residential Groundwater PCLs, dated January 6, 2021).











SUBJECT PROPERTY BOUNDARY

PARCEL LAND USE

LANDFILL

COMMERCIAL/INDUSTRIAL

RESIDENTIAL



OTHER LAND USES (E.G. SCHOOLS, CHURCHES)



VACANT



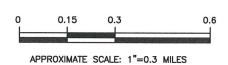
SCHOOL



CHURCH



PARK





SKA CONSULTING, L.P. 1888 STEBBINS DRIVE, SUITE 100 HOUSTON, TEXAS 77043

Texas Registered Engineering Firm F-005009 Texas Registered Geoscience Firm 50011

SURROUNDING LAND USE MAP

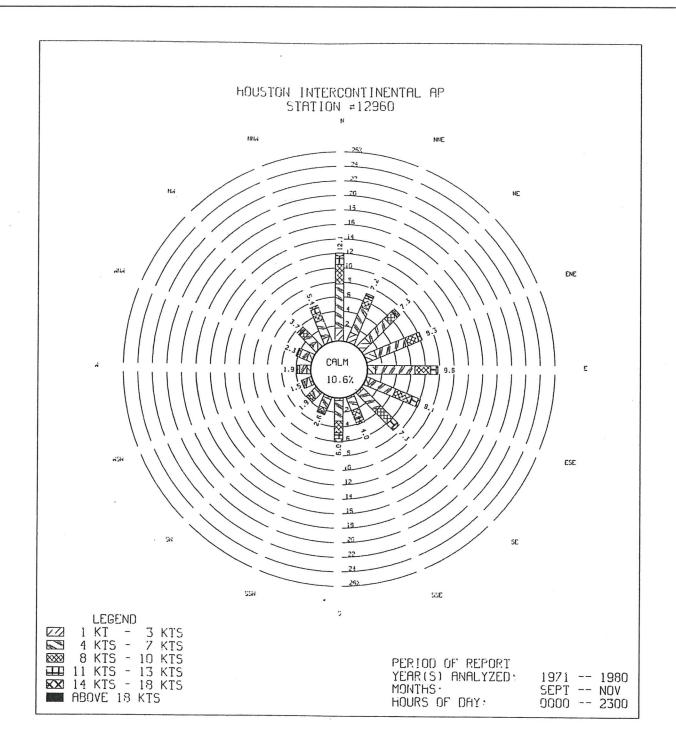
FIGURE 3

AUTHORIZATION TO DISTURB COVER OVER CLOSED MUNICIPAL SOLID WASTE LANDFILL FOR NON-ENCLOSED STRUCTURE

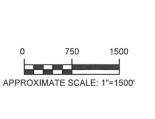
DOTY SAND PIT VENTURE LANDFILL (MSW PERMIT 1247) OLSHAN DEMOLISHING LANDFILL (MSW PERMIT 1259, REVOKED) 12000 BISSONNET STREET HOUSTON, HARRIS COUNTY, TEXAS



ATE: NOVEMBER 2023 | JOB NO: 5019-0001 | SCALE: AS SHOWN FIRST REVISION DRAWN BY:



REFERENCE: TEXAS DEPARTMENT OF TEXAS, CLIMATIC ATLAS OF TEXAS, DECEMBER 2019







SKA CONSULTING, L.P. 1888 STEBBINS DRIVE, SUITE 100 HOUSTON, TX 77043

Texas Registered Engineering Firm F-005009 Texas Registered Geoscience Firm 50011

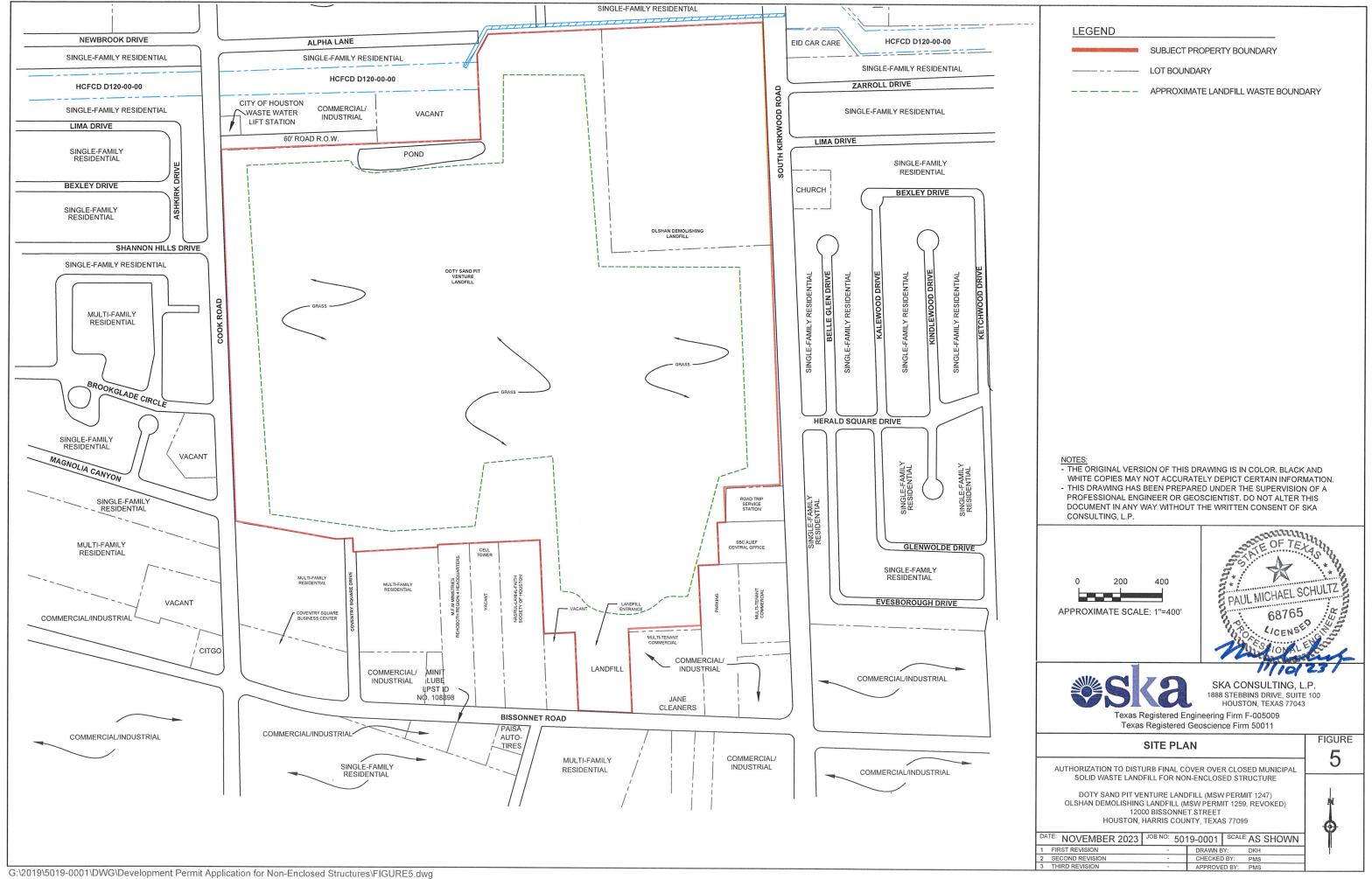
PREVAILING WIND DIRECTION

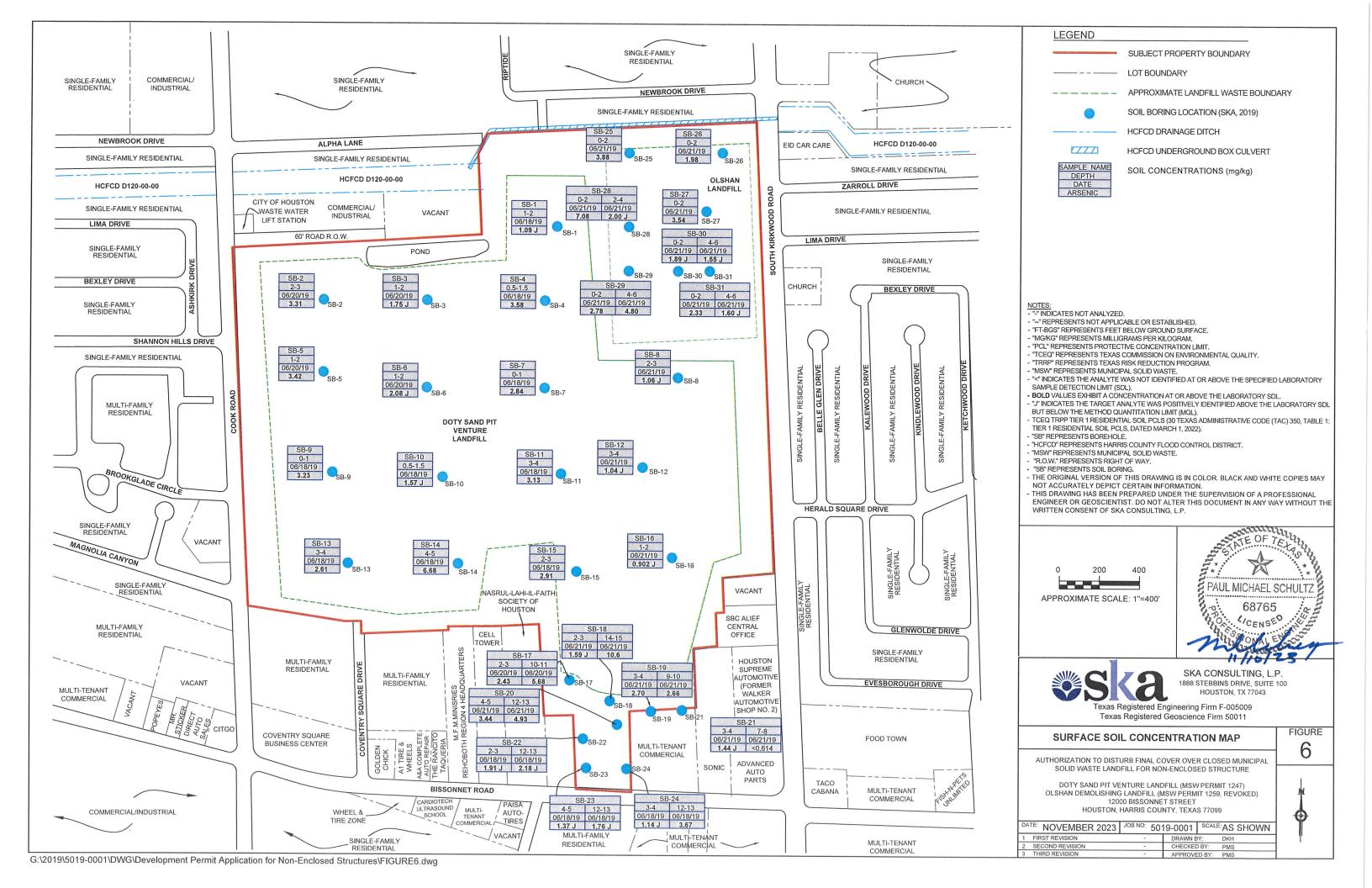
AUTHORIZATION TO DISTURB FINAL COVER OVER CLOSED MUNICIPAL SOLID WASTE LANDFILL FOR NON-ENCLOSED STRUCTURE

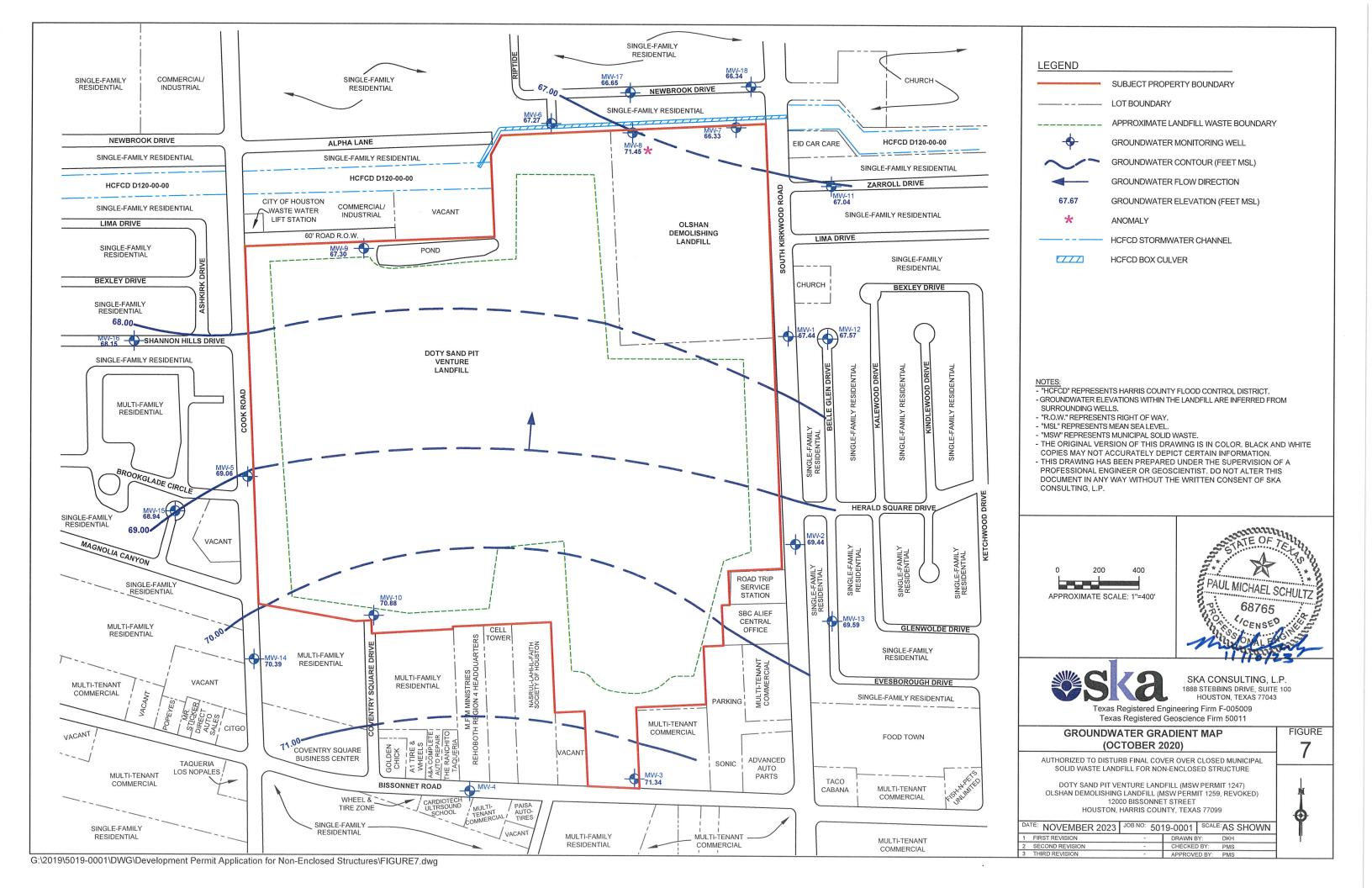
DOTY SAND PIT VENTURE LANDFILL (MSW PERMITS 1247)
OLSHAN SAND PIT VENTURE LANDFILL (MSW PERMIT 1259, REVOKED)
12000 BISSONNET STREET
HOUSTON, HARRIS COUNTY, TEXAS 77099

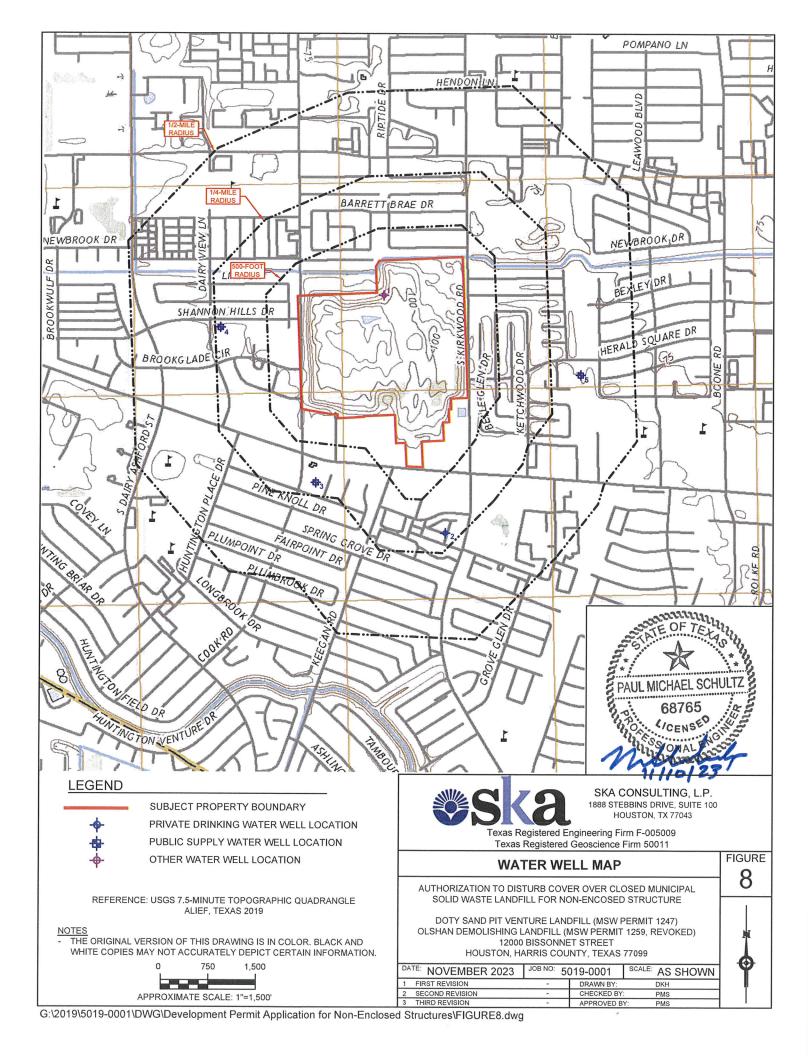
DA	TE: NOVEMBER 2023	JOB NO: 50	019-0001	SCALE: AS SHOWN
1	FIRST REVISION	-	DRAWN BY:	DKH
2	SECOND REVISION	-	CHECKED BY:	PMS
3	THIRD REVISION	-	APPROVED B	Y: PMS

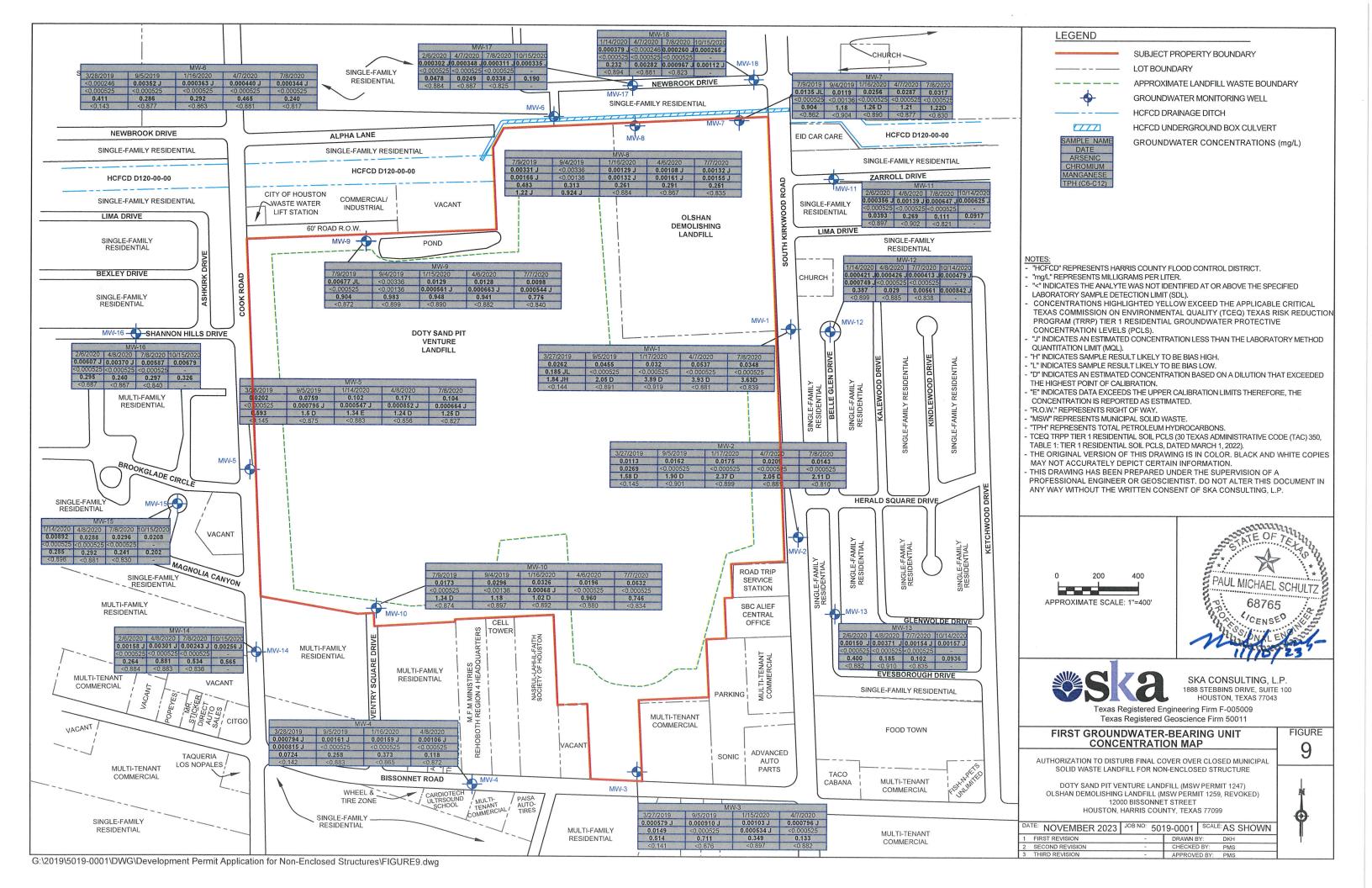
FIGURE

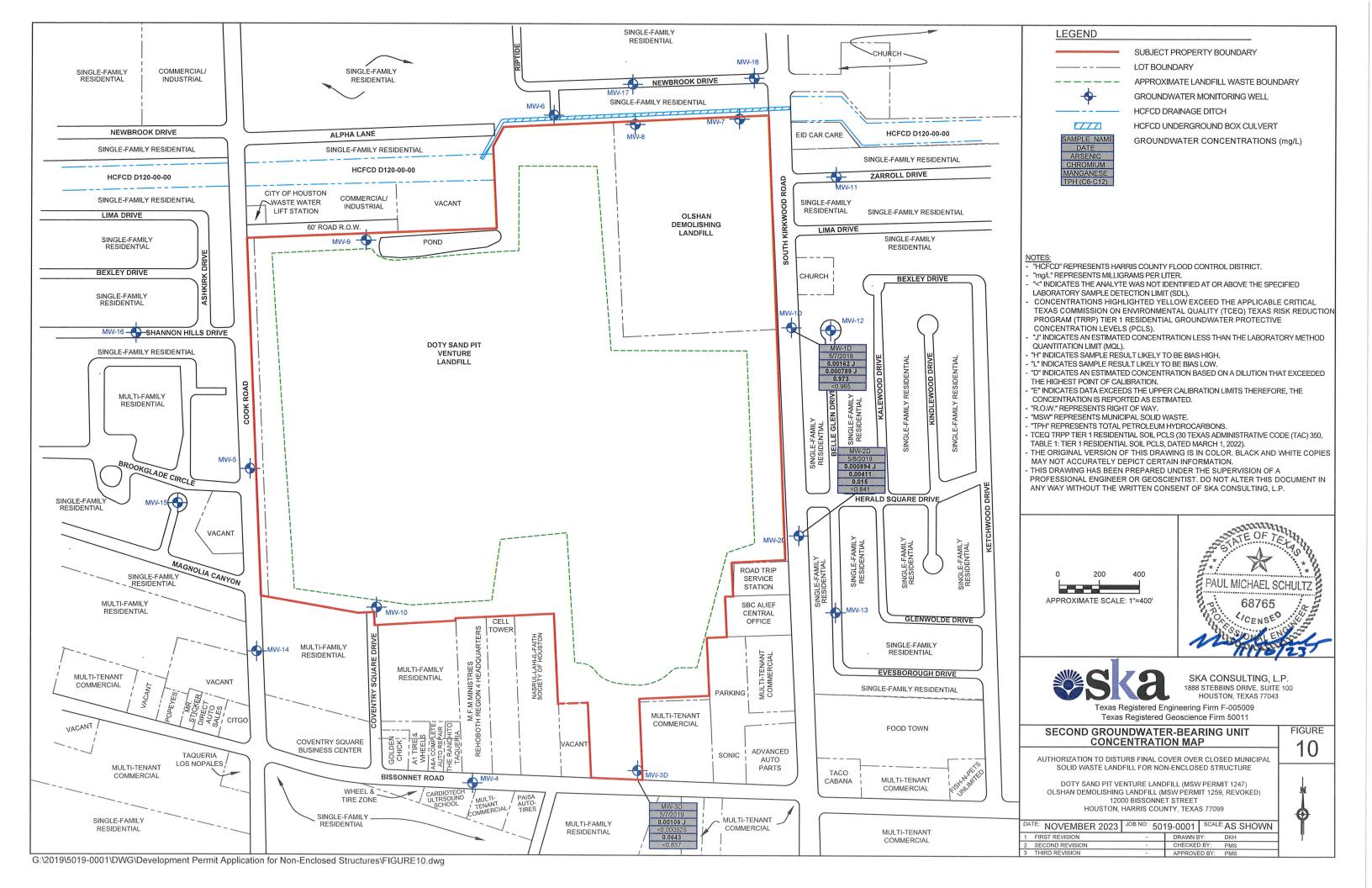


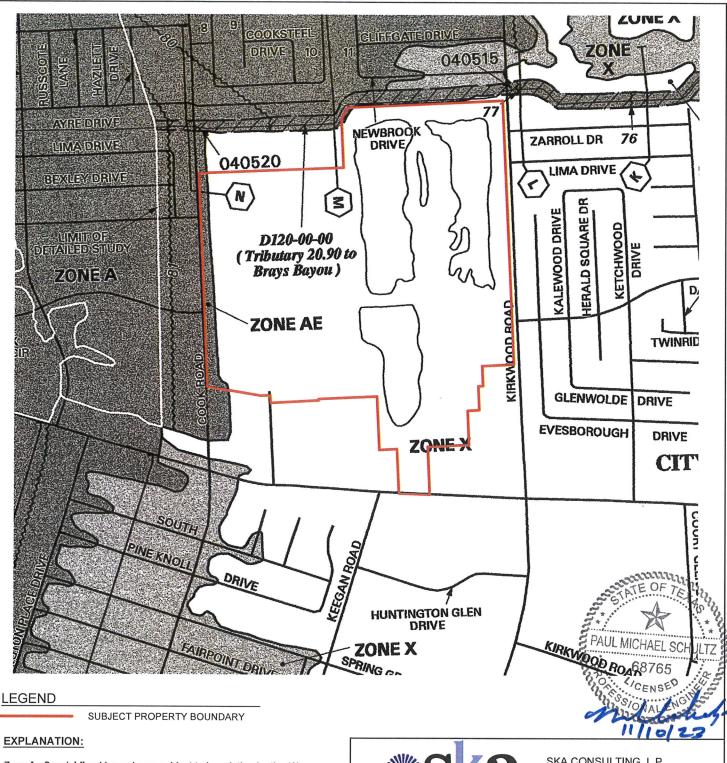












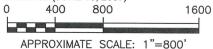
Zone A - Special flood hazard area subject to inundation by the 1% annual chance flood. No Base flood elevations determined. Zone AE - Special flood hazard area subject to inundation by the 1% annual chance flood. Base flood elevations determined.

Zone X (Unshaded) - Areas determined to be outside the 0.2% annual chance floodplain.

Zone X (shaded) - Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depth of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

FEDERAL EMERGENCY MANAGEMENT AGENCY HARRIS COUNTY, TEXAS

MAP No.: 48201C0840L (JUNE 18, 2007)





SKA CONSULTING, L.P. 1888 STEBBINS DRIVE, SUITE 100 HOUSTON, TX 77043

FIGURE

11

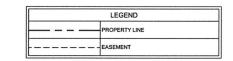
Texas Registered Engineering Firm F-005009 Texas Registered Geoscience Firm 50011

FEMA FLOOD INSURANCE RATE MAP

AUTHORIZATION TO DISTURB FINAL COVER OVER CLOSED MUNICIPAL SOLID WASTE LANDFILL FOR NON-ENCLOSED STRUCTURE

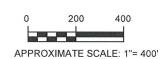
DOTY SAND PIT VENTURE LANDFILL (MSW PERMIT 1247) OLSHAN DEMOLISHNG LANDFILL (MSW PERMIT 1259, REVOKED 12000 BISSONNET STREET

DA	TE: NOVEMBER 2023	JOB NO: 5	019-0001	SCALE: AS SHOWN
1	FIRST REVISION	-	DRAWN BY:	DKH
2	SECOND DEVISION		CHECKED BY	DIMO



Cut/Fill Values											
Number	Minimum Elevation	Maximum Elevation	Volume (CY)	Color							
1	-27.87	-20.00	9548.70	蘇							
2	-20.00	-15.00	22154.62	30							
3	-15.00	-10.00	59141.03	菱							
4	-10.00	-5.00	127455.33								
5	-5.00	0.00	202214.18								
6	0.00	5.00	151474.69	83							
7	5.00	10.00	63979.12	脈							
8	10.00	15.00	18167.01	8							
9	15.00	18.49	1046.46	8							

VOLUME (CY)
462,600
258,150



- NOTES:
 THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK AND WHITE COPIES MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.
 THIS DRAWING HAS BEEN PREPARED BY KIMLEY-HORN.





SKA CONSULTING, L.P. 1888 STEBBINS DRIVE, SUITE 100 HOUSTON, TEXAS 77043

FIGURE

12

Texas Registered Engineering Firm F-005009 Texas Registered Geoscience Firm 50011

CUT-AND-FILL BALANCE

AUTHORIZATION TO DISTURB FINAL COVER OVER CLOSED MUNICIPAL SOLID WASTE LANDFILL FOR NON-ENCLOSED STRUCTURE

DOTY SAND PIT VENTURE LANDFILL (MSW PERMIT 1247) OLSHAN DEMOLISHING LANDFILL (MSW PERMIT 1259, REVOKED) 12000 BISSONNET STREET HOUSTON, HARRIS COUNTY, TEXAS 77099

DA	TE: DECEMBER 2023	JOB NO:	501	9-0001	SCALI	E:AS	SHOWN
1	FIRST REVISION	-		DRAWN E	Y:	MLH	
2	SECOND REVISION	-		CHECKE	BY:	PMS	
3	THIRD REVISION			ADDDOV/	D BV:	DMC	

DA'	TE: DECEMBER 2023	JOB NO: 50	19-0001	SCALE: AS SHOWN
1	FIRST REVISION	-	DRAWN B	Y: MLH
2	SECOND REVISION	-	CHECKED	BY: PMS
3	THIRD REVISION	-	APPROVE	D BY: PMS

APPENDIX 1 LEGAL AND ADMINISTRATIVE DOCUMENTS





Franchise Tax Account Status

As of: 11/07/2023 14:40:19

This page is valid for most business transactions but is not sufficient for filings with the Secretary of State

BISSONNET 136, LLC

Texas Taxpayer Number 32071037793

Mailing Address 22310 GRAND CORNER DR STE 140 KATY, TX 77494-7467

Right to Transact Business in

Texas ACTIVE

State of Formation TX

Effective SOS Registration Date 06/13/2019

Texas SOS File Number 0803343508

Registered Agent Name JOHN QUINLAN

Registered Office Street Address 22310 GRAND CORNER DRIVE, SUITE 140 KATY, TX 77494

CERTIFICATE OF FORMATION

OF

FILED
In the Office of the Secretary of State of Texas
JUN 13 2019

BISSONNET 136, LLC (A Limited Liability Company)

Corporations Section

ARTICLE ONE

The name of the filing entity being formed is Bissonnet 136, LLC (the "Company").

ARTICLE TWO

The filing entity being formed is a limited liability company.

ARTICLE THREE

The purpose for which the Company is formed is any lawful purpose for which a limited liability company may be formed under the Texas Business Organizations Code.

ARTICLE FOUR

The street address of the Company's initial Registered Office, and the name of its initial Registered Agent at that office, are as follows:

John Quinlan 22310 Grand Corner Dr., Suite 140 Katy, Texas 77494

ARTICLE FIVE

The Company will not have Managers. The name and address of the initial Member is:

THE IRELAND FAMILY LIMITED PARTNERSHIP, A TEXAS LIMITED PARTNERSHIP 22310 Grand Corner Dr., Suite 140 Katy, Texas 77494

ARTICLE SIX

The undersigned Organizer hereby disclaims any past or future interests in or control of Bissonnet 136, LLC and resigns as the Organizer effective upon the formation of the Company.

IN WITNESS WHEREOF, I have hereunto set my hand this thirteenth day of June, 2019.

Sharon Leal, Organizer

505 W. 15th Street

Austin, Texas 78701-1511

(512) 474-2002

Texas Franchise Tax Public Information Report

(Rev.9-11/30)

To be filed by Corporations, Limited Liability Companies (LLC) and Financial Institutions
This report MUST be signed and filed to satisfy franchise tax requirements

■ Tcode 13196 Franchise

■ Taxpayer number						■ Re	port	year		You have	certair	rights	under Cha	pter !	552 ar	nd 559	, Gove	ernme	nt Co	de.
3 2 0 7	1 0	3 7	7	9	3	2	0	2	0	to review, i Contact us	request	, and co	rrect infor	matio	n we i	have c				
Taxpayer name	SONNET	136.1	l C						l	comactus	ut (000	7/232 13	20101 (312	.) 403	4000.					
Mailing address	10 GRAN				STE	140											(SOS)		umb	er or
City		ID COI	VIVL.	Stat					ZIP (Code	Plus	4	C	ompt			umbe			
Disalvan single if	KATY					TX			<u></u>	77494	<u> </u>						3343			
Blacken circle if Principal office Principal place of bus		ently no c	nange	s from [previou	s year; if r	no into	ormatic	on is d	isplayed, cor	nplete	the appl	icable info	ormati	on in :	sectio	ns A, B	and (c.	
Please sign below	Officer, Report report. officers	There is a director	eted. no req s, or m	The info Juiremo nanage	ormation ent or personant ers chan	on is upd procedur ige throu	ated a e for s ighou	annual upplei t the y	lly as p menti ear.	e date a Pub part of the fi ing the info	ranchis	e tax		• (1 • • • (1)			(1 1 8 8 (1 1 8		11114 158	(1 8211 12
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Mailing address 22310 GRAND	CORNE	R DRIV	E, S	UITE	140	City			K	ATY	-		State TX	- TF	EXAS	3	ZIP C	ode 774	94	
Name						Title					Dire	ctor YES	Term		m	m	d	d	у	у
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SECTION B Enter th	ne informatio	on requir	red for	r each	corpor	ration or	LLC,	if any,	in wh	nich this en	tity ov	vns an i	nterest o	f 10 r	percei	nt or	more	<u> </u>		-
Name of owned (subs	idiary) corpoi	ration or	limited	d liabili	ity com	pany		state o			_		OS file nu						owne	rship
Name of owned (subs	idiary) corpoi	ration or l	limited	ilidail b	ty com	pany	9	State o	f form	nation		Texas So	OS file nu	mber	, if any	Perc	entag	je of c	wne	rship
SECTION C Enter the liability	ne information company.	on requir	ed for	r each	corpor	ation or	LLC,	if any,	that	owns an in	terest	of 10 p	ercent or	more	e in th	nis en	tity o	r limi	ted	
Name of owned (pare								state o				Texas SO	OS file nu	mber	, if any	/ Perc	entag	je of c	wne	rship
Registered agent and Agent: JOHN QU		fice curre	ntly o	n file.	(see inst	tructions	if you	need t			0	Blacke the re	en circle it gistered a	f you agent	need or re	forms gister	ed off	ice in	form	
Office: 22310 GR	AND COF	RNERI	DRIV	/E, S	UITE	140			City		KAT	Υ	200	Sta	te T	X	ZIF	P Cod 77	e 494	ļ
The above information is for Sections A, B, and C, if	required by Se necessary. The	ction 171.2 information	203 of t on will	he Tax be avai	Code for lable for	r each corp public ins	ooratio pectio	on or lin	nited li	iability comp	any that	files a Te	exas Franch	nise Ta	x Repo	ort. Use				
l declare that the informa been mailed to each pers	ition in this doc on named in th	cument and	d any a who is a	ttachm an office	ents is to er, direct	rue and co tor or man	rrect to	o the b	est of r	my knowledg currently em	e and b	elief, as c by this, c	of the date or a related,	below , corpo	, and t	hat a c	opy of	this re	eport	nas anv.
nere Noelle S							Title		ctro		Date	-	3-2020		Area	code	and p	hone	num	
					Toya	c Com	ntro	llor C	Affi e	ial Use O										
													VE/C	DE			RINC			

Texas Franchise Tax Public Information Report

Comptroller 05-102 05-102 (Rev.9-11/30) FORM

To be filed by Corporations, Limited Liability Companies (LLC) and Financial Institutions
This report MUST be signed and filed to satisfy franchise tax requirements

■ Tcode 13196 Franchise

1 1 1				_	n Re	port year		You have	certair	rights u	nder Chapte	er 552	and 55	9, Gove	ernmei	nt Co	le,
3 2 0 7	1 0 3	7 7	9 3		2	0 2	1				rect informa 81or (512) 4			on file	about	you.	
axpayer name	SONNET 13	6. LLC															
Mailing address	310 GRAND		R DR	STF	140								of State			umbe	r or
lity	KATY	OTTIVE	State				ZIP (Code	Plus	4	Com	ptroll	er file r				
Rlackon circle if	there are currently	, no change	o from m	ما راه ا	TX	. :		77494			-11:6			3343			
Principal office		no change	s from pr	evious	year; ii n	o informa	uon is a	ispiayed, coi	mpiete	tne applic	cable inform	ation i	n Sectio	ons A, E	and C	-	
Principal place of bus	iness																
lease sign belo	officers, dire	mpleted. re is no rec ectors, or n	The infor quiremer nanagers	matio nt or po chang	n is upda rocedure ge throu	ated annu for supp ghout the	ially as i lement year.	part of the f	franchis	e tax			(81) 88/23				
SECTION A Name,	title and mailing	address	of each o	officer,		r or man	ager.		15:				207103	77932	1	(1114 1141	1181
IRELAND FAN	ALL VILIBALTER		NEDC		Title	DIDE			Dire		Term	_ <u>n</u>	1 m	d	d	у	y
	MILY LIMITEL	JPAKI	NERS	HIP		DIKE	СТО	K		YES	expiratio	n L					
Mailing address 22310 GRAND	CORNER D	RIVE, S	UITE	140	City		K	ATY			State	ГХ		ZIP C	ode 774	94	
lame					Title				Dire	ctor	Term	n	m	d	d	у	,
IRELAND FAN	AILY LIMITED	PART	NERS	HIP		MEI	MBEF	·		YES	expiratio	n L					
Mailing address 22310 GRAND	CORNER D	RIVE, S	UITE	140	City		K	ATY			State	ГХ		ZIP C	ode 774	94	
lame					Title				Dire	ctor	,	n	n m	d	d	y	у
					V-					YES	Term expiratio	n					
Nailing address	,				City						State			ZIP C	ode		
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or Sections A, B, and C, i declare that the inform	ation in this docume	ent and any	attachmei	nts is tr	ue and co	rrect to the	best of	my knowled	ge and b	elief, as o	f the date bel	ow. an	d that a	copy o	f this re	eport	nas
een mailed to each per	son named in this re	port who is	an officer	, direct	or or man	ager and w	ho is no	t currently er	mployed	by this, o	r a related, co	rporati	on or lii	mited li	ability (comp	any
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Texas Franchise Tax Public Information Report

Comptroller of Public Accounts FORM (Rev.9-11/30)

To be filed by Corporations, Limited Liability Companies (LLC) and Financial Institutions
This report MUST be signed and filed to satisfy franchise tax requirements

■ Tcode 13196 Franchise

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Entity Status: In existence

Domestic Limited Liability Company (LLC)

TEXAS SECRETARY of STATE JANE NELSON

BUSINESS ORGANIZATIONS INQUIRY - VIEW ENTITY

FEIN:

Entity Type:

Filing Number:

Formation Date:

803343508

Original Date of Filing:

June 13, 2019

N/A

Tax ID: **Duration:**

Perpetual

32071037793

Name:

Address:

Bissonnet 136, LLC 22310 GRAND CORNER DR STE 140

KATY, TX 77494-7467 USA

<u>ASSOCIATED</u> REGISTERED AGENT **FILING HISTORY** NAMES MANAGEMENT ASSUMED NAMES **INITIAL ADDRESS ENTITIES** Name Address **Inactive Date** John Quinlan 22310 Grand Corner Drive, Suite 140 Katy, TX 77494 USA

Order

Return to Search

Instructions:

Entity Status: In existence

Domestic Limited Liability Company (LLC)

TEXAS SECRETARY of STATE JANE NELSON

BUSINESS ORGANIZATIONS INQUIRY - VIEW ENTITY

Entity Type:

Filing Number:

803343508

June 13, 2019

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N/A

32071037793

FEIN:

Duration: Name:

Tax ID:

Perpetual

Bissonnet 136, LLC

Address:

22310 GRAND CORNER DR STE 140

KATY, TX 77494-7467 USA

REGIST	ERED AGENT	FILING HISTORY	NAMES	MANAGEMENT	ASSUMED	The same of the sa	SOCIATED ENTITIES	INITIAL	ADDRESS
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Order

Return to Search

Instructions:

TEXAS SECRETARY of STATE JANE NELSON

BUSINESS ORGANIZATIONS INQUIRY - VIEW ENTITY

Filing Number:

803343508

June 13, 2019

Entity Type:

Domestic Limited Liability Company (LLC)

Original Date of Filing: **Formation Date:**

N/A

Entity Status: In existence

Tax ID:

Duration:

32071037793 Perpetual

FEIN:

Name:

Bissonnet 136, LLC

Address:

22310 GRAND CORNER DR STE 140

KATY, TX 77494-7467 USA

ASSOCIATED REGISTERED AGENT **FILING HISTORY** NAMES MANAGEMENT **ASSUMED NAMES ENTITIES** INITIAL ADDRESS Name Name Status Name Type Name Inactive Date Consent Filing # Bissonnet 136, LLC In use Legal 0

Order

Return to Search

Instructions:

TEXAS SECRETARY of STATE JANE NELSON

BUSINESS ORGANIZATIONS INQUIRY - VIEW ENTITY

Filing Number:

803343508

Entity Type:

Domestic Limited Liability Company (LLC)

Original Date of Filing:

June 13, 2019

Entity Status: In existence

Formation Date:

N/A

Tax ID: **Duration:** 32071037793

FEIN:

Name:

Perpetual

Bissonnet 136, LLC

Address:

22310 GRAND CORNER DR STE 140

KATY, TX 77494-7467 USA

REGISTERED AGENT	FILING HISTORY	NAMES	MANAGEMENT	ASSUMED NAMES	ASSOCIATED ENTITIES	INITIAL ADDRESS		
Last Update	Name		Title	Address				
August 16, 2020 IRELAND FAMILY LIMITED PARTNERSHIP		MITED	Member	22310 GRAND CORNER DRIVE, SUITE 140 KATY, TX - 77494 USA				
August 16, 2020	IRELAND FAMILY LI PARTNERSHIP	MITED	DIRECTOR	22310 GRAND KATY, TX - 774	CORNER DRIVE, 94 USA	SUITE 140		

Order

Return to Search

Instructions:

TEXAS SECRETARY of STATE JANE NELSON

BUSINESS ORGANIZATIONS INQUIRY - VIEW ENTITY

Filing Number:

803343508

Entity Type:

Domestic Limited Liability Company (LLC)

Original Date of Filing:

June 13, 2019

Entity Status: In existence

Formation Date:

N/A

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Tax ID: Duration:

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Name:

Bissonnet 136, LLC

Address:

22310 GRAND CORNER DR STE 140

KATY, TX 77494-7467 USA

ASSOCIATED REGISTERED AGENT FILING HISTORY **NAMES MANAGEMENT** ASSUMED NAMES **ENTITIES INITIAL ADDRESS** Name **Assumed Name** Date of Filing **Expiration Date Inactive Date** Status Counties No names exist for this filing.

Order

Return to Search

Instructions:

TEXAS SECRETARY of STATE JANE NELSON

BUSINESS ORGANIZATIONS INQUIRY - VIEW ENTITY

Filing Number:

803343508 June 13, 2019

Entity Type:

Domestic Limited Liability Company (LLC)

Original Date of Filing:

N/A

Entity Status: In existence

Formation Date:

Tax ID:

32071037793

Duration:

Perpetual

FEIN:

Name:

Bissonnet 136, LLC

Address:

22310 GRAND CORNER DR STE 140

KATY, TX 77494-7467 USA

ASSOCIATED REGISTERED AGENT **FILING HISTORY** NAMES MANAGEMENT ASSUMED NAMES **ENTITIES INITIAL ADDRESS Document Entity Filing** Name **Entity Type** Description **Filing Date** Number Jurisdiction Capacity There are no documents listed for this entity which match your inquiry.

Order

Return to Search

Instructions:

Entity Status: In existence

TEXAS SECRETARY of STATE JANE NELSON

BUSINESS ORGANIZATIONS INQUIRY - VIEW ENTITY

FEIN:

Entity Type:

Filing Number: Original Date of Filing: 803343508

June 13, 2019

Formation Date:

N/A

Tax ID:

32071037793

Duration:

Perpetual

Name:

Bissonnet 136, LLC

Address:

22310 GRAND CORNER DR STE 140

KATY, TX 77494-7467 USA

REGISTERED AGENT **FILING HISTORY** NAMES

MANAGEMENT

ASSUMED NAMES

ASSOCIATED

Domestic Limited Liability Company (LLC)

ENTITIES INITIAL ADDRESS

This entity does not have an initial address record.

Order

Return to Search

Instructions:



TCEQ Use Only

TCEQ Core Data Form

For detailed instructions regarding completion of this form, please read the Core Data Form Instructions or call 512-239-5175.

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Renewal (Core Data Form should be submitted with the renewal form)					form)		☐ Other					
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CN 606018687					or RN nui ntral Regis		RN	RN 101288322				
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80334350	803343508 320710			37793			8	34-20	85503			
11. Type of Customer:				☐ Individual			Partnership: ☐ General ☐ Limited					
Government:	Government: City County Federal State Other Sole Prop						etorship Other:					
12. Number of Employees ⊠ 0-20 □ 21-100 □ 101-250 □ 251-500				501 and higher				13. Independently Owned and Operated? ☑ Yes ☐ No				
14. Custome	r Role (Pr	oposed or Actual) –	as it relates to	the Reg	ulated Ent	tity listed o	on this fo	orm. Ple	ase check one of the	following		
⊠Owner ☐Occupatio	nal Licens	☐ Operat	or nsible Party			er & Ope ntary Cle		pplican	t Other:			
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15. Mailing	Suite	140										
Address:	City	Katy		St	State TX		ZIP	774	494	ZIP + 4		
16. Country I	Mailing In	formation (if outside	le USA)		17. E-N			-Mail Address (if applicable)				
	16. Country Mailing Information (if outside USA)						lester@landcorealestate.com					
18. Telephon	e Numbe	r		19. Ex	tension				20. Fax Numb		ble)	
(650) 63	(650) 638-0900 700						() -					
ECTION	III: R	egulated En	tity Infor	mati	on							
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23. Street Addre	ss of													
the Regulated Er	ntity:													
(No PO Boxes)		City	Ног	ıston	State		TX	ZIP	7	7099	ZIF	+ 4		
24. County		Harris							-					
			Enter Ph	ysical L	ocation Des	scription	ı if no str	eet ac	ddress is	provided.				
25. Description to Physical Location: 700 N BISSONNET STREET 200 FEET E COOK ROAD 500 FEET S ALPHA LANE 700 FEET W KIRKWOOD														
26. Nearest City	l								St	ate		Nea	rest ZIP Code	
Houston									T	ζ		770)99	
27. Latitude (N) In Decimal: 29.68037			80378°)	28. L	28. Longitude (W) In			Decimal: 95.59		8°			
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Closed Type	IV lan	dfill 												
34. Mailing						2	2310 Gra	nd Co	orner Driv	re .			-	
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35. E-Mail A	ddress:					n	nlester@	landc	orealesta	te.com				
36.	Telepho	ne Numb	er		37. Ex	tension	or Code			38. Fax N	umber (i	f appli	cable)	
	(650)6	38-900				700				()	-		
9. TCEQ Programs orm. See the Core Date	and ID	Number	S Check all	Programs	and write in	the perm	its/registra	tion nu	mbers that	will be affecte	d by the u	ipdates	submitted on this	
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SECTION IV			Intorn	<u>iation</u>		T	44 T:41a.)	1 F., .;				
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	CHAILE	,												
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Number (713) 266-605 SECTION V: 6. By my signature ignature authority to	Autle below, o submit	3. Ext./Control of the second	d Signs	(713) 266-099	hat the in	mike.s	schul	Itz@ska	is form is true	e and con	nplete,	and that I have e ID numbers	
42. Telephone Number (713) 266-605 SECTION V: 6. By my signature ignature authority to dentified in field 39. Company:	Autle below, o submit	3. Ext./Control of the second	d Sign: to the best	(713) 266-099	hat the in	mike.s	schul n proveld 6	Itz@ska	is form is truerequired for t	e and con	nplete,	and that I have e ID numbers	

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Signature:		m	Jul	4	Hordul	Date:	5/18/2022
	UB	1 225	nnet	136	uc		

SPECIAL WARRANTY DEED

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER

Effective Date: June 26, 2019

Grantor: STALLION TEXAS REAL ESTATE FUND, LLC

Grantor's Address: 10119 Lake Creek Parkway, Ste 202

Austin, Texas 78729

Grantee: BISSONNET 136, LLC, a Texas limited liability company

Grantee's Mailing Address: 22310 Grand Corner Drive, Suite 140

Katy, TX 77494

<u>Consideration</u>: Ten and No/100 Dollars and other good and valuable consideration the receipt of which is hereby acknowledged

Property (including any improvements):

A 136.888 acre tract of land being the residue of a certain called 137.904 acres to Resource Transition Consultants, LLC, a Washington limited liability company as Custodial Receiver with Power of Sale Pursuant to Court Order of the Superior Court of Washington, IN and for King County No. 13-2-19960-6SEA and Eduardo S. Espinosa, Receiver as Texas Receiver Pursuant to Court Order of District Court of Harris County: 234th Judicial District Cause No. 2014-11141; said 136.888 acres of land being a portion of a call 117.8968 acre tract (Harris County Clerk's File (H.C.C.F.) No. U215133), a call 18.5993 acre tract (H.C.C.F. No. U065389) and a call 1.3688 acre tract (H.C.C.F. No. U419454) being out of an original call 74.4127 acre tract (H.C.C.F. No. D576145) and an original call 95.87 acre tract (H.C.C.F. No. B839886) being in the H.T. & B. Railroad Company Survey, Section No. 11, Abstract No. 406, in the H.T. & B. Railroad Company Survey, Section No. 9, Abstract No. 407, and in the W.E. Sanders Survey, Abstract No. 1138, Harris County, Texas, and being more particularly described in metes and bounds description in Exhibit "A" attached hereto.

Reservations from Conveyance: None

Exceptions to Conveyance and Warranty: Subject only to the Permitted Exceptions described on Exhibit "B" attached hereto.

Grantor, for the Consideration and subject to the Reservations from Conveyance and the Exceptions to Conveyance and Warranty, grants, sells, and conveys to Grantee the Property, together with all and singular the rights and appurtenances thereto in any wise belonging, to have and hold it to Grantee, Grantee's heirs, executors, administrators, successors, and assigns forever. Grantor binds Grantor and Grantor's heirs, executors, administrators, and successors to warrant and forever defend all and singular the Property to Grantee and Grantee's heirs, executors, administrators, successors, and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof, when the claim is by, through, or under Grantor but not otherwise, except as to the Reservations from Conveyance and the Exceptions to Conveyance and Warranty.

AS A MATERIAL PART OF THE CONSIDERATION FOR THIS DEED, GRANTOR AND GRANTEE AGREE THAT GRANTOR HEREBY SPECIFICALLY DISCLAIMS ANY WARRANTY, GUARANTY OR REPRESENTATION, ORAL OR WRITTEN, EXPRESS OR IMPLIED, PAST, PRESENT OR FUTURE, OF, AS TO, OR CONCERNING THE PROPERTY; INCLUDING BUT NOT LIMITED TO: (I) THE NATURE AND CONDITION OF THE PROPERTY, INCLUDING, WITHOUT LIMITATION, THE WATER, SOIL AND GEOLOGY; (II) THE SUITABILITY OF THE PROPERTY FOR ANY AND ALL ACTIVITIES AND USES WHICH GRANTEE MAY ELECT TO CONDUCT; (III) THE EXISTENCE OR NONEXISTENCE OF ANY ENVIRONMENTAL HAZARDS OR CONDITIONS (INCLUDING BUT NOT LIMITED TO THE PRESENCE OF ASBESTOS OR OTHER HAZARDOUS MATERIALS) OR COMPLIANCE WITH APPLICABLE ENVIRONMENTAL LAWS, RULES OR REGULATIONS; (IV) THE COMPLIANCE OF THE PROPERTY OR ITS OPERATION WITH ANY LAWS, ORDINANCES OR REGULATIONS OF ANY GOVERNMENTAL ENTITY OR BODY, INCLUDING WITHOUT LIMITATION, ZONING, ENVIRONMENTAL AND LAND USE LAWS AND REGULATIONS; (V) TAX CONSEQUENCES; (VI) OPERATING HISTORY OR PROJECTIONS; (VII) VALUATIONS; (VIII) THE TRUTH, ACCURACY OR COMPLETENESS OF THE ITEMS OR ANY OTHER INFORMATION PROVIDED BY OR ON BEHALF OF GRANTOR TO GRANTEE: PROVIDED HOWEVER ANY DOCUMENTS INFORMATION PROVIDED BY GRANTOR TO GRANTEE UNDER THE SALES CONTRACT WERE TRUE AND CORRECT COPIES OF THE DOCUMENTS IN THE POSSESSION OF THE GRANTOR AND WILL NOT BE ALTERED BY THE GRANTOR. ACKNOWLEDGES THAT HAS INSPECTED THE PROPERTY AND GRANTEE IS RELYING SOLELY ON ITS OWN INVESTIGATION OF THE PROPERTY AND NOT ON ANY INFORMATION PROVIDED OR TO BE PROVIDED FOR OR ON BEHALF OF GRANTOR. GRANTEE FURTHER ACKNOWLEDGES THAT THE INFORMATION PROVIDED WITH RESPECT TO THE PROPERTY WAS OBTAINED FROM A VARIETY OF SOURCES AND (1) GRANTEE HAS MADE ITS OWN INDEPENDENT INVESTIGATION OR VERIFICATION OF SUCH INFORMATION; AND (2) GRANTOR DOES NOT MAKE ANY REPRESENTATIONS AS TO THE ACCURACY OR COMPLETENESS OF SUCH INFORMATION. THE SALE OF THE PROPERTY IS MADE ON AN "AS IS," "WHERE IS" AND "WITH ALL FAULTS" BASIS, AND GRANTEE EXPRESSLY ACKNOWLEDGES THAT, IN CONSIDERATION OF THE AGREEMENTS OF GRANTOR, GRANTOR MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, OR ARISING BY OPERATION OF LAW, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF CONDITION, ELIGIBILITY, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO

THE PROPERTY OR ANY PORTION THEREOF.

When the context requires, singular nouns and pronouns include the plural.

STALLION TEXAS REAL ESTATE FUND, LLC, a Delaware limited liability company

By: STALLION CAPITAL MANAGEMENT, LLC a Delaware limited liability company
Its: Manager

J

By: VINCENT BALAGIA, Manager

STATE OF TEXAS

8 8 8

COUNTY OF WILLIAMSON

This instrument was acknowledged before me on the day of June, 2019 by VINCENT BALAGIA, Manager of STALLION CAPITAL MANAGEMENT, LLC, a Delaware limited liability company, it being the Manager of STALLION TEXAS REAL ESTATE FUND, LLC, a Delaware limited liability company on behalf of said limited liability companies.

RACHAELE OSTERLOH
Notary Public, State of Texas
Comm. Expires 03-22-2020
Notary ID 128928856

Notary Public, State of Texas

After Recording Return to:

Bissonnet 136, LLC

After Recording Return:To: Riverway Title

5 Riverway, Suite 300

EXHIBIT "A" Legal Description

A 136.888 acre tract of land being the residue of a certain called 137.904 acres to Resource Transition Consultants, LLC, a Washington limited liability company as Custodial Receiver with Power of Sale Pursuant to Court Order of the Superior Court of Washington, IN and for King County No. 13-2-19960-6SEA and Eduardo S. Espinosa, Receiver as Texas Receiver Pursuant to Court Order of District Court of Harris County: 234th Judicial District Cause No. 2014-11141; said 136.888 acres of land being a portion of a call 117.8968 acre tract (Harris County Clerk's File (H.C.C.F.) No. U215133), a call 18.5993 acre tract (H.C.C.F. No. U065389) and a call 1.3688 acre tract (H.C.C.F. No. U419454) being out of an original call 74.4127 acre tract (H.C.C.F. No. D576145) and an original call 95.87 acre tract (H.C.C.F. No. B839886) being in the H.T. & B. Railroad Company Survey, Section No. 11, Abstract No. 406, in the H.T. & B. Railroad Company Survey, Section No. 9, Abstract No. 407, and in the W.E. Sanders Survey, Abstract No. 1138, Harris County, Texas and more particularly described by metes and bounds as follows:

BEGINNING at a set 5/8" iron rod with cap in the easterly right-of-way line of Cook Road (width varies) for the Northwest corner of COVENTRY SQUARE DEVELOPMENT (Volume 311, Page 55, Map Records of Harris County, Texas); said corner being in the westerly line of said call 117.8988 acre tract, in the westerly line of said call 74.4127 acre tract and being the most westerly southwest corner of this 137.904 acre tract;

THENCE, N. 02°29'49" W (call N 02°30'00" W), a distance of 1786.87 feet along the easterly right-of-way of said Cook Road to a set 5/8" iron rod with cap for the most westerly northwest corner of this 137,904 acre tract; said corner being the southwest corner of a call 1.011 acre tract for public road (H.C.C.F. No. D305424);

THENCE, N 87°42'00" E (call N 87°42'11" E), a distance of 1219.88 feet along the north line of said call 117.8988 acre tract to a found 5/8" iron rod for interior corner;

THENCE, N 02°38'49" W (call N 02°39'00" W), a distance of 407.10 feet (call 407.09 feet) to a set 5/8" iron rod with cap for angle corner; from said corner bears a found 5/8" iron rod with cap at N 32°53'53" E, 2.98 feet;

THENCE, N 28°36'11" E (call N 28°36'00" E), a distance of 109.68 feet (call 109.69 feet) along a southeasterly line of the Harris County Flood Control District call 43,380 square foot tract (H.C.C.F. No. D353109) to a found 5/8 inch iron rod with cap for the most northerly northwest corner of this 137.904 acre tract;

THENCE, N 87°21'38" E (call N 87°21'27" E), a distance of 1286.07 feet to a set 5/8" iron rod with cap in the easterly right-of-way line of Kirkwood Drive (width varies);

THENCE, S 02°34'25" E (call S 02°34'36" E) with said right-of-way line of Kirkwood Drive, a distance of 2210.93 feet to a set 5/8" iron rod with cap in the North line of a call 1 acre tract (H.C.C.F. No. B712666);

THENCE, S 87°23'31" W (call S 87°23'20"W), a distance of 240.00 feet to a set 5/8" iron rod with cap for interior corner of this tract; said corner being the northwest corner of said call 1 acre tract;

THENCE, S 02°36'29" E (call S 02°36'40" E), a distance of 167.54 feet to a found 5/8" iron rod for corner; said corner being the southwest corner of said call 1 acre tract;

THENCE, S 87°23'31" W (call S 87°23'20" W), a distance of 40.00 feet to a set 5/8" iron rod with cap for interior corner of this tract; said corner being the northwest corner of a call 1.377 acre tract (H.C.C.F. No. C287739);

THENCE, S 02°36'29" E (call S 02°36'40" E), a distance of 200.00 feet to a set 5/8" iron rod with cap for corner of this tract; said corner being the southwest corner of said call 1.377 acre tract;

THENCE, S 87°23'31" W (call S 87°23'20" W), a distance of 100.00 feet to a set 5/8" iron rod with cap for interior corner of this tract; said corner being the most northerly northwest corner of a call 10.082 acre tract (H.C.C.F. No. D577580);

THENCE, S 02°33'29" E (call S 02°36'40" E), a distance of 286.14 feet to a set 5/8" iron rod with cap for corner of this tract; said corner being the northeast corner of Golf Plaza Reserve "A", Block 1 (Volume 580, Page 258-261, Map Records of Harris County, Texas);

THENCE, S 87°26'31" W (call S 87°26'20" W), a distance of 350.00 feet to a set 5/8" iron rod with cap for interior corner of this tract; said corner being the northwest corner of said Golf Plaza Reserve "A" and being the northeast corner of SUGARHILL ADDITION (Film Code 450135, Map Records of Harris County, Texas); from said corner bears a found 5/8" iron rod at N 44°21'17" E, 1.16 feet;

THENCE, S 02°34'26" E (call S 02°34'37" E), a distance of 400.90 feet to a found 5/8" iron rod with cap for the most southerly southeast corner of this 137.904 acre tract; said corner being the southeast corner of said SUGARHILL ADDITION and being in the northerly right-of-way line of Bissonnet Street (100 feet wide);

THENCE, N 87°39'33" W (call N 87°39'44" W), a distance of 259.02 feet along the northerly right-of-way line of said Bissonnet Street to a set 5/8" iron rod with cap for the most southerly southwest corner of this 137.904 acre tract; said corner being the most southerly southwest corner of said SUGARHILL ADDITION; from said corner bears a found 1/2" iron rod at N 51°41'37" W, 0.46 feet;

THENCE, N 02°39'16" W (call N 02°39'27" W), a distance of 370.99 feet to a found 5/8" iron rod with cap set for interior corner of this tract and SUGARHILL ADDITION:

THENCE, S 87°18'10" W (call S 87°17'59" W), a distance of 149.40 feet to a set 5/8" iron rod with cap for corner of this tract; said corner being the most westerly southwest corner of said SUGARHILL ADDITION;

THENCE, N 02°39'16" W (call N 02°39'27" W), at 100.00 feet pass a point for the northwest corner of said SUGARHILL ADDITION, in all 441.31 feet to a found 5/8" iron rod with cap for an interior corner of the herein described tract;

THENCE, S 87°20'44" W (call S 87°20'33" W), a distance of 200.00 feet to a found 5/8" iron rod with cap for the northwest corner of a call 4.9320 acre tract (H.C.C.F. No. M710134) and the northeast corner of a call 4.561 acre tract (H.C.C.F. No. E751280);

THENCE, N 87°43'49" W (call N 87°44'00" W), a distance of 255.23 feet to a set 5/8" iron rod with cap for the northwest corner of a said 4.561 acre tract;

THENCE, S 02°38'49" E (call S 02°39'00" E), a distance of 32.14 feet to a set 5/8" iron rod with cap for corner of this tract in an iron fence; said corner being the northeast corner of COVENTRY SQUARE SUBDIVISION (Volume 311, Page 55, Map Records of Harris County, Texas);

THENCE, S 87°21'11" W (call S 87°21'00" W), a distance of 446.00 feet along a northerly line of said COVENTRY SQUARE SUBDIVISION to a set 5/8" iron rod with cap for corner;

THENCE, N 02°38'49" W (call N 02°39'00" W), a distance of 65.00 feet along an easterly line of said COVENTRY SQUARE SUBDIVISION to a set 5/8" iron rod with cap for interior corner;

THENCE, S 87°21'11" W (call S 87°21'00" W), at 60.00 feet pass a point for reentrant corner of said call 2.1261 acre tract, in all 80.00 feet along a northerly line of said COVENTRY SQUARE SUBDIVISION to a point for corner from which bears a found 5/8" iron rod with cap at N 14°38'49" E, 0.26 feet;

THENCE, N 80°35'19" W (call N 80°35'30" W), a distance of 455.69 feet along a northerly line of said COVENTRY SQUARE SUBDIVISION to the PLACE OF BEGINNING and containing 136.888 acres (5,962,869 square feet) of land and Reserve "A" in Block One (1), of SUGARHILL ADDITION, a subdivision in Harris County, Texas, according to the map or plat thereof recorded in Film Code No. 450135 of the Map Records of Harris County, Texas.

Exhibit "B" Permitted Exceptions

As set forth in instrument filed for record in Film Code No. 450135, Map Records of Harris County, Texas. (As to the 2.9286 acre tracts within Unrestricted Reserve A, Block 1, Sugar Hill Addition). BUT OMITTING ANY COVENANT OR RESTRICTION BASED ON RACE, COLOR, RELIGION, SEX, HANDICAP, FAMILIAL STATUS, OR NATIONAL ORIGIN.

The following, as set forth on plat recorded in Film Code No. 450135, Map Records of Harris County, Texas:

25 foot Building set back line along Bissonnet Street.

Drainage Easement 15 feet in width on each side of the center line of all natural drainage courses.

Storm Sewer Easement 20 feet in width granted to the City of Houston as set forth in instrument filed for record under Harris County Clerk's File No. <u>H651543</u>, and being described and located therein.

Public Street Easement along the northerly portion of the east property line granted to the City of Houston as set forth in instrument filed for record under Harris County Clerk's File No. <u>U625060</u>, and being described and located therein.

Public Street Easement along the southerly portion of the east property line granted to the City of Houston as set forth in instrument filed for record under Harris County Clerk's File No. <u>U901717</u>, and being described and located therein.

Notice to consult with the Texas Natural Resource Conservation Commission prior to planning or initiating any activity involving disturbance of the landfill cover or monitoring system as evidenced by affidavits filed for record under Harris County Clerk's File No(s). <u>L342902</u>, <u>L406045</u>, <u>L475665</u>, <u>U527131</u>, and <u>U625435</u>.

Right to repurchase as set forth in instrument filed for record under Harris County Clerk's File No. <u>U419454</u>. This repurchase right applies only to a 1.3688 acre tract of land described in the document.

All the private water rights are expressly excepted therefrom and not insured hereunder, as the same are set forth in instrument(s) filed for record under Harris County Clerk's File No. <u>U419454</u>. (Said interest not investigated subsequent to date of reservation or conveyance.)

A 1/2 interest in and to all the oil, gas and other minerals, and all other elements not considered a part of the surface estate, the royalties, bonuses, rentals and all other rights in connection with same all of which are expressly excepted therefrom and not insured hereunder, as the same are set forth in instrument(s) filed for record in <u>Volume 1367</u>, <u>Page 213</u>, Deed Records of Harris County, Texas. (Said interest not investigated subsequent to date of reservation or conveyance.)

All the oil, gas and other minerals, and all other elements not considered a part of the surface estate, the royalties, bonuses, rentals and all other rights in connection with same all of which are expressly excepted therefrom and not insured hereunder, as the same are set forth in instrument(s) filed for record under Harris County Clerk's File No. <u>U419454</u>. (Said interest not investigated subsequent to date of reservation or conveyance.)

All leases, grants, exceptions or reservations of coal, lignite, oil, gas and other minerals, together with all rights, privileges, and immunities relating thereto, appearing in the Public Records whether listed in Schedule B or not. There may be leases, grants, exceptions or reservations of mineral interest that are not listed. (Pursuant to Procedural Rule P-50.1 the above exception must appear on any corresponding policy issued if a T-19.2 or T-19.3 endorsement that meets underwriting standards is requested by the proposed insured.)

RP-2019-275311
Pages 7
06/27/2019 02:54 PM
e-Filed & e-Recorded in the
Official Public Records of
HARRIS COUNTY
DIANE TRAUTMAN
COUNTY CLERK
Fees \$36.00

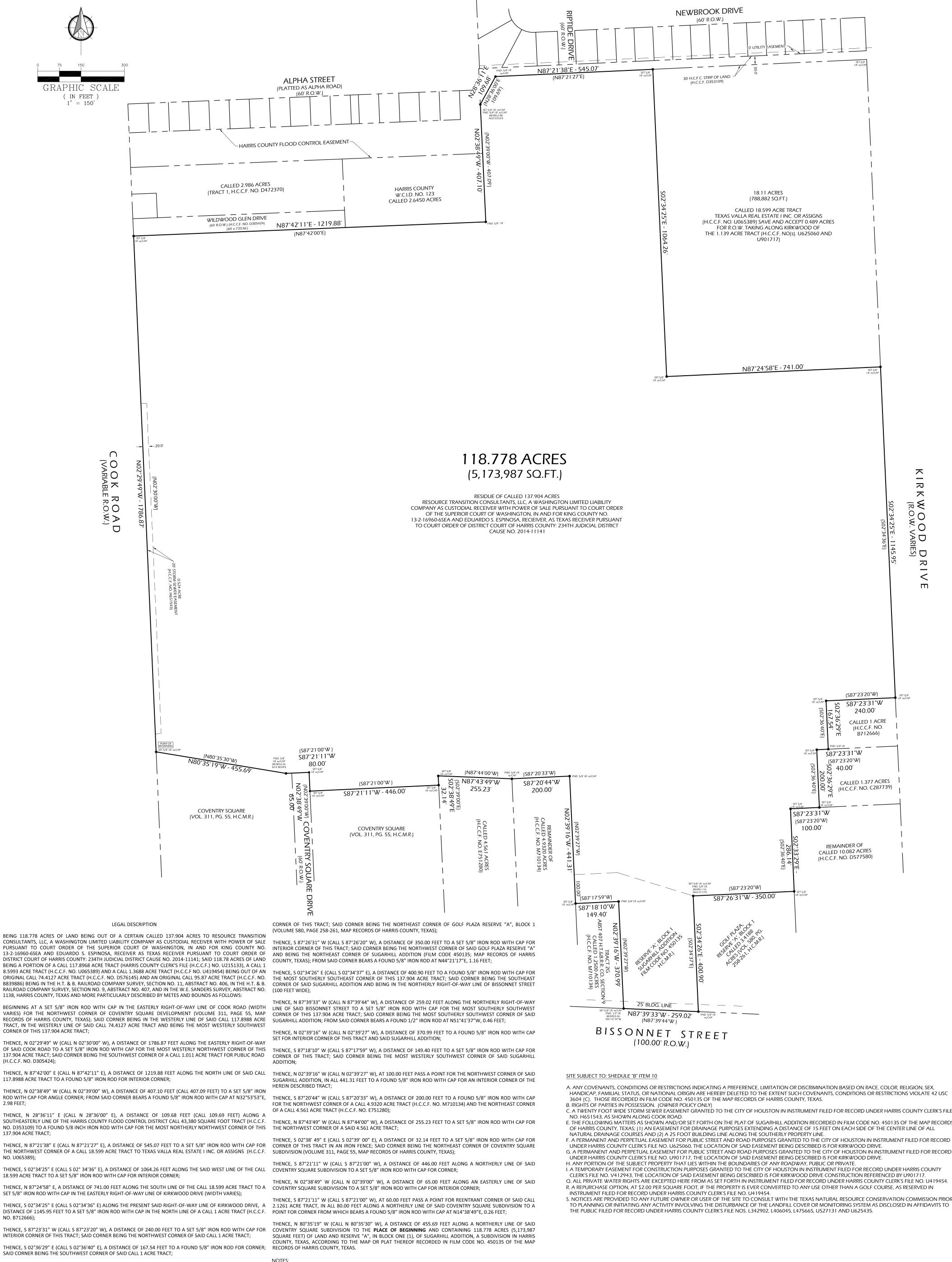
RECORDERS MEMORANDUM
This instrument was received and recorded electronically and any blackouts, additions or changes were present at the time the instrument was filed and recorded.

Any provision herein which restricts the sale, rental, or use of the described real property because of color or race is invalid and unenforceable under federal law.

THE STATE OF TEXAS
COUNTY OF HARRIS
I hereby certify that this instrument was FILED in File Number Sequence on the date and at the time stamped hereon by me; and was duly RECORDED in the Official Public Records of Real Property of Harris County, Texas.

OF HARRIS COUNTY, THE

COUNTY CLERK HARRIS COUNTY, TEXAS



HANDICAP, FAMILIAL STATUS, OR NATIONAL ORIGIN ARE HEREBY DELETED TO THE EXTENT SUCH COVENANTS, CONDITIONS OR RESTRICTIONS VIOLATE 42 USC

C. A TWENTY FOOT WIDE STORM SEWER EASEMENT GRANTED TO THE CITY OF HOUSTON IN INSTRUMENT FILED FOR RECORD UNDER HARRIS COUNTY CLERK'S FILE

E. THE FOLLOWING MATTERS AS SHOWN AND/OR SET FORTH ON THE PLAT OF SUGARHILL ADDITION RECORDED IN FILM CODE NO. 450135 OF THE MAP RECORDS

G. A PERMANENT AND PERPETUAL EASEMENT FOR PUBLIC STREET AND ROAD PURPOSES GRANTED TO THE CITY OF HOUSTON IN INSTRUMENT FILED FOR RECORD

Q. ALL PRIVATE WATER RIGHTS ARE EXCEPTED HERE FROM AS SET FORTH IN INSTRUMENT FILED FOR RECORD UNDER HARRIS COUNTY CLERK'S FILE NO. U419454. S. NOTICES ARE PROVIDED TO ANY FUTURE OWNER OR USER OF THE SITE TO CONSULT WITH THE TEXAS NATURAL RESOURCE CONSERVATION COMMISSION PRIOR

4. SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY; IT IS NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS OR INTERIOR CORNER OF THIS TRACT; SAID CORNER BEING THE MOST NORTHERLY NORTHWEST CORNER OF A CALL 10.082 ACRE TRACT (H.C.C.F. NO. D577580); THENCE, S 02°33'29" E (CALL S 02°36'40" E), A DISTANCE OF 286.14 FEET TO A SET 5/8" IRON ROD WITH CAP FOR DATE: 06-29-2015

THENCE, S 87°23'31"W (CALL S 87°23'20"W), A DISTANCE OF 40.00 FEET TO A SET 5/8" IRON ROD WITH CAP FOR

INTERIOR CORNER OF THIS TRACT; SAID CORNER BEING THE NORTHWEST CORNER OF A CALL 1.377 ACRE TRACT

THENCE, S 87°23'31" W (CALL S 87°23'20" W), A DISTANCE OF 100.00 FEET TO A SET 5/8" IRON ROD WITH CAP FOR

CORNER OF THIS TRACT: SAID CORNER BEING THE SOUTHWEST CORNER OF SAID CALL 1.377 ACRE TRACT:

ORIGINAL TRANSACTION. FLOOD INFORMATION PROPERTY "IS NOT" IN THE 100 YEAR FLOOD ZONE, THIS PROPERTY LIES IN ZONE "X" ACCORDING TO F.I.R.M. MAP NO. 48201C0840L DATED 6-18-2007. BY GRAPHIC PLOTTING ONLY, WE DO NOT ASSUME RESPONSIBILITY FOR EXACT DETERMINATION.

1. SURVEYOR HAS NOT ABSTRACTED PROPERTY. SURVEY PERFORMED WITHOUT THE BENEFIT OF A TITLE

SHOWN HEREON ARE PER RECORDED PLAT UNLESS OTHERWISE SHOWN.

WHICH IS BASED ON HIS BEST KNOWLEDGE, INFORMATION AND BELIEF.

COMMITMENT, AND IS BASED ON LEGAL DESCRIPTION(S) PROVIDED BY CLIENT; THERE MAY BE ADDITIONAL BUILDING LINES AND/OR EASEMENTS AFFECTING SUBJECT PROPERTY; ALL BUILDING LINES AND/OR EASEMENTS

THE WORD CERTIFY IS UNDERSTOOD TO BE AN EXPRESSION OF PROFESSIONAL JUDGMENT BY THE SURVEYOR,

5. THIS SURVEY IS BEING PROVIDED SOLELY FOR THE USE OF THE CURRENT PARTIES AND NO LICENSE HAS BEEN CREATED, EXPRESSED OR IMPLIED, TO COPY THE SURVEY EXCEPT AS IS NECESSARY IN CONJUNCTION WITH THE

ADDRESS: 12000 BISSONNET ST. HOUSTON, TEXAS 77099

CLIENT :FISHER HOMES OF

BUYER :TEXAS VALLA REAL

TEXAS

A STANDARD LAND SURVEY OF

A TRACT CONTAINING 118.778 ACRES OR 5,173,987.33 SQ.FT. OF LAND AND BEING A PORTION OF A CALL 117.8968 ACRE TRACT (HARRIS COUNTY CLERK'S FILE NO. U215133), A CALL 1 8.5993 ACRE TRACT (HARRIS COUNTY CLERK'S FILE NO. U065389) AND A CALL 1.3688 ACRE TRACT (HARRIS COUNTY CLERK'S FILE NO. U419454) BEING OUT OF AN ORIGINAL CALL 74.4127 ACRE TRACT (HARRIS COUNTY CLERK'S FILE NO. D576145) AND AN ORIGINAL CALL 95.87 ACRE TRACT (HARRIS COUNTY CLERK'S FILE NO. B839886) BEING IN THE H.T. & B. RAILROAD COMPANY SURVEY, SECTION NO. 11, ABSTRACT NO. 406, IN THE H.T. & B. RAILROAD COMPANY SURVEY, SECTION NO. 9, ABSTRACT NO. 407, AND IN THE W.E. SANDERS SURVEY, ABSTRACT NO. 1138, HARRIS COUNTY, TEXAS.

(BEARINGS BASED ON METES AND BOUNDS SHOWN HERE ON)

REVISION: DRAWN BY: EJL APPROVED BY: MB PROJECT NO: GL-1605 LEGEND: H.C.M.R. - HARRIS COUNTY MAP RECORD H.C.D.R. - HARRIS COUNTY DEED RECORD H.C.C.F. - HARRIS COUNTY CLERK FILE R.O.W. - RIGHT OF WAY CM - CONTROL MONUMENT I.R./I.P. - IRON ROD/IRON PIPE PTP - PINCHED TOP PIPE

(H.C.C.F. NO. C287739);

I HEREBY CERTIFY THAT THIS SURVEY WAS MADE ON THE GROUND UNDER MY SUPERVISION AND THAT IT CORRECTLY REPRESENTS THE FACTS FOUND AT THE TIME OF THE SURVEY. THERE WERE NO ENCROACHMENTS APPARENT ON THE GROUND EXCEPT AS SHOWN HEREON.

THENCE. S 02°36'29" E (CALL S 02°36'40" E), A DISTANCE OF 200.00 FEET TO A SET 5/8" IRON ROD WITH CAP FOR 2. NOTHING IN THIS SURVEY IS INTENDED TO EXPRESS AN OPINION REGARDING OWNERSHIP OR TITLE.

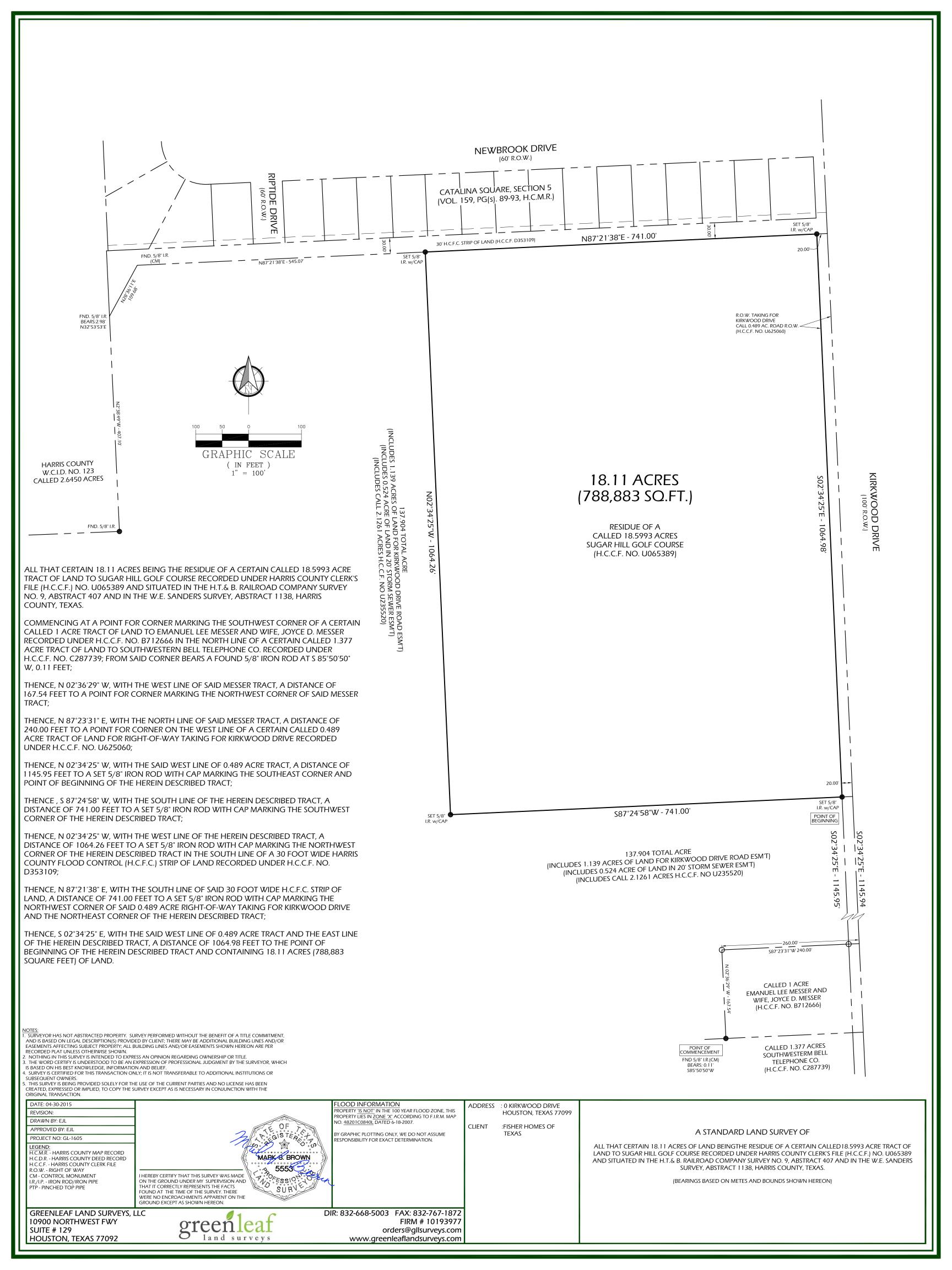
SUBSEQUENT OWNERS

DIR: 832-668-5003

FAX: 832-767-1872 orders@gllsurveys.com www.greenleaflandsurveys.com

ESTATE I INC.OR ASSIGNS

GREENLEAF LAND SURVEYS, LLC 10900 NORTHWEST FWY SUITE # 129 HOUSTON, TEXAS 77092



NOTICE TO REAL PROPERTY RECORDS, BUYERS, LEESSES, AND OCCUPANTS REGARDING LAND WHICH OVERLIES A CLOSED MUNICIPAL SOLID WASTE LANDFILL

In accordance with the provisions of Chapter 361, Subchapter R, Health and Safety Code (the "Code") and the rules of the Texas Commission on Environmental Quality ("TCEQ") published in Subchapter T, "Use of Land over Closed Municipal Solid Waste Landfills" (30 TAC, Section 330.951-330.964) (the "TCEQ Rules") requiring the preparation and filing of a Notice to Real Property Records of Harris County, Texas, with respect to land overlying a closed municipal solid waste landfill; Bissonnet 136, LLC, the undersigned owner (the "Owner") of the land (the "Land") formerly known as the Doty Sand Pit Venture Landfill described in Exhibit A attached hereto and incorporated herein by reference does hereby state the following:

1. Prior Use of the Land or Tract as a Municipal Solid Waste Landfill

Owner has determined through site investigations that the Land was used for disposal of municipal solid waste by a previous owner and/or operator.

2. Legal Description of the Portion of the Land or Tract that Contains a Closed Municipal Solid Waste Landfill

Exhibit A is a legal description of the portion of the tract of land containing the closed municipal solid waste landfill.

3. Provisions with Respect to Development or Lease of this Property

Provisions with respect to development or lease of this property exist in the Code and the TCEQ Rules (30 TAC, Section 330.951-330.964)

4. Name of Owner

> Bissonnet 136, LLC 22310 Grand Corner Drive, Suite 140 Katy, Fort Bend County, TX 77494

This	instru	ment w	os ac	Know	Jedg ed
before	e me	on the	18th	dos	of
Mai	7,202	2		. /	

Bissonnet 136, LLC

MARILYN VILLASANA

124884376

OTARY PUBLIC, STATE OF TEXAS MY COMMISSION EXPIRES

APRIL 6, 2024

Date:

Attest:

By:

HIU HA SIT

John Quinlan

President

5/18/2022

LEGAL DESCRIPTION

Being 118.778 acres of land being out of a certain called 137.904 acres to Resource Transition Consultants, LLC, a Washington Limited Liability Company as Custodial Receiver with Power of Sale Pursuant to Court Order of the Superior Court of Washington, In and for King County No. 13-2-16960-6SEA and Eduardo S. Espinosa, Receiver as Texas Receiver pursuant to Court Order of District Court of Harris County: 234th Judicial District Cause No. 2014-11141; said 118.78 acres of land being a portion of a call 117.8968 Acre Tract (Harris County Clerk's File (H.C.C.F.) No. U215133), a call 1 8.5993 Acre Tract (H.C.C.F. No. U065389) and a call 1.3688 Acre Tract (H.C.C.F. No. U419454) being out of an original call 74.4127 Acre Tract (H.C.C.F. No. D576145) and an original call 95.87 Acre Tract (H.C.C.F. No. B839886) being in the H.T. & B. Railroad Company Survey, Section No. 11, Abstract No. 406, in the H.T. & B. Railroad Company Survey, Section No. 407, and in the W.E. Sanders Survey, Abstract No. 1138, Harris County, Texas and more particularly described by metes and bounds as follows:

W

BEGINNING at a set 5/8" iron rod with cap in the Easterly right-of-way line of Cook Road (width varies) for the Northwest corner of Coventry Square Development (Volume 311, Page 55, Map Records of Harris County, Texas); said corner being in the Westerly line of said call 117.8988 Acre Tract, in the Westerly line of said call 74.4127 Acre Tract and being the most Westerly Southwest corner of this 137.904 Acre Tract;

THENCE, N 02°29'49" W (Call N 02°30'00" W), a distance of 1786.87 feet along the Easterly right-of-way of said Cook Road to a set 5/8" iron rod with cap for the most Westerly Northwest corner of this 137.904 Acre Tract; said corner being the Southwest corner of a call 1.011 Acre Tract for public road (H.C.C.F. No. D305424);

THENCE, N 87°42′00″ E (Call N 87°42′11″ E), a distance of 1219.88 feet along the North line of said call 117.8988 Acre Tract to a found 5/8″ iron rod for interior corner;

THENCE, N $02^{\circ}38'49''$ W (Call N $02^{\circ}39'00''$ W), a distance of 407.10 feet (Call 407.09 feet) to a set 5/8'' iron rod with cap for angle corner; from said corner bears a found 5/8'' iron rod with cap at N32°53′53″E, 2.98 feet;

THENCE, N 28°36′11″ E (Call N 28°36′00″ E), a distance of 109.68 feet (Call 109.69 feet) along a Southeasterly line of the Harris County Flood Control District call 43,380 square foot tract (H.C.C.F. No. D353109) to a found 5/8 inch iron rod with cap for the most Northerly Northwest corner of this 137.904 Acre Tract;

THENCE, N 87°21′38″ E (Call N 87°21′27″ E), a distance of 545.07 feet to a set 5/8″ iron rod with cap for the Northwest corner of a call 18.599 Acre Tract to Texas Valla Real Estate I Inc. or Assigns (H.C.C.F. No. U065389);

THENCE, S $02^{\circ}34'25''$ E (Call S $02^{\circ}34'36''$ E), a distance of 1064.26 feet along the said West line of the call 18.599 Acre Tract to a set 5/8'' iron rod with cap for interior corner;

THENCE, N 87°24′58″ E, a distance of 741.00 feet along the South line of the call 18.599 Acre Tract to a set 5/8″ iron rod with cap in the Easterly right-of-way line of Kirkwood Drive (Width Varies);

THENCE, S $02^{\circ}34'25''$ E (Call S $02^{\circ}34'36''$ E) along the present said right-of-way line of Kirkwood Drive, a distance of 1145.95 feet to a set 5/8'' iron rod with cap in the North line of a call 1 Acre Tract (H.C.C.F. No. B712666);

THENCE, S 87°23′31″ W (Call S 87°23′20″ W), a distance of 240.00 feet to a set 5/8″ iron rod with cap for interior corner of this tract; said corner being the Northwest corner of said call 1 Acre Tract;

THENCE, S 02°36′29″ E (Call S 02°36′40″ E), a distance of 167.54 feet to a found 5/8″ iron rod for corner; said corner being the Southwest corner of said call 1 Acre Tract;

THENCE, S 87°23′31″W (Call S 87°23′20″W), a distance of 40.00 feet to a set 5/8″ iron rod with cap for interior corner of this tract; said corner being the Northwest corner of a call 1.377 Acre Tract (H.C.C.F. No. C287739);

THENCE, S 02°36′29″ E (Call S 02°36′40″ E), a distance of 200.00 feet to a set 5/8″ iron rod with cap for corner of this tract; said corner being the Southwest corner of said call 1.377 Acre Tract;

THENCE, S 87°23′31″ W (Call S 87°23′20″ W), a distance of 100.00 feet to a set 5/8″ iron rod with cap for interior corner of this tract; said corner being the most Northerly Northwest corner of a call 10.082 Acre Tract (H.C.C.F. No. D577580);

THENCE, S 02°33′29″ E (Call S 02°36′40″ E), a distance of 286.14 feet to a set 5/8″ iron rod with cap for corner of this tract; said corner being the Northeast corner of Golf Plaza Reserve "A", Block 1 (Volume 580, Page 258-261, Map Records of Harris County, Texas);

THENCE, $5.87\,^{\circ}26'31''$ W (Call $5.87\,^{\circ}26'20''$ W), a distance of 350.00 feet to a set 5/8'' iron rod with cap for interior corner of this tract; said corner being the Northwest corner of said Golf Plaza Reserve "A" and being the Northeast corner of Sugarhill Addition (Film Code 450135; Map Records of Harris County, Texas); from said corner bears a found 5/8'' iron rod at N44°21'17"E, 1.16 feet;

THENCE, S 02°34′26″ E (Call S 02°34′37″ E), a distance of 400.90 feet to a found 5/8″ iron rod with cap for the most Southerly Southeast corner of this 137.904 Acre Tract; said corner being the Southeast corner of said Sugarhill Addition and being in the Northerly right-of-way line of Bissonnet Street (100 feet wide);

THENCE, N 87°39′33″ W (Call N 87°39′44″ W), a distance of 259.02 feet along the Northerly right-of-way line of said Bissonnet Street to a set 5/8″ iron rod with cap for the most Southerly Southwest corner of this 137.904 Acre Tract; said corner being the most Southerly Southwest corner of said Sugarhill Addition; from said corner bears a found 1/2″ iron rod at N51°41′37″W, 0.46 feet;

THENCE, N 02°39′16″ W (Call N 02°39′27″ W), a distance of 370.99 feet to a found 5/8″ iron rod with cap set for interior corner of this tract and said Sugarhill Addition;

THENCE, S 87°18′10" W (Call S 87°17′59" W), a distance of 149.40 feet to a set 5/8" iron rod with cap for corner of this tract; said corner being the most Westerly Southwest corner of said Sugarhill Addition;

THENCE, N 02°39′16″ W (Call N 02°39′27″ W), at 100.00 feet pass a point for the Northwest corner of said Sugarhill Addition, in all 441.31 feet to a found 5/8″ iron rod with cap for an interior corner of the herein described tract;

THENCE, S 87°20′44″ W (Call S 87°20′33″ W), a distance of 200.00 feet to a found 5/8″ iron rod with cap for the Northwest corner of a call 4.9320 Acre Tract (H.C.C.F. No. M710134) and the Northeast corner of a call 4.561 Acre Tract (H.C.C.F. No. E751280);

THENCE, N 87°43'49" W (Call N 87°44'00" W), a distance of 255.23 feet to a set 5/8" iron rod with cap for the Northwest corner of a said 4.561 Acre Tract:

THENCE, S 02°38′ 49″ E (Call S 02°39′ 00″ E), a distance of 32.14 feet to a set 5/8″ iron rod with cap for corner of this tract in an iron fence; said corner being the Northeast corner of Coventry Square Subdivision (Volume 311, Page 55, Map Records of Harris County, Texas);

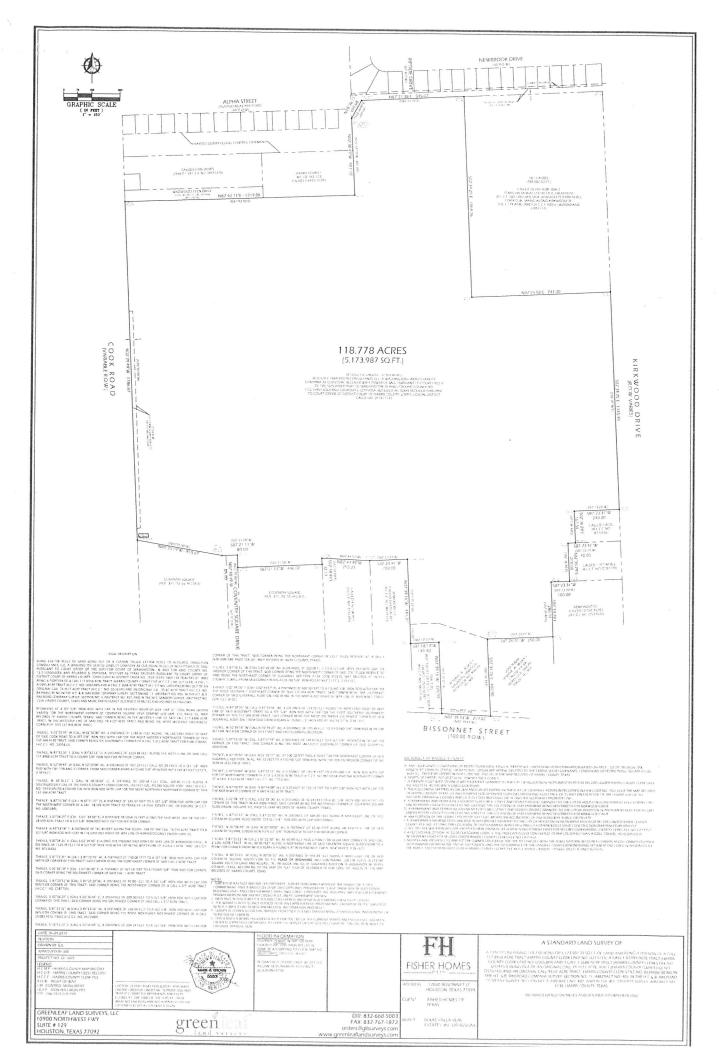
THENCE, S 87°21′11″ W (Call S 87°21′00″ W), a distance of 446.00 feet along a Northerly line of said Coventry Square Subdivision to a set 5/8″ iron rod with cap for corner;

THENCE, N $02^{\circ}38'49''$ W (Call N $02^{\circ}39'00''$ W), a distance of 65.00 feet along an Easterly line of said Coventry Square Subdivision to a set 5/8'' iron rod with cap for interior corner;

THENCE, S 87°21′11″ W (Call S 87°21′00″ W), at 60.00 feet pass a point for reentrant corner of said call 2.1261 Acre Tract, in all 80.00 feet along a Northerly line of said Coventry Square Subdivision to a point for corner from which bears a found 5/8″ iron rod with cap at N14°38′49″E, 0.26 feet;

THENCE, N 80°35′19″ W (Call N 80°35′30″ W), a distance of 455.69 feet along a Northerly line of said Coventry Square Subdivision to the **PLACE OF BEGINNING** and containing 118.778 Acres (5,173,987 Square Feet) of land and Reserve "A", in Block One (1), of Sugarhill Addition, a subdivision in Harris County, Texas, according to the map or plat thereof recorded in Film Code No. 450135 of the Map Records of Harris County, Texas.

Mark S. Brown RPLS# 5553 Greenleaf Land Surveys, LLC 10900 Northwest Freeway, Ste 129 Houston, Texas 77092



FILED FOR RECORD

12:23:03 PM

Friday, May 20, 2022

COUNTY CLERK, HARRIS COUNTY, TEXAS

ANY PROVISION HEREIN WHICH RESTRICTS THE SALE RENTAL, OR USE OF THE DESCRIBED REAL PROPERTY BECAUSE OF COLOR OR RACE IS INVALID AND UNENFORCEABLE UNDER FEDERAL LAW.

THE STATE OF TEXAS COUNTY OF HARRIS

I hereby certify that this instrument was FILED in File Number Sequence on the date and at the time stamped hereon by me; and was duly RECORDED; in the Official Public Records of Real Property of Harris County Texas

Friday, May 20, 2022

COUNTY CLERK HARRIS COUNTY, TEXAS



NOTICE TO REAL PROPERTY RECORDS, BUYERS, LEESSES, AND OCCUPANTS REGARDING LAND WHICH OVERLIES A CLOSED MUNICIPAL SOLID WASTE LANDFILL

In accordance with the provisions of Chapter 361, Subchapter R, Health and Safety Code (the "Code") and the rules of the Texas Commission on Environmental Quality ("TCEQ") published in Subchapter T, "Use of Land over Closed Municipal Solid Waste Landfills" (30 TAC, Section 330.951-330.964) (the "TCEQ Rules") requiring the preparation and filing of a Notice to Real Property Records of Harris County, Texas, with respect to land overlying a closed municipal solid waste landfill; Bissonnet 136, LLC, the undersigned owner (the "Owner") of the land (the "Land") formerly known as the Olshan Demolishing Landfill described in Exhibit A attached hereto and incorporated herein by reference does hereby state the following:

1. Prior Use of the Land or Tract as a Municipal Solid Waste Landfill

Owner has determined through site investigations that the Land was used for disposal of municipal solid waste by a previous owner and/or operator.

2. Legal Description of the Portion of the Land or Tract that Contains a Closed Municipal Solid Waste Landfill

Exhibit A is a legal description of the portion of the tract of land containing the closed municipal solid waste landfill.

3. Provisions with Respect to Development or Lease of this Property

Provisions with respect to development or lease of this property exist in the Code and the TCEQ Rules (30 TAC, Section 330.951-330.964)

4. Name of Owner

> Bissonnet 136, LLC 22310 Grand Corner Drive, Suite 140 Katy, Fort Bend County, TX 77494

This instrument was ocknowledged before me on the 18th day of May, 2022.

> マイトリントトリントリントリントリントリントリントリント MARILYN VILLASANA 124884376 NOTARY PUBLIC, STATE OF TEXAS MY COMMISSION EXPIRES

APRIL 6, 2024

Bissonnet 136, LLC

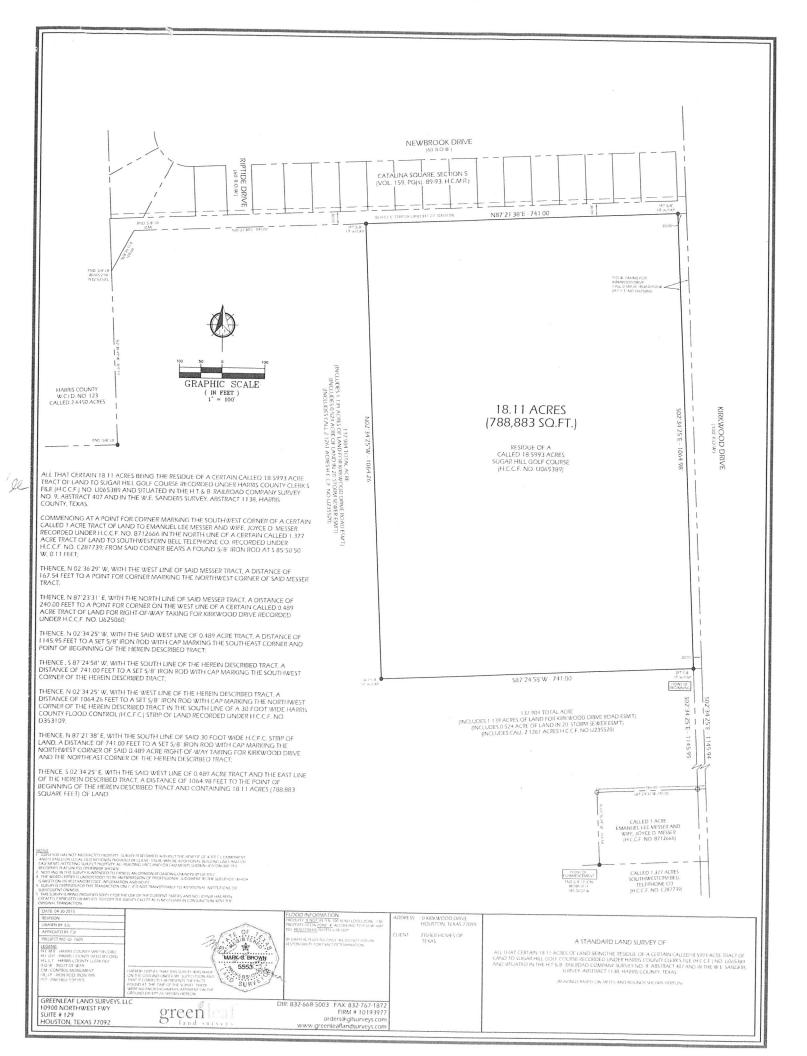
By:

John Quinlan President

Attest:

Date:

1888 Stebbins Dr. #100 Houston TX 77043



FILED FOR RECORD

12:23:03 PM

Friday, May 20, 2022

COUNTY CLERK, HARRIS COUNTY, TEXAS

ANY PROVISION HEREIN WHICH RESTRICTS THE SALE RENTAL, OR USE OF THE DESCRIBED REAL PROPERTY BECAUSE OF COLOR OR RACE IS INVALID AND UNENFORCEABLE UNDER FEDERAL LAW.

THE STATE OF TEXAS **COUNTY OF HARRIS**

I hereby certify that this instrument was FILED in File Number Sequence on the date and at the time stamped hereon by me; and was duly RECORDED; in the Official Public Records of Real Property of Harris County Texas

Friday, May 20, 2022

COUNTY CLERK HARRIS COUNTY, TEXAS

Environmental Notice

The land at 12000 Bissonnet Street is a redevelopment on a brownfield, putting land that was formerly a construction and demolition debris landfill back into its highest productive use. Two former landfills, known as the Doty Sand Pit Venture (DSPV) Landfill and the Olshan Demolishing (Olshan) Landfill operated on the property under Texas Commission on Environmental Quality (TCEQ) Municipal Solid Waste (MSW) Permit No. 1247 and 1259, respectively. The DSPV Landfill and closed in 1999 and is currently in post closure care. The Olshan Landfill closed in 1987 and has completed post closure care and Permit No, 1259 was revoked by the TCEQ in 2002.

In order to safely redevelop, the property has undergone extensive regulatory review to obtain a development permit from the Texas Commission on Environmental Quality, under the regulations found at 30 Texas Administrative Code (TAC), Chapter 330, Subchapter T.

Consistent with the requirements of these regulations and the development permit, the following controls have been implemented:

- Remaining landfill debris is separated from the surface by a compacted clay cap cover, with a minimum thickness of 2 feet, with additional soils added up to 15 feet thick over the clay cap.
- The potential for landfill gas is monitored quarterly in gas monitoring probes at the property boundary.
- Any future buildings must obtain a separate development permit for enclosed structures from the TCEQ.
- Any future building foundations must include a vented, 12-inch-thick permeable gravel layer which contains a gas collection system. Over the gravel layer is a low permeability vapor barrier to prevent gases from entering the building.
- Gas sensors must be present in the gas collection system installed under any future building foundation. These sensors are connected to an audible alarm. The sensors can detect, and the alarm is set to sound at low concentrations of landfill gas. This means that the alarm will first sound when concentrations are well below levels that would be an actual concern, so that preventative measures can be implemented.

Please sign below to acknowledge receipt of this notice.

Signature:	
Date:	
Signature:	
Date:	



December 21, 2023

SKA Project No. 5019-0001 (Via Federal Express)

Financial Administration Unit, MC-181 Texas Commission on Environmental Quality (TCEQ) 12100 Park 35 Circle Austin, Texas 78753

RE: Authorization to Disturb Final Cover Over Closed Municipal Solid Waste Landfill

for Non-Enclosed Structure and Permit Modification Doty Sand Pit Venture Landfill (MSW 1247) and Olshan Demolishing Landfill (MSW 1259, revoked)

Bissonnet 136 LLC

12000 Bissonnet Street, Houston, Harris County, Texas

To Whom It May Concern:

SKA Consulting, L.P. (SKA), on behalf of Bissonnet 136, LLC (Applicant) submits the enclosed check (\$150) for a Permit Modification to MSW 1247 pursuant to an Authorization to Disturb Final Cover Over Closed Municipal Solid Waste Landfill for Non-Enclosed Structure.

Please do not hesitate to contact us at (713) 266-6056, or at mike.schultz@skaconsulting.com if you have any questions.

Sincerely,

SKA CONSULTING, L.P.

Mike Schultz, P.E.

Executive Vice President, Partner

Mich lehuly

Enclosures

Permit Modification Check

cc: Mr. Mark Lester, Northwest Metro Holdings, CS 34, LLC (w/o enclosures)

Ms. Karina Rocha, Waste Program Manager, TCEQ Region 12 Office (w/o enclosures)

SKA CONSULTING, LP 1888 STEBBINS DRIVE, SUITE 100 HOUSTON, TX 77043

COMERICA BANK www.comerica.com 32-75/1110 492

021175

DATE

December 21, 2023

PAY

One Hundred Fifty and 00/100 Dollars

AMOUNT

\$150.00

TO THE ORDER OF

Texas Commission on Environmental Quality

P.O. Box 13088

MC 214

Austin, TX 78711-3088

med leful

AUTHORIZED SIGNATURE

"O21175" ::111000753:: 1882034497"

SKA CONSULTING, LP

021175

Check Date: 12/21/2023

Invoice Number	Date	Voucher	Amount	Discounts	Previous Pay	Net Amount
5019-0001	12/19/2023	0022786	\$150.00			\$150.00
Texas Commission on Enviror	mental Quality	TOTAL	\$150.00			\$150.00
Checking	20	TCEQ	191			

SKA CONSULTING, LP

021175

Check Date: 12/21/2023

			71100K Date. 12/2 1/20	120		
Invoice Numb	per Date	Voucher	Amount	Discounts	Previous Pay	Net Amount
5019-0001	12/19/2023	0022786	\$150.00			\$150.00
Texas Commission	on Environmental Quali	y TOTAL	\$150.00			\$150.00
Checking	20	TCEQ				

Public Involvement Plan Form for Permit and Registration Applications

The Public Involvement Plan is intended to provide applicants and the agency with information about how public outreach will be accomplished for certain types of applications in certain geographical areas of the state. It is intended to apply to new activities; major changes at existing plants, facilities, and processes; and to activities which are likely to have significant interest from the public. This preliminary screening is designed to identify applications that will benefit from an initial assessment of the need for enhanced public outreach.

All applicable sections of this form should be completed and submitted with the permit or registration application. For instructions on how to complete this form, see TCEQ-20960-inst.

Section 1. Preliminary Screening

New Permit or Registration Application

New Activity - modification, registration, amendment, facility, etc. (see instructions)

If neither of the above boxes are checked, completion of the form is not required and does not need to be submitted.

Section 2. Secondary Screening

Requires public notice,

Considered to have significant public interest, and

Located within any of the following geographical locations:

- Austin
- Dallas
- Fort Worth
- Houston
- San Antonio
- West Texas
- Texas Panhandle
- Along the Texas/Mexico Border
- Other geographical locations should be decided on a case-by-case basis

If all the above boxes are not checked, a Public Involvement Plan is not necessary. Stop after Section 2 and submit the form.

Public Involvement Plan not applicable to this application. Provide **brief** explanation.

TCEQ-20960 (02-09-2023)

Section 3. Application Information

Type of Application (check all that apply):

Air Initial Federal Amendment Standard Permit Title V

Waste Municipal Solid Waste Industrial and Hazardous Waste Scrap Tire

Radioactive Material Licensing Underground Injection Control

Water Quality

Texas Pollutant Discharge Elimination System (TPDES)

Texas Land Application Permit (TLAP)

State Only Concentrated Animal Feeding Operation (CAFO)

Water Treatment Plant Residuals Disposal Permit

Class B Biosolids Land Application Permit

Domestic Septage Land Application Registration

Water Rights New Permit

New Appropriation of Water

New or existing reservoir

Amendment to an Existing Water Right

Add a New Appropriation of Water

Add a New or Existing Reservoir

Major Amendment that could affect other water rights or the environment

Section 4. Plain Language Summary

D ' 1	1 1		0 1 1	
Provide 3	hrigt d	accrintion	of planned	activation
I I OVIUE a	титет и	CSCLIDUOL	от паппси	activities.

Section 5. Community and Demographic Information

Community information can be found using EPA's EJ Screen, U.S. Census Bureau information, or generally available demographic tools.

Information gathered in this section can assist with the determination of whether alternative language notice is necessary. Please provide the following information.

language notice is n	ecessary. Please pro	ovide the following information.	
(City)			
(County)			
(Census Tract) Please indicate which City	h of these three is the County	ne level used for gathering the following information. Census Tract	
(a) Percent of people	e over 25 years of age	e who at least graduated from high school	
-		r the specified location ercent of population by race within the specified location	
(d) Percent of Lingui	stically Isolated Hous	seholds by language within the specified location	
(e) Languages comm	only spoken in area b	by percentage	
(f) Community and/o	or Stakeholder Group	ps	
(g) Historic public in	iterest or involvemen	nt	

Section 6. Planned Public Outreach Activities

(a) Is this application subject to the public participation requirements of Title 30 Texas Administrative Code (30 TAC) Chapter 39?

Yes No

(b) If yes, do you intend at this time to provide public outreach other than what is required by rule?

Yes No

If Yes, please describe.

If you answered "yes" that this application is subject to 30 TAC Chapter 39, answering the remaining questions in Section 6 is not required.

(c) Will you provide notice of this application in alternative languages?

Yes No

Please refer to Section 5. If more than 5% of the population potentially affected by your application is Limited English Proficient, then you are required to provide notice in the alternative language.

If yes, how will you provide notice in alternative languages?

Publish in alternative language newspaper

Posted on Commissioner's Integrated Database Website

Mailed by TCEQ's Office of the Chief Clerk

Other (specify)

(d) Is there an opportunity for some type of public meeting, including after notice?

Yes No

(e) If a public meeting is held, will a translator be provided if requested?

Yes No

(f) Hard copies of the application will be available at the following (check all that apply):

TCEQ Regional Office

TCEQ Central Office

Public Place (specify)

Section 7. Voluntary Submittal

For applicants voluntarily providing this Public Involvement Plan, who are not subject to formal public participation requirements.

Will you provide notice of this application, including notice in alternative languages?

Yes No

What types of notice will be provided?

Publish in alternative language newspaper

Posted on Commissioner's Integrated Database Website

Mailed by TCEQ's Office of the Chief Clerk

Other (specify)

APPENDIX 2 GEOTECHNICAL REPORT AND SOIL BORING LOGS



May 9, 2019

Mr. Mark D. Lester, Principal LANDCO, ARESC, LLC P.O. Box 2058 1141 Capuchino Avenue Burlingame, CA 94011

Subject:

Letter Agreement-Release of Preliminary Geotechnical Engineering Report (dated August 29, 2006) and Information for the Sugar Hill Residential Development in Houston, Texas (the Preliminary Report)

Dear Mr. Lester:

As we discussed, the Preliminary Geotechnical Engineering Report (Preliminary Report) for the subject development was prepared by Civil & Environmental Consultants, Inc. (CEC) for a Developer client (Developer) in the mid-2000s, and to the best of our knowledge, the Developer ceased doing business shortly after its receipt. Based on your request, and subject to the terms of this Letter Agreement, CEC is willing to release the Preliminary Report and associated information to you, LANDCO, ARESC, LLC (LANDCO), on an "as is" basis and with no warranties whatsoever either express or implied, provided that and in consideration of LANDCO's agreement, to indemnify, defend, hold harmless, and release CEC and its officers, directors, and employees, to the fullest extent of the law, for any and all claims and costs associated with any alleged or actual legal action in any way related to the use of the Preliminary Report and associated information, even if occurring after the running of any applicable statute of limitations (Release Obligation).

LANDCO should use the Preliminary Report and associated information with a great deal of caution for the following reasons. First, the Preliminary Report was not finalized because payment issues prevented CEC from collecting the information needed to finalize the conclusions and recommendations for the project. That information was being collected from test fills that were used to estimate settlements that could be incurred by buildings placed on the project site. Further, because of the time that has passed since the investigations were performed



Mr. Mark D. Lester, Principal May 9, 2019 Page 2

and the Preliminary Report was prepared, conditions have likely changed, and those changes would impact all of the preliminary conclusions and recommendations.

By signing this letter, LANDCO agrees to fully comply with the above terms including the Release Obligation for the use of the Preliminary Report.

Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Kenneth R. Miller, P.E.

President

AGREED TO:

Mark Lester, Principal LANDCO AESC, LLC.

Adm/KRM/LANDCO

PRELIMINARY GEOTECHNICAL ENGINEERING REPORT

Project Name:

Sugar Hill Residential Development Houston, Texas

Prepared For:

SHRD Partners, L.P.
50 Briar Hollow Lane, Suite 210 East Tower
Houston, Texas 77027

Prepared By:

Civil & Environmental Consultants, Inc. 3041 Woodcreek Drive, Suite 210 Downers Grove, IL 60515

CEC Project No. 060-234

August 29, 2006

August 29, 2006

Mr. Richard D. Wheeler SHRD Partners, L.P. 50 Briar Hollow Lane Suite 210 East Tower Houston, Texas 77027

Re: Preliminary Geotechnical Engineering Report
Sugar Hill Residential Development, Houston, Texas
Civil & Environmental Consultants, Inc. Project No. 060-234

Dear Mr. Wheeler:

Enclosed are two copies of the preliminary geotechnical report for the Sugar Hill Residential Development (Site). Civil & Environmental Consultants, Inc. (CEC) is pleased to submit this preliminary report which documents the Site soil conditions, and provides the results of the laboratory testing program with preliminary recommendations for design of foundations to support the proposed residential improvements.

CEC has also constructed and is in the process of monitoring settlement across five fill pads at the Site. Complete results of the settlement analysis will be provided in our final report. We have prepared this report in accordance with our January 31, 2006 proposal which was authorized by SHRD Partners in a letter of authorization dated February 1, 2006.

Civil & Environmental Consultants appreciates the opportunity to complete the project in the near future. If you have questions, please call the undersigned at (630) 963-6026.

Sincerely,

Civil & Environmental Consultants, Inc.

Dean Jones, Jr. P.E. Senior Project Manager Gary Goodheart, P.E. Vice President

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APPENDICES

APPENDIX A	Soil Boring Location Plan
APPENDIX B	Boring Logs
APPENDIX C	Fugro's Report of Soil Testing
APPENDIX D	Important Information About Your Geotechnical Engineering Report

1. INTRODUCTION

Civil & Environmental Consultants, Inc. (CEC) is pleased to submit this preliminary geotechnical report for the Sugar Hill Residential Development (Site) in Houston, Texas. The preliminary report documents the Site soil conditions, and provides the results of the laboratory testing program with preliminary recommendation for design of foundations to support the proposed residential improvements.

CEC has also constructed and is monitoring settlement across five fill pads at the Site. Complete results of the settlement analysis will be provided in our final report. We have prepared this report in accordance with our January 31, 2006 proposal which was authorized by SHRD Partners in a letter of authorization dated February 1, 2006.

2. BACKGROUND

The Sugar Hill Residential Development is at 12000 Bissonnet Street in Houston, Harris County, Texas. The property is comprised of 138 acres that have been most recently used as an 18-hole golf course (Sugar Hill Golf Course). Before development of the golf course, two landfills covered approximately 122.5 acres of the proposed residential development. The DSPV Landfill covered approximately 104.5 acres, while the Olshan Demolishing Inc. Landfill (Olshan Landfill) covered approximately 18 acres. The Olshan Landfill is in the northeast corner of the 138-acre Site.

From the 1950's into the 1970's, the Site was operated as a sand mining operation (Doty Sand Pit). As sand reserves were depleted, open areas were landfilled beginning in the mid to late 1960's. The Site was originally permitted to receive construction and demolition waste in May 1970 under Harris County License No. 1.

After the Texas Department of Health (TDH) assumed regulatory authority, the DSPV Landfill received an operating permit in May 1981 as a Type IV Landfill. The facility was operational

until August 1999 and was certified closed in January 2001. SHRD now has controlling interest in the Site and the original permittee (DSPV Landfill) intends to petition TCEQ to end the post-closure care period in March 2006. The Olshan Landfill operated separately from the DSPV Landfill during the 1980s and through the mid to late 1990s. The Olshan Landfill has been closed for more than five years and has exited the post-closure care period.

CEC understands the Site will be redeveloped as a residential community with associated amenities. In order to redevelop the Site, a Development Permit is required by the Texas Commission on Environmental Quality (TCEQ). As part of the Development Permit, extent and type of landfill cover are required to be evaluated and landfill waste needs to be characterized.

3. PURPOSE

The purpose of the geotechnical investigation was to conduct field and laboratory studies designed to assess the composition and consistency of the subsurface soil conditions and to develop opinions and recommendations regarding:

- 1. Soil conditions in cover materials that overlie the closed landfills;
- 2. General character of waste materials in closed landfills;
- 3. Geotechnical engineering properties of the encountered cover materials;
- 4. Foundation design criteria, including recommended foundation type, bearing elevations, and allowable bearing pressures;
- 5. Estimated post-construction total and differential settlements of the proposed development structures.

This scope of work does not include provisions for the environmental characterization of the landfill, specifically, the assessment of landfill gas and/or the design of features to protect residents from harmful conditions as the results of the land fill.

4. SUBSURFACE INVESTIGATION AND LABORATORY TESTING

Field exploration activities were conducted during the period of April 5 through May 26, 2006, including drilling test borings, construction of the fill pads to monitor settlement, and the laboratory testing program.

Subsurface Investigation. The field exploration program included 48 soil borings that were drilled through the cover materials into the top of the underlying waste and designated as 'BH' borings. Five additional borings, designated as 'SPB' borings, were drilled through the cover and waste to the underlying native soil layer. CEC established a grid across the Site consisting of 48 sections that measured approximately 350 feet square and then randomly selected a location for one soil boring in each section. As-drilled boring locations are shown on the Soil Boring Location Plan (see Appendix A). Boring locations including: northing, easting, and ground surface elevation are also provided in Table 1. BH borings were drilled by Jetcore Drilling using a rotary drill rig mounted on an all-terrain carrier. Borings depths ranged from 3 to 17 feet below the existing ground surface. Hollow stem augers were used to advance the boreholes, while soil samples were collected continuously from the ground surface to the termination depth of the boring using the thin-walled tube sampling procedure in general accordance with American Society for Standards and Materials (ASTM) D1587. Thin-walled tube samples were extruded and logged in the field.

SPB borings were drilled by MEDI using a truck-mounted rotary drill rig. Except for Boring SPB-4, which was drilled to refusal at a depth of 17 feet, borings depths ranged from 42 to 62 feet below the existing ground surface. Hollow stem augers were used to advance the boreholes, while soil samples were collected continuously from the ground surface to the termination depth of the boring using thin-walled tube sampling procedure through the cover materials and the split barrel sampling procedure through the landfill waste in general accordance with ASTM D1586. The split-barrel sampler is driven in six-inch intervals using a 140-pound hammer falling 30 inches, which is the number of blows required to drive the split-barrel sampler.

Table 1 - As-Drilled Soil Boring Locations

Boring No.	Northing (ft)	Easting (ft)	Ground Elevation (ft)	Boring No.	Northing (ft)	Easting (ft)	Ground Elevation (ft)
B-1	13811573.11	3049942.01	95.79	B-28	13811915.45	3051268.91	99.93
B-2	13811747.96	3049960.52	98.21	B-29	13812353.05	3051414.83	102.03
B-3	13812040.26	3050113.17	101.51	B-30	13812651.99	3051492.67	104.08
B-4	13812593.08	3049930.98	103.82	B-31	13812932.48	3051329.07	101.40
B-5	13812897.00	3050055.99	103.60	B-32	13813114.41	3051230.55	101.21
B-6	13813070.95	3049897.21	102.53	B-33	13813556.99	3051472.91	90.25
B-7	13811587.05	3050293.95	96.81	B-34	13811277.67	3051606.86	89.99
B-8	13811719.00	3050463.01	103.80	B-35	13811459.17	3051701.35	94.01
B-9	13812089.44	3050441.96	104.23	B-36	13811898.78	3051592.82	98.83
B-10	13812363.95	3050296.82	109.39	B-37	13812220.94	3051675.00	98.87
B-11	13812724.99	3050349.99	109.63	B-38	13812613.56	3051795.01	96.84
B-12	13813104.98	3050169.02	99.85	B-39	13812844.48	3051681.55	93.34
B-13	13811506.14	3050703.82	94.84	B-40	13813387.07	3051739.94	84.52
B-14	13811931.18	3050797.00	104.57	B-41	13813617.32	3051884.02	79.67
B-15	13812268.70	3050504.87	108.27	B-42	13811525.26	3051938.54	96.20
B-16	13812461.35	3050807.98	111.31	B-43	13811817.89	3052194.50	87.69
B-17	13812779.95	3050681.72	109.94	B-44	13812263.28	3052017.72	96.36
B-18	13813081.14	3050502.10	97.81	B-45	13812488.70	3052001.29	96.80
B-19	13811523.71	3051184.50	87.18	B-46	13812936.53	3051952.20	83.70
B-20	13811782.07	3051090.47	93.53	B-47	13813155.00	3052113.00	83.75
B-21	13812269.30	3051156.64	108.16	B-48	13813555.26	3052013.86	80.54
B-22	13812548.00	3051039.03	113.94				
B-23	13813033.32	3051084.21	105.10	SPB-1	13811950.62	3050519.49	102.30
B-24	13813348.43	3051155.56	98.17	SPB-2	13812879.74	3050534.89	108.36
B-25	13813507.33	3051129.27	95.67	SPB-3	13811958.15	3051164.72	100.37
B-26	13811134.99	3051251.61	85.18	SPB-4	13813205.70	3051637.70	85.68
B-27	13811538.12	3051370.37	95.10	SPB-5	13812012.73	3052067.45	95.41

CEC's field geologist observed the field investigation, prepared a log of the conditions encountered in the borings, classified the soil samples, and recorded the results of field testing procedures. The geologist also measured water levels while drilling, and at the conclusion of each boring, performed hand penetrometer tests on cohesive soil samples. Soils were classified according to ASTM D2487 (Classification of Soils for Engineering Purposes).

After classifying each soil sample, a representative portion of each sample was sealed in either a glass jar or plastic bag for further inspection and possible geotechnical laboratory testing. After

final groundwater measurements, the borings were backfilled to the ground surface with hydrated bentonite chips.

<u>Test Pad Construction</u>. The settlement evaluation included the construction of five test fill pads. The test pads were constructed to evaluate differential and total settlement of the landfill under the equivalent static load of a three-story, single family residence. Test pad locations are shown on the boring location plan.

Test pads measured approximately 30 feet by 30 feet by 3 feet thick with five settlement plates installed in each pad. One settlement plate is anchored in the center of each pad (to evaluate total settlement) with one settlement plate in each corner of the pad (to evaluate differential settlements between the center and corners of the surcharge area). Test pads were constructed of clayey materials obtained from SHRD-approved off site locations. Clay fill materials were placed in loose lifts not exceeding 12 inches thick and compacted to between 92 and 95 percent maximum Standard Proctor dry density, (ASTM D-698), to simulate foundation loading conditions over each test area.

Settlement plates were constructed of an 18-inch diameter by ¼-inch thick steel plate with a ¼-inch diameter solid steel rod welded to the center of the plate. Plates were installed approximately two feet below existing grade with the ¼-inch diameter steel rod extended vertically in three-foot long sections to approximately two to three feet above the surface of the fill pad. A 1-inch diameter steel pipe was placed over the steel rod so that the rod could move freely (without soil friction) within the fill. The pipe was not connected to the steel plate. The 1-inch pipe extended from approximately one to two inches above the settlement plate to two to three feet above the surface of the fill pad, leaving approximately three to four inches of the steel rod exposed above the top of the pipe.

<u>Laboratory Testing Results</u>. Soil samples were shipped to Fugro Consultants in Houston, Texas for laboratory testing. The testing program included the following procedures to determine the composition, consistency and density of the clay cap and native soil.

- Natural moisture content (ASTM D2216),
- Soil density (ASTM D2166),
- Grain size analysis (ASTM D441, D422 and D2217),
- Atterberg Limits (ASTM D4318),
- One dimensional consolidation (ASTM D2435), and
- Standard proctor density (ASTM D698).

A summary of the laboratory results are provided in Table 2. Test results are also shown on the soil boring logs attached in Appendix B with Fugro's Report of Soil Testing provided in Appendix C.

SUGAR HILL RESIDENTIAL DEVELOPMENT GEOTECHNICAL INVESTIGATION TABLE 2 – SUMMARY OF LABORATORY TEST RESULTS CEC PROJECT NO. 060-234

THE PERSON NAMED IN	1000																						Max. $\gamma_d = 109.2 \text{ pcf}$, MC _{0w} = 16.7%	Max. $\gamma_d = 99.1 \text{ pcf}$, MC _{Ort} = 22.3%	May v. = 103 5 nef
Control of the		Notes	200															c _c = , e _o =					Max. y _d	Max. 74	May
1	9	Failure	7 -				1											5							İ
The owner of	ASTM D2166	Strain (%)	,	4	oc	2	2	œ		6					=			7	00	12	15	13			İ
	VSV	OC (pap	2.66	1.73	6.04	2 12	1	3.11		1.189					1.55			8.7	0.82	2,31	3.2	3.76			Ī
	8	PI (%)													26	34		33	43	43	44		19	38	Ī
	ASTM D4318	PL (%)												***	91	14		13	21	17	18		91	81	
30	W.	77													42	48		46	20	09	62		35	99	
THE REAL PROPERTY.	The state of the s	Clay													71	78		82	77	18	76				I
Children C.D.	ASTM D421, D2217	Silt													7	7		00	7						
COLUMN TO SERVICE	ASTMD	Sand (%)													72	22		82	22	61	24				
The state of		Gravel													2	0		0	-	0	0				
ASTM	D2166	Dry Density	116.3	110.3	120.1	1154	L'OH	116.2	114.4	0.86	104.2	108.8	102.0		114.4	117.2		119.0	92.4	111.8	5'801	111.3			
ASTM	D2216	MC	15	80	14	: 4	2	13	16	18	23	20	28		18	17		13	29	17	19	18			
		₽ G	4.5		4.5			4,5	2.75	1.0	2.0	4.0	1.5		2.5		1.25		0.75	3.0	4.0				
TO SERVICE STREET, STR	ASTM D2487 ¹	Material Description	Light gray and light tan CLAY with sand,	Dark gray CLAY with sand, moist, medium	JIII.		Dark pray Cl.AY with sand moist very stiff	to hard	Light gray and light tan CLAY with sand, moist, very stiff	Dark gray CLAY moist, stiff	Dark gray CLAY with sand, moist, very stiff	Gray CLAY moist, hard	Dark gray SILTY CLAY moist, stiff	· · · · · · · · · · · · · · · · · · ·	Light gray LEAN CLAY with sand, trace gravel, moist, very stiff (CL)	Brown LEAN CLAY with sand, moist, stiff (CL)		Reddish brown LEAN CLAY with sand, moist (CL)	Dark gray FAT CLAY with sand, trace	Brown and dark gray FAT CLAY with sand, moist, very stiff (CH)	Dark gray FAT CLAY with sand, moist, hard (CH)		Reddish brown and light gray sandy LEAN CLAY	Dark gray FAT CLAY w/ calcareous nodules & grass roots	
		Depth (ft)	2-4	8-9	2-4	4		2-4	10 - 12	2-4	8-9	2-4	8 - 10	- Comment	2-4	2-4	4-6	2 - 4	9-9	2-4	2-4	4-6	' Park	rd #3	
		Sample	ST-2	ST-4	+	+	-	ST-2	ST-6	ST-2	ST-4	ST-2	ST-5		ST-2	ST-2	ST-3	ST-2	ST4	ST-2	ST-2	ST-3	Authur Storey Park	Settlement Pad #3	
		Boring	H	BH-I	BH-6	HE		BH-22	BH-22	BH-25	BH-25	BH-34	BH-34		SPB-1	SPB-2	SPB-2	SPB-3	SPB-3	SPB-4	SPB-5	SPB-5	Ϋ́	Sel	

^{1.} Material Description in bold based on laboratory testing data according to ASTM D2487-92 Standard Classification of Soile for Engineering Purposes (Unified Soil Classification System).

2. Laboratory test results were provided by Fugor Consultants LP, Houston, Texas according with the testing program provided by CEC.

3. Samples from Author. Sovery Parts, Settlement Part 81, and Settlement Part 81, and Settlement Part 81, and Settlement Part 81, are testing results performed on bulk samples of material used to construct the load test pads.

4. The complete laboratory test report from Fugor Consultants is attached in Appendix B.

5. Additional moisture content and pockect penetrometer data provided on the boring logs.

Notes:

Legend:

Civil & Environmental Consultants, Inc.

q, = unconfined compressive strength using pocket penetrometer; MC = moisture content; LL = liquid limit; PL = plastic limit; Pl = plastic limit; Pl = plasticity index, UC = unconfined compressive strength according to ASTM procedure; B = bulge failure; S = skear failure.

5. SITE CONDITIONS

The 138-acre Sugar Hill Residential Development will be located at the site of the closed Sugar Hill Golf Course in a residential area of Houston, Texas. The Site is on the north side of Bissonnet Street between South Kirkwood on the east and Cook Road on the west. Other residential development(s) border to the north. Undulating terrain is the most prevalent feature with ground surface elevations ranging between 78 and 120 feet. At the time of our investigation, the Site was overgrown with various grasses, brush, and sparse tree cover.

<u>Soil and Groundwater Conditions</u>. A generalized description of the soil conditions encountered in the soil borings is discussed below with detailed descriptions of the soil conditions provided on the attached soil boring logs.

Landfill Cover Soils. The surface soils consist of cover materials from the former landfills. Cap thickness ranges from 3 to 17 feet and consists primarily of medium stiff to hard lean and fat clays (USCS Classification of CL and CH). Typical clay cap soil strength, unconfined compressive strength (qu), ranged between 0.5 to in excess of 4.5 tons per square foot (tsf) with soil density in the range of 98 to 120 pounds per cubic foot (pcf). Soil moisture content showed a correlation to correspond to soil strength (i.e. soil moisture greater than 20% resulted in qu less than 1 tsf, while soil moisture lower than 20% resulted in qu greater than 1 tsf). Soil moisture content results range between 14 and 29 percent.

Engineering properties of the clay cover materials included:

- Liquid Limits between 42 and 64 percent,
- Plastic Limits between 16 and 21 percent,
- Plasticity Index between 26 and 44 percent,
- Less than 1 percent gravel,
- 18 to 27 percent sand, and
- 71 to 82 percent fines (silt and clay sized soil particles).

In isolated areas, the cover materials included fine-to-medium grained sand (SP) or clayey sand (SC) fill. The poorly graded fine-to-medium grained sand was encountered at the surface of Borings BH-8, BH-11 and B-47 while the clayey sand soil was noted in Borings BH-16, BH-41, and BH-48.

Landfill Waste. Fifty-three borings were drilled and sampled to either the top of the waste or as in the case of the SPB borings drilled through the waste to the underlying native soils. Data presented in the boring logs suggests that the landfill waste (DSPV Landfill) consist of clean construction debris (CCD). As shown on the boring logs, CCD consisted of wood products including construction lumber, particle board, and shredded wood; plastic including plastic bags and pipe; glass; sheet rock; shingles; drain tile; brick; paving materials including concrete, asphalt, and crushed stone; landscape debris; carpeting; steel; and natural clay and sandy soils. In the Olshan Landfill, the CCD consists of concrete construction debris.

Based on the observations made by the field geologist, the CCD in the DSPV Landfill was comprised of approximately 80 percent degradable material such as wood, landscape waste, and carpeting and 20 percent non degradable refuse such as paving materials, steel, glass, and plastic.

Zones within the CCD that contained general household refuse were not encountered. Screening for methane gas and other contaminants while drilling failed to identify the presence of material decomposition as would be noted by the presence of methane gas and other unusual odors.

Native Soil. Native soils were investigated by advancing Borings SPB 1 through SPB-5 through the clay cap and landfill waste. In SPB-1, native soil was encountered at depth of 61 feet below the ground surface (elevation 41.3 feet) and consisted of a wet, dark gray, fine to medium grained sand.

In SPB-2, SPB-3 and SPB-5, native soil layers were encountered at 41, 49.5 and 50 feet (elevations 66.36, 50.87, and 45.41 feet), respectively. The native soil in these borings consisted of stiff to very stiff, gray or yellowish brown clay. SPB-4 did not reach the native soils, as the boring was refused in concrete construction debris at a depth of 17 feet.

Groundwater Levels. Groundwater levels were measured by the field geologist while drilling by noting the depth of free water on the sampling tools and/or by noting the presence of free water in the soil samples. After drilling, the boreholes typically caved, preventing the collection of after drilling water levels.

Groundwater measurements are recorded on the attached soil boring logs. Except for Boring SPB-1 and SPB-3, all the borings were drilled under dry conditions. In WSPB-1 and SPB-3, isolated sand within in the lower section of the refuse and in the native sandy soils was wet at depth of 61 and 40 feet, respectively.

6. ENGINEERING ANALYSIS AND RECOMMENDATIONS

This report provides preliminary geotechnical opinions and recommendations regarding the design and construction of the proposed residential development. Specifically the report covers the following items:

- 1. Soil conditions in cover materials that overlie the closed landfills;
- 2. General character of waste materials in closed landfills;
- 3. Geotechnical engineering properties of the encountered cover materials;
- 4. Foundation design criteria, including recommended foundation type, bearing elevations, and allowable bearing pressures;
- 5. Estimated post-construction total and differential settlements of the proposed development structures.

Discussions with regard to characterization and engineering properties of the cover material and characterization of the landfill waste are provided in the previous sections. Assessment of the landfill waste material did not include screening for environmental purposes, since this task was completed by ESA, Inc. under separated contract to SHRD Partners. Discussions with respect to

general site development, foundation design criteria, and post construction settlement are provided below.

General Site Development. At the time of our investigation, the Site was an abandoned golf course. The Site was overgrown and the ground surface undulated between elevations 78 and 120 feet, resulting in cover materials thickness of 3 to 17 feet in thickness. Thickness of the clay cap is provided in Table 3.

Table 3 – Clay Cap Thickness

	Ground	Fill		Ground	Fill		Ground	Fill
Boring	Elevation	Thickness	Boring	Elevation	Thickness	Boring	Elevation	Thickness
No.	(ft)	(ft)	No.	(ft)	(ft)	No.	(ft)	(ft)
B-1	95.79	8.0	B-19	87.18	5.8	B-37	98.87	9.8
B-2	98.21	8.5	B-20	93.53	6.0	B-38	96.84	7.8
B-3	101.51	7.5	B-21	108.16	2.8	B-39	93.34	16.0
B-4	103.82	13.5	B-22	113.94	12.5	B-40	84.52	9.8
B-5	103.60	3.8	B-23	105.10	7.8	B-41	79.67	3.5
B-6	102.53	6.8	B-24	98.17	3.9	B-42	96.20	10.0
B-7	96.81	10.5	B-25	95.67	8.8	B-43	87.69	7.0
B-8	103.80	10.3	B-26	95.18	9.9	B-44	96.36	7.8
B-9	104.23	3.0	B-27	95.10	9.5	B-45	96.80	8.0
B-10	109.39	7.8	B-28	99.93	8.5	B-46	83.70	5.9
B-11	109.63	5.8	B-29	102.03	6.5	B-47	83.75	8.5
B-12	99.85	3.5	B-30	104.08	16.5	B-48	80.54	6.5
B-13	94.84	10.0	B-31	101.40	6.5			
B-14	104.57	9.0	B-32	101.21	6.5	SPB-1	102.30	7.0
B-15	108.27	8.0	B-33	90.25	12.5	SPB-2	108.36	5.0
B-16	111.31	7.0	B-34	89.99	12.0	SPB-3	100.37	8.8
B-17	109.94	5.8	B-35	94.01	7.5	SPB-4	85.68	5.5
B-18	97.81	5.0	B-36	98.83	6.0	SPB-5	95.41	5.0

Before construction of the proposed residential development, mass grading operation will be necessary to uniformly grade the ground surface to allow for the construction of the new development. A grading plan was not available at the time of our study.

After stripping, the exposed subgrade will consist primarily of stiff to hard lean and/or fat clay fill. In isolated areas the subgrade may be soft, loose, and/or saturated while in other areas the cover materials may contain debris and/or degradable materials. If unsuitable soils are encountered, we recommend the unsuitable material be removed full depth and replaced with a compacted fill.

Exposed subgrades should be proof-rolled with a fully loaded 10-wheel dump truck to locate zones of unstable soils. Zones that exhibit instability, such as excess rutting or pumping in excess of 1-inch, should be disked, reconditioned, and compacted or removed. Actual depth and volume of undercut should be determined at the time of construction based on observations of an experienced geotechnical engineer. Excavated material should be replaced with an approved structural fill and compacted according to the project specification.

Approved Fill Material and Placement. Due to the uneven terrain, construction activities will include a cut and fill grading operation to achieve final grades. For grading operations, cohesive and/or granular fill may be used as fill. Cut areas should not reduce existing fill thickness (cover material) to less than 5-feet without the approval of a qualified geotechnical engineer. We recommend a compacted granular fill beneath building foundations and for roadway subbase (i.e., in areas that will be covered by structures or asphalt/concrete pavement).

Both granular and cohesive fill material should be pre-approved before use. The fill should be an inorganic soil free of waste, debris and saturated materials. Specifications for both granular and cohesive soils are provided below.

Granular Fill. Granular fill may consist of locally available crushed limestone or recycled concrete meeting the appropriate gradations. For roadway subbase or structural fill below building foundations, we recommend using a well-graded crushed aggregate.

Cohesive Fill. Results of the laboratory testing program indicate the clayey soil used for construction of the landfill cover maybe reused during regrading. Cohesive fill from an offsite borrow should consist of a lean clay soil having as USCS classification of CL and should have the following properties.

- Liquid limit less than 50 and plasticity index less than 25,
- Maximum dry density greater than 100 pcf, when determined according to ASTM D1557, Modified Proctor Method, and
- Shall not contain organic material in excess of 5 percent when tested in accordance with ASTM D2974, Loss on Ignition Method.

Silt and other materials designated as ML, MH, PT, OL, and OH should not be used for mass landfill grading but can be used for landscaping purposes, i.e. construction of berms.

Fill Placement. Fill should be placed where dry stable conditions exist at design or undercut subgrade. Fill should be placed in 8 to 12-inch loose lifts and be compacted to 95 percent of the maximum dry density determined in accordance with ASTM D1557, modified Proctor method.

<u>Foundation Design Criteria and Post-Construction Settlement</u>. Based on available soils information, shallow foundations may be used to support the proposed residential building foundations.

The building foundations will be supported within the upper horizon of the clay cover, with at least three feet of clay cover material beneath building floor slabs. For protection from shrinking and/or expansive soils, foundations must be supported at a minimum depth of four feet below final exterior grade. At this depth, foundations may be designed with an allowable soil bearing pressure of 3,000 psf, provided the compacted clay cover material has a minimum unconfined compressive strength of 1.75 tons per square foot (tsf).

Borings logs show isolated areas where the supporting cover soils will not have the required unconfined compressive strength. We recommend each building foundation subgrade be inspected by an experienced geotechnical engineer. Hand augers should be performed in each excavation to confirm the thickness of the cover material and that the unconfined compressive strength of the cover material exceeds the recommended strength to a depth equal to four times the foundation width.

If subgrade soil fails to meet the minimum unconfined compressive strength, the cover material should be removed full depth and replaced with compacted clay fill. The compacted clay fill should meet the specification provided in the General Site Development section.

For design purposes, we recommend that the isolated column footings have a minimum dimension of 30 inches square and continuous wall footings have a minimum width of 18 inches. Strip footing should be reinforced longitudinally to help bridge over soft foundation soils and to negate the affects of settlement.

For purposes of this preliminary report, we estimate that total settlement will not exceed one inch. Differential settlement should not exceed one half the total settlements. Our evaluation of the recorded settlement data from the test pads show total and differential settlement should be less than one inch total settlement and ½ inch differential settlement. However, as of the date of this preliminary report, the monitoring of the fill pads was not complete.

7. LIMITATIONS AND STANDARD OF CARE

This investigation was conducted to assess subsurface conditions for design and construction of the Sugar Hill Residential Development. This report was prepared for the sole use of the Site owner (SHRD Partners, L.P.). The named parties are the only intended beneficiaries of our work for the specific purposes referenced herein. No other party should rely on the information contained herein without prior written consent of CEC.

The recommendations contained in this report are based on the soils encountered at the boring locations at the date and time indicated. Should conditions encountered during excavation differ from those encountered in the borings, CEC should be notified so that the recommendations can be reviewed and revised if necessary.

The services performed by CEC were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the geotechnical engineering profession practicing contemporaneously under similar conditions in the locality of the project. No other representation is made. Appendix D contains a document entitled "Important Information About Your Geotechnical Engineering Report." This document further explains the realities of geotechnical engineering and the limitations that exist in evaluating geotechnical issues.

APPENDIX A

Soil Boring Location Plan

APPENDIX B

Boring Logs

	Ground	Fill		Ground	Fill
Boring	Elevation	Thickness	Boring	Elevation	Thickness
No.	(ft)	(ft)	No.	(ft)	(ft)
B-1	95.79	8.0	B-28	99.93	8.5
B-2	98.21	8.5	B-29	102.03	6.5
B-3	101.51	7.5	B-30	104.08	16.5
B-4	103.82	13.5	B-31	101.40	6.5
B-5	103.60	3.8	B-32	101.21	6.5
B-6	102.53	6.8	B-33	90.25	12.5
B-7	96.81	10.5	B-34	89.99	12.0
B-8	103.80	10.3	B-35	94.01	7.5
B-9	104.23	3.0	B-36	98.83	6.0
B-10	109.39	7.8	B-37	98.87	9.8
B-11	109.63	5.8	B-38	96.84	7.8
B-12	99.85	3.5	B-39	93.34	16.0
B-13	94.84	10.0	B-40	84.52	9.8
B-14	104.57	9.0	B-41	79.67	3.5
B-15	108.27	8.0	B-42	96.20	10.0
B-16	111.31	7.0	B-43	87.69	7.0
B-17	109.94	5.8	B-44	96.36	7.8
B-18	97.81	5.0	B-45	96.80	8.0
B-19	87.18	5.8	B-46	83.70	5.9
B-20	93.53	6.0	B-47	83.75	8.5
B-21	108.16	2.8	B-48	80.54	6.5
B-22	113.94	12.5			
B-23	105.10	7.8	SPB-1	102.30	7.0
B-24	98.17	3.9	SPB-2	108.36	5.0
B-25	95.67	8.8	SPB-3	100.37	8.8
B-26	95.18	9.9	SPB-4	85.68	5.5
B-27	95.10	9.5	SPB-5	95.41	5.0

P:\2006\060234 - Sugar Hill Residential Development\Fill Table.doc

606-234		Projective boreliotely unital vyelloyilloo	2000-4	5.00	Clevation	חבליוו	Startbehm	חבליווו בוו מפר
	BH-1		3049942.01	13811573.11	95.79		8) 2
606-234	BH-10	H	3050296.82	13812363.95	109.39	٥.	6	0 20
606-234	BH-11	∺	3050349.99	13812724.99	109.63) 9	0 20
606-234	BH-12	н	3050169.02	13813104.98	99.85) (0 20
606-234	BH-13	Н	3050703.82	13811506.14	94.84	-	1 (0 20
606-234	BH-14	1	3050797	13811983.18	104.57	10		0 20
606-234	BH-15	1	3050504.87	13812268.7	108.27) 6	0 20
606-234	BH-16	1	3050807.98	13812461.35	111.31		8	0 20
606-234	BH-17	1	3050681.72	13812779.95	109.94) 9	0 20
606-234	BH-18	1	3050502.1	13813081.14	97.18) 9	0 20
606-234	BH-19	1	3051184.5	13811523.71	87.18) 9	0 20
606-234	BH-2	1	3049960.52	13811747.96	98.21	1	11 (0 20
606-234	BH-20	1	3051090.47	13811782.07	93.53) 9	0 20
606-234	BH-21	1	3051156.64	13812269.3	108.16		3	0 20
606-234	BH-22	1	3051139.03	13812584	113.94	-	13 (0 20
606-234	BH-23	1	3051084.21	13813033.32	105.1		8	0 20
606-234	BH-24	1	3051155.56	13813348.43	98.17		4	0 20
606-234	BH-25	1	3051129.27	13813507.33	95.67		6	0 20
606-234	BH-26	1	3051251.61	13811134.99	85.18		8	0 20
606-234	BH-27	1	3051370.37	13811538.12	95.1	1	10	0 20
606-234	BH-28	-	3051268.91	13811915.45	99.93		6	0 20
606-234	BH-29	1	3051414.83	13812353.05	102.03		7	0 20
606-234	BH-3	1	3050113.17	13812040.26	101.51		8	0 20
606-234	BH-30	1	3051492.67	13812651.99	104.08	1	17	0 20
606-234	BH-31	Н	3051329.07	13812932.48	101.4		7	0 20
606-234	BH-32	1	3051230.55	13813114.41	101.21		7	0 20
606-234	BH-33	Н	3051472.91	13813556.99	90.25	1	13	0 20
606-234	BH-34	H	3051606.86	13811277.67	89.99	1	12	0
606-234	BH-35	1	3051701.35	13811459.17	94.01		8	0
606-234	BH-36	1	3051592.82	13811898.78	98.83		9	0 20

ProjectNum	ProjectNumber BoreholeNumbe WellSymbol	WellSymbol	X-Coord	Y-Coord	Elevation	Depth	StartDepth	DepthPerPage
606-234	BH-37	1	3051675	13812220.94	98.87	10	0 0	20
606-234	BH-38	1	3051795.01	13812613.56	96.84		8	20
606-234	BH-39	1	3051681.55	13812844.48	93.34	17	16 0	20
606-234	BH-4	1	3049930.98	13812593.08	103.82	14	4	20
606-234	BH-40	1	3051739.94	13813387.07	84.52	10	0) 20
606-234	BH-41	1	3051884.02	13813617.32	79.67	,	0) 20
606-234	BH-42	1	3051938.54	13811525.26	96.2	1.	1 0	20
606-234	BH-43	1	3052194.5	13811817.89	87.69		8	20
606-234	BH-44	1	3052017.72	13812263.28	96.36		7 0) 20
606-234	BH-45	1	3052001.29	13812488.7	8.96	J.	0 6	20
606-234	BH-46	1	3051952.2	13812936.53	83.7		0 9) 20
606-234	BH-47	1	3052113	13813155	83.75	J.	0 6) 20
606-234	BH-48	1	3052013.86	13813555.26	80.54		7) 20
606-234	BH-5	1	3050055.99	13812897	103.6		4) 20
606-234	BH-6	1	3049897.21	13813070.95	102.53		7) 20
606-234	BH-7	1	3050293.95	13811587.05	96.81	1	2 0) 20
606-234	8H-8	1	3050463.01	13811719	103.8	1	1 0) 20
606-234	BH-9	1	3050441.96	13812089.44	104.23		4 0) 20
606-234	SPB-1	ч	3050519.49	13811950.62	102.3	62	2 0) 20
606-234	SPB-2	1	3050534.89	13812879.74	108.36	42	2 0) 20
606-234	SPB-3	1	3051164.72	13811958.15	100.37	20	0 0	20
606-234	SPB-4	1	3051637.7	13813205.7	85.68	17	7 0) 20
606-234	SPB-5	П	3052067.45	13812012.73	95.41	51	1 0) 20

Borehole Numbe	TopDepth	BottomDepth	Elevation	Thickness DescTitle	Description	XCoord	YCoord
BH-1	0	5.5	0	5.5 Clay	Yellowish brow	3049942	13811573
BH-1	5.5	7,9000000954	0	2.4000000954 Clay	Very stiff, 10YR	3049942	13811573
BH-1	7.9000000954	8	0	0.0999999046 Waste	Wood, constru	3049942	13811573
BH-1	8	8	0	0 EOB @ 8'		3049942	13811573
BH-10	0	7.75	0	7.75 Clay	Stiff, 10YR6/2, I	3050297	13812364
BH-10	7.75	9	0	1.25 Waste	Shredded woo	3050297	13812364
BH-10	9	9	0	0 EOB @ 9'		3050297	13812364
BH-11	0	1.5	0	1.5 Sand	Loose, 10TY8/2	3050350	13812725
BH-11	1.5	4.75	0	3,25 Clay	Very stiff, 10YR	3050350	13812725
BH-11	4.75	5.75	0	1 Clay	Stiff, 10YR3/3,	3050350	13812725
BH-11	5.75	6	0	0.25 Waste	Constrcution w	3050350	13812725
BH-11	6	6	0	0 EOB @ 6'		3050350	13812725
BH-12	0	3.5	0	3.5 Clay	Very Stiff, 10YR	3050169	13813105
BH-12	3.5	4	0	0.5 Waste	Construution w	3050169	13813105
BH-12	4	4	0	0 EOB @ 4'		3050169	13813105
BH-13	0	3	0	3 Silty Clay	Stiff, 10YR5/3,	3050704	13811506
BH-13	3	7	0	4 Clay	Soft, 10YR5/4,	3050704	13811506
BH-13	7	10	0	3 Clay	Soft, 10YR4/4,	3050704	13811506
вн-13	10	11	0	1 Waste	Constrcution w	3050704	13811506
BH-13	11	11	0	0 EOB @ 11'		3050704	13811506
BH-14	0	2.75	0	2.75 Clay	Soft, 10YR4/2,	3050797	13811983
BH-14	2.75	3	0	0.25 Sand	10YR5/2, very	3050797	13811983
BH-14	3	9	0	6 Clay	Soft, 10YR5/3,	3050797	13811983
BH-14	9	10	0	1 Waste	Constrcution w	3050797	13811983
BH-14	10	10	0	0 EOB @ 10'		3050797	13811983
BH-15	0	8	0	8 Clay	Very stiff, 10YR	3050527	13812280
BH-15	8	9	0	1 Waste	Constrcution w	3050527	13812280
BH-15	9	9	0	0 EOB @ 9'		3050527	13812280
BH-16	0	2.25	0	2.25 Clayey Sand	Dense, 10YR7/	3050808	13812461
BH-16	2.25	7	0	4.75 Clay	Stiff, 10YR6/6,	3050808	13812461

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BoreholeNumbe	TopDepth	BottomDepth	Elevation	Thickness	DescTitle	Description	XCoord	YCoord
BH-16	7	8	0	1	Waste	Constrcution w	3050808	13812461
BH-16	8	8	0	C	EOB @ 8'		3050808	13812461
BH-17	0	2	0	2	Clay	Very Stiff, 10YR	3050692	13812788
BH-17	2	4.5	0	2.5	Clay	Stiff, 10YR5/6,	3050692	13812788
BH-17	4.5	5.75	0	1.25	Clay	Soft, 10YR4/4,	3050692	13812788
BH-17	5.75	6	0	0.25	Waste	Shredded and s	3050692	13812788
BH-17	6	6	0	C	EOB @ 6'		3050692	13812788
BH-18	0	4.5	0	4,5	Clay	Stiff, 10YR4/4,	3050502	13813081
BH-18	4.5	5	0	0.9	Clay	Soft, 10YR4/1,	3050502	13813081
BH-18	5	6	0	1	Waste	Constrcution w	3050502	13813081
BH-18	6	6	0	C	EOB @ 6'		3050502	13813081
BH-19	0	3	0	3	Clay	Hard, 10YR4/3,	3051179	13811526
BH-19	3	5.75	0	2.75	Clay	Stiff, 10YR4/1,	3051179	13811526
BH-19	5.75	6	0	0.25	Waste	Shredded, parti	3051179	13811526
BH-19	6	6	0	C	EOB @ 6'		3051179	13811526
BH-2	0	3.4000000954	0	3.4000000954	Clay	Hard, 10YR6/6	3049964	13811741
BH-2	3.4000000954	3.5	0	0.0999999046	5	very thin (1/4")	3049964	13811741
BH-2	3.5	5	0	1.5	Sandy Clay	Very stiff, 10YR	3049964	13811741
BH-2	5	8.5	0	3.5	Clay	Very stiff, 10YR	3049964	13811741
BH-2	8.5	10.899999619	0	2.3999996185	Waste	Shredded woo	3049964	13811741
BH-2	10.899999619	11	0	0.1000003815	EOB @ 11'		3049964	13811741
BH-20	0	5.9499998093	0	5.9499998093	Clay	Medium, 10YR	3051069	13812269
BH-20	5.9499998093	6	0	0.0500001907	' Waste	Waste in botto	3051069	13812269
BH-20	6	6	0	(EOB @ 6'		3051069	13812269
BH-21	0	2.75	0	2.75	Clay	Hard, 10YR5/6,	3051157	13812269
BH-21	2.75	3	0	0.25	Waste	Waste- Shingle	3051157	13812269
BH-21	3	3	0		EOB @ 3'		3051157	13812269
BH-22	0	3.5	0	3.5	Clay	Soft, 10YR5/4,	3051157	13812269
BH-22	3.5	11	0	7.9	Clay	Very Stiff, 10YR	3051157	13812269
BH-22	11	12.5	0	1.5	Silty Clay	Soft, 10YR6/2, I	3051157	13812269

Borehole Numbe	TopDepth	Bottom Depth	Elevation	Thickness DescTitle	Description	XCoord	YCoord
BH-22	12.5	13	0	0.5 Waste	Construction w	3051157	13812269
BH-22	13	13	0	0 EOB @ 13'		3051157	13812269
BH-23	0	5.5	0	5.5 Clay	Hard, 10YR5/4	3051084	13813033
BH-23	5.5	7.75	0	2.25 Clay	Stiff, 10YR3/2,	3051084	13813033
BH-23	7.75	8	0	0,25 Waste	Composite shin	3051084	13813033
BH-23	8	8	0	0 EOB @ 13'		3051084	13813033
BH-24	0	3,9000000954	0	3.9000000954 Clay	Hard, 10YR5/2,	3051140	13813350
BH-24	3,9000000954	4	0	0.0999999046 Waste	Construction w	3051140	13813350
BH-24	4	8	0	4 EOB @ 4'		3051140	13813350
BH-25	0	3.75	0	3.75 Clay	Medium stiff, 1	3050297	13812364
8H-25	3.75	8.75	0	5 Clay	Stiff, 10YR3/2,	3050297	13812364
BH-25	8.75	9	0	0.25 Waste	Shredded, deca	3050297	13812364
BH-25	9	9	0	0 EOB @ 9'		3050297	13812364
BH-26	0	2.5	0	2.5 Sandy Clay	Very stiff, 10YR	3051225	13811195
BH-26	2.5	2.5999999046	0	0.0999999046 Sand	Dense, 10YR6/	3051225	13811195
BH-26	2.5999999046	4.5	0	1.9000000954 Clay	Very stiff, 10YR	3051225	13811195
BH-26	4.5	6.5	0	2 Clay	Soft, 10YR3/2,	3051225	13811195
BH-26	6.5	7.9000000954	0	1.4000000954 Clay	Soft, 10YR3/4,	3051225	13811195
BH-26	7.9000000954	8	0	0.0999999046 Waste	Wood, plastic	3051225	13811195
BH-26	8	8	0	0 EOB @ 8'		3051225	13811195
BH-27	0	5.5	0	5.5 Clay	Stiff, 10YR5/2,	3051382	13811533
BH-27	5.5	8	0	2.5 Clay	Stiff, 10YR6/2, I	3051382	13811533
BH-27	8	9.5	0	1.5 Clay	Stiff, 10YR3/2,	3051382	13811533
BH-27	9,5	10	0	0.5 Waste	Wood, plastic	3051382	13811533
BH-27	10	10	0	0 EOB @ 10'		3051382	13811533
BH-28	0	2.5	0	2.5 Clay	Very Stiff, 10YR	3051265	13811895
BH-28	2.5	6	0	3.5 Clay	Hard, 10YR4/6,	3051265	13811895
BH-28	6	8.5	0	2.5 Clay	Stiff, 10YR5/2,	3051265	13811895
BH-28	8.5	9	0	0.5 Waste	Wood, plastic	3051265	13811895
BH-28	9	9	0	1 EOB @ 9'		3051265	13811895

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Borehole Numbe	TopDepth	BottomDepth	Elevation	Thickness	DescTitle	Description	XCoord	YCoord
BH-29	0	1.75	0	1.75	Clay	Very stiff, 10YR	3051411	13812344
BH-29	1.75	5	0	3.25	Clay	Stiff, 10YR6/4, I	3051411	13812344
BH-29	5	6.5	0	1.5	Clay	Soft, 10YR4/2,	3051411	13812344
BH-29	6.5	7	0	0.5	Waste	plastic	3051411	13812344
BH-29	7	7	0	(EOB @ 7'		3051411	13812344
BH-3	0	7.5	0	7.5	Clay	Very stiff, 10YR	3050113	13812040
вн-3	7.5	7.9000000954	0	0.4000000954	Waste	Shredded woo	3050113	13812040
BH-3	7.9000000954	8	0	0.0999999046	EOB @ 8'		3050113	13812040
BH-30	0	4.5	0	4.5	Clay	Stiff, 10YR5/3,	3051467	13812643
BH-30	4.5	10	0	5.5	Clay	Hard, 10YR5/6,	3051467	13812643
BH-30	10	16.5	0	6.5	Clay	Soft, 10YR4/1,	3051467	13812643
BH-30	16.5	17	0	0.5	Waste	composite shin	3051467	13812643
BH-30	17	17	0		EOB @ 7'		3051467	13812643
BH-31	0	3.75	0	3.75	Clay	Very stiff, 10YR	3051325	13812931
BH-31	3.75	6.5	0	2.75	Clay	Hard 10YR4/2,	3051325	13812931
BH-31	6.5	7	0	0.5	Waste	Construction w	3051325	13812931
BH-31	7	7	0		EOB @ 7'		3051325	13812931
BH-32	0	6.9000000954	C	6.9000000954	Clay	Hard, 10YR4/6,	3051233	13813097
BH-32	6.9000000954	7	C	0.0999999046	Waste	Waste in botto	3051233	13813097
BH-32	7	7	C	. (EOB @ 7'		3051233	13813097
BH-33	0	3.5	C	3.5	Clay	Hard, 10YR4/2,	3051483	13813465
BH-33	3.5	8.25	C	4.7	Clay	Very stiff, 10YR	3051483	13813465
BH-33	8.25	12.5	C	4.25	Clay	Stiff, 10YR3/2,	3051483	13813465
BH-33	12.5	13	C	0.5	Waste	Decomposed c	3051483	13813465
BH-33	13	13			EOB @ 13'		3051483	13813465
BH-34	0	5	c		Clay	Hard 10YR5/3,	3051233	13813097
BH-34	5	11,899999619	C	6.899999618	5 Clay	Stiff, 10YR4/1,	3051233	13813097
BH-34	11.899999619	12		0.100000381	Waste	Decomposed c	3051233	13813097
BH-34	12	12	C	1	EOB @ 12'		3051233	13813097
BH-35	0	4.5	C	4.5	5 Clay	Very stiff, 10YR	3051699	13811465

BoreholeNumbe	TopDepth	Bottom Depth	Elevation	Thickness	DescTitle	Description	XCoord	YCoord
BH-35	4.5	6	0	1.5	Sandy Clay	Soft, 10YR6/2, I	3051699	13811465
BH-35	6	7,5	0	1.5	Clay	Soft 10YR3/2, v	3051699	13811465
BH-35	7.5	8	0	0.5	Waste	Construction w	3051699	13811465
BH-35	8	8	0	0	EOB @ 8'		3051699	13811465
BH-36	0	4,5	0	4.5	Clay	Very stiff-hard,	3051600	13811905
BH-36	4.5	5,9000000954	0	1.4000000954	Clay	Stiff, 10YR3/2,	3051600	13811905
BH-36	5,9000000954	6	0	0.0999999046	Waste	Wood, composi	3051600	13811905
BH-36	6	6	0	0	EOB @ 6"		3051600	13811905
BH-37	0	5.5	0	5,5	Clay	Very stiff, 10YR	3051675	13812221
BH-37	5,5	9.75	0	4.25	Clay	Very stiff-stiff,	3051675	13812221
BH-37	9.75	10	0	0.25	Waste	Wood, shingles	3051675	13812221
8H-37	10	10	0	0	EOB @ 10'		3051675	13812221
BH-38	0	4.75	0	4.75	Clay	Hard, 10YR3/3	3051785	13812616
BH-38	4.75	6.5	0	1.75	Clay	Soft, 10YR5/4,	3051785	13812616
BH-38	6.5	7.75	0	1.25	Clay	Very stiff, 10YR	3051785	13812616
BH-38	7.75	8	0	0.25	Waste	Plastic	3051785	13812616
BH-38	8	10	0	2	EOB @ 8'		3051785	13812616
BH-39	0	6.75	0	6.75	Clay	Soft 10YR5/2, g	3051691	13812823
BH-39	6.75	12.25	0	5.5	Clay	Soft-medium st	3051691	13812823
BH-39	12.25	15.899999619	0	3.6499996185		Consistency ch	3051691	13812823
BH-39	15.899999619	16	0	0.1000003815	Waste	Drain tile and	3051691	13812823
BH-39	16	16	0	0	EOB @ 16'		3051691	13812823
ВН-4	0		0	4.25	Clay	Very stiff, 10YR	3049931	13812593
BH-4	4.25	5	0	0.75	Sandy Clay	Soft, 10YR5/6,	3049931	13812593
BH-4	5	13.5	0	8.5	Clay	Soft, 10YR3/4,	3049931	13812593
BH-4	13.5	14	0	0.5	Waste	Shredded woo	3049931	13812593
BH-4	14		0	0	EOB @ 14'		3049931	13812593
BH-40	0		0	1.5	Clay	Hard, 10YR4/3,	3051740	13813387
BH-40	1.5		0	5	Clay	Stiff-medium st	3051740	13813387
BH-40	6.5	8	0	1.5	Clayey Sand	Loose, 10YR5/6	3051740	13813387

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BoreholeNumbe	TopDepth	BottomDepth	Elevation	Thickness	DescTitle	Description	XCoord	YCoord
BH-40	8	9.75	0	1.75	Clay	Soft, 10YR3/2,	3051740	13813387
BH-40	9.75	10	0	0.25	Waste	Composite shin	3051740	13813387
BH-40	10	10	0	0	EOB @ 10'		3051740	13813387
BH-41	0	1	0	1	Clayey Sand	Dense, 10YR6/	3051884	13813617
BH-41	1	3.5	0	2.5	Clay	Hard 10YR3/3,	3051884	13813617
BH-41	3.5	4	0	0.5	Waste	Shredded woo	3051884	13813617
BH-41	4	4	0	0	EOB @ 4'		3051884	13813617
BH-42	0	8	0	8	Clay	Hard, 10YR4/4,	3051938	13811525
BH-42	8	10	0	2	Clay	Soft, 10YR3/2,	3051938	13811525
BH-42	10	11	0	1	Waste	Shredded woo	3051938	13811525
BH-42	11	11	0	0	EOB@ 11'		3051938	13811525
BH-43	0	5	0	5	Clay	Very stiff, 10YR	3052189	13811816
BH-43	5	7	0	2	Clay	Medium stiff 1	3052189	13811816
BH-43	7	8	0	1	Waste	concrete, wood	3052189	13811816
BH-43	8		0	0	EOB@8'		3052189	13811816
BH-44	0		0	4.5	Clay	Very stiff-hard,	3052018	13812264
BH-44	4.5	5.5	0	1	Clay	Soft, 10YR5/2,	3052018	13812264
BH-44	5.5	6.75	0	1.25	Clay	Very stiff, 10YR	3052018	13812264
BH-44	6.75		0	0.25	Waste	Composite shin	3052018	13812264
BH-44	7		0	C	EOB@ 7'		3052018	13812264
BH-45	0		0	3.5	Clay	Very stiff, 10YR	3052002	13812489
BH-45	3.5		0	1.5	Clay	Soft, 10YR6/2, I	3052002	13812489
BH-45	5		D	3	Clay	Soft, 10YR5/4,	3052002	13812489
BH-45	8		0	1	Waste	Wood, plastic	3052002	13812489
BH-45	9		0		EOB@ 9'		3052002	13812489
BH-46	0		0	2.5	Silty Clay	Hard, 10YR5/4,	3051952	13812937
BH-46	2.5		0	2	Clay	Medium stiff, 1	3051952	13812937
BH-46	4.5		0	1.4000000954	Clay	Medium stiff, 1	3051952	13812937
BH-46	5.9000000954		0	0.0999999046	Waste	Concrete, cond	3051952	13812937
BH-46	5.5000000554		0		EOB@ 7'		3051952	13812937

BoreholeNumbe	TopDepth	BottomDepth	Elevation	Thickness	DescTitle	Description	XCoord	YCoord
BH-47	0	5.75	0	5.75	Sand	Loose, 10YR6/3	3052113	13813155
BH-47	5.75	8.5	0	2.75	Clay	Hard, 10YR4/2,	3052113	13813155
BH-47	8.5	9	0	0.5	Waste	Concrete, plasti	3052113	13813155
BH-47	9	9	0	0	EOB @ 9'		3052113	13813155
BH-48	0	1.5	0	1.5	Sandy Clay	Hard, 10YR6/4,	3051986	13813499
BH-48	1.5	6.5	0	5	Clay	Hard, 10YR4/2,	3051986	13813499
BH-48	6.5	7	0	0.5	Waste	Plastic, glass	3051986	13813499
BH-48	7	7	0	0	EOB @ 9'		3051986	13813499
BH-5	0	3.75	0	3.75	Clay	Stiff, 10YR5/2,	3050056	13812897
BH-5	3.75	4	0	0.25	Waste	Shredded woo	3050056	13812897
BH-5	4	4	0	0	EOB @ 4'		3050056	13812897
ВН-6	0	5	0	5	Clay	Very Stiff, 10YR	3049897	13813071
ВН-6	5	6.75	0	1.75	Silty Clay	Soft, 10YR5/1,	3049897	13813071
BH-6	6.75	7	0	0.25	Waste	Shredded woo	3049897	13813071
BH-6	7	7	0	0	EOB @ 7'		3049897	13813071
BH-7	0	6	0	6	Clay	Very stiff, 10YR	3050294	13811587
BH-7	6	10.5	0	4.5	Clay	Medium stiff, 1	3050294	13811587
BH-7	10.5	12	0	1.5	Waste	Shredded woo	3050294	13811587
BH-7	12	12	0	0	EOB @ 12'		3050294	13811587
BH-8	0	1.5	0	1.5	Sand	Dense, 7.5YR6/	3050463	13811719
BH-8	1.5	7	0	5.5	Silty Clay	Very soft, 10YR	3050463	13811719
BH-8	7	10.25	0	3.25	Clay	Very soft, 10YR	3050463	13811719
BH-8	10.25	11	0	0.75	Waste	Shredded woo	3050463	13811719
вн-в	11	11	0	0	EOB @ 11'		3050463	13811719
BH-9	0	2	0	2	Clay	Very stiff, 10YR	3050442	13812090
BH-9	2	3	0	1	Clay	Medium stiff, 1	3050442	13812090
вн-9	3	4	0	1	Waste	Shredded woo	3050442	13812090
вн-9	4	4.0100002289	0	0	EOB @ 4'		3050442	13812090
SPB-1	0	5	0	5	Clay	Hard-very stiff,	3049942	13811573
SPB-1	5	7	0	2	Clay	Medium stiff-st	3049942	13811573

Page 7

LithologyReport

BoreholeNumbe	TopDepth	BottomDepth	Elevation	Thickness	DescTitle	Description	XCoord	YCoord
SPB-1	7	14	0	7	Waste	Wood, pressbo	3049942	13811573
SPB-1	14	14.5	0	0.5	Sandy Clay	Medium stiff 1	3049942	13811573
SPB-1	14.5	34	0	19.5	Waste	Wood, pressbo	3049942	13811573
SPB-1	34	34.5	0	0.5	Sand	Dense, 10YR5/	3049942	13811573
SPB-1	34.5	61	0	26.5	Waste	Wood, pressbo	3049942	13811573
SPB-1	61	62	0	1	Sand	10YR4/1, Dark	3049942	13811573
SPB-1	62	8	0	C	EOB @ 62'		3049942	13811573
SPB-2	0	3	0	3	Clay	Very Stiff-hard,	3050518	13812890
SPB-2	3	5	0	2	Clay	Medium stiff-st	3050518	13812890
SPB-2	5	20	0	15	Waste	Wood, shredde	3050518	13812890
5PB-2	20	21	0	1		3" of stiff 10YR	3050518	13812890
SPB-2	21	38	0	17	Waste	Wood, pressbo	3050518	13812890
SPB-2	38	39	0	1		3" of 10YR5/1 g	3050518	13812890
SPB-2	39	41	0	2		Wood, pressbo	3050518	13812890
SPB-2	41	42	0	1	Clay	Stiff-very stiff,	3050518	13812890
SPB-2	42	42	0	C	EOB @ 42'		3050518	13812890
SPB-3	0	4.5	0	4.5	Clay	Very stiff-hard,	3051138	138712016
SPB-3	4.5	8.75	0	4.25	Clay	Soft, 10YR3/2,	3051138	138712016
SPB-3	8.75	12	0	3.25	Waste	Wood, shredde	3051138	138712016
SPB-3	12	25	0	13	Waste	Wood, pressbo	3051138	138712016
SPB-3	25	27.25	0	2.25	Clay	Stiff, 5YR5/1, gr	3051138	138712016
SPB-3	27.25	40	0	12.75	Waste	Decomposed w	3051138	138712016
SPB-3	40	41	0	1	Clay	Dense, 10YR6/	3051138	138712016
SPB-3	41	49.5	0	8.5	Waste	Shredded or de	3051138	138712016
SPB-3	49.5	50	0	0.5	Clay	Very stiff, 10YR	3051138	138712016
SPB-3	50	50	0	C	EOB @ 50'		3051138	138712016
SPB-4	0	5.5	0	5.5	Clay	Stiff-very stiff,	3051652	13813201
SPB-4	5.5	17	0	11.5	Waste	Constrction wo	3051652	13813201
SPB-4	17	17	0	C	EOB @ 17	First Attempt -	3051652	13813201
SPB-5	0	4	0	4	Clay	Hard-very stiff,	3052087	13812015

BoreholeNumbe	TopDepth	Bottom Depth	Elevation	Thickness DescTi	tie Description	XCoord	YCoord
SPB-5	4	5	0	1 Clay	Medium stiff, 1	3052087	13812019
SPB-5	5	21	0	16 Waste	Pressboard, pa	3052087	13812015
SPB-5	21	23	0	2 Clay	Stiff, 10YR4/1,	3052087	13812015
SPB-5	23	30	0	7 Waste	Wood, carpetin	3052087	13812015
SPB-5	30	31	0	1	Soft, 10YR4/1,	3052087	13812015
SPB-5	31	40.5	0	9.5 Waste	Wood, composi	3052087	13812015
SP8-5	40.5	43	0	2.5 Clay	Stiff-medium st	3052087	13812015
SPB-5	43	50	0	7 Waste	Shredded and	3052087	13812015
SPB-5	50	51	0	1 Clay	Medium stiff, 1	3052087	13812015
SPB-5	51	51	0	0 EOB @ 51		3052087	13812015

APPENDIX C

Fugro's Report of Soil Testing

APPENDIX D Important Information About Your Geotechnical Engineering Report

TEST FILL SURVEY DATA

SUGAR HILL REDEVELOPMENT PROJECT SETTLEMENT PLATE TOP ROD ELEVATION CALCULATION VARIFICATION

May	10.	20	06
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W.	7	IVI	ay 10, 20	00		
	Location	Adj.	nsturmen	Adj.	Location	Loop
	ID	+	Elev.	100	Elev.	Error
		(feet)	(feet)	(feet)	(feet)	(feet)
	TBM-SP1				103.93	
Bench Mar		3.48	107.41			
	SP1-A			2.84	104.57	
	SP1-B			2.75	104.66	
	SP1-C			2.41	105.00	
	SP1-D			2.61	104.80	
	SP1-E			2.58 2.58	104.83 104.83	
ا Bench Maı	TP(SP1-E)	2.44	107.27	2.56	104.63	
	TBM-SP1	2.44	107.27	3.34	103.93	0.00
				3.34	107.32	0.00
l Bench Mai	TBM-SP2	6.14	113.46		107.32	
		0.14	113.40	1.52	111.94	
	SP2-A			1.52	111.50	
	SP2-B SP2-C			2.22	111.30	
	SP2-C SP2-D			1.76	111.24	
	SP2-E			1.70	111.70	
	TP(SP2-E)			1.92	111.54	
Bench Mai		1.69	113.23	1.02	111.54	
	TBM-SP2	1.00	110.20	5.91	107.32	0.00
	TBM-SP3				99.32	
Bench Mai		6.3	105.62		00.02	
	SP3-A	0.0	100101	1.74	103.88	
	SP3-B			1.64	103.98	
	SP3-C			1.33	104.29	
	SP3-D			1.69	103.93	
	SP3-E			1.55	104.07	
	TP(SP3-E)			1.55	104.07	
Bench Mai		1.35	105.42			
	TBM-SP3			6.10	99.32	0.00
	TBM-SP4				86.77	
Bench Mai		4.19	90.96			
	SP4-A			2.48	88.48	
	SP4-B			2.51	88.45	
	SP4-C			2.18	88.78	
	SP4-D			2.18	88.78	
	SP4-E			2.30	88.66	
	TP(SP4-E)	Ŷ,		2.30	88.66	
Bench Ma		2.15	90.81			
	TBM-SP4			4.04		0.00
	TBM-SP5				97.31	
Bench Ma		3.98	101.29			
	SP5-A			1.81	99.48	
	SP5-B			2.26		
	SP5-C			1.60		
	SP5-D			1.31	99.98	
	SP5-E			1.73		
	TP(SP-5E)		404.00	1.73	99.56	
Bench Ma		1.50	101.06		07.20	0.04
	TBM-SP5			3.76	97.30	-0.01

D. Grant Field Book NO. 129 (3)	Refer to Klotz Associates Project Our Job No. 2005-221-16	See FB No. 97, Pg. 35	a in	D S P I		
Settlement Plate Survey	client: Civil & Environmental Consultants, Inc. our Job 100. 2006-253-01	Ekvation Monitoring Survey HIV - Elv Rocks. 3 107.66	2.98 104.58 2.98 104.68 2.65 105.01		3.64 103.93 103.93	
Sugar	chest: Civil & En	First 6 60 5ta + TBM-5P1	SP1-A SP1-B SP1-C	5P1-0 5P1-6	73M-581	

D. Grant Field Book NO. 129 (3)	Refer to Klotz Associates Project Our Job No. 2005-221-16		SEE FEND. 37, Pg. 35	a v		111		D	<u>a</u>		
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Sugar Hill Golf Course	chest: Civil & Environment our Job No. 2006-253-	E KUO	78M-5P1 3.73 107.66	SP1-A		5P1-C	501-0	5pi-E	77	4.83 107.57	73M - SPI

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4-11-06 conta	5 P B A A B B B B B B B B B B B B B B B B
Elevation Manitoring Saries	H1 — EW Rinks 1.25 111-97 1.75 111-52 1.95 111-27 1.67 111-58 1.67 111-58 5.19 108-06 5.19 107-32 5.19 208-06
First Eleva	54a + 57a + 59a + 5a + 5

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4-11-06 contid	SEC FB. NO 97, Pg. 35	n a	A W	
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horing bu	Elv Rinks		88 88.78 8.47.89			
- Sulla	EN 86.77			86.77		
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FOUNTY Elevation	Sta + 1811-508 + 3.98	595-4 595-6 505-0 505-0 505-6 1-50	Nofes: (1) See First



GEOTECHNICAL INVESTIGATION REPORT

Project Name:
Kirkwood Crossing
12000 Bissonnet Street
Houston, Texas

Prepared for:
Impact Residential Development, LLC
118 Vintage Park, Suite W406
Houston, TX 77070

Prepared by:
Goodheart & Associates PLLC

2021 Midwest Road, Suite 200

Oak Brook, IL 60523

Project No. 22-009.001

TEXAS REGISTERED ENGINEERING FIRM NO. F-21548

October 21, 2022



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1. INTRODUCTION

1.1 General

This report presents the results of our geotechnical investigation for the Kirkwood Crossing property located at 12000 Bissonnet Street in Houston, Harris County, Texas (Site). Kirkwood Crossing is a 12.085-acre parcel in southwest Houston currently owned by Bissonnet 136 LLC (Bissonnet 136). Figure 1 presents a Vicinity Map showing the general location of the Site. This report was prepared by Goodheart & Associates PLLC (Goodheart) for Impact Residential Development LLC (IRD) in accordance with our original proposal to IRD, dated April 25, 2022.

A Municipal Solid Waste (MSW) Type IV (construction and demolition debris) landfill occupies the entire Site. IRD is planning to acquire and redevelop the Site with a multi-family housing development project. IRD has retained SKA Consulting, L.P. (SKA) to assist with Texas Commission on Environmental Quality (TCEQ) permitting associated with redevelopment over a landfill. Kimley-Horn and Associates, Inc. (KH) will provide Site civil design services, and Rosemann & Associates, P.C. (Rosemann) will provide architectural and structural engineering services for the project.

Bissonnet 136 will provide roads, utilities, and other infrastructure necessary to access and redevelop the Site. Goodheart is familiar with the overall property and has provided geotechnical consulting services in support of Bissonnet 136 redevelopment efforts. SKA and KH have also supported Bissonnet 136 redevelopment efforts on the overall property, SKA with TCEQ permits and other related environmental matters and KH with master planning and Site civil design services.

1.2 Project Description

Planned Site improvements include five (5) multi-family residential structures, a community building (Clubhouse), surface parking, outdoor lighting, exterior amenities and green space. The multi-family residential structures will be 3-story, walk-up buildings that vary in size and footprint (see Table 1 for basic building information). Building widths will be approximately 100 feet and the length will vary depending on the size of the building and the number of units.



TABLE 1: BUILDING INFORMATION

Building Number	Gross Size ¹ (SQ FT)	Number of Units ¹	Comments
1	25950	24	3-Story walk-up Residential
2	19560	18	3-Story walk-up Residential
3	25950	24	3-Story walk-up Residential
4	49380	48	3-Story walk-up Residential
5	23070	24	3-Story walk-up Residential
6	3250		1-Story Community Building

^{1 –} Information provided by IRD

The residential buildings will be wood-frame construction with variably clad exterior walls (stone 45% and fiber cement 55%) resting on continuous slab-on-grade foundations. Exterior wall loads will range up to 4000 pounds per linear foot, and interior wall loads will range between 2000 and 3700 pounds per linear foot. The Community Building will be supported on a continuous slab-on-grade foundation, with interior wall loads ranging up to 1300 pounds per linear foot and exterior wall loads of approximately 700 pounds per linear foot.

1.3 Purpose and Scope of Services

The purpose of the geotechnical investigation program for this project was to:

- Evaluate the character and nature of the surficial fill, landfill cap, and underlying waste and potential for soft zones or voids beneath the proposed improvements;
- Develop conclusions regarding the need for ground improvement or deep foundations to support the proposed improvements;
- Provide recommended foundation types for support of the proposed structures;
- Develop design criteria for shallow foundations and slabs-on-grade;
- Develop the data necessary to estimate total and differential settlements for the proposed improvements; and
- Provide recommendations for earthwork and shallow foundation construction.

The proposed scope of services for this investigation was outlined in Goodheart's April 25, 2022, proposal to IRD and included:

1. Developing a field exploration plan based on prior Site knowledge and the Preliminary Site Plan provided by IRD, obtaining a Subchapter T permit as well as a landfill modification permit from



the Texas Commission on Environmental Quality (TCEQ), staking proposed boring locations in the field, making One Call notifications to clear borings of underground utilities, and selecting subcontractors for the field exploration program.

- 2. Drilling and sampling twelve (12) soil borings with truck-mounted hollow stem auger (HSA) equipment to depths ranging from 15 to 60 feet below existing surface grade, including three (3) borings to depths of approximately 60 feet below ground surface (bgs), three (3) borings to depths of approximately 55 feet bgs, two (2) borings to depths of approximately 12 feet bgs, and four (4) borings to depths of approximately 10 feet bgs. These borings were expected to encounter overburden soils, landfill waste, and in the six deeper borings, natural soils below the bottom of the landfill. (Note that the field exploration program had to be modified while in progress due to the presence of landfill gases and accessibility issues that were encountered.)
- 3. Conducting a geotechnical laboratory testing program on the subsurface materials encountered during the field exploration program.
- 4. Performing geotechnical engineering analyses as required to provide recommendations for design and construction of foundations and earthwork. The anticipated scope of the geotechnical report included:
 - Description of field exploration and laboratory testing methodology
 - Findings of field exploration and laboratory testing programs, including final boring logs and laboratory test data
 - Discussion and conclusions regarding the need for ground improvement or deep foundations to support the proposed improvements (see note below)
 - Shallow foundation design recommendations, including allowable bearing pressures and estimated total and differential settlements
 - Lateral earth pressure design criteria
 - Slab-on-grade design recommendations
 - Utility trench design and construction recommendations
 - Earthwork design and construction recommendations



2. BACKGROUND INFORMATION

Background information provided in this geotechnical report was summarized using available geotechnical data and Site information developed for the:

- Preliminary Geotechnical Engineering Report, prepared by Civil & Environmental Consultants, Inc., dated August 29, 2006 (CEC report);
- Phase II Environmental Site Assessment Report, Doty Sand Pit Venture Landfill and Olshan Landfill, 12000 Bissonnet, Houston, Harris County, Texas, prepared by SKA Consulting, L.P., dated July 29, 2019 (SKA report); and
- Supplemental Geotechnical Report, prepared by Goodheart & Associates, PLLC, dated February 19, 2020 (Supplemental Report).

The overall Bissonnet 136 property is approximately 136.8 acres in size and is located at 12000 Bissonnet Street on the north side of Bissonnet Street between Kirkwood Road on the east and Cook Road on the west. Two closed Municipal Solid Waste (MSW) Type IV (construction and demolition debris) landfills are located on the Bissonnet 136 property: the Doty Sand Pit Venture (DSPV) Landfill and Olshan Landfill. The DSPV Landfill covers approximately 118.8 acres and includes the IRD Site.

From the 1950's into the 1970's, the DSPV portion of the Site was operated as a sand mine. As sand reserves were depleted, open areas of the DSPV property were landfilled with construction and demolition waste. The DSPV Landfill received waste from about 1960 to 1999 and was permitted to receive construction and demolition waste in May 1970 under Harris County License No. 1. After the Texas Department of Health (TDH) assumed regulatory authority, the DSPV Landfill received an operating permit in May 1981 as a Type IV Landfill (MSW No. 1247). The facility was operational until August 1999. According to TCEQ records, the DSPV Landfill was then closed and capped with a three-foot thick compacted clay layer. The DSPV Landfill was certified closed in January 2001 and has been in post-closure care since that time. MSW Permit No. 1247 is still active with the TCEQ (successor agency to the TDH) pending permit revocation. The MSW 1247 permittee is Northwest Metro Holdings, CS 34, LLC (Northwest Metro), a related entity to Bissonnet 136.



A landfill gas management and monitoring network (gas vents and gas monitoring probes) was installed around the perimeter of both landfills by others in 2006. This network is currently monitored by SKA for Northwest Metro.

Following DSPV Landfill closure in 2000, some 2 million cubic yards of fill (also referred to in this report as surficial fill) was reportedly brought to the Site to create The Sugar Hills Golf Course on top of both landfills. The depth of surficial fill ranges from 0 to as much as 13.5 feet. The Sugar Hills Golf Course operated on top of the landfills from approximately 2000 to 2005, but was closed and abandoned. This report includes further discussion about the extent and effects of the surficial fill on the Site.



3. SUBSURFACE EXPLORATION

Field exploration and laboratory testing activities were conducted at the Site to further investigate the surficial fill/landfill cap materials, waste matrix and the depth and character of native soils beneath the Site, and to develop geotechnical data to support recommendations for design and construction of foundations and earthwork.

3.1 Field Exploration Program

Field exploration activities were conducted at the Site during the period July 28 through September 6, 2022. The field exploration program included drilling a total of fifteen (15) soil borings (see Figure 2 - Boring Location Plan, and Table 2 – Summary of Field Exploration Program). Twelve boring locations were pre-determined based on the preliminary layout of the planned improvements developed by Rosemann. Three (3) additional borings were drilled as offsets in relatively close proximity to original boring locations. The pre-determined boring locations were surveyed in the field and ground surface elevations were obtained for those locations prior to the start of drilling. One Call notifications were also made to clear boring locations prior to the start of drilling.

Twelve (12) borings were drilled using a CME 75 truck-mounted drill rig and three (3) borings were drilled using a CME 55 track-mounted drill rig. The borings ranged in depth from 6 feet below ground surface (bgs) to 75 feet bgs. Hollow stem augers (HSAs) were used to advance the borings to their terminal depths using standard methods (ASTM D-6151). Disturbed and undisturbed soil samples were typically obtained at 2½-foot intervals through the surficial fill and landfill cap materials. Sampling was then expanded to 5-foot intervals through the waste and into the underlying native soils (i.e., to the terminal depths of the borings). Twelve (12) soil borings were drilled by Tolunay-Wong Engineers, Inc. (TWE), and three (3) soil borings were drilled by Envirotech Drilling Services (EDS), both under subcontract to Goodheart. Soils encountered in the borings were classified in accordance with the Unified Soil Classification System (USCS) shown on Figure A1 in Appendix A. The Logs of Borings for this investigation are presented in Appendix A.

Disturbed samples were collected in general accordance with ASTM D-1586. A standard split barrel sampler (2.00-inch O.D. by 1.375-inch I.D.) was driven a total of 18 inches with an automatic 140-pound



hammer falling from a vertical height of 30 inches. The number of blows required to drive the split spoon sampler every 6 inches was recorded, and the number of blows required to drive the sampler the last 12 inches is typically designated as the SPT N-Value. Representative portions of the disturbed samples were placed in plastic bags, labelled and sealed, and transported to the geotechnical testing laboratory for further inspection and possible laboratory testing.

Undisturbed samples were obtained by hydraulically pushing a 3.0-inch diameter by 24-inch long thin-wall Shelby tube in general accordance with ASTM D-1587. Undisturbed samples were obtained in cohesive materials encountered at various locations and depths, as indicated on the boring logs. The thin-wall tubes were field extruded and intact specimens were wrapped in protective foil, placed in rigid plastic tubes and transported to the geotechnical testing laboratory for further inspection and possible laboratory testing. Pocket penetrometer tests were performed on cohesive materials in the field to obtain consistency measurements on the undisturbed samples.

The field exploration program was overseen by an experienced TWE geotechnical technician, who documented the field exploration program, logged the borings, collected representative disturbed and undisturbed samples, maintained communication with the senior project geotechnical engineer, and provided direction to the drillers.

Drill cuttings from the borings were collected and segregated where possible. Soil and waste materials were placed on plastic sheeting so that they could be sampled and analyzed for possible contaminants. Non-impacted soils were spread on the ground surface in the vicinity of the borings, and impacted soils and waste materials were to be managed for off-site disposal.

Groundwater levels were observed as the borings progressed; when groundwater was detected, drilling was halted so that groundwater levels could be observed and measured. Groundwater was encountered in only three borings; the remainder were dry at the time of drilling. Upon completion, the borings were filled with cement-bentonite grout from the bottom to the top.



Field drilling operations were monitored with a four-gas meter to check for possible explosive or dangerous gases (CH4, O2, H2S and CO). The presence of landfill gases at high concentrations resulted in termination of borings B22-1A, B22-4, B22-5A, B22-6A, and B22-8 before reaching planned depth and modifications to the planned drilling program, including mobilization of a track-mounted HSA drill rig with rotary wash capabilities to complete the field exploration program.

TABLE 2: SUMMARY OF FIELD EXPLORATION PROGRAM

TABLE 2. SOMMANT OF TILLS EXPLORATION PROGRAM									
Boring Number	Existing Top Elevation	Thickness of Surficial Fill and Landfill Cap (ft)	Thickness of CCDD Waste Material (ft)	Total Depth of Boring (ft)	Bottom Elevation of Waste	Groundwater Elevation			
B22-1A ¹	103.45	2.0		3.0		Not Encountered			
B22-1B	103.45	2.5	68.5	75.0	32.45	Not Encountered			
B22-2	104.94	4.0	50.0	55.0	50.94	20.0			
B22-3	99.09	8.5	50.0	60.0	40.59	10.5			
B22-4 ¹	107.4	6.0		10.0		Not Encountered			
B22-5A ¹	103.37	12.0+		12.0		Not Encountered			
B22-5B	103.4	13.5	45.0	65.0	44.9	Not Encountered			
B22-6A ¹	102.08	13.5		15.0		Not Encountered			
B22-6B	102.01	13.0	45.5	60.0	43.21	Not Encountered			
B22-7	104.0	4.5		10.0		Not Encountered			
B22-8 ¹	105.46	4.0		20.0		Not Encountered			
B22-9	105.59	10.0+		10.0		Not Encountered			
B22-10	102.82	10.0+		10.0		Not Encountered			
B22-11	98.18	6.5		12.0		10.0			
B22-12	101.09	2.5		10.0		Not Encountered			

^{1 –} Elevated landfill gases encountered in boring during drilling



3.2 Laboratory Testing

Select samples from the borings were tested to verify field soil classifications and to determine pertinent geotechnical engineering properties of the various materials encountered during the field exploration program. The laboratory testing program included:

- Natural moisture content
- Density and Unit Weight
- Atterberg limits
- Unconfined compression tests on soil
- One-dimensional consolidation tests

Based on geotechnical laboratory testing performed for this investigation, unconfined compressive strength (q_u) of the landfill cap material ranged between 3.0 and about 12+ kips per square foot (ksf), with a weighted average of about 8.0 ksf. Soil density ranged from 103 to 119 pounds per cubic foot (pcf). Soil moisture content for the surficial fill/landfill cap material ranged from 10.3 to 37.8 percent.

Soil classification and strength test results are summarized on Tables 3 and 4 and are presented on the individual boring logs. The results of all tests, including the one-dimensional consolidation tests, are included in Appendix B. Geotechnical laboratory tests were performed in accordance with current test standards as determined by ASTM. Laboratory testing was performed by TWE under subcontract to Goodheart.



TABLE 3: NATURAL MOISTURE CONTECT AND ATTERBERG LIMITS

	Depth	Natural Dry th Moisture Density					
Boring No.	(ft)	Content	(pcf)	LL	PL	PI	Comments
	. ,	(%)	., .				
B22-2	4.0-6.0	14.8	86.4	NV	NP	NP	Fill/Cap (NP)
B22-2	53.5-55.0	30.3	-	-	-	-	Native (SM)
B22-3	2.0-4.0	13.6	118.9	49	19	30	Fill/Cap
							(CL-CH)
B22-3	6.0-8.0	22.1	103.2	52	20	32	Fill/Cap (CH)
B22-3	10.5-12.0	37.8	-	48	20	28	Fill/Cap
							(CL-CH)
B22-3	18.5-20.0	54.5	-	83	30	53	Waste (CH)
B22-4	2.5-4.0	11.1	-	-	-	-	Fill/Cap (SM)
B22-4	4.0-6.0	13.0	117.7	44	17	27	Fill/Cap (CL)
B22-5A	4.0-6.0	18.7	105.2	53	18	35	Fill/Cap (CH)
B22-5A	8.0-10.0	20.8	106.2	53	19	34	Fill/Cap (CH)
B22-6A	2.5-4.0	14.2	1	-	ı	1	Fill/Cap (CL)
B22-6A	4.5-6.0	15.7	1	49	19	30	Fill/Cap (CH)
B22-6A	6.5-8.0	27.0	-	65	23	42	Fill/Cap (CH)
B22-6A	8.5-10.0	22.5	-	47	20	27	Fill/Cap (CL)
B22-6B	2.5-4.0	12.7		48	18	30	Fill/Cap (CL)
B22-6B	6.5-8.0	17.7	-	51	19	32	Fill/Cap (CH)
B22-6B	58.5-60.0	26.4		71	19	52	Native (CH)
B22-7	2.5-4.0	11.8	1	39	18	21	Fill/Cap (CL)
B22-8	2.5-4.0	10.5	1	31	15	16	Fill/Cap (CL)
B22-8	4.0-6.0	-	-	NV	NP	NP	Waste (NP)
B22-9	2.5-4.0	24.6	-	73	27	46	Fill/Cap (CH)
B22-9	8.5-10.0	18.1	-	-	-	-	Fill/Cap (CH)
B22-10	2.0-4.0	10.3	111.9	33	17	16	Fill/Cap (CL)
B22-11	2.5-4.0	13.2	-	38	17	21	Fill/Cap (CL)
B22-11	6.5-8.0	17.4	-	59	21	38	Waste (CH)
B22-11	8.0-10.0	22.8	-	56	22	34	Waste (CH)
B22-11	10.5-12.0	36.6	-	-	-	•	Waste (CH)
B22-12	2.5-4.0	11.6	-	-	-	-	Fill/Cap (CL)
B22-12	4.0-6.0	-	-	NV	NP	NP	Waste (NP)
B22-12	8.5-10.0	29.5	-	-	-	-	Fill/Cap (CH)

Notes: NP – Non plastic

CL – Low plasticity clay CH – High plasticity clay

SM – Silty Sand



TABLE 4: U-U TEST RESULTS

Boring No.	Depth (ft)	Soil Description	Test Type	Unconfined- Unconsolidated Compressive Strength (tsf)	Failure Strain (%)	Confining Pressure (psi)
B22-2	4.0-6.0	Dark Gray Tree Bark	U-U	17.1	15.0	4.0
B22-3	2.0-4.0 Gray Lean Clay (CL)		U-U	6.82	5.8	1.9
B22-3	6.0-8.0	Red-Brown Fat Clay (CH)	U-U	1.48	4.4	6.5
B22-4	4.0-6.0	Gray Lean Clay (CL)	U-U	5.87	10.3	4.0
B22-5A	4.0-6.0	Gray Fat Clay (CH)	U-U	2.95	3.24	4.0
B22-5A	8.0-10.0	Gray Fat Clay (CH)	U-U	1.83	14.8	7.5
B22-10	2.0-4.0	Gray Lean Clay (CL)	U-U	6.42	3.1	2.5



4. SITE CONDITIONS

4.1 Local Geology

The Site is located within the Coastal Plain physiographic province. The surficial native soils in the Site area are Quaternary deposits formed during periods of high standing sea level and are part of the Beaumont Formation of Pleistocene age. In the subsurface, the Beaumont Formation is undifferentiated from the underlying Lissie Formation. Figure 3 provides a Geological Map of the State of Texas and indicates the presence of Beaumont Formation soils at the Site.

Beaumont Formation soils often consist of reddish orange or dark brown to brownish dark gray clays, with very fine to fine quartz sand, silt, and minor fine gravel, intermixed and interbedded. The Beaumont formation includes poorly defined meander-belt ridges and pimple mounds aligned approximately normal to the coast, and marine delta-front sand, lagoonal clay, and near-shore marine sand deposits. Beaumont clays typically exhibit a high Plasticity Index (PI) and are subject to significant shrinking and swelling with changes in moisture content.

The Houston area, and the Gulf Coast in general, is laced by numerous growth faults which are geological hazards that are known to impact and damage house slabs, building-support structures, highways and associated foundations. Figure 4 shows a group of east-northeast-trending geologic features and faults¹, some of which have displaced the land surface in western Houston.

The geologic feature nearest the Site is the Renn Scarp², located approximately 1½ miles northwest of the Site. The Renn Scarp was originally categorized as a fault; however, subsequent drilling has confirmed that the scarp is actually the cutbank of an ancient stream channel. The Renn Scarp has been masked by recent urban development. The closest known growth fault relative to the Site is the Clodine Fault, which is located approximately 3 miles northwest of the Site. Given the location and orientation of the Clodine Fault, it is not a concern, and growth faults will not impact Site development.

^{1 -} Principal Active Faults in Harris County, Texas, US Geological Survey and Harris County Coastal Subsidence District (20024)

^{2 -} Clodine Fault, Southwestern Houston Metropolitan Area, Texas by E. R. Verbeek, U.S. Geological Survey, and U. S. Clanton, National Aeronautics and Space Administration (1979)



4.2 Surface Conditions

The Site is located in a mixed commercial and residential area on the west side of Houston and is north of Bissonnet Street between Kirkwood Road on the east and Cook Road on the west. The primary entrance to the Site is currently off Bissonnet Street on the south side, where the former Sugar Hill Golf Course Club House, maintenance facilities and parking areas for the Golf Course were located.

Site surface topography is characterized by undulating terrain which was created when the golf course was graded. Ground surface elevations range between approximately 98 and 106 feet above mean sea level (MSL). The high point is located in the north central portion of the Site, and surface elevations fall off toward the southern portion of the Site. There are no ponds or standing water on the Site.

The Site is heavily overgrown with various grasses, thick brush, and scrub trees up to several inches in diameter. Paved and unpaved golf cart paths traverse the Site, although these are difficult to find and follow in many areas because of the overgrowth. The overgrowth also masks the former fairways, making the fairways difficult to identify in some areas. There is some evidence of minor erosion and raveling across the surface of the landfill, but no major erosional gullies, sinkholes or large depressions have been observed.

4.3 Subsurface Conditions

Soil borings drilled during this investigation were used to characterize subsurface conditions at the Site. Subsurface materials encountered were compared with boring logs from prior investigations to check for consistency and to expand the available geotechnical data base.

4.3.1 Surficial Soils and Landfill Cap

Boring logs from this and prior investigations indicate the landfill cap typically consists of 2½ to 3 feet of medium stiff to hard, lean and fat clays (USCS Classification of CL and CH). The landfill cap is also assumed to extend across the entire Site. Surficial soils on the Site range from 0 to as much as 10½ feet in thickness above the landfill cap. The surficial soils, defined in this report as the material above the 3-foot-thick landfill cap, are mostly medium-stiff lean and fat clays (CL and CH). From a review of prior



reports, it is unlikely the surficial soils were compacted, so for purposes of this report, the surficial soils are assumed to be an uncontrolled fill.

4.3.2 Landfill Waste Material

Most borings drilled for this investigation and prior investigations extended into the top of the waste. Five borings drilled for this investigation and a prior CEC boring drilled on the Site extended through the waste into the underlying native soils. The thickness of the waste encountered in our borings varied from 45.0 to 68.5 feet across the Site, as indicated in Table 2.

The boring logs suggest that the waste material consists of a matrix of soil and construction debris. Soils in the waste matrix included low and high plasticity clays and non-plastic material (sands, gravel and silty sands). Waste materials encountered in the borings included: paving materials, such as concrete and asphalt fragments; landscape debris; carpeting; wood products, such as construction lumber, particle board, and shredded wood; and plastic bags and miscellaneous construction and demolition debris.

Field observations during drilling indicate the waste material was typically comprised of at least 50% soil, with the majority of the remainder being miscellaneous non-degradable material. From a review of the boring logs in this and prior reports, it is unlikely the waste material was compacted, so for purposes of this report, the waste material are also assumed to be an uncontrolled fill.

4.3.3 Native Soils

The native soils underlying the waste were encountered at depths ranging from 54 to 71 feet bgs (approximately 51 to 32.5 feet MSL). Sand (SM) was encountered in Boring B22-2 at a depth of approximately 54 feet bgs (50 feet MSL). Stiff to very stiff high plasticity clays (CH materials) were encountered in all other borings that extended into the underlying native soils.

4.3.4 Groundwater Levels

Groundwater levels across the Site are variable. Approximate groundwater levels were determined during drilling by noting the depth of free water on the sampling tools and/or by noting the presence of free water in the soil samples. Groundwater levels were noted in Borings B22-2, B22-3 and B22-11 at



depths ranging from 10 to 20 feet bgs (approximate groundwater elevations from 85 to 90 feet MSL). All other borings were noted as dry to the depths explored. It was noted that moisture content in the surficial fill/landfill cap material tended to increase with depth.

Groundwater level data is also available from the monitoring wells around the perimeter of the larger Bissonnet 136 Site. The upper groundwater-bearing unit is slightly confined with static water levels ranging from 8 to 10 feet below ground surface (approximate groundwater elevations from 67 to 72 feet MSL).



5. DISCUSSION

The following discussion is based on the overall body of geotechnical information and data developed at the Bissonnet 136 Site, including the findings of this geotechnical investigation, and Goodheart's understanding of the planned Site improvements.

5.1 Interpretation of Field Data

Because it is extremely difficult to obtain and test waste materials, such as those encountered at the Site, we tested the subsurface materials in-place while sampling using the Standard Penetration Test (SPT). The SPT is a simple, cost-effective field-testing procedure widely used in geotechnical engineering to evaluate subsurface materials. Empirical values of the angle of internal friction (Φ), relative density (D_r), and unit weight (γ) of granular soils, and ultimate shear strength (q_u) and consistency of cohesive soils, have been correlated with SPT N-values and published for many years. SPT N-values were compared with shear strength test data from the Site soils (i.e., surficial fill, landfill cap and native soils) to assist in interpretation of subsurface conditions. Due to the relatively small number of undisturbed samples of surficial fill and landfill cap material, and the complete lack of shear strength data from the waste material, much of this investigation depends on interpretation of SPT N-values.

SPT N-values obtained during the field exploration program were plotted versus depth to evaluate the strength of the surficial soils, landfill cap and waste materials (see scatter plot diagram in Figure 5). The data indicates the relative shear strength of the surficial fill and landfill cap material typically ranges from "stiff to very stiff" with an ultimate shear strength ranging between 3.0 and 6.0 ksf. Approximately 15% of the recorded N-values from SPT's taken in the surficial fill and landfill cap material were of medium consistency indicating the presence of some random softer zones of material. SPT N-values in the surficial fill and landfill cap material correlate well with published data and with the limited shear strength data from U-U tests performed for this investigation.

Previous data (CEC report) suggests as much as 80% of the waste material at the Site could be non-degradable, and visual observations of the waste material sampled during this investigation generally seem to bear that out. The waste has been in place for 30 to 40+ years, and for much of that time has been covered with surficial fill and landfill cap material ranging between 2.5 and over 13.5 feet thick.



Although there is little or no published data to correlate N-values with shear strength of the waste material, the data was qualitatively evaluated to determine whether the waste is suitable as bearing material for the anticipated loads.

Average N-values recorded in the waste material during this investigation ranged from 10 to more than 30 blows per foot. Approximately three-fourths of the recorded N-values from SPT's taken in the waste material were greater than 15 blows per foot while the remaining one-quarter of the recorded N-values ranged between 7 and 15 blows per foot. SPT N-values seem to trend slightly higher with depth, and no apparent voids, extremely soft material, or extensive zones of soft material were encountered in the waste.

From a geotechnical engineering standpoint, and taken as a whole, the data suggests that waste at the Site has substantially settled under its own weight and the surcharge of the surficial fill and landfill cap material. From a bearing standpoint, the waste can support the anticipated foundation loads; however, as much as a quarter of the waste could contain zones of softer material that would be subject to some degree of total and differential settlement, as evidenced by the N-values below 15. This evaluation was performed using the best available information and limited techniques, coupled with geotechnical engineering experience and judgement.

5.2 Foundation Support

5.2.1 Shallow Foundations

Subsurface conditions encountered at the Site vary due to the:

- Character and thickness of the surficial fill and landfill cap material;
- Character and thickness of waste material; and
- Nature and depth of the underlying native soils.

Planned improvements at the Site can be supported on shallow foundations and/or slabs-on-grade provided the recommendations presented herein are followed regarding site preparation, filling and grading, and implementation of ground improvement methods to provide more uniform support and control settlement behavior.



Significant filling and grading will be required to establish minimum thicknesses of surficial fill and to prevent penetration of the landfill cap. Ground improvement coupled with properly compacted fill will provide good bearing support for conventional foundations. Ground improvement methods considered for the Site are discussed in Section 5.2.3; further design efforts and consultation with specialty contractor(s) are required to develop final recommendations. Recommendations for Site preparation, filling and grading, and foundation design are presented in Section 6.0.

5.2.2 Deep Foundations

The field exploration data, and specifically the SPT data, indicate the likely presence of softer zones of fill and waste material that could result in excessive total and differential settlement; however, there is no evidence to-date that indicates these zones are widespread or excessively thick. Deep foundations will provide excellent bearing and will mitigate the obvious concerns regarding total and differential settlement; however, deep foundations are likely cost-prohibitive for development of the planned improvements, and as noted above, ground improvement coupled with properly compacted fill will provide good bearing support for conventional foundations.

Deep foundations were deemed unnecessary for foundation support of the planned improvements at the Site, and no further evaluation of deep foundations was performed or considered.

5.2.3 Ground Improvement

Geotechnical analysis using the field exploration and laboratory test data indicate lightly loaded shallow foundations and/or slabs-on-grade can be designed for allowable bearing capacities of up to 4.0 ksf. The primary concern, however, is that the Site is essentially a very large uncontrolled fill with combined surficial fill, landfill cap and waste depths of more than 50 feet. It is likely that undetected zones or pockets of soft material exist in the shallow subsurface as well as at depth. Ground improvement is recommended to control settlement and provide a compact, uniform, and consistent subgrade for foundation and slab-on-grade construction.

Ground improvement methods are used at sites with poor or variable subsurface conditions to bridge any soft zones and mitigate the possible damaging effects of total and differential settlements. A



qualitative evaluation of possible ground improvement methods was performed for the Kirkwood Crossing Site. These ground improvement methods should be further evaluated by the Project Team to determine the optimum method with regard to overall effectiveness, cost and schedule impact:

- Proof-rolling Proof-rolling with a heavy sheepsfoot roller can be used to compact and tighten the surficial fill and landfill cap materials, thus providing a good working surface for construction of foundations, slabs and pavements. However, proof-rolling will have limited depth of penetration in the mostly clay materials that comprise the surficial fill and landfill cap materials (generally less than 5 feet of total penetration). More importantly, it is very unlikely that heavy proof-rolling would have any effect on the underlying waste, and any soft zones that remain could reflect to the surface and have detrimental effects on foundation performance. Proof-rolling should be performed, but only in conjunction with another ground improvement method that would extend into and compact the waste.
- Pre-Loading or Surcharging Surcharging can be used to pre-load the surficial fill/landfill cap and waste materials, thus inducing settlement to occur before foundation construction begins. When surcharging is used, the foundation area(s) are typically pre-loaded with excess fill to an amount equal to or greater than the foundation loads. The surcharge is allowed to sit and is monitored until the anticipated settlements have occurred. This method can be cost-effective if: (1) there is readily available fill, and (2) there is sufficient time in the project schedule. However, the overall Bissonnet 136 Site currently has a shortage of fill. To import additional fill would require TCEQ approval, and the time required to implement the process likely precludes surcharging as a viable option for this project.
- Rammed Aggregate Piers Rammed aggregate piers (RAP™ systems or Geopiers®) create a densified column of aggregate surrounded by a stiffened matrix of soil and waste. Geopiers can be used in many different soil types and applications and would likely be an effective ground improvement solution at Kirkwood Crossing. Goodheart recommends IRD and the Project Team conduct further evaluation of RAP™ to provide settlement control for support of spread footings and slabs-on-grade at the Site, including discussions with specialized subcontractors, and cost and schedule analyses.
- Deep Dynamic Compaction Dynamic deep compaction (DDC) involves dropping a heavy weight (up to 30 tons falling from as high as 80 to 100 feet) in a grid pattern on the ground surface to compact soils and other soft materials to depths as great as 40 to 50 feet bgs. DDC can be used to reduce foundation settlements and permit construction on soft native soils as well as uncontrolled fills, such as landfills, and would likely be an effective ground improvement solution at Kirkwood Crossing. Goodheart recommends IRD and the Project Team conduct further evaluation of DDC to provide settlement control for support of spread footings and slabs-on-grade at the Site, including discussions with specialized subcontractors, and cost and schedule analyses.



- Wick Drains Wick drains are used to remove pore water from soft compressible soil and other subsurface matrices so the soils consolidate faster. Wick drains consist of a flexible core with grooves (that allow water to flow unimpeded) wrapped in geotextile filter fabric. Wick drains are typically installed to design depth in in a pattern using a hollow mandrel mounted on an excavator or crane mast, and are usually tied to a sand blanket to capture and remove pore water. While wick drains can be effective in accelerating settlement of saturated subsurface materials, the subsurface materials at the Site are variable and do not appear to contain a lot of water (i.e., their effectiveness would be limited at best). Other considerations regarding the use of wick drains include: (1) the installation process will likely require a special TCEQ permit; (2) the leachate that emanates from the waste will likely have to be captured, treated and properly disposed off-site; and (3) the time required to permit and implement the process likely precludes wick drains as a viable ground improvement option.
- Combination of Methods Two or more of the foregoing options can also be used together to address potential settlement concerns and accelerate the construction process. For example, heavy proof-rolling can be used in conjunction with either RAP™ or DDC. Also, wick drains are frequently used in conjunction with DDC; however, as noted above, there are several major concerns with the use of wick drains.

5.3 Estimated Settlements

Based on existing conditions at the Site and the planned improvements, total settlements in the surficial fill and landfill cap materials are estimated to be on the order of ½- to 1-inch. Differential settlements in the surficial fill and landfill cap materials are anticipated to be about half the estimated total settlement.

Our qualitative evaluation of total and differential settlements in the waste material indicates shallow foundations and slabs-on-grade should be designed for at least 2- to 4-inches of total and differential settlement, increasing the combined total settlements in the uncontrolled fill at the Site (i.e., surficial fill, landfill cap and waste materials) to as much a 4 to 5 inches. Due to the nature and thickness of the uncontrolled fill, it is likely that differential settlements could also range between 3 and 5 inches.

Ground improvement methods coupled with properly compacted fill will provide good bearing support for slab-on-grade construction and conventional foundations, and should substantially mitigate settlement concerns. In general, implementation of appropriate ground improvement methods should limit total foundation settlements to approximately 1-inch and differential settlements should be on the order of ½-inch.



5.4 Environmental Considerations

The Site is underlain by 45 to 68+ feet of construction and demolition debris (waste) intermixed with soil. The waste materials include landscape debris, wood products and other degradable materials. Decomposition of the degradable waste generates landfill gases, such as methane and hydrogen sulfide (H2S), which in elevated concentrations, can be explosive or toxic, respectively. Screening for methane gas and other contaminants while drilling identified the presence of methane gas and other unusual odors emanating from the boreholes.

SKA has been retained by both Bissonnet 136 and IRD to assist with regulatory compliance, landfill post-closure care and permit issues at the Site. SKA is currently maintaining both the groundwater monitoring well network and the landfill gas management and monitoring network (gas vents and gas monitoring probes) around the perimeter of the Bissonnet 136 property. SKA is also working with TCEQ on behalf of Bissonnet 136 to revoke MSW Permit No. 1247 so that the Site can complete the post-closure care process.

Development over closed landfills is regulated by TCEQ under 30 Texas Administrative Code (TAC) Chapter 330, Subchapter T. One purpose of the Subchapter T rules and regulations is to ensure that potentially explosive gases are appropriately monitored and/or abated to protect occupants in these buildings. The Subchapter T rules also regulate practices which could contribute landfill leachate. Subchapter T rules apply to all developments over closed landfills except for single-family or double family homes which are not part of a residential subdivision. A Subchapter T permit from TCEQ will be required for Site development.

Preliminary discussions with TCEQ have determined that ground improvement activities can be performed under the Subchapter T permit provided the landfill cap is maintained and meets the minimum requirements when ground improvement is completed. TCEQ will also require a landfill gas venting system with monitoring beneath all enclosed structures on the Site.



6. CONCLUSIONS AND RECOMMENDATIONS

This section provides geotechnical conclusions and recommendations for design and construction of the planned Site improvements. The conclusions and recommendations presented herein are based on the geotechnical data developed during this investigation and qualitative analyses and evaluation of the overall geotechnical data base for the Site.

6.1 Earthwork, Mass Grading and General Site Development

General Guidelines. Before construction of the proposed residential development and associated amenities can begin, ground improvement and/or mass grading operations will be necessary to establish roadways, building pads and drainage patterns. Earthwork operations should be designed and conducted so as not to penetrate or disturb any portion of the landfill cap that covers the entire Site footprint. In addition, the total thickness of surficial fill and landfill cap should be at least 8.0 feet thick to allow for foundation and underground utility construction without penetrating or disturbing the landfill cap. This would allow 1 to 2 feet as a buffer zone above the landfill cap in most areas and for elevation variances across the Site.

TCEQ requires that the landfill cap for Type IV (MSW) landfills consist of at least 18 inches of compacted clay (SC or CL) plus 6 inches of topsoil (per 30 TAC 330.453(a)). If the landfill cap is penetrated during mass grading, ground improvement activities, foundation or infrastructure construction, it should be repaired or reconstructed as soon as possible. Landfill cap repairs should be accomplished using clay (SC or CL) compacted in accordance with structural or general fill requirements, depending on where the repairs take place. If waste must be removed to facilitate construction, the waste shall be segregated from the overlying soils, stored on plastic sheeting and covered with plastic sheeting, until disposed off-site. The reburial of waste on Site is not generally permitted by TCEQ once the landfill is in post-closure care.

The surficial soils range from 0 to 10.0+ feet in thickness above the landfill cap. In general, Site elevations are higher across the northern portion of the Site than they are across the southern portion of the Site, whereas the thickness of the surficial fill and landfill cap material is considerably thicker



across the southern portion of the Site than it is across the northern portion. Therefore, the northern portion of the Site will need to be built up as much as 6 feet above existing grade in order to meet the 8.0-foot thickness requirement. To accommodate the overall Site slope, Goodheart recommends creating a terraced Site with surface grades adjacent to structures in the northern portion of the Site at least 10 to 12 feet higher in elevation than the surface grades adjacent to structures in the southern portion of the Site.

As noted elsewhere in this report, each floor slab should be continuous and maintained on one elevation. Because of the relatively abrupt changes in grade of ground surface elevations to meet the minimum fill requirements over waste, Goodheart anticipates floor slab elevations in adjacent buildings could differ by as much as 10 feet. Grading plans should consider the use of retaining structures to facilitate these abrupt grade changes. Grading plans should also consider switching Building 3 or Building 5 with the Community Building/Club House and adjacent exterior amenities to aid in balancing cut and fill.

<u>Clearing and Grubbing</u>. Due to the extensive amount of dense vegetation at the Site, including high grasses and weeds, thick brush, and widespread scrub trees up to several inches in diameter, clearing and grubbing will be a major consideration for Site development. All brush and trees located above the landfill cap, regardless of size, should be cut and properly disposed in accordance with local regulations. Tree trunks/stumps larger than 4 inches in diameter should be grubbed, and roots larger than 1 inch in diameter should be removed. The ground surface in areas where fill and/or structures will be constructed should be inspected by a qualified geotechnical engineer following initial clearing to check for evidence of sinkholes or erosional features that were not previously evident due to heavy vegetation.

At least the upper 6 inches of surface grass and vegetation should be stripped and properly disposed in accordance with local regulations; additional stripping could be required in some areas, depending on how far the root mass penetrates below the ground surface and as identified by a qualified geotechnical engineer during construction. The upper 6-12 inches of topsoil, immediately underlying surface grass



and vegetation, should be stripped and stockpiled on Site or properly removed and disposed in accordance with local regulations.

Ground Improvement. Ground improvement activities should be performed in areas where total and differential settlement will have a detrimental effect on the planned improvements. Ground improvement methods should be designed and constructed by specialty contractors, in conjunction with geotechnical and structural design criteria. Ground improvement activities, such as DDC, should generally be performed in areas that contain just the landfill cap (i.e., before significant fill is placed over landfill cap material and after excess surficial fill is removed from the thicker areas) in order to maximize the kinetic energy imparted to the waste and effect pre-construction settlement. Ground improvement activities should be an integral part of the construction sequence.

<u>Proof-compaction and Subgrade Preparation</u>. After stripping, the exposed subgrade material will consist primarily of lean and/or fat clay fill. The exposed subgrade material is generally suitable for structural fill or general fill anywhere on the Site, as determined by a qualified geotechnical engineer. The exposed subgrade materials can also be left in place and used for support of buildings, foundations, roadways, parking lots, or as subgrade for placement of additional fill to bring the area up to finished subgrade elevation. Proof-compaction and subgrade preparation will generally take place after ground improvement activities have been completed.

Exposed subgrade materials that will be left in place should be proof-rolled with at least four passes of a Caterpillar 825K Wedgefoot Soil Compactor (or equivalent) to locate zones of loose and/or unstable soils. Proof-rolling operations should be witnessed by a qualified geotechnical engineer to determine whether soft, loose, or saturated soil and/or detrimental material such as debris and/or degradable materials are present. Zones that exhibit instability during proof-rolling, such as excess rutting or pumping in excess of 1-inch, should be disked, reconditioned, and compacted or removed and replaced with approved fill, as directed by a qualified geotechnical engineer.

If unsuitable soils or other detrimental materials are encountered, the unsuitable material should be removed full depth and replaced with properly compacted fill. Actual depth and volume of undercut



should be determined at the time of construction based on observations of a qualified geotechnical engineer. Excavated material should be replaced with properly compacted structural fill, as defined in this report.

Structural and General Fill Material. Due to the uneven terrain, construction activities will include a cut and fill grading operation to achieve final grades. Cut areas should not reduce surficial fill and landfill cap thickness to less than 8-feet without the approval of a qualified geotechnical engineer and/or civil design engineer. Compacted structural fill should be used beneath structures and pavements, and either general or structural fill can be used in open areas. Structural fill should generally extend from the bottom of slabs-on-grade (or foundations) down to the top of waste and at least 5 feet outside building footprints. A qualified geotechnical engineer can assist in determining the most efficient means of compaction.

Structural fill used for mass grading and Site earthwork should meet the following minimum requirements:

- 1. Imported structural fill may consist of locally available lean clay soils (CL) with the following properties:
 - Liquid limit (LL) less than 50 and plasticity index (PI) less than 25,
 - Maximum dry density greater than 100 pounds per cubic foot (pcf), when determined according to the Modified Proctor Method (ASTM D 1557)
- New structural fill should not contain more than 5% organic material when tested in accordance with ASTM D 2974 test method. The fill shall be free of waste, debris, and frozen or deleterious material.
- 2. Materials unsatisfactory for use as structural fill include soils classified as silt or organic silt (ML, MH, IL, and OH) in the Unified Soil Classification System (ASTM D 2847).
- 3. Cohesive materials used as structural fill should be placed in 6- to 9-inch-thick loose lifts, moisture-conditioned to within plus or minus 2% of optimum moisture and compacted to at least 95% modified Proctor density (ASTM D1557 / AASHTO T180).
- 4. Granular materials used as structural fill should be placed in maximum 10- to 12-inch-thick loose lifts, moisture-conditioned to within plus or minus 3% of optimum moisture and compacted to at least 95% modified Proctor density (ASTM D1557 / AASHTO T180).
- 5. Fill should be placed where dry and stable conditions exist at design or undercut subgrade.



General fill should not contain more than 8% organic material when tested in accordance with ASTM D 2974 test method, and should be free of waste, debris, and frozen or deleterious material. Cohesive materials used as general fill should be placed in 6- to 9-inch-thick loose lifts, moisture-conditioned to within plus or minus 3% of optimum moisture and compacted to at least 92% modified Proctor density (ASTM D1557 / AASHTO T180). Granular materials used as general fill should be placed in maximum 10-to 12-inch-thick loose lifts, moisture-conditioned to within plus or minus 3% of optimum moisture and compacted to at least 92% modified Proctor density (ASTM D1557 / AASHTO T180).

In general, the surficial fill materials on the Site meet the requirements outlined herein and can be used as structural or general fill; however, structural fill should be approved by a qualified geotechnical engineer before it is moved on-site or imported to the Site. Silt and other materials designated as ML, MH, PT, OL, and OH can be used for landscaping purposes (i.e., construction of berms).

Goodheart recommends using at least a 6-inch thick layer of well-sorted, compacted granular fill (AASHTO #5 stone or equivalent) beneath building slabs and foundations to allow for landfill gas collection (see Section 6.2). For roadway subbase (i.e., in areas that will be covered by asphalt/concrete pavement), a well-graded, compacted granular fill or crushed aggregate is recommended. Imported granular structural fill can consist of crushed limestone, crushed gravel with sand, or recycled concrete meeting the gradation limits in Table 5. Where wet subgrade conditions are encountered, free-draining crushed limestone similar to the free draining 1.5- or 3-inch gradations in Table 5 should be used.

TABLE 5: COARSE AGGREGATE GRADATIONS

Gradation (% Passing)	Sieve Size 3"	2.5" 2"	2"	1.5"	1"	0.5"	No. 4	No.	No.	
		5	2.5		1.5	1	0.5	NO. 4	16	200
	3-inch	100	95±5	60±15	15±15	3±3				
	1.5-inch				100	95±5	75±5	43±13	25±15	8±4
	1.5-inch FD				40	95±5	45±15	5±5		

FD - Free Draining



6.2 Foundation Design Criteria

There are a number of considerations associated with design and construction of residential structure foundations at the Site, including:

- The surficial fill material varies in thickness (0 to 13.5 feet), and was apparently placed as an uncontrolled fill;
- The underlying waste material varies in location and thickness (45 to 68+ feet), and was apparently placed as an uncontrolled fill;
- Waste materials over the Site have been allowed to settle under their own weight for a period of at least 20 years and as long as 40+ years for some parts of the landfill;
- The surficial fill has added up to as much as 1500 to 1700 pounds per square foot (psf) of load on the surface of the landfills, causing further consolidation of the waste materials;
- The surficial fill has also settled under its own weight for a period of at least 20 years;
- Although there are no documented voids, sinkholes or depressions on the Site, it is possible that soft zones and/or voids exist which could affect foundation support; and
- The management of landfill gas will require sub-slab venting systems and well-sorted granular backfill along with robust chemical vapor barriers as required by TCEQ.

The planned residential structures can be supported on conventional slab-on-grade foundations provided ground improvement and earthwork operations are conducted as recommended herein. Due to the size and nature of the uncontrolled fill beneath the Site, slab-on-grade foundations should be made sufficiently thick and stiff to spread out the wall loads into the slab to reduce applied foundation loads to allowable limits, to span soft or weak spots and potential small voids in the underlying waste material, to protect against shrinking and/or expansive soils, and to resist potential differential settlements. The slabs should also be designed as continuous structures, without expansion joints, and on one level.

Continuous slab-on-grade foundations should be properly reinforced for shear and load transfer, and stiffened, if necessary, using "waffle slabs" and/or post-tensioning. Slabs-on-grade should incorporate sections at least 30 inches wide and 18 inches thick in areas where interior load-bearing walls of 3 kips per linear foot or more will be constructed and around perimeter walls with loads greater than 3 kips per linear foot. Slab-on-grade foundations can be designed with a maximum allowable soil bearing pressure of 3,000 psf, provided the compacted structural fill and landfill cover material have a minimum



unconfined compressive strength of 3.0 ksf. Stiffened slabs will spread the applied load and reduce soil bearing pressures and help control total and differential settlement. As an alternative to using a "ribbed slab design, uniformly thick post-tensioned slabs-on-grade should be designed in accordance with PTI design criteria.

Slabs-on-grade should be supported within the upper horizon of a properly constructed building pad, with at least 12 inches of soil embedment around the perimeter of the slab. The ground surface should be graded so that water flows away from the structure. Goodheart recommends the use of at least 6 inches of a well-sorted crushed aggregate base (AASHTO #5 stone or equivalent) beneath building slabs and foundations to provide a capillary break with any underlying groundwater, allow for landfill gas collection, and to provide uniform foundation support. A sub-slab soil vapor venting system should be incorporated into the aggregate base, as required by TCEQ (EPRO e.vent low profile system or equivalent). A chemical vapor barrier (Drago Wrap Vapor Intrusion Barrier, manufactured by Stego Industries, or equivalent) should also be provided above the aggregate base material and beneath the slab. SKA can provide specific details regarding the subsurface vapor collection system.

Foundations for entry steps and porches should be designed and supported integrally to the building foundation. Asphalt, patio blocks or other materials that can withstand minor displacements without causing cracking and/or can be easily replaced should be considered for flatwork, driveways and patios, sidewalks or other approaches to steps and porches.

6.3 Post-Construction Settlement

Most of the Site has settled under the weight of the waste material, landfill cap and surficial fill; however, some additional settlement could occur in areas where significant amounts of new fill (4 plus feet) are placed during mass grading operations. Such consolidation could be detrimental to new structures, roadways and utilities and is very difficult to predict due to the nature and variable thickness of the waste and fill materials at the Site. As noted in Section 5.2.3, ground improvement is recommended to control and/or mitigate settlement, particularly beneath building footprints.



New fills created during mass grading that are greater than 4 feet thick should be monitored with settlement instrumentation to check for new and on-going movements. Settlement instrumentation should consist of 18-inch x 18-inch x ¼-inch thick steel plates with a ¼-inch solid steel rod welded to the center of the plates. The plates should be installed approximately two feet below existing grade with the ¼-inch steel rod extending vertically in 3-foot-long sections above the ground surface. A 1-inch diameter steel pipe should be placed over the steel rod so that the rod can move freely (without soil friction) within the fill (the pipe should not be connected to the steel plate). The pipe should extend from approximately 2 inches above the steel plate to between 2- and 3-feet above the final grade, leaving 3- to 4-inches of steel rod exposed above the top of the pipe. The steel plate and rod constructed and installed in this manner will allow for periodic measurements of settlement or consolidation in the fill.

Settlement monitoring should be conducted on a weekly basis for the first month and then monthly thereafter until observed movements (i.e., settlements) and "time rate of settlement" analysis indicates future anticipated total settlements will be less than 1 inch. Qualitative analysis suggests this process could take as much as three to six months or more after completion of fill operations, depending on the thickness and nature of the fill and underlying waste materials. A qualified geotechnical engineer should review the settlement data and determine settlement has slowed to a degree that new construction (roadways, parking lots, buildings, etc.) can proceed.

6.4 Lateral Earth Pressures

Lateral resistance to loads can be provided by sliding friction acting on the base of footings and floor slabs (see Section 6.5 for appropriate values). Resistance to lateral loads can also be obtained in part from passive earth pressure against the face of rigid foundation elements.

An equivalent fluid pressure of 250 pcf can be used to resist short-term lateral loads on foundations in compacted structural fill (CL or CH materials). For sustained loading, an equivalent fluid pressure of 150 pcf can be used. The upper 1 foot of soil should be neglected in determining passive resistance when the soil is not confined by paving or floor slabs.



Retaining structures could be required to transition grades across the Site, particularly between buildings that are relatively close together. Active earth pressures working against retaining structures will vary according to the rigidity of the structure. Walls free to rotate (such as cantilevered retaining walls) should be designed to resist an equivalent fluid pressure of 60 pcf (active condition). Braced walls, which are not free to rotate, should be designed for an equivalent fluid pressure of 75 pcf (at-rest condition). These values assume a hydrostatic level below the base of the structure; design of retaining walls should incorporate drainage behind the walls to eliminate hydrostatic pressures. Also, the influence of surcharge loads should be added to the calculated earth pressures to determine the total lateral stress acting on the walls. A qualified geotechnical engineer should determine appropriate geotechnical design criteria once the type and size of retaining structures have been determined.

6.5 Soil Design Criteria

Soil design criteria have been established by correlation with previous data on similar soils, field testing and laboratory tests. Table 6 summarizes soil design parameters.

TABLE 6: SOIL DESIGN VALUES

Soil Design Parameter	Structural Fill	Structural Fill	Waste
Joil Design Farameter	(CL/CH)	(SC, SM, SP)	Material
Angle of Internal Friction (Degrees)	0	34	20 ¹
Cohesion (psf)	3500	0	500 ¹
Saturated Unit Weight (pcf)	125	115	120 ¹
Coefficient of active earth pressure (k _a)	.49	.28	.49
Coefficient of passive earth pressure (kp)	2.03	3.25	2.03
Coefficient of at-rest earth pressure (k₀)	.60	.45	.50
Coefficient of sliding friction	.35 ¹	.50¹	
Poisson's Ratio	0.25 ¹	0.3 ¹	
Modulus of vertical subgrade reaction, Kv (K/ft³)	200¹	250 ¹	150 ¹

^{1 –} Estimated value based on published literature and/or engineering judgement

The Site subsurface materials consist of 4 to 8 feet of medium stiff to hard clay fill over 45 to 68+ feet of medium dense waste over stiff to very stiff native clays to the depths explored. The subsurface materials within the top 100 feet have normalized shear strength values of 1.5 tsf or



greater and average SPT N-values of 15 or greater. In accordance with the 2018 International Building Code (IBC 2018) Section 1613.2.2, the Site has a Seismic Site Classification of D.

6.6 Trench Excavations and Underground Utilities

Stormwater management facilities, including culverts and stormwater structures, water and wastewater (wet) utilities, and gas, electric, and communication (dry) utilities should be designed in accordance with the most recent edition of the City of Houston Infrastructure Design Manual. Stormwater management facilities should also be designed to meet City of Houston code requirements, as complemented by Harris County and the Harris County Flood Control District (HCFCD), and water quality requirements in the Rules and Regulations published by TCEQ. Similarly, wet and dry utilities should also be designed to meet City of Houston and other applicable code requirements. Any stormwater detention facilities must be located off of the waste footprint. Utilities that will be continually wet such as water lines and lift stations, must have secondary containment. Secondary containment may consist of trenches lined with impermeable membranes.

It is anticipated that various drainage enhancements and improvements could be required, including storm sewers, stormwater detention, drainage structures, and overland (sheet) run-off. Stormwater culverts and wet and dry utilities should be constructed in open trenches in the upper 5-foot horizon of surficial fill (i.e., above the landfill cap). The surficial fill should first be constructed to an elevation not less than one (1) foot above the top of the pipe (or utility). Where the surficial fill consists of compact stable clay material, trench excavations can be made using an open cut with vertical sides to a depth of four feet; cuts deeper than 4 feet should be sloped, protected with a trench box or braced, as necessary. Groundwater and unstable or incompressible material in the bottom of the trench excavation should be removed and undercut areas should be backfilled with compacted structural or flowable fill to the design bedding depth.

Class C pipe bedding should be used for stormwater culverts and wet utilities. Goodheart recommends using a minimum of 3 inches of cement stabilized sand for pipe bedding. Trench excavations should be backfilled as soon as practical after installation of the pipe/utility. Trench backfill should meet the



requirements for structural fill outlined in Section 6.1 and be free from stones large enough to interfere with compaction or other deleterious material.

Trench backfill should be placed at the moisture content needed to obtain the required density, in layers no greater than 6 inches deep (loose measurement) and alternated from side to side to bring up the backfill about equally around the pipe/utility. Trench backfill should be compacted to at least 95% Modified Proctor density using mechanical tamps or rammers. Small rollers may be used to compact backfill if feasible. Stormwater culverts should have at least 12 inches of cover above the pipe, and water and wastewater utilities should be designed to meet the cover requirements in the Infrastructure Design Manual.

If the landfill cap is penetrated by trenches, backfill should include at least 2 feet of compacted clay over the waste material. If waste must be removed to facilitate construction, the waste shall be segregated from overlying soils, stored on plastic sheeting and covered with plastic sheeting, until disposed off-site. The reburial of waste on site is not generally permitted by TCEQ once the landfill is in post closure care.

Depending on Contractor preference and the available fill materials, Goodheart recommends the use of either properly compacted lean clay fill or granular material mixed with bentonite as utility trench backfill. The use of either of these materials as utility trench backfill should be considered "best management practices" that would minimize the potential for migration of methane and/or other soil vapors contained in the underlying landfill materials. If a bentonite/fill mixture is used, mixing can be accomplished on-site either in a pugmill or in thin lifts (preliminary estimate of 2-4% bentonite by dry weight) prior to placing in the trench. Goodheart also recommends all utility penetrations at building foundations be designed using flexible connections that can withstand up to 2 inches of displacement and be sealed to prevent landfill gas intrusion.

6.7 Site Roads and Pavements

Site preparation and mass grading will likely expose a mixture of lean and fat clays (CL and CH materials) at subgrade level. The fat clays will be subject to shrinking and swelling with changes in moisture



content that cause damage to road and parking lot pavements. Lime stabilization of the exposed subgrade is recommended to reduce soil plasticity and swell potential, reduce the required pavement thickness, aid compaction and create a strong, stable base for construction of road and parking lot pavements.

Grading and alignment of roads and parking lot pavements should establish design subgrade elevations. The upper 9 inches of subgrade materials beneath roads and parking areas should be stabilized with 4% hydrated lime in accordance with the material and installation requirements of the current edition of the Texas Highway Department Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges.

A small to moderate amount of long-term settlement (up to 1 inch) should be anticipated beneath pavements that receive significant fill (more than 3 feet). Properly designed and constructed flexible pavement sections should be cost-effective and perform adequately at the Site. Flexible pavement that incorporates lime stabilized subgrade as described above can be designed using a CBR of 8 for the subbase layer. A qualified geotechnical engineer should determine appropriate geotechnical design criteria and pavement section(s) once the type of pavement for roads and parking areas has been determined.



7. CONSTRUCTION CONSIDERATIONS

7.1 Construction Sequencing

Given the timeline to complete construction, and the ground improvement and grading requirements necessary to develop the Site for the proposed improvements, construction sequencing for this project will be important. As a general guideline, each area (building pads and pavements) should be developed in sequence as follows:

- Clear and grub as necessary, then strip topsoil and organic material and stockpile for reuse
- Adjust landfill cap thickness above waste to approximate 3-foot thickness
- Conduct selected ground improvement activities within building footprints and other areas as required
- Level and proof-roll the subgrade within the building footprint, repairing or correcting any deficient areas
- Place compacted fill as necessary to achieve final design grades
- Install gas collection layer and geotextile layers
- Construct underslab utilities (if required) and building slab

It is anticipated that existing surficial fill in the southern portion of the Site will be excavated, moved and reused in the northern portion of the Site. Ground improvement, proof-compaction, and subgrade preparation in the northern portion of the Site should be complete before the surficial fill is moved from the southern portion of the Site.

7.2 Earthwork Construction

All earthwork and mass grading operations at the Site can be conducted with conventional earth-moving equipment (scrapers, bulldozers, backhoes, wedgefoot rollers, etc.). Utility trenches in the surficial fill can be excavated with conventional backhoes. Clay fill materials should be compacted with wedgefoot (Caterpillar 825K Soil Compactor or equivalent) or sheepsfoot rollers that achieve compaction from the bottom up. Smooth drum rollers should be used on the top lifts and road subgrades to seal the surface and limit water infiltration.

Contractors should anticipate some volume change as a result of earthwork cut and fill operations. Although there is limited laboratory data available, Goodheart estimates a 3-5% shrinkage factor should



be applied to surficial fill materials that are relocated to other areas of the Site and then recompacted to meet project specifications.

7.3 Cut and Fill Slopes

Slopes constructed in the surficial fill materials should not be steeper than 3.0 (horizontal): 1.0 (vertical). Fill should be placed in horizontal lifts and properly compacted. Surficial fill slopes should be overfilled and then trimmed back to expose a dense, compacted surface. Temporary slopes cut in the surficial fill (e.g., in utility trenches) above the groundwater table will probably be stable at 1.5 (horizontal): 1.0 (vertical). If temporary slopes are cut through granular materials, they could be subject to drying, wind erosion, and occasional caving or sloughing. Temporary slopes should be monitored for signs of impending failure (surface cracks, continued sloughing and caving, etc.).

Shallow temporary excavations should have a maximum slope of 1.0 horizontal to 1.0 vertical or flatter as required to provide stable side slopes. Excavations should be completed in accordance with OSHA Regulation 1926 Subpart P, Appendix B on "Sloping and Benching". The bottom of excavations should extend a minimum of 1 foot beyond the plan dimensions to allow for adequate working space, and satisfy the over-excavation requirements, as appropriate.

7.4 Groundwater Control

Based on the boring logs, Goodheart does not anticipate cut and fill operations or foundation and trench excavations will extend below the water table. Contractors should establish Site drainage so that surface runoff is directed away from foundation and trench excavations and construct small berms where necessary to prevent surface water from running into excavations. If excavations do extend below the groundwater level, dewatering could be required to enable excavations to be made in the dry. Goodheart anticipates dewatering of shallow excavations can be accomplished with conventional sumps and pumps. Recovered groundwater may require treatment and off-site disposal.



8. GEOTECHNICAL ENGINEERING SERVICES DURING DESIGN AND CONSTRUCTION

8.1 Review of Plans and Specifications

Prior to construction, Goodheart should review the final plans and specifications for conformance with the intent of our recommendations. In general, we should review plans and specifications related to the following:

- 1. Site grading and filling
- 2. Ground improvement plans
- 3. Earth-retaining structures (if applicable)
- 4. Slab-on-grade construction
- 5. Conventional foundations for buildings and Site structures
- 6. Pavement construction
- 7. Site detention ponds

Also, we should review Contractor proposed changes in material specifications during bid evaluation.

8.2 Construction Observations

To a degree, the performance of a project is dependent upon the procedures and quality of construction of the Site development work. Site preparation, over-excavation, placement and compaction of fill, roadway construction, and implementation of erosion and sediment control measures should be performed under the inspection of a qualified and experienced geotechnical engineer.

Goodheart or its designated representative should observe site preparation, ground improvement activities, and grading and foundation installation to check that the work is performed in accordance with the plans and specifications. This would allow us to observe field conditions and to provide recommendations and/or solutions regarding any unusual conditions that are noted during site grading. Further, these observations would permit us to determine that soil conditions are as anticipated and to modify our recommendations, if necessary.

We recommend that Goodheart provide a soil engineer at the Site during the initial stages of construction to assist in developing optimum earthwork construction procedures and in overall implementation of the earthwork program.



Goodheart recommends each building foundation subgrade be inspected and tested by a qualified geotechnical engineer. If subgrade soil fails to meet the minimum unconfined compressive strength, the cover material should be removed full depth and replaced with compacted clay fill. The compacted clay fill should meet the specification provided herein.



9. LIMITATIONS AND STANDARD OF CARE

The recommendations presented in this report are based on the soils and materials encountered in the boring locations at the time of our borings and on the information and data collected in prior investigations at the Site (CEC, SKA and Goodheart reports). Should conditions encountered during excavation and construction operations differ from those encountered in the borings, Goodheart should be notified so that the recommendations can be reviewed and revised if necessary.

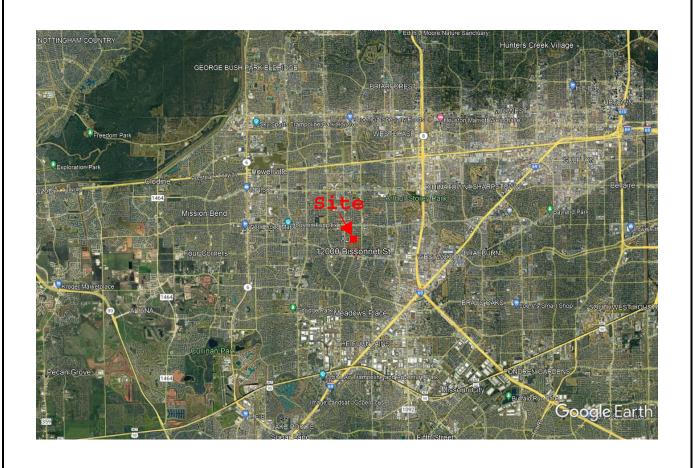
This investigation was performed in accordance with accepted geotechnical engineering practices for determining soil conditions and preparing recommendations for the referenced Site improvements only. The services performed by Goodheart were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the geotechnical engineering profession practicing contemporaneously under similar conditions in the locality of the project. No other representation is made.

Verification of subsurface conditions for purposes of determining the extent of waste materials, difficulty of excavation and implementation of ground improvements, dewatering, and trafficability is beyond the scope of this investigation. In the event that any changes in the nature, design or location of the proposed construction are made, the conclusions and recommendations contained in this report should not be considered valid until the changes are reviewed and the conclusions and recommendations in this report have been modified or verified in writing.

This report was prepared for the sole use of the Client (Impact Residential Development LLC), the only intended beneficiaries of our work for the specific purposes referenced herein. No other party should rely on the information contained herein without prior written consent of Goodheart.



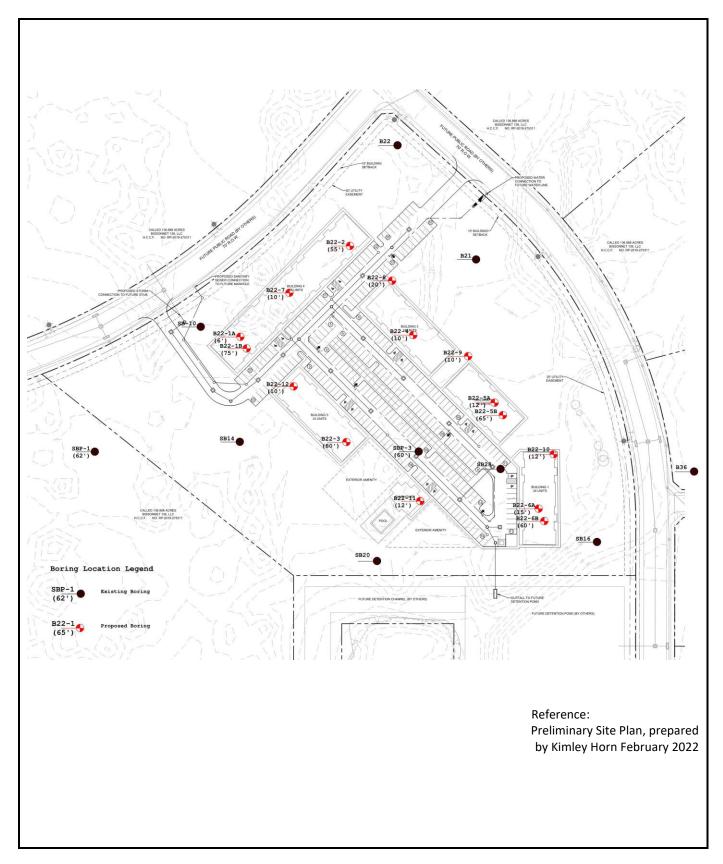
FIGURES





VICINITY MAP
KIRKWOOD CROSSING

FIGURE 1

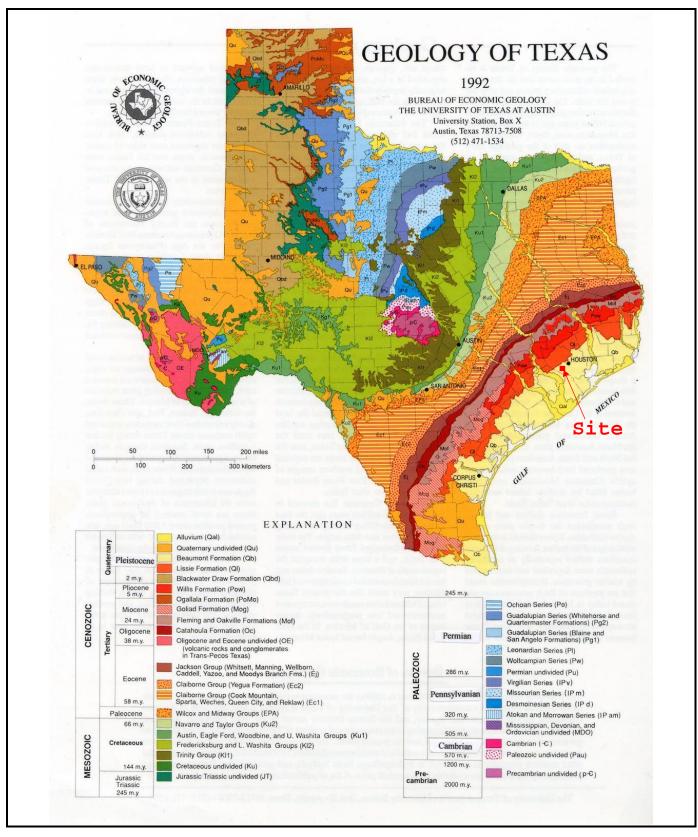




BORING LOCATION PLAN KIRKWOOD CROSSING

FIGURE 2

DRAWN	JOB NUMBER	DATE
GFG	22-009.001	09/13/2022



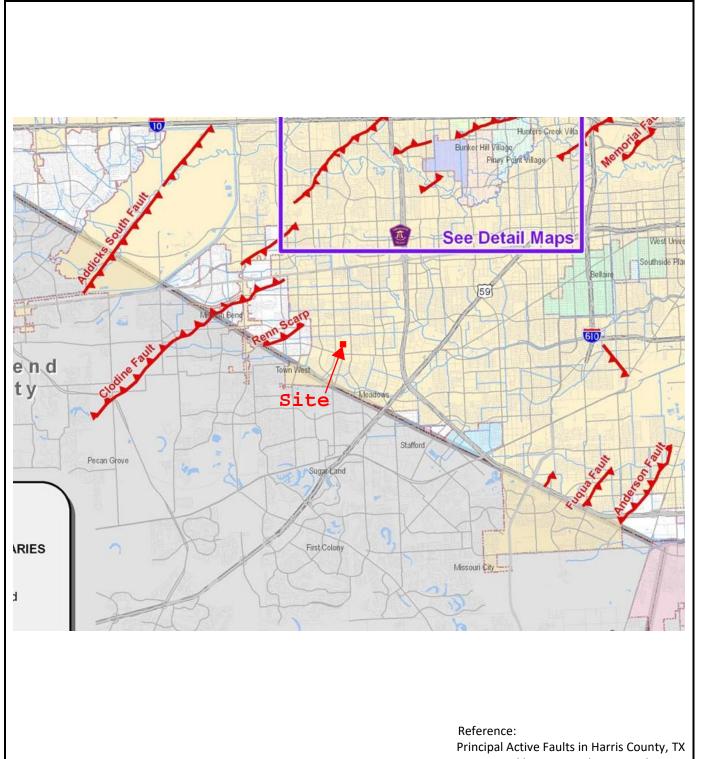


TEXAS GEOLOGICAL MAP KIRKWOOD CROSSING

FIGURE 3

 DRAWN
 JOB NUMBER
 DATE

 GFG
 22-009.001
 9/26/2022



Principal Active Faults in Harris County, TX Prepared by USGS and Harris-Galveston Coastal Subsidence District 2004

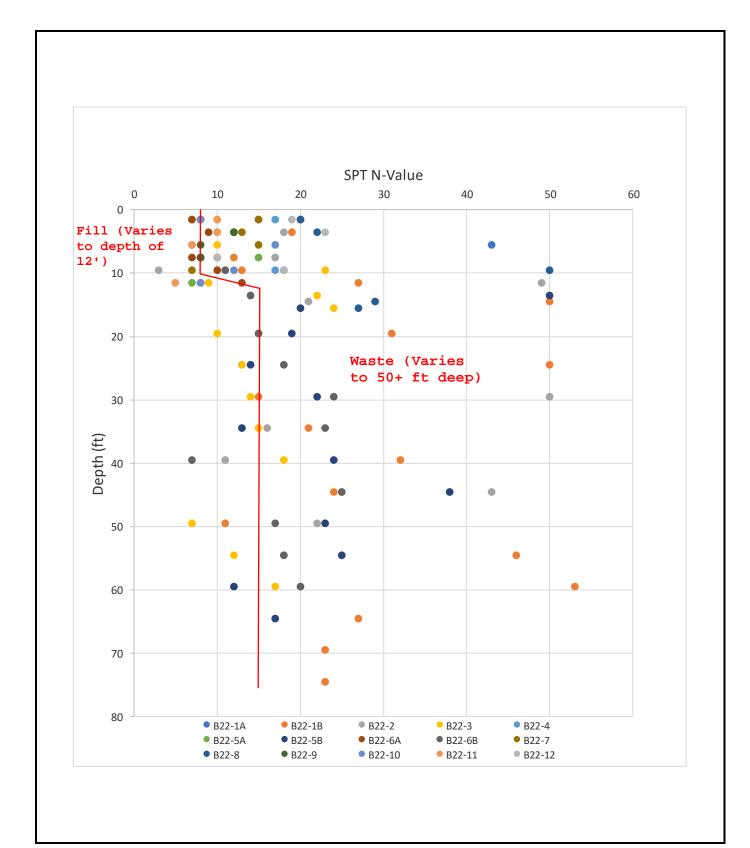


Goodheart & Associates, PLLCInfrastructure Engineering

GEOLOGIC HAZARDS MAP KIRKWOOD CROSSING

FIGURE 4

DRAWN	JOB NUMBER	DATE
GFG	22-009.001	9/26/2022





SPT N-VALUES v. DEPTH KIRKWOOD CROSSING

FIGURE 5

DRAWN	JOB NUMBER	DATE
GFG	22-009.001	9/23/2022



APPENDICES

APPENDIX A BORING LOGS

	M	AJOR DIVISIONS		GRAPHIC	SYMBOL	Т	YPICAL NAMES					
	arse 4 sieve)	CLEAN GR		99.00	GW	Well graded mixtures, o	d gravels, gravel-sand r sand-gravel-cobble mixtures					
eve)	S 9 6	(Less than 5% passe	s No. 200 sieve)		GP	Poorty grad tures, or sa	led gravels, gravel-sand mix- nd-gravel-cobble mixtures					
SOILS 200 sl	GRAVELS or less of passes No	GRAVELS WITH FINES	Limits plot below "A" line & hatched zone on plasticity chart	#	GM	Silty gravel	s, gravel-sand-silt mixtures					
E-GRAINED SOIL % passes No. 200	(50% fraction p	(More than 12% passes No. 200 sieve)	"A" fine & heached zone on plassicity chart	GC	Clayey grav	vels, gravel-sand-clay mixture						
COARSE-GRAINED SOILS Less than 50% passes No. 200 sleve)	arse sleve)	CLEAN S			sw	Well graded	d sands, gravelly sands					
COARS than 50	IDS 19 of co.	(Less than 5% passe	s No. 200 sieve)		SP	Poorly grad	led sands, gravelly sands					
Less	SANDS or more of passes No.	SANDS WITH FINES	Limits plot below "A" line & hatched zone on plasticity chart		SM	Silty sands,	sand-silt mixtures					
	(50% fraction	(More than 12% passes No. 200 sieve)	Limits plot above "A" line & traiched zone on plassicity chart	1/1	sc	Clayey san	ds, sand-clay mixtures					
eve)	TS tables 'A' table tone	SILTS OF LOW ((Liquid Limit les	PLASTICITY ss than 50)		ML	Inorganic s medium pla	ilts, clayey silts of low to sticity					
SOILS to, 200 st	SILTS Units plot below 'A' line & hetched sone on passidity chert	SILTS OF HIGH (Liquid Limit 5			мн	Inorganic si diatomaced	ilts, micaceous or ous silty soils, elastic silts					
NED S(AYS sbore 'A' dragient dryghent	CLAYS OF LOW (Liquid Limit les		1//	CL	Inorganic clays of low to medium plasticity, gravelly, sandy, and sitty of						
FINE-GRAINED or more passes N	CLAYS Units plot above "X" In a harded sone on plastedy gipet	CLAYS OF HIGH (Liquid Limit 5		LOW Of Organic si		Inorganic c clays, sand	lays of high plasticity, fat y clays of high plasticity					
FINE-GRAINED SOILS (50% or more passes No. 200 sleve)		ORGANIC SILTS AND PLASTICITY (Liquid L	CLAYS OF LOW imit less than 50)			Organic sitt plasticity, s	s and clays of low to medium andy organic sits and clays					
(20	ORGANIC SILTS AND CLAYS	ORGANIC SILTS AND PLASTICITY (Liquid			ОН	Organic silt plasticity, s	s and clays of high andy organic sits and clays					
	SANIC	PRIMARILY ORGA (dark in color and	organic odor)		PT	Peat						
		NOTE: Coarse-grained soils with with firmits plotting in the	between 5% and 12% pas hatched zone on the plastic	sing the No. : ity chart have	dust classif	ications.						
	601	PLASTICITY CHA	RT	ı		DMPONENT	F SOIL FRACTIONS PARTICLE SIZE RANGE					
PLASTICITY INDEX	50 PI - 40 LL - 30 PI - 20 CL - MI	4;45LL525 0.73 (LL-20)	MH or OH		Boulden Cobbles Gravel Coarse Fine gr Sand Coarse Medium	gravel avel sand sand	Above 12 in. 12 in. to 3 in. 3 in. to No. 4 sieve 3 in. to 3/4 in. 3/4 in. to No. 4 sieve No. 4 to No. 200 sieve No. 4 to No. 10 sieve No. 10 to No. 40 sieve No. 40 to No. 200 sieve Less than No. 200 sieve					



UNIFIED SOIL CLASSIFICATION SYSTEM KIRKWOOD CROSSING

FIGURE A1

LOG OF BORING B22-1A CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: N: 29°40'47.60" (P) POCKET PEN (tsf) STD. PENETRATION TEST BLOWCOUNT FAILURE STRAIN (%) DRY UNIT WEIGHT (T) TORVANE (tsf) W: 85°35'32.42" CONFINING PRESSURE (psi) **ELEVATION (FT)** COMPRESSIVE STRENGTH (tsf) PASSING #200 SIEVE (%) OTHER TESTS PERFORMED SAMPLE TYPE MOISTURE CONTENT (%) LIQUID LIMIT (%) PLASTICITY INDEX (%) DEPTH (FT) SURFACE ELEVATION: 103.45 ft SYMBOL N₆₀ DRILLING METHOD: Dry Augered: to Wash Bored: to **MATERIAL DESCRIPTION** 0 Stiff gray & tan SANDY LEAN CLAY "FILL" 8/6" w/ sand pockets 8/6" 7/6" LANDFILL CAP 0'-2' (P)4.50 -very stiff to hard & black w/ wood & nails @ 2'-4' "FILL" 100 3/6" 6/6" 37/6" Hard black & brown w/ WOOD and plastic 5 Terminated @ 6' 95 10 90 15 85 20 80 25 75 30 70 35

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

6 ft 7/29/2022 7/29/2022 Gayrian Singleton 22.14.222 NOTES: No Free Water and No Static Water encountered.

Boring backfilled with cement-bentonite grout upon completion of soil sampling. SPT Hammer Type: Automatic Hammer Drilling Equipment: TRUCK CME

LOG OF BORING B22-1B CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: N: 29°40'47.60" STD. PENETRATION TEST BLOWCOUNT FAILURE STRAIN (%) P) POCKET PEN (tsf) DRY UNIT WEIGHT (T) TORVANE (tsf) CONFINING PRESSURE (psi) W: 95°35'32.42" OTHER TESTS PERFORMED **ELEVATION (FT)** COMPRESSIVE STRENGTH (tsf) PASSING #200 SIEVE (%) SAMPLE TYPE MOISTURE CONTENT (%) LIQUID LIMIT (%) PLASTICITY INDEX (%) DEPTH (FT) SURFACE ELEVATION: 103.45 FT SYMBOL N₆₀ DRILLING METHOD: Dry Augered: to 75' Wash Bored: to **MATERIAL DESCRIPTION** 0 Very stiff brown & tan SANDY LEAN CLAY "FILL" 3/6" w/ organic LANDFILL CAP 0'-2' 8/6" 12/6" 5/6" 7/6" 12/6" -black & gray w/ shingles & wood @ 2.5'-4' 100 (P)4.50 Hard black & gray LEAN CLAY "FILL" 5 w/ miscellaneous, non degradable material 4/6" -stiff @ 6.5'-10' 5/6" 7/6" 95 -brown @ 8.5'-10' 9/6" 7/6' 6/6" 10 -very stiff @ 10.5'-12' 12/6" 17/6" -w/ wood @ 10.5'-30' 10/6" -gray @ 10.5'-15' 90 50/3" 15 85 9/6" 15/6" 16/6' 20 80 50/3" -gray w/ concrete fragments @ 23.5'-25' 25 75 -w/ miscellaneous, non-degradable material @ 28.5'-7/6' 8/6'

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

30

35

70

30'

75 ft 9/1/2022 9/2/2022 Omar Rodriguez 22.14.222

w/ trash & sand pockets

Very stiff gray & reddishbrown FAT CLAY "FILL"

NOTES: No Free Water and No Static Water encountered.

7/6"

Boring backfilled with soil cuttings & dry bentonite upon completion of soil sampling.

SPT Hammer Type: Safety Hammer Drilling Equipment: TRACK EDS



LOG OF BORING B22-1B CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: N: 29°40'47.60" P) POCKET PEN (tsf) STD. PENETRATION TEST BLOWCOUNT FAILURE STRAIN (%) DRY UNIT WEIGHT CONFINING PRESSURE (psi) (T) TORVANE (tsf) W: 95°35'32.42" OTHER TESTS PERFORMED **ELEVATION (FT)** PASSING #200 SIEVE (%) COMPRESSIVE STRENGTH (tsf) MOISTURE CONTENT (%) SAMPLE TYPE PLASTICITY INDEX (%) DEPTH (FT) SURFACE ELEVATION: LIQUID LIMIT 103.45 FT SYMBOL N_{60} (bct) (%) DRILLING METHOD: Dry Augered: to 75' Wash Bored: **MATERIAL DESCRIPTION** 35 11/6" Very stiff gray & reddishbrown FAT CLAY "FILL" 65 -hard @ 38.5'-40' 8/6" 13/6" -black @ 38.5'-50' 19/6" 40 60 -very stiff @ 43.5'-45' 9/6" -w/ concrete fragments @ 43.5'-50' 6/6' 18/6" 45 55 9/6" -stiff w/ sand pockets & wood @ 48.5'-50' 5/6" 50 50 11/6" 11/6" Hard black LEAN CLAY "FILL" w/ wood & concrete fragments 35/6" 55 45 30/6" -w/ trash @ 58.5'-60' 30/6" 23/6" 60

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

70

65

40

35

75 ft 9/1/2022 9/2/2022 Omar Rodriguez 22.14.222

Very stiff black & gray LEAN CLAY (CL)

Medium dense black SILTY SAND "FILL"

w/ wood, concrete & aggregate

w/ trash & sand pockets

NOTES: No Free Water and No Static Water encountered.

24/6" 12/6"

15/6

12/6" 11/6"

12/6'

Boring backfilled with soil cuttings & dry bentonite upon completion of soil sampling.

SPT Hammer Type: Safety Hammer Drilling Equipment: TRACK EDS

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LOG OF BORING B22-1B CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: N: 29°40'47.60" (P) POCKET PEN (tsf) STD. PENETRATION TEST BLOWCOUNT FAILURE STRAIN (%) (T) TORVANE (tsf) DRY UNIT WEIGHT CONFINING PRESSURE (psi) W: 95°35'32.42" **ELEVATION (FT)** COMPRESSIVE STRENGTH (tsf) PASSING #200 SIEVE (%) OTHER TESTS PERFORMED SAMPLE TYPE MOISTURE CONTENT (%) LIQUID LIMIT (%) PLASTICITY INDEX (%) DEPTH (FT) SURFACE ELEVATION: 103.45 FT SYMBOL (bct) N_{60} DRILLING METHOD: Dry Augered: to 75' Wash Bored: MATERIAL DESCRIPTION Very stiff black & gray LEAN CLAY (CL) Native material 30 9/6" 9/6" 14/6" 75 Terminated @ 75' 25 80 20 85 15 90 10 95 5 100 0 105 COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: 75 ft 9/1/2022 NOTES: No Free Water and No Static Water encountered. Boring backfilled with soil cuttings & dry bentonite upon completion of soil 9/2/2022 sampling. Omar Rodriguez 22.14.222 LOGGER: PROJECT NO.: SPT Hammer Type: Safety Hammer Drilling Equipment: TRACK EDS

TOLUNAY-WONG ENGINEERS, INC.

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LOG OF BORING B22-2

PROJECT: Bissonnet 136 Site CLIENT: Goodheart & Associates, LLC

ELEVATION (FT) DEPTH (FT)	SAMPLE TYPE	SYMBOL	COORDINATES: N: 29°40'49.33" W: 95°35'30.52" SURFACE ELEVATION: 104.94 ft DRILLING METHOD: Dry Augered: 0' to 20' Wash Bored: 20' to 55' MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N ₆₀	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
		なるない ないかい かいかい かいかい かいかい かいかい かいかい かいかい	Very stiff tan & gray SANDY LEAN CLAY "FILL" SURFICIAL FILL & LAND FILL CAP 0'-4' -black w/ wood @ 4'-10' w/ shingles @ 4'-6'	(P)4.50	7/6" 10/6" 10/6" 6/6" 9/6" 9/6"		9	86	0	NP	17.06	15	4		
100 — 5		かんかん かんしょう かんしん かんしん	-w/ trash @ 4-6 -w/ trash @ 6.5'-8' -very stiff @ 6.5'-8' -soft & gray @ 8.5'-10'		5/6" 11/6" 6/6" 1/6" 1/6" 2/6"										
95 — 10 		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Hard black LEAN CLAY "FILL" w/ wood Black & brown w/ wood "FILL"		5/6" 4/6" 45/6"										
90 — 15	X	The state of the s			10/6" 11/6" 14/6" 8/6" 7/6"										
80 25		さらい かられる かっとう ないかん かっとう かんしょう んしょう かんしょ かんしょ かんしょ かんしょ かんしょ かんしょ かんしょ かんしょ	-w/ tar & gravel @ 23.65'-25'		7/6" 7/6" 6/6"										
75 — 30		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			50/4"										
70 — 35	X		-dark gray @ 33.5'-35' -w/ clay pockets @ 33.5'-40'		7/6" 8/6" 8/6"										

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

55 ft 7/29/2022 7/30/2022 Gayrian Singleton 22.14.222 NOTES: Free Water encountered at 20' during drilling and dry after 10 and 15 minutes. Boring backfilled with dry bentonite chips and cement-bentonite grout upon completion of soil sampling.

SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK

LOG OF BORING B22-2 CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: N: 29°40'49.33" (P) POCKET PEN (tsf) STD. PENETRATION TEST BLOWCOUNT FAILURE STRAIN (%) (T) TORVANE (tsf) DRY UNIT WEIGHT CONFINING PRESSURE (psi) W: 95°35'30.52" OTHER TESTS PERFORMED **ELEVATION (FT)** PASSING #200 SIEVE (%) COMPRESSIVE STRENGTH (tsf) MOISTURE CONTENT (%) SAMPLE TYPE PLASTICITY INDEX (%) DEPTH (FT) LIQUID LIMIT SURFACE ELEVATION: 104.94 ft SYMBOL N_{60} (bct) %) DRILLING METHOD: Dry Augered: to 20' Wash Bored: to 20' 55' MATERIAL DESCRIPTION 35 Dark gray & black w/ wood "FILL" 11/6" 5/6" 7/6" 65 40 -miscellaneous non-degradable material @ 43.5'-45' 11/6" 4 21/6" 22/6" 60 45 11/6" -brown @ 48.5'-50' 14/6" 55 50 8/6" 30 10/6' 8/6" Medium dense gray SILTY SAND (SM) 50 w/ clay pockets 55 Native material Terminated @ 55' 45 60 40 65 35 └ 70 COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: NOTES: Free Water encountered at 20' during drilling and dry after 10 and 15 minutes. 55 ft 7/29/2022 7/30/2022 Boring backfilled with dry bentonite chips and cement-bentonite grout upon completion of soil sampling. Gayrian Singleton 22.14.222

TOLUNAY-WONG

SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK

ENGINEERS, INC.

Page 2 of 1

LOGGER: PROJECT NO.:

LOG OF BORING B22-3

PROJECT: Bissonnet 136 Site CLIENT: Goodheart & Associates, LLC

ELEVATION (FT) DEPTH (FT)	SAMPLE TYPE	SYMBOL	COORDINATES: N: 29°40'45.80" W: 95°35'30.3" SURFACE ELEVATION: 99.09 ft DRILLING METHOD: Dry Augered: 0' to 14.5' Wash Bored: 14.5' to 60' MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N ₆₀	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
-0		これが、これでは、これでは、これでは、これでは、これでは、これでは、これでは、これでは	Stiff gray & orange SANDY LEAN CLAY "FILL" w/ ferrous nodules -very stiff to hard w/ calcareous deposits @ 2'-4'	(P)4.50+	4/6" 5/6" 5/6"		14	119	49	30	6.82	6	2		
95 5		1 2 V 2 V 2 V 2 V 2 V 2 V 2 V 2 V 2 V 2	Stiff reddishbrown & gray FAT CLAY "FILL" w/ ferrous nodules & sand pockets	(P)2.00	3/6" 4/6" 6/6"		22	103	52	32	1.48	4 *	7		
90 — 10		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Reddishbrown LEAN CLAY "FILL" Medium dense black w/ wood "FILL" Stiff reddishbrown & gray LEAN CLAY "FILL"		4/6" 7/6" 16/6"		38		48	28					
85 —	X	**************************************	w/ sand pockets & wood -very stiff & black @ 12.5'-14'		3/6" 3/6" 6/6" 3/6" 8/6" 14/6"				10	10					
1s	5	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	w/ wood and miscellaneous non-degradable material "FILL"		4/6" 21/6" 3/6"										
80 20	0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Stiff gray & black FAT CLAY "FILL" w/ wood		8/6" 4/6" 6/6"		55		83	53					
75 — 25 — 25	5	THE PARTY OF THE P	Stiff gray & black FAT CLAY "FILL" w/ sand pockets & wood		6/6" 7/6" 6/6"										
70 30	0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-no recovery @ 28.5'-30'		6/6" 8/6" 7/6"										
65 - 3	5		FILL w/ TRASH, WOOD, PLASTIC & CONCRETE		14/6" 8/6"										

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

60 ft 7/28/2022 7/29/2022 Gayrian Singleton 22.14.222

NOTES: Free Water encountered at 10' during drilling and dry after 5, 10 and 15 minutes. Boring backfilled with dry bentonite chips and cement-bentonite grout upon completion of soil sampling.

SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK



LOG OF BORING B22-3 CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: N: 29°40'45.80" P) POCKET PEN (tsf) STD. PENETRATION TEST BLOWCOUNT FAILURE STRAIN (%) DRY UNIT WEIGHT CONFINING PRESSURE (psi) W: 95°35'30.3" (T) TORVANE (tsf) OTHER TESTS PERFORMED **ELEVATION (FT)** PASSING #200 SIEVE (%) COMPRESSIVE STRENGTH (tsf) MOISTURE CONTENT (%) SAMPLE TYPE PLASTICITY INDEX (%) DEPTH (FT) SURFACE ELEVATION: LIQUID LIMIT 99.09 ft SYMBOL N_{60} (bct) %) DRILLING METHOD: Dry Augered: to 14.5' Wash Bored: 14.5' to 60' MATERIAL DESCRIPTION 35 7/6" FILL w/ TRASH, WOOD, PLASTIC & CONCRETE 8/6" 8/6" FILL w/ WOOD 60 10/6" 美艺 40 8/6" 55 12/6" 13/6" 45 Firm reddishbrown FAT CLAY "FILL" 4/6" 50 3/6" 4/6" 50 1 3 5 S -stiff w/ wood @ 53.5-55' 4/6" 45 5/6" 7/6" 55 5/6" 6/6" Very stiff reddishbrown FAT CLAY (CH) 40 slickensided 11/6" 60 Native material Terminated @ 60' 35 65 30 - 70 NOTES: Free Water encountered at 10' during drilling and dry after 5, 10 and 15 minutes. Boring backfilled with dry bentonite chips and cement-bentonite grout upon

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

7/28/2022 7/29/2022 Gayrian Singleton 22.14.222 completion of soil sampling.

SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK

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LOG OF BORING B22-4 CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: N: 29°40'47.71" P) POCKET PEN (tsf) FAILURE STRAIN (%) STD. PENETRATION TEST BLOWCOUNT DRY UNIT WEIGHT (T) TORVANE (tsf) CONFINING PRESSURE (psi) W: 95°35'28.97" OTHER TESTS PERFORMED **ELEVATION (FT)** COMPRESSIVE STRENGTH (tsf) PASSING #200 SIEVE (%) SAMPLE TYPE MOISTURE CONTENT (%) LIQUID LIMIT (%) PLASTICITY INDEX (%) DEPTH (FT) SURFACE ELEVATION: 107.4 SYMBOL N₆₀ DRILLING METHOD: Dry Augered: to 10' Wash Bored: to **MATERIAL DESCRIPTION** 0 Loose tan SILTY SAND "FILL" 1/6" 3/6" 4/6" w/ clay pockets SURFICIAL FILL & LANDFILL CAP 0 105 2/6" 6/6" 6/6" -medium dense brown @ 2.5'-3' 11 Very stiff brown LEAN CLAY "FILL" w/ ferrous nodules P)4.50-13 118 44 27 5.87 10 4 Very stiff to hard dark gray, gray & tan SANDY LEAN 5 CLÁY "FILL" w/ ferrous nodules, sand pockets & calcareous deposits 1/6" -dark brown w/ wood & trash @ 6.5'-10' 3/6" 5/6" 100 3/6" 8/6' 9/6" 10 Terminated @ 10' 95 15 90 20 85 25 80 30 75 35 COMPLETION DEPTH: NOTES: Free Water encountered at 10' during drilling and dry after 5, 10 and 15 minutes. 10 ft

DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.: 10 ft 7/30/2022 7/30/2022 Gayrian Singleton 22.14.222 S: Free Water encountered at 10' during drilling and dry after 5, 10 and 15 minutes Boring backfilled with dry bentonite chips and cement-bentonite grout upon completion of soil sampling.

SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK

LOG OF BORING B22-5A CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: 29° 40' 46.40" . PENETRATION T BLOWCOUNT P) POCKET PEN (tsf) FAILURE STRAIN (%) DRY UNIT WEIGHT (T) TORVANE (tsf) W 95° 35' 27.40" CONFINING PRESSURE (psi) **ELEVATION (FT)** COMPRESSIVE STRENGTH (tsf) PASSING #200 SIEVE (%) OTHER TESTS PERFORMED SAMPLE TYPE MOISTURE CONTENT (%) LIQUID LIMIT (%) PLASTICITY INDEX (%) SURFACE ELEVATION: 103.37 ft DEPTH (FT) SYMBOL DRILLING METHOD: Dry Augered: to STD. P TEST B Wash Bored: to **MATERIAL DESCRIPTION** 0 Firm brown & gray FAT CLAY (CH) 2/6" w/ organic SURFICIAL FILL & LANDFILL CAP 0'-12' 3/6" 4/6" -stiff @ 2.5'-10' 2/6" 3/6" 7/6" 100 -w/ silt seams @ 2.5'-4' -w/ ferrous nodules @ 4'-12' (P)2.75 19 105 53 35 2.95 13 4 -black @ 4'-6' 5 5/6" -brown @ 6.5'-8' 5/6" 10/6" (P)1.75 106 53 1.83 8 -w/ calcareous nodules @ 8'-12' 21 34 15 95 10 -firm @ 10.5'-12' 2/6" 2/6" 5/6" Terminated @ 12' 90 15 85 20 80 25 75 30 70 35

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.: 12 ft 9/2/2022

Omar Rodriguez 22.14.222 NOTES: No Free Water and No Static Water was encountered.

Boring backfilled with dry bentonite upon completion of soil sampling.

SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK



LOG OF BORING B22-5B

PROJECT: Bissonnet 136 Site CLIENT: Goodheart & Associates, LLC

				•	Г										
ON (FT) H (FT)	: TYPE	30L	COORDINATES: N: 29°40'46.40" W: 95°36'27.40" SURFACE ELEVATION: 103.4	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	TRATION	0	JURE NT (%)	WEIGHT	LIMIT)	(%)	ESSIVE TH (tsf)	FAILURE STRAIN (%)	NING RE (psi)	G #200 : (%)	TESTS
ELEVATION (FT) DEPTH (FT)	SAMPLE TYPE	SYMBOL	DRILLING METHOD: Dry Augered: 0' to 65' Wash Bored: to) POCKE (T) TORV	STD. PENETRATION TEST BLOWCOUNT	N ₆₀	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	AILURE S'	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
•			MATERIAL DESCRIPTION	=	0) .							Ш			
100 —		The state of the s	Very stiff to hard dark gray & brown FAT CLAY "FILL" w/ calcareous deposits SURFICIAL FILL & LANDFILL CAP 0'-13.5'												
95 —		は、これには、ないというないない													
10 10		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			50/6"										
90		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Dark brown w/ miscellaneous non-degradable fill and asphalt "FILL"		40/6" 9/6" 11/6"										
85 — 20					14/6" 9/6" 10/6"										
80 — 25	X	10 10 10 10 10 10 10 10 10 10 10 10 10 1	-w/ wood @ 23.5'-55'		45/6" 8/6" 6/6"										
75 —		The state of the s	-w/ brick @ 28.5'-35'		40/6" 8/6" 14/6"										
70 — 35	X	1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	-w/ plastic @ 33.5'-35'		11/6" 3/6" 10/6"										

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

65 ft 9/6/2022 9/6/2022 Joshua Sparks 22.14.222 NOTES: No Free Water and No Static Water was encountered.

Boring backfilled with dry bentonite upon completion of soil sampling.

SPT Hammer Type: Safety Hammer Drilling Equipment: TRACK EDS

LOG OF BORING B22-5B CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: N: 29°40'46.40" P) POCKET PEN (tsf) STD. PENETRATION TEST BLOWCOUNT FAILURE STRAIN (%) (T) TORVANE (tsf) DRY UNIT WEIGHT CONFINING PRESSURE (psi) W: 95°36'27.40" **ELEVATION (FT)** PASSING #200 SIEVE (%) OTHER TESTS PERFORMED COMPRESSIVE STRENGTH (tsf) SAMPLE TYPE MOISTURE CONTENT (%) PLASTICITY INDEX (%) DEPTH (FT) SURFACE ELEVATION: LIQUID LIMIT 103.4 SYMBOL N_{60} (bct) %) DRILLING METHOD: Dry Augered: to 65' Wash Bored to MATERIAL DESCRIPTION 35 -w/ miscellaneous non-degradable material "FILL" 65 15/6" 10/6" 14/6" 40 60 12/6" 18/6" 20/6" 45 55 16/6" 9/6" 50 50 20/6" 11/6" 14/6" 55 45 8/6" 5/6" 7/6" Stiff brown FAT CLAY (CH) Native Material 60 40 NO RECOVERY 7/6" 7/6" 10/6" 65

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

35

65 ft 9/6/2022 9/6/2022 Joshua Sparks 22.14.222

Terminated @ 65'

NOTES: No Free Water and No Static Water was encountered.

Boring backfilled with dry bentonite upon completion of soil sampling.

SPT Hammer Type: Safety Hammer Drilling Equipment: TRACK EDS

Page 2 of 1

LOG OF BORING B22-6A

PROJECT: Bissonnet 136 Site CLIENT: Goodheart & Associates, LLC

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	COORDINATES: N: 29°40'44.62" W: 95°35'26.34" SURFACE ELEVATION: 102.08 DRILLING METHOD: Dry Augered: 0' to 15' Wash Bored: to MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N ₆₀	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
	- 0															
100 —	4	X	10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Firm dark brown FAT CLAY "FILL" w/ sand pockets & calcareous deposits SURFICIAL FILL AND LANDFILL CAP 0'-13.5'		3/6" 3/6" 4/6"										
+	2		· · · · · · · · · · · · · · · · · · ·	Stiff dark brown SANDY LEAN CLAY "FILL" w/ calcareous deposits		4/6" 4/6" 5/6"		14								
_	- 5	X	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-firm @ 4.5'-6'		1/6" 2/6" 5/6"		16		49	30					
95 —		X	LOW MA	Firm dark brown FAT CLAY "FILL" w/ sand pockets & calcareous deposits		1/6" 3/6" 4/6"		27		65	42					
	<u> </u>		v, 44, 63 4, 4, 4	-stiff @ 8.5'-9'		3/6" 4/6"		23		47	27					
	- 10	X	7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Stiff dark brown SANDY LEAN CLAY "FILL"		6/6"										
90 —	2	X	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Firm dark brown FAT CLAY "FILL" w/ calcareous deposits		2/6" 6/6" 7/6"										
+	4	$\langle $	10 7 4 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1	-stiff brown FAT CLAY "FILL" & trash @ 13.5'-15'												
+	15	ŀ	4	Terminated @ 15'												
85 —	- 20															
80																
75 — 	- 25															
 70 	- 30															
_	- 35															

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

15 ft 8/3/2022 8/3/2022 Josh Sparks 22.14.222 NOTES: No Free Water and No Static Water was encountered.
Boring backfilled with dry bentonite upon completion of soil sampling.
SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK



LOG OF BORING B22-6B

PROJECT: Bissonnet 136 Site CLIENT: Goodheart & Associates, LLC

		1	COORDINATES: N: 29°40'44.62"												
ELEVATION (FT) DEPTH (FT)	SAMPLE TYPE	SYMBOL	W: 95°35'26.34" SURFACE ELEVATION: 102.08 DRILLING METHOD: Dry Augered: 0' to 15' Wash Bored: 15' to 60'	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N ₆₀	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
ш ¦			MATERIAL DESCRIPTION		STI			R			0 %	FAII	Δ.		
100	X	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Firm dark brown FAT CLAY "FILL" w/ roots SURFICIAL FILL & LANDFILL CAP 0'-13.5'		2/6" 3/6" 5/6"										
 5	X	12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Stiff brown SANDY LEAN CLAY "FILL" w/ calcareous deposits -very stiff to hard @ 4'-6'	(P)4.50+	4/6" 5/6" 7/6"		13		48	30				64	
95	X	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	w/ ferrous nodules & calcareous deposits		2/6" 3/6" 5/6"		18		51	32				57	
- 10	X	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-stiff & gray w/ sand pockets @ 8.5'-10'		3/6" 4/6" 7/6"										
90 —		1 3 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-firm w/ calcareous deposits @ 10.5'-12' -dark brown @ 10.5'-13'		3/6" 3/6" 5/6"										
15 85		The state of the s	Stiff brown w/ wood and miscellaneous non- degradable material "FILL"		3/6" 5/6" 9/6"										
		というない ないかん かんかん かんかん かんかん かんかん かんかん かんかん かん			11/6" 9/6" 6/6"										
25 75		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-w/ carpet @ 23.5'-35'		9/6" 10/6" 8/6"										
70 -		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			30/6" 15/6" 9/6"										
35	X	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			14/6" 17/6" 6/6"										

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

60 ft 9/6/2022 9/6/2022 Josh Sparks 22.14.222 NOTES: No Free Water and No Static Water was encountered.

Boring backfilled with dry bentonite upon completion of soil sampling.

SPT Hammer Type: Safety Hammer Drilling Equipment: TRACK EDS

LOG OF BORING B22-6B CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: N: 29°40'44.62" (P) POCKET PEN (tsf) STD. PENETRATION TEST BLOWCOUNT FAILURE STRAIN (%) DRY UNIT WEIGHT CONFINING PRESSURE (psi) (T) TORVANE (tsf) W: 95°35'26.34" OTHER TESTS PERFORMED **ELEVATION (FT)** PASSING #200 SIEVE (%) COMPRESSIVE STRENGTH (tsf) MOISTURE CONTENT (%) SAMPLE TYPE PLASTICITY INDEX (%) DEPTH (FT) SURFACE ELEVATION: 102.08 LIQUID LIMIT SYMBOL N_{60} (bct) %) DRILLING METHOD: Dry Augered: to 15' Wash Bored: to 15' 60' MATERIAL DESCRIPTION 35 Fill w/ miscellaneous non-degradable material 65 5/6" 3/6" 4/6" 40 60 16/6" 13/6" 12/6" 45 55 22/6" -w/ carpet @ 48.5'-50' 10/6" 50 50 25/6" 10/6" 8/6" 55 45 7/6" 9/6" Very stiff brown FAT CLAY (CH) 26 71 52 11/6" 60 Native Material Terminated @ 60' 40 65 35

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

70

60 ft 9/6/2022 9/6/2022 Josh Sparks 22.14.222 NOTES: No Free Water and No Static Water was encountered.

Boring backfilled with dry bentonite upon completion of soil sampling.

SPT Hammer Type: Safety Hammer Drilling Equipment: TRACK EDS

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LOG OF BORING B22-7 CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: 29° 40' 44.66' P) POCKET PEN (tsf) FAILURE STRAIN (%) STD. PENETRATION TEST BLOWCOUNT (T) TORVANE (tsf) DRY UNIT WEIGHT W 95° 35' 36.07' CONFINING PRESSURE (psi) OTHER TESTS PERFORMED **ELEVATION (FT)** COMPRESSIVE STRENGTH (tsf) PASSING #200 SIEVE (%) SAMPLE TYPE MOISTURE CONTENT (%) LIQUID LIMIT (%) PLASTICITY INDEX (%) DEPTH (FT) SURFACE ELEVATION: 104.0 ft SYMBOL N₆₀ DRILLING METHOD: Dry Augered: to 10' Wash Bored: to **MATERIAL DESCRIPTION** 0 Stiff dark brown & tan SANDY LEAN CLAY "FILL" 4/6" w/ calcareous deposits SURFICIAL FILL & LANDFILL CAP 0'-4.5' 8/6" 7/6" -brown @ 2.5'-6' 4/6" 12 39 21 6/6" 7/6" -orange w/ ferrous nodules @ 2.5'-4' 100 4/6" -wood and miscellaneous non-degradable material @ 6/6" 9/6" 4.5'-6' w/ wood "FILL" -miscellaneous non-degradable material @ 8.5'-10' 9/6" 95 4/6" 3/6" 10 Terminated @ 10' 90 15 85 20 80 25 75 30

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

- 35

70

10 ft 8/2/2022 8/2/2022 Josh Sparks 22.14.222 NOTES: No Free Water and No Static Water was encountered.

Boring backfilled with dry bentonite chips upon completion of soil sampling. SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK



LOG OF BORING B22-8

PROJECT: Bissonnet 136 Site CLIENT: Goodheart & Associates, LLC

	_,,,,,,		5					0.7.0		,				
ELEVATION (FT) DEPTH (FT)	SAMPLE TYPE	COORDINATES: N N: 29°40'48.65" WW: 95°35'29.44" SURFACE ELEVATION: 105.46 ft DRILLING METHOD: Dry Augered: 0' to 20' Wash Bored: to MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N ₆₀	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
105 — 0	2.00 2.45 1.46 1.46 1.47 1.47	Very stiff gray SANDY LEAN CLAY "FILL" SURFICIAL FILL & LANDFILL CAP 0'-4'		3/6" 10/6" 10/6"										
100 — 5	1. 2. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	-brown & black @ 2.5'-4' Brown, blue & black w/ wood and carpet "FILL"		5/6" 14/6" 8/6"		11		0	16 NP					
95 — 10	1	Firm gray & reddishbrown SANDY LEAN CLAY "FILL" Firm gray & reddishbrown FAT CLAY "FILL" w/ carpet -very stiff to hard @ 8.5'-10' w/ wood		WOH/ 6" 2/6" 6/6" 2/6" 5/6" 50/2"										
90 — 15	2 4 4 5 5 6 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6	-very stiff w/ sand pockets & miscellaneous non- degradable material @ 13.5'-15'		3/6" 14/6" 15/6"										
85 — 20 85 — 20	14 14 14 14 14 14 14 14 14 14 14 14 14 1	Very stiff brown w/ wood "FILL" Terminated @ 20'		9/6" 13/6" 14/6"										
80 — 25														
75 — 30														

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

20 ft 8/1/2022 8/1/2022 Gayrian Singleton 22.14.222 NOTES: No Free Water and No Static Water was encountered.

Boring backfilled with dry bentonite chips upon completion of soil sampling. SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK



LOG OF BORING B22-9 CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: N: 29°40'47.31" P) POCKET PEN (tsf) FAILURE STRAIN (%) STD. PENETRATION TEST BLOWCOUNT DRY UNIT WEIGHT (T) TORVANE (tsf) CONFINING PRESSURE (psi) PASSING #200 SIEVE (%) W: 95°255'28.97" **ELEVATION (FT)** COMPRESSIVE STRENGTH (tsf) OTHER TESTS PERFORMED SAMPLE TYPE MOISTURE CONTENT (%) LIQUID LIMIT (%) PLASTICITY INDEX (%) SURFACE ELEVATION: 105.59 ft. DEPTH (FT) SYMBOL N₆₀ DRILLING METHOD: Dry Augered: to 10' Wash Bored: to **MATERIAL DESCRIPTION** Loose dark brown SANDY LEAN CLAY "FILL" 105 4/6" w/ calcareous deposits SURFICIAL FILL & LANDFILL CAP 0'-10' 4/6" 4/6" 2/6" Stiff dark brown FAT CLAY "FILL" 25 73 46 5/6" 7/6" -firm @ 4.5'-7' 2/6" 5 3/6" 5/6" -gray w/ ferrous nodules @ 4.5'-6' 100 -brown @ 6.5'-7' 2/6" 3/6" 5/6" Firm tan SILTY SAND "FILL" 5/6' 18 Very stiff brown & gray FAT CLAY "FILL" 8/6" 10/6" w/ ferrous nodules & calcareous deposits 10 Terminated @ 10' 95 15 90 20 85 25 80 30 75

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

35

10 ft 8/2/2022 8/2/2022 Josh Sparks 22.14.222 NOTES: No Free Water and No Static Water encountered.

Boring backfilled with dry bentonite chips upon completion of soil sampling. SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK



LOG OF BORING B22-10 CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: 29° 40' 45.62' . PENETRATION T BLOWCOUNT P) POCKET PEN (tsf) FAILURE STRAIN (%) DRY UNIT WEIGHT (T) TORVANE (tsf) CONFINING PRESSURE (psi) W 95° 35' 26.08" OTHER TESTS PERFORMED **ELEVATION (FT)** COMPRESSIVE STRENGTH (tsf) PASSING #200 SIEVE (%) SAMPLE TYPE MOISTURE CONTENT (%) LIQUID LIMIT (%) PLASTICITY INDEX (%) DEPTH (FT) SURFACE ELEVATION: 102.82 SYMBOL N₆₀ DRILLING METHOD: Dry Augered: to 12' STD. P TEST B Wash Bored: to **MATERIAL DESCRIPTION** Firm brown SANDY LEAN CLAY (CL) 3/6" w/ calcareous deposits & roots SURFICIAL FILL & LANDFILL CAP 0'-12' 4/6" 4/6" -very stiff to hard & tan @ 2'-4' P)4.50-112 33 16 6.42 3 3 100 Very stiff brown FAT CLAY (CH) 3/6" 8/6" 9/6" w/ calcareous nodules, sand pockets & sand lens Stiff tan & brown SANDY LEAN CLAY (CL) 2/6" 4/6" 95 6/6" -dark brown w/ clay pockets & calcareous deposits @ 3/6" 4/6" 8.5'-10' 8/6" 10 2/6" 3/6" Firm dark brown FAT CLAY (CH) w/ sand pockets, calcareous deposits & roots 5/6" Terminated @ 12' 90 15 85 20 80 25 75 30 70

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.: 12 ft 8/2/2022 8/2/2022 Chuck Doss 22.14.222 NOTES: No Free Water and No Static Water was encountered.

Boring backfilled with dry bentonite chips upon completion of soil sampling. SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK



LOG OF BORING B22-11 CLIENT: Goodheart & Associates, LLC PROJECT: Bissonnet 136 Site COORDINATES: 29° 40' 44.75' . PENETRATION T BLOWCOUNT P) POCKET PEN (tsf) FAILURE STRAIN (%) DRY UNIT WEIGHT (T) TORVANE (tsf) W 95° 35' 28.82" CONFINING PRESSURE (psi) OTHER TESTS PERFORMED **ELEVATION (FT)** COMPRESSIVE STRENGTH (tsf) PASSING #200 SIEVE (%) SAMPLE TYPE MOISTURE CONTENT (%) LIQUID LIMIT (%) PLASTICITY INDEX (%) DEPTH (FT) SURFACE ELEVATION: 98.18 ft SYMBOL N₆₀ DRILLING METHOD: Dry Augered: to 12' STD. P TEST B Wash Bored: to **MATERIAL DESCRIPTION** 0 Stiff dark brown SANDY LEAN CLAY "FILL" 5/6" w/ calcareous deposits 4/6" 6/6" SURFICIAL FILL'& LANDFILL CAP 0'-6.5' 2/6" 4/6" 6/6" -w/ sand seams @ 2.5'-4' 13 38 21 95 1/6" -firm & light brown w/ clay pockets @ 4.5'-6' 2/6" 5/6" Stiff dark brown FAT CLAY "FILL" 4/6" 17 38 59 5/6" w/ calcareous deposits & miscellaneous non-5/6" 90 degradable material (P).50 23 97 56 34 Firm dark brown SANDY FAT CLAY "FILL" w/ sand seams & miscellaneous non-degradable 10 ≚material 3/6" 37 1/6" 4/6" Terminated @ 12' 85 15 80 20 75 25 70 30

COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

35

65

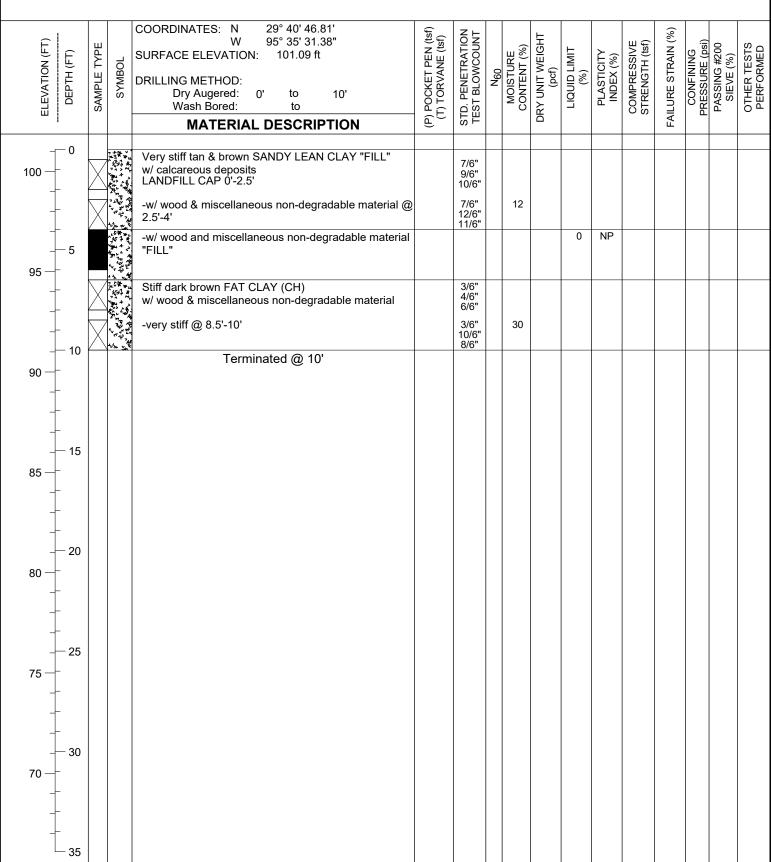
12 ft 8/2/2022 8/2/2022 Josh Sparks 22.14.222 NOTES: Free Water encountered at 10' during drilling and dry from 5 minutes to 15 minutes.

Boring backfilled with dry bentonite chips upon completion of soil sampling. SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK

Page 1 of 1



PROJECT: Bissonnet 136 Site LOG OF BORING B22-12 CLIENT: Goodheart & Associates, LLC



COMPLETION DEPTH: DATE BORING STARTED: DATE BORING COMPLETED: LOGGER: PROJECT NO.:

10 ft 8/2/2022 8/2/2022 Josh Sparks 22.14.222 NOTES: No Free Water and No Static Water was encountered.

Boring backfilled with dry bentonite chips upon completion of soil sampling. SPT Hammer Type: Automatic Hammer Drilling Equipment: CME TRUCK





APPENDIX B LABORATORY TEST DATA

Client: Goodheart & Associates, LLC

Project No. 22.14.222

Project: Bissonnet 136 Site

(ff) (tsf) (tsf) (tsf) 0.5 0.5 2.5-4 4 4.50 6.5 8.5		_		D A						ľ					
++++	(tst)	Soil Description	nscs	Content		Liquid	Plastic	Plast.	Finer than #200 Sieve	Ha	Lab Vane	Uc/UU.		Conf.	Failure
				(%)	(bct)			Index	(%)	- i		(tes)	,,	Pres.	Type
++++			-							-	(101)	(191)	(70)	(lsd)	2
$\overline{}$			-											1	
++															
\vdash		Dark gray tree body	SC	8.9						-				1	
8.5		Daily gray tree Daily	B	14.8	86.4	N	NP.	NP NP		1		47.00			
2										+		17.06	15.0	4.0	Bulge
10.5										-					
13.5										-				1	
18.5										<u> </u>	T			1	
23.5										-			1	1	
28.5			1							+					
33.5										1	1		1		
35										+	1	1			
38.5										+			1		
43.5			1							1				+	
48.5										+	T		1	+	
53.5-55		Dark gray tree bort								1	1		1	1	
54		Daily glay thee Daily	ᆼ	30.3						+	1		1	1	
55										-		1	1	\dagger	
													1	+	
0										-		1	1	1	
0.5										-	1		+	1	
2-4 4.5+	0	Gray brown LEAN CLAY; calareous nodules	r G	13.6	118.9	49	10	25						\neg	
4.5							-	3				6.82	5.8	1.9 M.	Multiple
6-8 2.25	111 6	Reddish brown gray FAT CLAY; calcareous	공 -	22.1	103.2	52	20	32		H			+	+	shear
7		a de la companya de l										248	4.4	6.6 Sli	Slickensid
8.5			Y.,							+	1		1	+	
10.5-12										-	+	1	+	1	
12.5			ರ	37.8		48	20	28		-	1	1	+	+	
14.5										-	\dagger		+	+	
18.5-20						+					<u> </u>	\dagger	+	+	I
23.5			5	54.5		83	30 €	53			-	-	1	+	
28.5				1								-	+	+	
33.5				1										+	

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TOLUNAY-WONG TA ENGINEERS, INC.

Project No. 22.14.222

Project: Bissonnet 136 Site

Client: Goodheart & Associates, LLC

(%) (pc) Limit Innex (%) (%) (isj) (isj) (isj) (isj) (ips) (ip
SC 11.1 CL 13.0 117.7 44 17 27 5.87 10.3 4.0 CL 14.2 CL 14.2 CL 15.7 CL 22.5 CL 22.5 CL 11.8 S9 18 21
SC 11.1 CL 13.0 117.7 44 17 27 5.87 10.3 4.0 CL 14.2 CL 15.7 CL 22.5 CL 22.5 CL 11.8 39 18 21
SC 11.1 CL 13.0 117.7 44 17 27 5.87 10.3 4.0 CL 14.2 CL 27.0 CH 27.0 C
SC 11.1 CL 13.0 117.7 44 17 27 5.87 10.3 4.0 CL 14.2 49 19 30 CH 27.0 66 23 42 CL 22.5 47 20 27 CL 11.8 39 16 21
SC 11.1 CL 13.0 117.7 44 17 27 5.87 10.3 4.0 CL 14.2 CL 16.7 49 19 30 CL 22.5 42 CL 22.5 47 20 27 CL 22.5 47 20 27 CL 11.8 39 18 21
SC 11.1
SC 11.1 44 17 27 587 10.3 4.0 CL 13.0 117.7 44 17 27 587 10.3 4.0 CL 14.2 49 19 30 CL 15.7 47 20 27 CL 22.5 47 20 27 CL CL 17.8 39 18 21
SC 11.1 44 17 27 5.87 10.3 4.0 CL 13.0 117.7 44 17 27 5.87 10.3 4.0 CL 14.2 65 23 42 CL 22.5 47 20 27 CL 22.5 47 20 27 CL 11.8 39 18 21 CL 11.8 39 18 21
CL 13.0 117.7 44 17 27 5.87 10.3 4.0 CL 14.2 49 19 30 CL 15.7 66 23 42 CH 27.0 66 23 42 CL 22.5 47 20 27 CL 17.8 39 18 21
CL 13.0 117.7 44 17 27 6.0 5.87 10.3 4.0 CL 14.2
14.2 15.7 15.7 15.7 22.5 22.5 47 20 22.5 47 20 22.5 47 20 27 22.5 47 20 27 47 20 27 47 20 21 47 20 21 47 20 21 47 20 21 47 20 27 47 20 27 47 20 20 21 47 20 20 20 20 20 20 20 20 20 20 20 20 20
14.2 15.7 27.0 65 23 22.5 47 20 47 20 11.8 39 18
14.2 15.7 27.0 65 23 22.5 47 20 47 20 11.8 39 18
14.2 15.7 27.0 22.5 49 19 22.5 47 20 47 20 11.8 39 18
14.2 15.7 27.0 65 23 22.5 47 20 47 20 11.8 39 18
14.2 15.7 27.0 65 22.5 47 20 11.8 39 18
14.2 15.7 27.0 65 23 22.5 47 20 47 20 11.8 39 18
15.7 49 19 27.0 65 23 22.5 47 20 11.8 39 18
22.5 65 23 22.5 47 20 11.8 39 18
22.5 47 20 22.5 11.8 39 18
11.8 39 18
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11.8 39 18

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TOLUNAY-WONG (NO.) ENGINEERS, INC.

Project No. 22.14.222

Project: Bissonnet 136 Site

Client: Goodheart & Associates, LLC

B22-9	0.5 2.5.4 4 4 4 4 6.5 7 7 8.5 13.5 18.5 20		()) (%)	(pcf) Lir	Limit Limit		Index #200 Sieve pH	(tsf)	(tef)	Strain (%)	Pres.	Type
B22-9	2.5.4 4 4 4 4 6.5 7 7 7 8.5 13.5 18.5 20 0 0							-		+	(1)	(ici)	(0/)	(led)	
B22-9	6.5 6.5 7 7 7 13.5 18.5 20 20 0				_덩	10.5	8	31 15	16						
B22-9	6.5 7 7 7 13.5 18.5 20 20 0			Tree bark and carpet	НО		Z		-						
B22-9	7 8.5 13.5 18.5 20 0 0							H	+					T	
B22-9	8.5 13.5 18.5 20 0 0														
B22-9	18.5													T	
B22-9	18.5								-						
B22-9	20 0													T	
B22-9	0 6													1	
	0 6														
										-				T	
	0.5														
	2.5-4				H	24.6	7	73 27	46						
	4.5							H	+					1	
	6.5														
	7													T	
	8.5-10				E.	18.1								T	
	10			No sample										t	
B22-10															
	0													T	
	0.5														
	2-4	4.5+		Gray brown LEAN CLAY with SAND; calcareous (FILL)	ರ	10.3	111.9	33 17	16			6.42	3.1	2.5	Slickensid
	4.5														
	6.5														
	8.5														
	10.5														
	12														
B22-11															
	0														
	0.5														
	2.5-4				C	13.2	8	38 17	21						
	4.5														
	6.5-8				СН	17.4	5	59 21							
	8-10	2.75			H	22.8	Ϋ́	6 22	34						
	10.5-12				H.	36.6									
	12														

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Project No. 22.14.222

Project: Bissonnet 136 Site

Client: Goodheart & Associates, LLC

Failure					1.0	
Fa						
Conf. Pres.	(1)					
Failure Strain (%)						
Uc/UU. Compr. (tsf)						
Lab Vane Shear (tsf)						
చ		I				
Finer than #200 Sieve (%)						
Plast. Index				NP		
Plastic Limit				A _P		
Liquid Limit				ž		
Dry Density (pcf)						
Content (%)			11.6		29.5	
U	+	+	H	_	+	
nscs			S	핑	공 등	
nscs	+		ರ	ō	5	
nscs			ט	Ö	Ö	
nscs			10	ō	5	
nscs			10	0	5	
nscs					5	
					5	
					Ö	
				Dark gray tree bark	Ö	
Soil Description					Ö	
Torvane Soil Description (tsf)					5	
Torvane Soil Description (tsf)					5	
Pen. (tsf) (tsf) Soil Description	0	0.5		Dark gray tree bark		
(tsf) Soil Description	0	0.5		Dark gray tree bark		

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TOLUNAY-WONG TAN ENGINEERS, INC.

Project No. 22.14.222

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site

Failure Type					Multiple	Olical	Bulge																								
Conf. Pres. (psi)					4.0		7.5																								
Failure Strain (%)																															
Uc/UU. Compr. (tsf)																															
Lab Vane Shear (tsf)																															
H																															
Finer than #200 Sieve (%)												63.7		57.3																	
Plast. Index					35		34					30		32														52			
Plastic Limit					18		19					18		19														19			
Liquid Limit					53		53					48		51														71			
Dny Density (pcf)					105.3		106.1																								
Water Content (%)					18.7		20.8					12.7		17.7														26.4			
nscs					끙		IJ.					ರ		H.						×								H.			
Soil Description					Dark gray and gray fat clay w/ CN		Light gray, light brown and dark gray fat clay w/ CN					Brown and dark gray sandy lean clay		Dark gray and light gray fat clay w/ sand and CN														Reddish brown and light gray fat clay			
Torvane (tsf)																															
Pocket Pen. (tsf)					3.00		1.25																					, re			
Depth (ff)		0	0.5	2.5	4	6.5	œ	10.5	12		0	2.5	4	6.5	8.5	10.5	12.5	13	18.5	23.5	28.5	33.5	35	38.5	43.5	48.5	53.5	58.5	09		
Sample No.																															
	B22-5A				,					B22-6B																					

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Project No. 22.14.222

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site

	e)le	r a		
	Failure	Multiple	Shear		
trength	Conf. Press. (psi)	4.0	7.5		
Compressive Strength	ပိ				
Compr	Strain (%)				
	Comp. (tsf)				
	Com				
	Dry Den. (pcf)	105.3	106.1		
(bct)	Wet Wt. gms.	1233.66	1247.92		
Dry Density (pcf)	Wet V				
Dry	ht. ii.	5.765	5.756		
	Dia. in.	2.882	2.864		
	Moisture	18.7	20.8	12.7	
intents (%)	tw	31.94	31.41	57.29 51.83 31.72	
Moisture Contents (%)	dw	122.67	126.09	143.69 138.23 116.51	
_	ww	139.68	145.74	154.69 153.54 138.87	
Denth	(#)	4	8	2.5 6.5 58.5	
	Boring	B22-5A		B22-6B	

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9/22/2022

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site Project Number: 22.14.222

Location: B22-5A

Depth: 4

Material Description: Dark gray and gray fat clay w/ CN

Sample Date: 09/20/2022

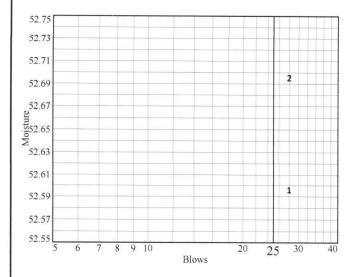
USCS: CH

Atterberg Testing Standard: ASTM D4318 Method B

Tested By: K Lopez **Test Date:** 09/21/2022

Checked By: R Kowis

Run No.	1	2	3	Δ	5	6
Wet+Tare	22.64	22.40		-1	J	0
Dry+Tare	19.50	19.37				
Tare	13.53	13.62				
# Blows	28	28				
Moisture	52.6	52.7				



Liquid Limit=	53
Plastic Limit=	18
Plasticity Index=	35
Natural Moisture=	18.7
Liquidity Index=	0.0

Run No.	1	2	3	4	
Wet+Tare	13.61	13.34		•	
Dry+Tare	12.65	12.40			
Tare	7.22	7.13			
Moisture	17.7	17.8			

. Tolunay-Wong Engineers, Inc. in Texas City, TX ___

9/22/2022

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site **Project Number:** 22.14.222

Location: B22-5A

Depth: 8

 $\textbf{Material Description:} \ Light \ gray, \ light \ brown \ and \ dark \ gray \ fat \ clay \ w/\ CN$

Sample Date: 09/20/2022

USCS: CH

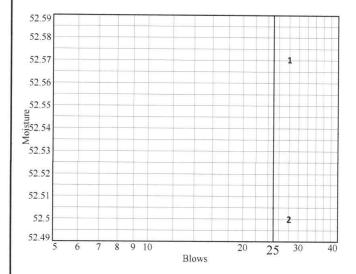
Atterberg Testing Standard: ASTM D4318 Method B

Tested By: K Lopez

Test Date: 09/21/2022

Checked By: R Kowis

Run No.	1	2	3	4	5	6
Wet+Tare	22.92	22.07				
Dry+Tare	19.75	19.13				
Tare	13.72	13.53				
# Blows	28	28				
Moisture	52.6	52.5				



Liquid Limit=	53
Plastic Limit=	19
Plasticity Index=	34
Natural Moisture=	20.8
Liquidity Index=	0.1

	entre area and		Plastic Limit D		
			Flastic Limit D	ita	
Run No.	1	2	3	4	
Wet+Tare	13.57	13.42			
Dry+Tare	12.53	12.43			
Tare	7.07	7.28			
Moisture	19.0	19.2			

Tolunay-Wong Engineers, Inc. in Texas City, TX ___

9/22/2022

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site **Project Number:** 22.14.222

Location: B22-6B Depth: 2.5

Material Description: Brown and dark gray sandy lean clay

Sample Date: 09/20/2022

USCS: CL

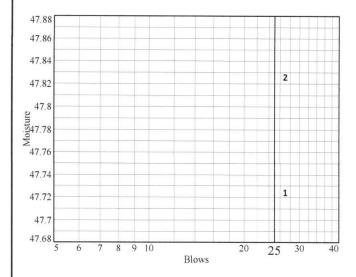
Atterberg Testing Standard: ASTM D4318 Method B

Tested By: K Lopez

Test Date: 09/21/2022

Checked By: R Kowis

Run No.	1	2	3	4	5	6
Wet+Tare	24.98	27.47		Sa) •		
Dry+Tare	21.31	22.96				
Tare	13.62	13.53				
# Blows	27	27				
Moisture	47.7	47.8				



Liquid Limit=	48
Plastic Limit=	18
Plasticity Index=	30
Natural Moisture=	12.7
Liquidity Index=	-0.2

Run No.	1	2	3	Δ	
Wet+Tare	14.74	14.54		7	
Dry+Tare	13.60	13.43			
Tare	7.15	7.18			
Moisture	17.7	17.8			

Tolunay-Wong Engineers, Inc. in Texas City, TX ___

9/22/2022

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site **Project Number:** 22.14.222

Location: B22-6B Depth: 6.5

Material Description: Dark gray and light gray fat clay w/ sand and CN

Sample Date: 09/20/2022

USCS: CH

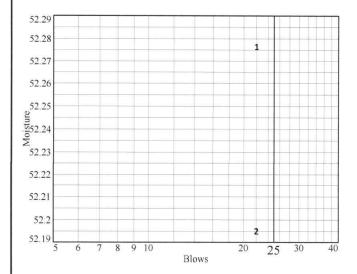
Atterberg Testing Standard: ASTM D4318 Method B

Tested By: K Lopez

Test Date: 09/21/2022

Checked By: R Kowis

Run No.	1	2	3	4	5	6
Wet+Tare	22.59	22.92				
Dry+Tare	19.49	19.71				
Tare	13.56	13.56				
# Blows	22	22				-
Moisture	52.3	52.2				



Liquid Limit=	51
Plastic Limit=	19
Plasticity Index=	32
Natural Moisture=	17.7
Liquidity Index=	0.0

			Plastic Limit D	ita	A CONTRACT OF THE STATE OF THE
Run No.	1	2	3	4	
Wet+Tare	14.56	14.37			
Dry+Tare	13.41	13.25			
Tare	7.23	7.24			
Moisture	18.6	18.6			

Tolunay-Wong Engineers, Inc. in Texas City, TX __

9/22/2022

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site **Project Number:** 22.14.222

Location: B22-6B Depth: 58.5

Material Description: Reddish brown and light gray fat clay

Sample Date: 09/20/2022

USCS: CH

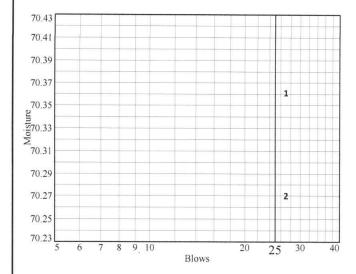
Atterberg Testing Standard: ASTM D4318 Method B

Tested By: K Lopez

Test Date: 09/21/2022

Checked By: R Kowis

Liquid Limit Data							
Run No.	1	2	3	4	5	6	
Wet+Tare	20.70	19.86					
Dry+Tare	17.78	17.26					
Tare	13.63	13.56					
# Blows	27	27					
Moisture	70.4	70.3					



Liquid Limit=	71
Plastic Limit=	19
Plasticity Index=	52
Natural Moisture=	26.4
Liquidity Index=	0.1

			Plastic Limit D	ata	
Run No.	1	2	3	4	
Wet+Tare	13.21	13.47			
Dry+Tare	12.23	12.45			
Tare	7.19	7.19			
Moisture	19.4	19.4			

Tolunay-Wong Engineers, Inc. in Texas City, TX _____

GRAIN SIZE DISTRIBUTION TEST DATA

9/22/2022

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site **Project Number:** 22.14.222

Location: B22-6B Depth: 2.5

Material Description: Brown and dark gray sandy lean clay

Sample Date: 09/20/2022

PL: 18

LL: 48

PI: 30

USCS Classification: CL

Checked by: R Kowis

Wash Test Data (ASTM D1140)

Test Date: 09/21/2022 Technician: K Lopez

Pre #200 Wash Test Weights (grams): Dry Specimen+Tare = 143.69

Tare Wt. = 52.29

Post #200 Wash Test Weights (grams): Dry Specimen+Tare = 243.89

Tare Wt. = 210.68

Minus #200 from wash = 63.7%

Tolunay-Wong Engineers, Inc. in Texas City, TX ___

GRAIN SIZE DISTRIBUTION TEST DATA

9/22/2022

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site Project Number: 22.14.222

Location: B22-6B Depth: 6.5

Material Description: Dark gray and light gray fat clay w/ sand and CN

PL: 19 Sample Date: 09/20/2022

LL: 51

PI: 32

USCS Classification: CH

Checked by: R Kowis

Wash Test Data (ASTM D1140)

Test Date: 09/21/2022 Technician: K Lopez

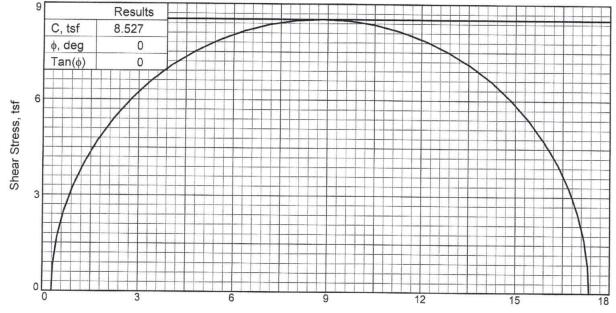
Pre #200 Wash Test Weights (grams): Dry Specimen+Tare = 138.23

Tare Wt. = 51.83

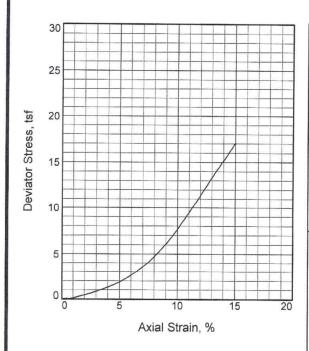
Post #200 Wash Test Weights (grams): Dry Specimen+Tare = 247.48

Tare Wt. = 210.59

Minus #200 from wash = 57.3%



Normal Stress, tsf



Sa	imple No.	1	
Initial	Water Content, % Dry Density, pcf Saturation, % Void Ratio Diameter, in. Height, in.	14.8 86.4 42.1 0.9510 2.87 5.92	
At Test	Water Content, % Dry Density, pcf Saturation, % Void Ratio Diameter, in. Height, in.	5.3 86.4 15.1 0.9510 2.87 5.92	
Str	ain rate, %/min.	1.00	
Ва	ck Pressure, psi	0.00	
Ce	Il Pressure, psi	4.00	
Fai	il. Stress, tsf	17.1	
1	Strain, %	15.0	
Ult	. Stress, tsf		
	Strain, %		
σ_1	Failure, tsf	17.3	
σ_3	Failure, tsf	0.3	

Type of Test:

Unconsolidated Undrained

Sample Type: Undisturbed

Description: Dark gray tree bark

LL= NV

PI= NP

Assumed Specific Gravity= 2.70

Remarks:

Test method: ASTM D2850

Failure type: Bulge

Figure ____

Client: Goodheart & Associates, LLC

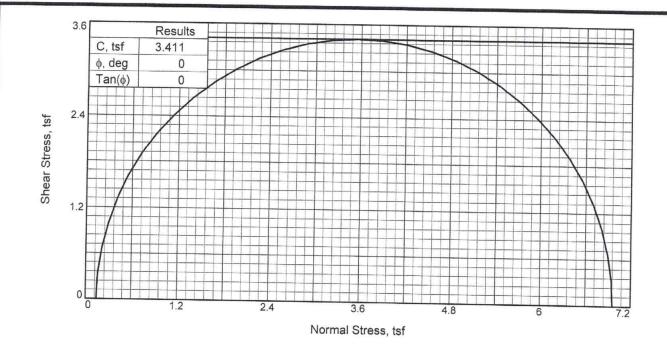
Project: Bissonnet 136 Site

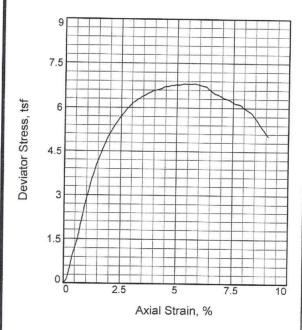
Source of Sample: B22-2

Depth: 4

Proj. No.: 22.14.222

Date Sampled: 8/23/22





Sample No. 1 Water Content, % 13.6 Dry Density, pcf 118.9 Saturation, % 87.7 Void Ratio 0.4171 Diameter, in. 2.83 Height, in. 5.91 Water Content, % 14.2 Dry Density, pcf 118.9 Saturation, % 92.2 Void Ratio 0.4171 Diameter, in. 2.83 Height, in. 5.91 Strain rate, %/min. 1.00 Back Pressure, psi 0.00 Cell Pressure, psi 1.93 Fail. Stress, tsf 6.82 Strain, % 5.8 Ult. Stress, tsf Strain, % σ₁ Failure, tsf 6.96 σ₃ Failure, tsf 0.14

Type of Test:

Unconsolidated Undrained **Sample Type:** Undisturbed

Description: Gray brown LEAN CLAY; calareous

nodules

LL= 49 PL= 19

PI= 30

Assumed Specific Gravity= 2.70

Remarks:

Test method: ASTM D2850 Failure type: Multiple shear

Figure

Client: Goodheart & Associates, LLC

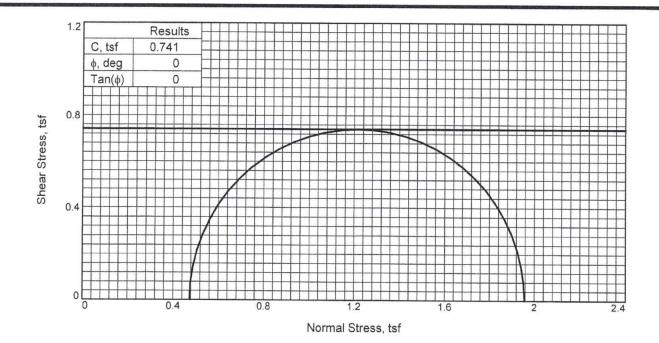
Project: Bissonnet 136 Site

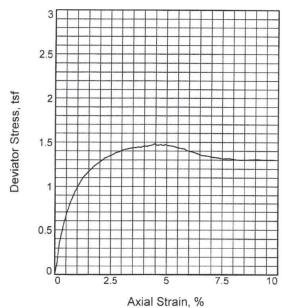
Source of Sample: B22-3

Depth: 2-4

Proj. No.: 22.14.222

Date Sampled: 08/24/2022





T	-6	T4:
Type	OT	Test:

Unconsolidated Undrained **Sample Type:** Undisturbed

Description: Reddish brown gray FAT CLAY;

calcareous nodules

LL= 52 PL= 20

PI= 32

Assumed Specific Gravity= 2.75

Remarks:

Test method: ASTM D2850 Failure type: Slickensided

_					
-	ı	n	11	re	
		м	u		

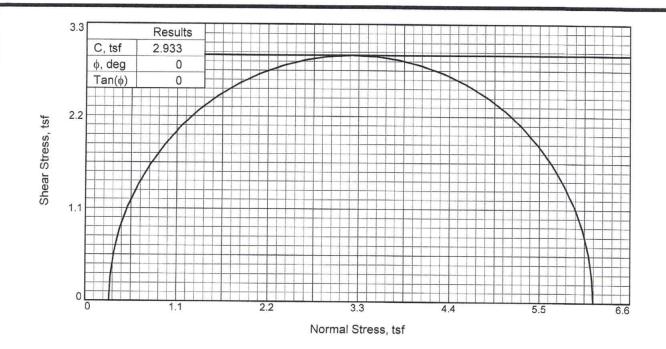
Sa	mple No.	1	
Initial	Water Content, % Dry Density, pcf Saturation, % Void Ratio Diameter, in. Height, in.	22.1 103.2 91.6 0.6628 2.83 5.86	
At Test	Water Content, % Dry Density, pcf Saturation, % Void Ratio Diameter, in. Height, in.	23.9 103.2 99.1 0.6628 2.83 5.86	
Str	ain rate, %/min.	1.00	
Bad	ck Pressure, psi	0.00	
Cel	Il Pressure, psi	6.58	
Fai	I. Stress, tsf	1.48	
	Strain, %	4.4	
	Stress, tsf		
	Strain, %		
	Failure, tsf	1.96	
σ_3	Failure, tsf	0.47	

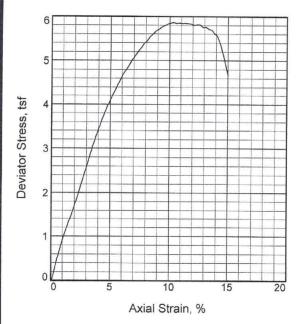
Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site

Source of Sample: B22-3 Depth: 6-8

Proj. No.: 22.14.222 Date Sampled: 08/24/2022





	Sa	mple No.	1	
	Initial	Water Content, % Dry Density, pcf Saturation, % Void Ratio Diameter, in. Height, in.	13.0 117.7 81.5 0.4320 2.66 5.86	
	At Test	Water Content, % Dry Density, pcf Saturation, % Void Ratio Diameter, in. Height, in.	13.3 117.7 82.9 0.4320 2.66 5.86	
	Stra	ain rate, %/min.	1.00	
	Bad	ck Pressure, psi	0.00	
	Cel	I Pressure, psi	4.00	
	Fai	I. Stress, tsf	5.87	
	S	Strain, %	10.3	
		Stress, tsf Strain, %		
1	σ_{1}	Failure, tsf	6.15	
	$\sigma_{\scriptscriptstyle 3}$	Failure, tsf	0.29	

Type of Test:

Unconsolidated Undrained Sample Type: Undisturbed

Description: Gray brown LEAN CLAY; calcareous

(Fill)

LL= 44

PL= 17

PI= 27

Assumed Specific Gravity= 2.70

Remarks:

Test method: ASTM D2850 Failure type: Multiple shear

Figure

Client: Goodheart & Associates, LLC

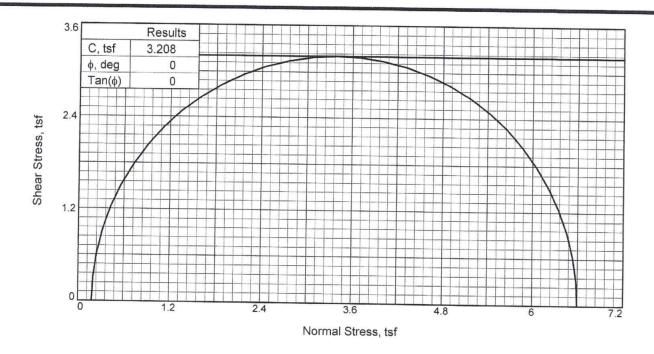
Project: Bissonnet 136 Site

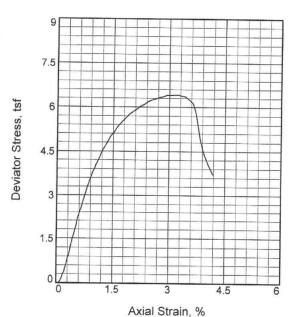
Source of Sample: B22-4

Depth: 4-6

Proj. No.: 22.14,222

Date Sampled: 08/24/2022





Sample No. 1 Water Content, % 10.3 Dry Density, pcf 111.9 Saturation, % 55.1 Void Ratio 0.5064 Diameter, in. 2.85 Height, in. 5.89 Water Content, % 11.2 Dry Density, pcf 111.9 Saturation, % 59.7 Void Ratio 0.5064 Diameter, in. 2.85 Height, in. 5.89 Strain rate, %/min. 1.00 Back Pressure, psi 0.00 Cell Pressure, psi 2.51 Fail. Stress, tsf 6.42 Strain, % 3.1 Ult. Stress, tsf Strain, % σ₁ Failure, tsf 6.60 σ₃ Failure, tsf 0.18

Type of Test:

Unconsolidated Undrained Sample Type: Undisturbed

Description: Gray brown LEAN CLAY with SAND;

calcareous (FILL)

LL= 33 **PL=** 17

PI= 16

Assumed Specific Gravity= 2.70

Remarks:

Test method: ASTM D2850 Failure type: Slickensided

Figure

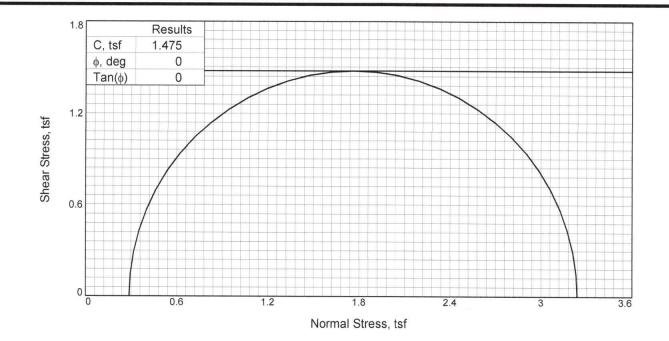
Client: Goodheart & Associates, LLC

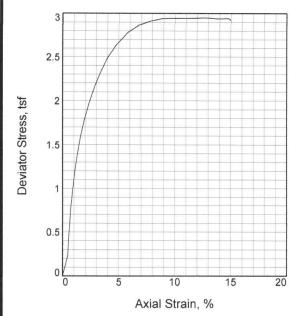
Project: Bissonnet 136 Site

Source of Sample: B22-10 Depth: 2-4

Proj. No.: 22.14.222

Date Sampled: 08/24/2022





Type	of	Test:

Unconsolidated Undrained Sample Type: Undisturbed

Description: Dark gray and gray fat clay w/ CN

LL= 53

PL= 18

PI= 35

Assumed Specific Gravity= 2.7 Remarks: Test method: ASTM D2850

Failure type: Multiple Shear

mple No.	1		
Water Content, % Dry Density, pcf Saturation, % Void Ratio Diameter, in. Height, in.	18.7 105.2 84.1 0.6017 2.88 5.76		
Water Content, % Dry Density, pcf Saturation, % Void Ratio Diameter, in. Height, in.	22.3 105.2 100.0 0.6017 2.88 5.76		
ain rate, %/min.	1.00		
ck Pressure, psi	0.00		
Il Pressure, psi	4.00		
I. Stress, tsf	2.95		
Strain, %	12.8		
. Stress, tsf			
Strain, %			
Failure, tsf	3.24		
Failure, tsf	0.29		
	Water Content, % Dry Density, pcf Saturation, % Void Ratio Diameter, in. Height, in. Water Content, % Dry Density, pcf Saturation, % Void Ratio Diameter, in. Height, in. ain rate, %/min. ck Pressure, psi II Pressure, psi II. Stress, tsf Strain, % Stress, tsf Strain, % Failure, tsf	Water Content, % 18.7 Dry Density, pcf 105.2 Saturation, % 84.1 Void Ratio 0.6017 Diameter, in. 2.88 Height, in. 5.76 Water Content, % 22.3 Dry Density, pcf 105.2 Saturation, % 100.0 Void Ratio 0.6017 Diameter, in. 2.88 Height, in. 5.76 ain rate, %/min. 1.00 ck Pressure, psi 0.00 Il Pressure, psi 4.00 I. Stress, tsf 2.95 Strain, % 12.8 Stress, tsf 3.24	

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site

Source of Sample: B22-5A Depth: 4

Proj. No.: 22.14.222 **Date Sampled:** 09/20/2022



Figure

Tested By: K Lopez

Checked By: R Kowis

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

9/22/2022 10:18 AM

Date: 09/20/2022

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site

 Project No.:
 22.14.222

 Location:
 B22-5A

Depth: 4

Description: Dark gray and gray fat clay w/ CN **Remarks:** Test method: ASTM D2850

Failure type: Multiple Shear

Type of Sample: Undisturbed

Assumed Specific Gravity=2.7 LL=53 PL=18 PI=35

Test Method: COE uniform strain

P	arameter	s for Specimen No	.1
Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	139.680		161.400
Moisture content: Dry soil+tare, gms.	122.670		140.310
Moisture content: Tare, gms.	31.940		30.950
Moisture, %	18.7	22.3	19.3
Moist specimen weight, gms.	1233.7		
Diameter, in.	2.88	2.88	
Area, in. ²	6.52	6.52	
Height, in.	5.76	5.76	
Net decrease in height, in.		0.00	
Wet density, pcf	125.0	128.7	
Dry density, pcf	105.2	105.2	
Void ratio	0.6017	0.6017	
Saturation, %	84.1	100.0	

Test Readings for Specimen No. 1

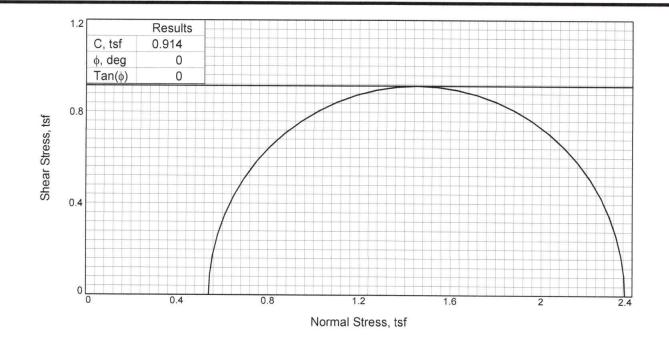
Membrane modulus = 0.124105 kN/cm²

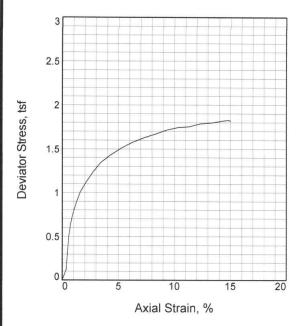
Membrane thickness = 0.02 cm Cell pressure = 4.00 psi (0.288 tsf) Back pressure = 0.00 psi (0.000 tsf)

Strain rate, %/min. = 1.00

Fail. Stress = 2.950 tsf at reading no. 23

Tolunay-Wong Engineers, Inc. in Texas City, TX ____





Tvi	эе	of	Te	st:
	-		-	

Unconsolidated Undrained Sample Type: Undisturbed

Description: Light gray, light brown and dark gray

fat clay w/ CN

LL= 53 **PL=** 19 **PI=** 34

Assumed Specific Gravity= 2.7 Remarks: Test method: ASTM D2850

Failure type: Bulge

Sa	mple No.	1		
Initial	Water Content, % Dry Density, pcf Saturation, % Void Ratio Diameter, in. Height, in.	20.8 106.2 95.4 0.5876 2.86 5.76		
At Test	Water Content, % Dry Density, pcf Saturation, % Void Ratio Diameter, in. Height, in.	21.8 106.2 100.0 0.5876 2.86 5.76		
Str	ain rate, %/min.	1.00		
Ва	ck Pressure, psi	0.00		
Се	Il Pressure, psi	7.50		
Fai	I. Stress, tsf	1.83		
	Strain, %	14.8		
100	Stress, tsf Strain, %			
σ_1	Failure, tsf	2.37		
σ_3	Failure, tsf	0.54		

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site

Source of Sample: B22-5A Depth: 8



Figure

Tested By: K Lopez Checked By: R Kowis

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

9/22/2022 10:21 AM

Date:

09/20/2022

Client:

Goodheart & Associates, LLC

Project:

Bissonnet 136 Site

Project No.:

22.14.222

Location:

B22-5A

Depth:

8

Description:

Light gray, light brown and dark gray fat clay w/CN

Remarks:

Test method: ASTM D2850

Failure type: Bulge

Type of Sample:

Undisturbed

Assumed Specific Gravity=2.7

LL=53

PL=19

PI=34

Test Method:

COE uniform strain

F	arameter	s for Specimen N	о. 1	
Specimen Parameter	Initial	Saturated	Final	CONFIDENCE
Moisture content: Moist soil+tare, gms.	145.740		152.850	
Moisture content: Dry soil+tare, gms.	126.090		132.040	
Moisture content: Tare, gms.	31.410		30.400	
Moisture, %	20.8	21.8	20.5	
Moist specimen weight, gms.	1247.9			
Diameter, in.	2.86	2.86		
Area, in. ²	6.44	6.44		
Height, in.	5.76	5.76		
Net decrease in height, in.		0.00		
Wet density, pcf	128.2	129.3		
Dry density, pcf	106.2	106.2		
Void ratio	0.5876	0.5876		
Saturation, %	95.4	100.0		

Test Readings for Specimen No. 1

Membrane modulus = 0.124105 kN/cm^2

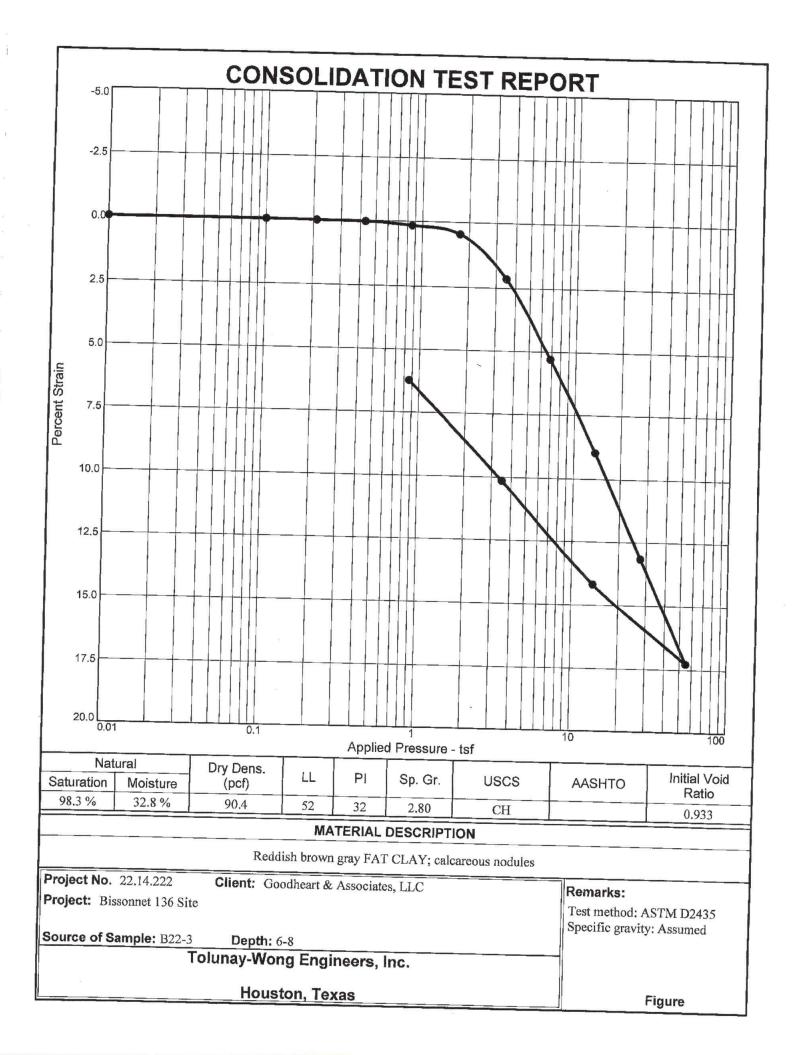
Membrane thickness = 0.02 cmCell pressure = 7.50 psi (0.540 tsf)

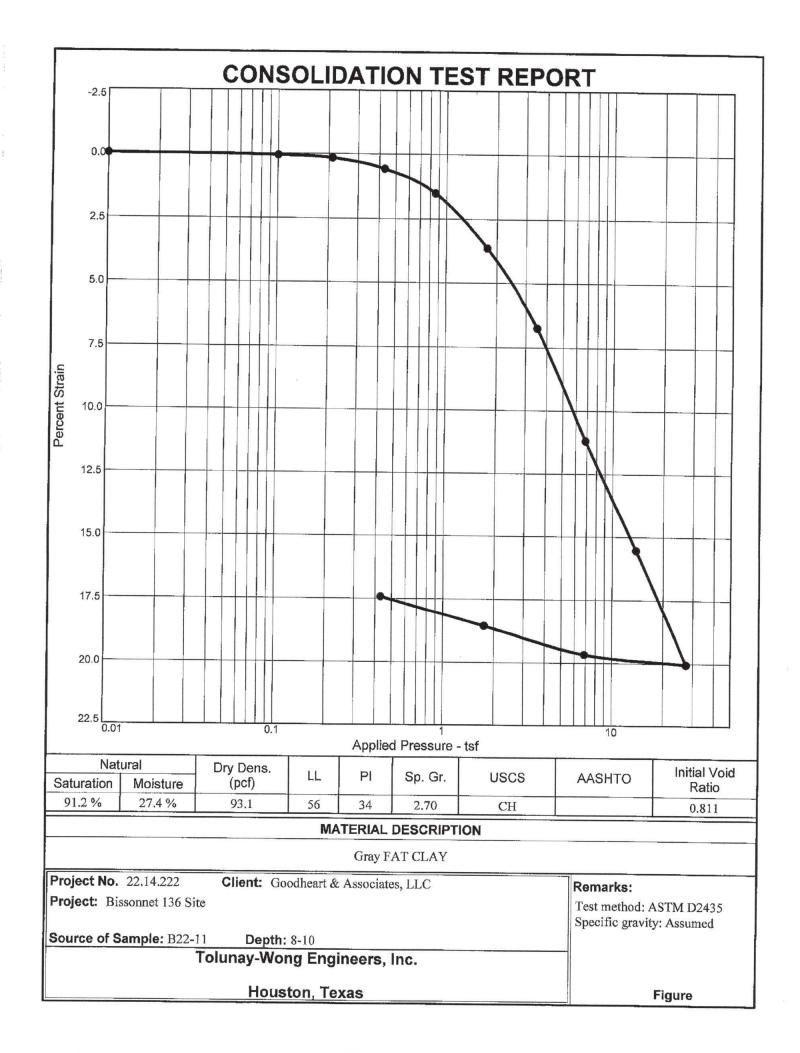
Back pressure = 0.00 psi (0.000 tsf)

Strain rate, %/min. = 1.00

Fail. Stress = 1.827 tsf at reading no. 24

, Tolunay-Wong Engineers, Inc. in Texas City, TX 🕳





CONSOLIDATION TEST DATA

Client: Goodheart & Associates, LLC

Project: Bissonnet 136 Site Project Number: 22.14.222

Location: B22-11 Depth: 8-10

Material Description: Gray FAT CLAY

Liquid Limit: 56

USCS: CH

Testing Remarks: Test method: ASTM D2435

Specific gravity: Assumed

DI41-14-	L. I.	24
Plasticity	index:	34

	Test Specimen Data	
NATURAL MOISTURE	VOID RATIO	AFTER TEST
Wet w+t = 135.86 g.	Spec. Gr. $= 2.70$	Wet w+t = 131.38 g .
Dry w+t = 120.10 g.	Est. Ht. Solids = 0.414 in.	Dry w+t = 120.10 g .
Tare Wt. = 62.52 g,	Init. V.R. = 0.811	Tare Wt. = 62.52 g .
Moisture = 27.4 %	Init. Sat. = 91.2%	Moisture = 19.6 %
UNIT WEIGHT	TEST START	Dry Wt. = 57.58^* g.
Height = 0.750 in.	Height $= 0.750 \text{ in.}$	3
Diameter = 2.000 in.	Diameter = 2.000 in.	
Weight = 73.34 g.		
Dry Dens. = 93.1 pcf	* Final dry weight used as mine	eral solids weight

	and the second second	The Australian State		Heroration	ia Summ	ary		
Pressure (tsf)	Final Dial (in.)	Machine Defl. (in.)	Deformation (in.)	C _V (ft.2/yr.)	c_{α}	Void Ratio	% Strain	
start	0.00000		0.00000			0.811		
0.01	0.00000	0.00000	0.00000			0.811	0.0 Comprs.	
0.10	0.00055	0.00010	0.00045			0.809	0.1 Comprs.	
0.21	0.00160	0.00040	0.00120			0.808	0.2 Comprs.	
0.43	0.00510	0.00080	0.00430	27.8	0.000	0.800	0.6 Comprs.	
0,86	0.01295	0.00160	0.01135	6.8	0.003	0.783	1.5 Comprs.	
1.75	0.02963	0.00240	0.02723	23.8	0.004	0.745	3.6 Comprs.	
3.49	0.05380	0.00320	0.05060	27.9	0.000	0.688	6.7 Comprs.	
6.87	0.08800	0.00410	0.08390	24.4	0.006	0.608	11.2 Comprs.	
13.75	0.12315	0.00670	0.11645	20.3	0.007	0.529	15.5 Comprs.	
27.50	0.15855	0.00820	0.15035	11.1	0.004	0.448	20.0 Comprs.	
6.87	0.15260	0.00510	0.14750	239.6	0.000	0.454	19.7 Comprs.	
1.75	0.14290	0.00360	0.13930	9.8	0.000	0.474	18.6 Comprs.	
0.43	0.13325	0.00260	0.13065	1.1	0.000	0.495	17.4 Comprs.	

Compression index (C_c), tsf = 0.27

Preconsolidation pressure (P_p), tsf = 1.7 Void ratio at P_p (e_m) = 0.747

Overburden (σ_{VO}), tsf = N/A



GEOTECHNICAL INVESTIGATION REPORT

Project Name:
Bissonnet Apartments
12000 Bissonnet Street
Houston, Texas

Prepared for:
Lincoln Avenue Capital
5700 Tennyson Pkwy, Ste. 300
Plano, TX 75024

Prepared by:

Goodheart & Associates PLLC 2021 Midwest Road, Suite 200 Oak Brook, IL 60523

Project No. 22-009.001

TEXAS REGISTERED ENGINEERING FIRM NO. F-21548 10 2 2023

October 2, 2023



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1. INTRODUCTION

1.1 General

This report presents the results of our geotechnical investigation for the Bissonnet Apartments Project located at 12000 Bissonnet Street in Houston, Harris County, Texas (Site). The Bissonnet Apartments Project Site is an approximate 11-acre parcel in southwest Houston currently owned by Bissonnet 136 LLC (Bissonnet 136) and under contract to Lincoln Avenue Capital (LAC). Figure 1 presents a Vicinity Map showing the general location of the Site. This report was prepared by Goodheart & Associates PLLC (Goodheart) for LAC in accordance with our original proposal to LAC, dated April 24, 2023.

The 11-acre Site is in the southwest corner of the larger Doty Sand Pit Venture (DSPV) Landfill, a Municipal Solid Waste (MSW) Type IV (construction and demolition debris) landfill that occupies the entire Site. LAC is planning to acquire and redevelop the Site with a multi-family housing development project. LAC has retained SKA Consulting, L.P. (SKA) to assist with Texas Commission on Environmental Quality (TCEQ) permitting associated with redevelopment over a landfill and landfill gas mitigation engineering. Kimley-Horn and Associates, Inc. (KH) will provide Site civil design services, and HEDK Architects (HEDK) will provide architectural services, and structural engineering services for the project.

Bissonnet 136 will provide roads, utilities, drainage, and other infrastructure necessary to access and redevelop the Site. Goodheart is familiar with the overall property and has provided geotechnical consulting services in support of the overall Bissonnet 136 redevelopment efforts. SKA and KH have also supported the Bissonnet 136 redevelopment efforts on the overall property, SKA with TCEQ permits and other related environmental matters and KH with master planning and civil design services.

1.2 Project Description

Planned Site improvements include seven (7) multi-family residential structures, a community building (Clubhouse), surface parking, outdoor lighting, exterior amenities and green space as shown on Figure 2. The multi-family residential structures will be 3-story, walk-up buildings that vary in size and footprint. Building widths will be approximately 57 feet and the length will vary depending on the size of the building and the number of units.



The residential buildings will be wood-frame construction with variably clad exterior walls (approximately stone 45% and fiber cement 55%) resting on continuous slab-on-grade foundations. Exterior wall loads will range up to 4000 pounds per linear foot, and interior wall loads will range between 2000 and 3700 pounds per linear foot. The Community Building will be supported on a continuous slab-on-grade foundation, with interior wall loads ranging up to 1300 pounds per linear foot and exterior wall loads of approximately 700 pounds per linear foot.

1.3 Purpose and Scope of Services

The purpose of the geotechnical investigation program for this project was to:

- Evaluate the character and nature of the surficial fill, landfill cap, and underlying waste and potential for soft zones or voids beneath the proposed improvements;
- Develop conclusions regarding the need for ground improvement or deep foundations to support the proposed improvements;
- Provide recommended foundation types for support of the proposed structures;
- Develop design criteria for shallow foundations and slabs-on-grade;
- Develop the data necessary to estimate total and differential settlements for the proposed improvements; and
- Provide recommendations for earthwork and shallow foundation construction.

The proposed scope of services for this investigation was outlined in Goodheart's April 24, 2023, proposal to LAC. The scope of services for this project was expanded to include field exploration services and geotechnical laboratory testing, as outlined in Change Order No. 1, dated May 16, 2023 and approved by LAC May 18, 2023. The combined scope of work outlined in the original proposal and Change Order No. 1 included:

- Developing a field exploration plan based on prior Site knowledge and the Preliminary Site Plan
 provided by LAC, staking proposed boring locations in the field, making One Call notifications to
 clear borings of underground utilities, and selecting subcontractors for the field exploration
 program.
- 2. Drilling and sampling up to nineteen (19) soil borings with truck-mounted hollow stem auger (HSA) equipment to depths ranging from 20 to 60 feet below existing surface grade. These borings



were expected to encounter overburden soils, landfill waste, and in the deeper borings, natural soils below the bottom of the landfill.

- 3. Conducting a geotechnical laboratory testing program on the subsurface materials encountered during the field exploration program.
- 4. Performing geotechnical engineering analyses as required to provide recommendations for design and construction of foundations and earthwork. The anticipated scope of the geotechnical report included:
 - Description of field exploration and laboratory testing methodology.
 - Findings of field exploration and laboratory testing programs, including final boring logs and laboratory test data.
 - Discussion and conclusions regarding the need for ground improvement or deep foundations to support the proposed improvements.
 - Shallow foundation design recommendations, including allowable bearing pressures and estimated total and differential settlements.
 - Lateral earth pressure design criteria.
 - Slab-on-grade design recommendations.
 - Utility trench design and construction recommendations.
 - Earthwork design and construction recommendations.



2. BACKGROUND INFORMATION

Background information provided in this geotechnical report was summarized using available geotechnical data and Site information developed for the:

- Preliminary Geotechnical Engineering Report, prepared by Civil & Environmental Consultants, Inc., dated August 29, 2006 (CEC report);
- Phase II Environmental Site Assessment Report, Doty Sand Pit Venture Landfill and Olshan Landfill, 12000 Bissonnet, Houston, Harris County, Texas, prepared by SKA Consulting, L.P., dated July 29, 2019 (SKA report); and
- Supplemental Geotechnical Report, prepared by Goodheart & Associates, PLLC, dated February 19, 2020 (Supplemental Report).
- Geotechnical Investigation Report, Kirkwood Crossing, 12000 Bissonnet Street, Houston, Texas, prepared by Goodheart & Associates, PLLC, dated October 24, 2022

The overall Bissonnet 136 property is approximately 136.8 acres in size and is located at 12000 Bissonnet Street on the north side of Bissonnet Street between Kirkwood Road on the east and Cook Road on the west. Two closed MSW Type IV (construction and demolition debris) landfills are located on the Bissonnet 136 property: the DSPV Landfill and the Olshan Demolishing Landfill. The DSPV Landfill covers approximately 118.8 acres and includes the entire LAC Bissonnet Apartments Site.

From the 1950's into the 1970's, the DSPV Landfill portion of the Bissonnet 136 property was operated as a sand mine. As sand reserves were depleted, open areas of the DSPV Landfill property were landfilled with construction and demolition waste. The DSPV Landfill received waste from about 1960 to 1999 and was permitted to receive construction and demolition waste in May 1970 under Harris County License No.

1. After the Texas Department of Health (TDH) assumed regulatory authority, the DSPV Landfill received an operating permit in May 1981 as a Type IV Landfill (MSW No. 1247). The facility was operational until August 1999. According to TCEQ (successor agency to the TDH) records, the DSPV Landfill was then closed and capped with a two-foot-thick compacted clay layer. The DSPV Landfill was certified closed in January 2001 and has been in post-closure care since that time. MSW Permit No. 1247 is still active with the TCEQ pending permit revocation. The MSW 1247 permittee is Northwest Metro Holdings, CS 34, LLC (Northwest Metro), a related entity to Bissonnet 136.



A landfill gas management and monitoring network (gas vents and gas monitoring probes) was installed around the perimeter of both landfills by others in 2006. This network is currently monitored by SKA for Northwest Metro as required by the TCEQ MSW Permit.

Following DSPV Landfill closure in 2000, some 2 million cubic yards of fill (also referred to in this report as surficial fill) was reportedly brought to the DSPV Landfill and Olshan Demolishing Landfill to create The Sugar Hills Golf Course on top of both landfills. The depth of surficial fill ranges from 0 to as much as 13.5 feet. The Sugar Hills Golf Course operated on top of the landfills from approximately 2000 to 2005, but was closed and abandoned. This report includes further discussion about the extent and effects of the surficial fill on the Site.



3. SUBSURFACE EXPLORATION

Field exploration and laboratory testing activities were conducted at the Site to further investigate the surficial fill/landfill cap materials, waste matrix and the depth and character of native soils beneath the Site, and to develop geotechnical data to support recommendations for design and construction of foundations and earthwork. An application for disturbance of the DSPV Landfill final cover for the field exploration program was prepared and submitted by SKA to TCEQ and approval was obtained from the TCEQ by letter dated May 25, 2023. All field exploration activities were conducted in accordance with the approved application.

3.1 Field Exploration Program

Field exploration activities were conducted at the Site during the period June 5 through June 6, June 19 through June 23, and July 3 through July 10, 2023. The field exploration program included drilling a total of seventeen (17) soil borings (see Figure 2 - Boring Location Plan, and Table 2 - Summary of Field Exploration Program). The boring locations were pre-determined based on the preliminary layout of the planned improvements developed by HEDK. Three (3) boring locations had to be adjusted due to Site conditions and were drilled as offsets in relatively close proximity to original boring locations. The pre-determined boring locations were surveyed in the field and ground surface elevations were obtained for those locations prior to the start of drilling. One Call notifications were also made to clear boring locations prior to the start of drilling.

The borings were drilled using a CME 75 truck-mounted drill rig. The borings ranged in depth from 10 feet below ground surface (bgs) to 60 feet bgs. Hollow stem augers (HSAs) were used to advance the borings to their terminal depths using standard methods (ASTM D-6151). Disturbed and/or undisturbed soil samples were typically obtained at 2½-foot intervals through the surficial fill and landfill cap materials. Sampling was then expanded to 5-foot intervals through the waste and into the underlying native soils (i.e., to the terminal depths of the borings). Two (2) soil borings were drilled by Tolunay-Wong Engineers, Inc. (TWE), and fifteen (15) soil borings were drilled by Envirotech Drilling Services (EDS), both under subcontract to Goodheart. Soils encountered in the borings were classified in accordance with the Unified Soil Classification System (USCS) shown on Figure A1 in Appendix A. The Logs of Borings for this investigation are presented in Appendix A.



TABLE 1: SUMMARY OF FIELD EXPLORATION PROGRAM

Boring Number	Existing Top Elevation (MSL)	Thickness of Surficial Fill and Landfill Cap (ft)	Thickness of CCDD Waste Material (ft)	Total Depth of Boring (ft)	Bottom Elevation of Waste (MSL)	Groundwater Elevation (MSL)
BH-23-1 ¹	93.12	6.5	16.5	30.0	70.1	71.1
BH-23-2	95.33	7.0	16.0	25.0	72.3	82.3
BH-23-3	93.49	8.0	25.0	35.0	60.5	72.5
BH-23-4	93.58	7.5	5.0+	12.0	N/A	81.6
BH-23-5	94.78	9.0	39.0	50.0	46.8	76.8
BH-23-6	89.28	8.5	34.5	45.0	46.3	71.3
BH-23-7	93.85	7.5	2.5+	10.0	N/A	Not Encountered
BH-23-8	92.58	9.0	24.0	40.0	59.6	70.6
BH-23-9 ¹	95.36	10.0	15.0+	25.0	N/A	Not Encountered
BH-23-10 ¹	96.58	6.5	41.5	50.0	48.6	76.6
BH-23-11	100.21	9.5	43.5	55.0	47.2	77.2
BH-23-12 ¹	100.2	13.0	7.0+	20.0	N/A	Not Encountered
BH-23-14	101.79	14.5	43.5	60.0	43.8	78.8
BH-23-16	97.55	8.5	49.5	60.0	39.6	74.6
BH-23-17	99.46	13.5	44.5	60.0	41.5	82.5
BH-23-18 ¹	105.52	7.0	51.0	60.0	47.5	69.5
BH-23-19	98.45	8.0	6.0+	14.0	N/A	Not Encountered

^{1 –} Elevated landfill gases encountered in boring during drilling

Disturbed samples were collected in general accordance with ASTM D-1586. A standard split barrel sampler (2.00-inch O.D. by 1.375-inch I.D.) was driven a total of 24 inches with an automatic 140-pound hammer falling from a vertical height of 30 inches. The number of blows required to drive the split spoon sampler every 6 inches was recorded, and the number of blows required to drive the sampler the second and third 6-inch intervals is designated as the SPT N-Value. Representative portions of the disturbed samples were placed in plastic bags, labelled and sealed, and transported to the geotechnical testing laboratory for further inspection and possible laboratory testing.

Undisturbed samples were obtained by hydraulically pushing a 3.0-inch diameter by 24-inch long thin-wall Shelby tube in general accordance with ASTM D-1587. Undisturbed samples were obtained in cohesive materials encountered at various locations and depths, as indicated on the boring logs. The thin-wall tubes were field extruded and intact specimens were wrapped in protective foil, placed in rigid plastic tubes and transported to the geotechnical testing laboratory for further inspection and possible



laboratory testing. Pocket penetrometer tests were performed on cohesive materials in the field to obtain consistency measurements on the undisturbed samples.

The field exploration program was overseen by an experienced geotechnical technician, who documented the field exploration program, logged the borings, collected representative disturbed and undisturbed samples, maintained communication with the senior project geotechnical engineer (Goodheart), provided direction to the drillers and monitored for landfill gasses. TWE provided a geotechnical technician for the first two borings drilled as part of this investigation (BH-23-9 and BH-23-12); SKA provided a geotechnical technician for all other borings.

Drill cuttings from the borings were collected and segregated. Soil and waste materials were placed on plastic sheeting so that they could be sampled and analyzed for possible contaminants. Non-impacted soils were spread on the ground surface in the vicinity of the borings, and impacted soils and waste materials were to be tested and managed for potential off-site disposal.

Groundwater levels were observed as the borings progressed; when groundwater was detected, drilling was halted so that groundwater levels could be observed and measured. Groundwater was encountered in thirteen borings; the remainder of the borings were dry at the time of drilling. Upon completion, the boreholes were filled with bentonite chips from the bottom to the top.

Field drilling operations were monitored with a four-gas meter to check for possible explosive or dangerous gases: methane (CH₄), oxygen (O₂), hydrogen sulfide (H₂S) and carbon dioxide (CO₂). The presence of landfill gases at high concentrations in the first two borings drilled during this investigation resulted in termination of boring BH-23-12 before reaching the planned depth. High concentrations of landfill gases were also encountered during drilling of other borings as noted on Table 2. Subsequent modifications were made to the planned drilling program, including temporarily halting drilling to let the gases vent, landfill gas monitoring of all breathing and workspaces, using electric fans and generators to evacuate gasses from the work areas at the rear of the drill rig, and mobilization of a second truckmounted HSA drill rig with rotary wash capabilities to complete the field exploration program.



3.2 Laboratory Testing

Select samples from the borings were tested to verify field soil classifications and to determine pertinent geotechnical engineering properties of the various materials encountered during the field exploration program. The laboratory testing program included:

- Natural moisture content (ASTM D2216)
- Density and Unit Weight (ASTM D2937)
- Grain Size with Hydrometer Analyses (ASTM D422)
- Atterberg limits (ASTM D4318)
- Unconfined compression tests on soil (ASTM D2166)
- One-dimensional consolidation tests (ASTM D2434)

Based on geotechnical laboratory testing performed for this investigation, unconfined compressive strength (qu) of the landfill cap material ranged between 2.16 and about 10+ kips per square foot (ksf), with a weighted average compressive strength of about 5.5 ksf. Soil dry density ranged from 89 to 115 pounds per cubic foot (pcf), with an average dry density of approximately 103 pcf. Soil moisture content for the surficial fill/landfill cap material ranged from 11.1 to 31.1 percent, with an average moisture content of 21.2 percent.

Atterberg limits tests were performed on 13 samples to check the plasticity of the surficial fill and landfill cap material, and to confirm field soil classifications. Liquid limits (LL) varied from a low of 41 to a high of 70, with an average LL of 52, and plastic limits (PL) varied from a low of 18 to a high of 24, with an average PL of 20. Plasticity Indices (PI) varied from a low of 21 to a high of 46, with an average PI of 32. These results indicate the surficial soils are mostly CL (low plasticity clays) intermixed with some CH (high plasticity clays) material, and that the average moisture content of the surficial fill and landfill cap material is slightly higher than the average PL.

Soil classification and strength test results are summarized on Tables 3 and 4 below and the strength tests are also presented on the individual boring logs. The results of all tests, including the one-dimensional consolidation tests, are included in Appendix B. Geotechnical laboratory tests were performed in accordance with current test standards as determined by ASTM. Laboratory testing was performed by TWE under subcontract to Goodheart.



TABLE 3: SOIL CLASSIFICATION TEST RESULTS

TABLE 3: SOIL CLASSIFICATION TEST RESULTS									
Boring No.	Depth Interval (ft)	Natural Moisture Content (%)	Dry Density (pcf)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Comments		
BH-23-1	3.5-4.0	26.3	-	-	-	-	Fill/Cap (CL)		
BH-23-1	6.0-6.5	22.6	-	44	19	25	Fill/Cap (CL)		
BH-23-2	2.5-4.5	26.0	97.4	48	18	30	Fill/Cap (CL)		
BH-23-3	3.5-4.0	24.0	-	-	-	-	Fill/Cap (CL)		
BH-23-3	5.0-7.0	-	-	70	24	46	Fill/Cap (CH)		
BH-23-4	2.5-3.0	21.5	-	-	-	-	Fill/Cap (CL)		
BH-23-4	7.5-8.0	21.2	-	53	20	33	Fill/Cap (CH)		
BH-23-5	3.0-3.5	20.2	-	-	-	-	Fill/Cap (CL)		
BH-23-5	5.0-7.0	19.3	105.1	49	19	30	Fill/Cap (CL)		
BH-23-5	8.5-9.0	22.2	-	-	-	-	Fill/Cap (CL)		
BH-23-6	2.0-2.5	18.5	-	-	-	-	Fill/Cap (CL)		
BH-23-6	5.0-7.0	18.0	104.7	46	17	29	Fill/Cap (CL)		
BH-23-6	8.0-8.5	18.7	-	-	-	-	Fill/Cap (CL)		
BH-23-7	3.0-3.5	18.4	-	-	-	-	Fill/Cap (CL)		
BH-23-7	7.0-7.5	18.3	-	-	-	-	Fill/Cap (CL)		
BH-23-8	2.5-3.0	23.0	-	-	-	-	Fill/Cap (CL)		
BH-23-8	4.0-6.0	27.1	88.8	48	20	28	Fill/Cap (CL)		
BH-23-8	8.5-9.0	22.2	-	-	-	-	Fill/Cap (CL)		
BH-23-9	4.0-6.0	21.8	-	-	-	-	Fill/Cap (CL)		
BH-23-9	10.5-12.0	31.1	-	-	-	-	Fill/Cap (CL)		
BH-23-10	3.5-4.0	18.0	-	-	-	-	Fill/Cap (CL)		
BH-23-10	6.0-8.0	17.5	104.7	48	17	31	Fill/Cap (CL)		
BH-23-11	3.0-33.5	18.3	-	-	-	-	Fill/Cap (CL)		
BH-23-11	4.0-6.0	20.1	105.5	54	21	33	Fill/Cap (CL)		
BH-23-11	8.5-9.0	18.7	-	-	-	-	Fill/Cap (CL)		
BH-23-12	4.5-6.0	21.0	-	-	-	-	Fill/Cap (CL)		
BH-23-12	6.5-8.0	19.3	-	-	-	-	Fill/Cap (CL)		
BH-23-14	2.5-4.5	18.8	-	41	20	21	Fill/Cap (CL)		
BH-23-14	9.0-9.5	22.0	-	-	-	-	Fill/Cap (CL)		
BH-23-14	13.0-13.5	16.0	-	-	-	-	Fill/Cap (CL)		
BH-23-16	3.0-3.5	21.5	-	-	-	-	Fill/Cap (CL)		
BH-23-16	5.0-7.0		-	56	19	37	Fill/Cap (CH)		
BH-23-16	8.0-8.5	19.3	-	-	-	-	Fill/Cap (CL)		
BH-23-17	2.5-3.0	20.8	-	-	-	-	Fill/Cap (CL)		
BH-23-17	5.0-7.0	23.5	99.2	59	22	37	Fill/Cap (CH)		
BH-23-17	8.5-9.0	22.2	-	-	-	-	Fill/Cap (CL)		



Boring No.	Depth Interval (ft)	Natural Moisture Content (%)	Dry Density (pcf)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Comments
BH-23-18	4.0-6.0	11.1	115.0	59	22	37	Fill/Cap (CH)
BH-23-18	6.0-7.0	12.1	1	-	-	-	Fill/Cap (CL)
BH-23-19	3.0-3.5	20.9	1	-	-	-	Fill/Cap (CL)
BH-23-19	5.0-5.5	17.1	-	-	-	-	Fill/Cap (CL)

Notes: CL – Low plasticity clay CH – High plasticity clay

TABLE 4: UNCONFINED STRENGTH TEST RESULTS

Boring No.	Depth Interval (ft)	Test Type	Unconfined Strength (tsf)	Failure Strain (%)	Soil Description
BH-23-2	2.5-4.5	UC	1.43	15.0	Brown Lean Clay w/Sand (Fill/Cap)
BH-23-6	5.0-7.0	UC	3.87	7.5	Brown Sandy Lean Clay (Fill/Cap)
BH-23-8	4.0-6.0	UC	1.08	8.5	Dark Brown Lean Clay w/Sand (Fill/Cap)
BH-23-11	4.0-6.0	UC	3.64	5.5	Red Brown Fat Clay (Fill/Cap)
BH-23-17	5.0-7.0	UC	1.67	10.8	Tan Red Sandy Lean Clay (Fill/Cap)
BH-23-18	4.0-6.0	UC	5.08	3.0	Tan Brown Lean Clay w/Sand (Fill/Cap)

Notes: UC – Unconfined compression



4. SITE CONDITIONS

4.1 Local Geology

The Site is located within the Coastal Plain physiographic province. The surficial native soils in the Site area are Quaternary deposits formed during periods of high standing sea level and are part of the Beaumont Formation of Pleistocene age. At this site, the sand body that was mined was likely a sand channel within the Beaumont. In the subsurface, the Beaumont Formation is typically undifferentiated from the underlying Lissie Formation. Figure 3 provides a Geological Map of the State of Texas and indicates the presence of Beaumont Formation soils at the Site.

Beaumont Formation soils often consist of reddish orange or dark brown to brownish dark gray clays, with very fine to fine quartz sand, silt, and minor fine gravel, intermixed and interbedded. The Beaumont formation includes poorly defined meander-belt ridges and pimple mounds aligned approximately normal to the coast, and marine delta-front sand, lagoonal clay, and near-shore marine sand deposits. Beaumont clays typically exhibit a high Plasticity Index (PI) and are subject to significant shrinking and swelling with changes in moisture content.

The Houston area, and the Gulf Coast in general, is laced by numerous growth faults which are geological hazards that are known to impact and damage house slabs, building-support structures, highways and associated foundations. Figure 4 shows a group of east-northeast-trending geologic features and faults¹, some of which have displaced the land surface in western Houston.

The geologic feature nearest the Site is the Renn Scarp, located approximately 1½ miles northwest of the Site. The Renn Scarp was originally categorized as a fault; however, subsequent drilling has confirmed that the scarp is actually the cutbank of an ancient stream channel. The Renn Scarp has been masked by recent urban development. The closest known growth fault relative to the Site is the Clodine Fault², which is located approximately 3 miles northwest of the Site and trends southwest to northeast. Given the

^{1 -} Principal Active Faults in Harris County, Texas, US Geological Survey and Harris County Coastal Subsidence District (20024)

^{2 -} Clodine Fault, Southwestern Houston Metropolitan Area, Texas by E. R. Verbeek, U.S. Geological Survey, and U. S. Clanton, National Aeronautics and Space Administration (1979)



location and orientation of the Clodine Fault, it is not a concern. A field study for potentially unknown growth faults was not performed; however, growth faults are not expected to impact Site development.

4.2 Surface Conditions

The Site is located in a mixed commercial and residential area on the west side of Houston and is north of Bissonnet Street between Kirkwood Road on the east and Cook Road on the west. The primary entrance to the Site is currently off Bissonnet Street on the south side, where the former Sugar Hill Golf Course Club House, maintenance facilities and parking areas for the Golf Course were located.

Site surface topography is characterized by undulating terrain which was created when the golf course was graded. Ground surface elevations range between approximately 85 and 106 feet above mean sea level (MSL). The high point is located in the north central portion of the Site, and surface elevations fall off toward the western and southern portions of the Site. There are no ponds or standing water on the Site.

The Site is heavily overgrown with various grasses, thick brush, and scrub trees up to several inches in diameter. Paved and unpaved golf cart paths traverse the Site, although these are difficult to find and follow in many areas because of the overgrowth. The overgrowth also masks the former fairways, making the fairways difficult to identify in some areas. There is some evidence of minor erosion and raveling across the surface of the landfill, but no major erosional gullies, sinkholes or large depressions have been observed.

4.3 Subsurface Conditions

Soil borings drilled during this investigation were used to characterize subsurface conditions at the Site. Subsurface materials encountered were compared with boring logs from prior investigations to check for consistency and to expand the available geotechnical database.

4.3.1 Surficial Soils and Landfill Cap

Boring logs from this and prior investigations indicate the landfill cap typically consists of 2 to 2½ feet of medium stiff to hard, lean and fat clays (USCS Classification of CL and CH). The landfill cap is also assumed



to extend across the entire Site. Surficial soils on the Site range from 0 to as much as 12½ feet in thickness above the landfill cap. The surficial soils, defined in this report as the material above the 2-foot-thick landfill cap, are mostly medium-stiff lean and fat clays (CL and CH). From a review of prior reports, it is unlikely the surficial soils were compacted, so for purposes of this report, the surficial soils are assumed to be an uncontrolled fill.

4.3.2 Landfill Waste Material

Most borings drilled for this investigation and prior investigations extended into the top of the waste. Twelve (12) borings drilled for this investigation and one (1) prior CEC boring drilled on the Site extended through the waste into the underlying native soils. The thickness of the waste encountered in our borings varied from 16 to 61 feet across the Site, as indicated in Table 1.

The boring logs suggest that the waste material consists of a matrix of soil and construction debris. Soils in the waste matrix included low and high plasticity clays and non-plastic material (sands, gravel and silty sands). Waste materials encountered in the borings included: paving materials, such as concrete and asphalt fragments; landscape debris; wood products, such as construction lumber, particle board, and shredded wood; ceramic materials; plastic; and miscellaneous construction and demolition debris.

Field observations during drilling indicate the waste material was typically comprised of at least 50% soil, with the majority of the remainder being miscellaneous non-degradable material. From a review of the boring logs in this and prior reports, it is unlikely the waste material was compacted except through the weight of overlying fill, so for purposes of this report, the waste materials are also assumed to be an uncontrolled fill.

4.3.3 Native Soils

The native soils underlying the waste were encountered at depths ranging from 23 to 58 feet bgs (approximately elevation 40 to 72 feet MSL). Sand (SM), possibly unmined portions of the original sand body, was encountered beneath the waste in Borings BH-23-3, BH-23-5, and BH-23-6 at depths of approximately 33 feet bgs (60.5 feet MSL), 48 feet bgs (46.8 feet MSL), 43 feet bgs (46.3 feet MSL), respectively. Medium stiff to very stiff low and high plasticity clays (CL and CH materials) were



encountered immediately beneath the waste in all other borings that extended into the underlying native soils.

4.3.4 Groundwater Levels

Groundwater levels across the Site are variable. Approximate groundwater levels were determined during drilling by noting the depth of free water on the sampling tools and/or by noting the presence of free water in the soil samples. Groundwater levels were noted in all borings **except** BH-23-7, BH-23-9, BH-23-12 and BH-23-19 at depths ranging from 12 to 36 feet bgs (approximate groundwater elevations from 69.5 to 82.5 feet MSL). All other borings were noted as dry to the depths explored. It was noted that moisture content in the surficial fill/landfill cap material generally tended to increase with depth.

Groundwater level data is also available from the monitoring wells around the perimeter of the larger Bissonnet 136 property. The upper groundwater-bearing unit is slightly confined with static water levels ranging from 8 to 10 feet below ground surface (approximate groundwater elevations from 67 to 72 feet MSL).



5. DISCUSSION

The following discussion is based on the overall body of geotechnical information and data developed at the Bissonnet 136 property, including the findings of this geotechnical investigation, and Goodheart's understanding of the planned Site improvements.

5.1 Interpretation of Field Data

Because it is extremely difficult to obtain and test waste materials, such as those encountered at the Site, we tested the subsurface materials in-place while sampling using the Standard Penetration Test (SPT). The SPT is a simple, cost-effective field-testing procedure widely used in geotechnical engineering to evaluate subsurface materials. Empirical values of the angle of internal friction (Φ), relative density (D_r), and unit weight (γ) of granular soils, and ultimate shear strength (q_u) and consistency of cohesive soils, have been correlated with SPT N-values and published for many years. SPT N-values were compared with shear strength test data from the Site soils (i.e., surficial fill, landfill cap and native soils) to assist in interpretation of subsurface conditions. Due to the relatively small number of undisturbed samples of surficial fill and landfill cap material, and the complete lack of shear strength data from the waste material, much of this investigation depends on interpretation of SPT N-values.

SPT N-values obtained during the field exploration program were plotted versus depth to evaluate the strength of the surficial soils, landfill cap and waste materials (see scatter plot diagram in Figure 5). The data indicates the relative shear strength of the surficial fill and landfill cap material typically ranges from "stiff to very stiff" with an ultimate shear strength ranging between 2.0 and 7.5 ksf. Approximately 30% of the recorded N-values from SPT's taken in the surficial fill and landfill cap material were of medium consistency indicating the presence of random softer zones of material. SPT N-values in the surficial fill and landfill cap material correlate well with published data and with the limited shear strength data from unconfined compression tests performed for this investigation.

Previous data (CEC report) suggests as much as 80% of the waste material at the Site could be non-degradable, and visual observations of the waste material sampled during this investigation generally seem to bear that out. The waste has been in place for 30 to 40+ years, and for much of that time has been covered with surficial fill and landfill cap material ranging between 2.5 and over 14 feet thick.



Although there is little or no published data to correlate N-values with shear strength of the waste material, the data was qualitatively evaluated to determine whether the waste is suitable as bearing material for the anticipated loads.

SPT N-values recorded in the waste material during this investigation ranged from 10 to more than 50 blows per foot. Approximately two-thirds of the recorded N-values from SPT's taken in the waste material were greater than 12 blows per foot while the remaining one-third of the recorded N-values ranged between 2 and 12 blows per foot. SPT N-values seem to trend slightly higher with depth. While no apparent voids were observed, zones of very soft to soft waste material were encountered in Borings BH-23-1, BH-23-3, and BH-23-17.

From a geotechnical engineering standpoint, and taken as a whole, the data suggests that waste at the Site has substantially consolidated under its own weight and the surcharge of the surficial fill and landfill cap material. From a bearing standpoint, the waste can support the anticipated foundation loads; however, as much as a quarter of the waste could contain zones of softer material that would be subject to some degree of total and differential settlement, as evidenced by the number N-values below 12. This evaluation was performed using the best available information and limited techniques, coupled with geotechnical engineering experience and judgement.

5.2 Foundation Support

5.2.1 Shallow Foundations

Subsurface conditions encountered at the Site vary due to the:

- Character and thickness of the surficial fill and landfill cap material;
- Character and thickness of waste material; and
- Nature and depth of the underlying native soils.

Planned improvements at the Site can be supported on shallow foundations and/or slabs-on-grade provided the recommendations presented herein are followed regarding site preparation, filling and grading, and implementation of ground improvement methods to provide more uniform support and control settlement behavior.



Significant filling and grading will be required to establish minimum thicknesses of surficial fill and to prevent penetration of the landfill cap. Ground improvement coupled with properly compacted fill will provide good bearing support for conventional foundations. Ground improvement methods considered for the Site are discussed in Section 5.2.3; further design efforts and consultation with specialty contractor(s) are required to develop final recommendations. Recommendations for site preparation, filling and grading, and foundation design are presented in Section 6.0.

5.2.2 Deep Foundations

The field exploration data, and specifically the SPT data, indicate the likely presence of soft zones of fill and waste material that could result in unacceptable total and differential settlement; however, there is no evidence to-date that indicates these zones are widespread or excessively thick. Deep foundations will provide excellent bearing and will mitigate the obvious concerns regarding total and differential settlement; however, deep foundations are likely cost-prohibitive for development of the planned improvements, and as noted above, ground improvement coupled with properly compacted fill will provide good bearing support for conventional foundations.

Deep foundations were deemed unnecessary for foundation support of the planned improvements at the Site, and no further evaluation of deep foundations was performed or considered.

5.2.3 Ground Improvement

Geotechnical analysis using the field exploration and laboratory test data indicate lightly loaded shallow foundations and/or slabs-on-grade can be designed for allowable bearing capacities of up to 4.0 ksf. The primary concern, however, is that the Site is essentially a very large uncontrolled fill with combined surficial fill, landfill cap and waste depths ranging from 23 feet to more than 50 feet thick. It is likely that undetected zones or pockets of soft material exist in the shallow subsurface as well as at depth. Ground improvement is recommended to control settlement and provide a compact, uniform, and consistent subgrade for foundation and slab-on-grade construction.



Ground improvement methods are used at sites with poor or variable subsurface conditions to bridge any soft zones and mitigate the possible damaging effects of total and differential settlements. A qualitative evaluation of possible ground improvement methods was performed for the Bissonnet Apartments Site. These ground improvement methods should be further evaluated by the Project Team to determine the optimum method with regard to overall effectiveness, cost and schedule impact:

- Proof-rolling Proof-rolling with a heavy sheepsfoot roller can be used to compact and tighten the surficial fill and landfill cap materials, thus providing a good working surface for construction of foundations, slabs and pavements. However, proof-rolling will have limited depth of penetration in the mostly clay materials that comprise the surficial fill and landfill cap materials (generally less than 3 feet of total penetration). More importantly, it is very unlikely that heavy proof-rolling would have any effect on the underlying waste, and any soft zones that remain could reflect to the surface and have detrimental effects on foundation performance. Proof-rolling should be performed, but only in conjunction with another ground improvement method that would extend into and compact the waste.
- Pre-Loading or Surcharging Surcharging can be used to pre-load the surficial fill/landfill cap and waste materials, thus inducing settlement to occur before foundation construction begins. When surcharging is used, the foundation area(s) are typically pre-loaded with excess fill to an amount equal to or greater than the anticipated foundation loads. The surcharge is allowed to sit and is monitored until the anticipated settlements have occurred. This method can be cost-effective if: (1) there is readily available fill, and (2) there is sufficient time in the project schedule. It should be noted that the Site has been subjected to some degree of surcharging over the last 20 years; the purpose of additional surcharging is to consolidate the fill so that it is as uniform as possible. If LAC desires to consider pre-loading and/or surcharging to provide settlement control for support of spread footings and slabs-on-grade at the Site, Goodheart recommends the Project Team conduct further evaluation of, including cost and schedule analyses.
- Rammed Aggregate Piers Rammed aggregate piers (RAP™ systems or Geopiers®) were previously considered as a means of ground improvement elsewhere on the Bissonnet 136 property. RAPs create a densified column of aggregate surrounded by a stiffened matrix of soil and waste. Geopiers can be used in many different soil types and applications; however, due to the depth of waste over much of the Bissonnet Apartments Site, it is not likely that RAPs would be an effective ground improvement solution. Specialty contractors who design and install RAPs have expressed concern that they do not have the tools to extend all the way through the waste and they will not warranty their work if they cannot install the RAPs to meet their criteria.
- Deep Dynamic Compaction Dynamic deep compaction (DDC) involves dropping a heavy weight
 (up to 30 tons falling from as high as 80 to 100 feet) in a grid pattern on the ground surface to
 compact soils and other soft materials to depths as great as 40 to 50 feet bgs. DDC can be used
 to reduce foundation settlements and permit construction on soft native soils as well as



uncontrolled fills, such as landfills, and would likely be an effective ground improvement solution at the Bissonnet Apartments Site. However, DDC generates significant noise and vibrations, and could have an adverse effect on the existing nearby apartment buildings. The general rule of thumb is not to conduct DDC within 500 feet of occupied structures, and the nearby apartments would be as close as 200 feet, so DDC is likely <u>not</u> a ground improvement solution for the Bissonnet Apartments Site.

- Rigid Inclusions Rigid inclusions is another means of ground improvement considered elsewhere on the Bissonnet 136 property. Rigid inclusions create a slender column of lean concrete to transfer vertical loads to more competent bearing strata. Rigid inclusions can be used in many different soil types and applications. Specialty contractors who design and install rigid inclusions should be consulted to determine if they will work as a cost-effective solution for the Site. If LAC desires to consider rigid inclusions to provide settlement control for support of spread footings and slabs-on-grade at the Site, Goodheart recommends the Project Team conduct further evaluation of, including cost and schedule analyses.
- Wick Drains Wick drains are used to remove pore water from soft compressible soil and other subsurface matrices so the soils consolidate faster. Wick drains consist of a flexible core with grooves (that allow water to flow unimpeded) wrapped in geotextile filter fabric. Wick drains are typically installed to design depth in a pattern using a hollow mandrel mounted on an excavator or crane mast, and are usually tied to a sand blanket to capture and remove pore water. While wick drains can be effective in accelerating settlement of saturated subsurface materials, the subsurface materials at the Site are variable and do not appear to contain a lot of free water (i.e., their effectiveness would be limited at best). Other considerations regarding the use of wick drains include: (1) the installation process will likely require a special TCEQ permit; (2) the leachate that emanates from the waste will likely have to be captured, treated and properly disposed offsite; and (3) the time required to permit and implement the process likely precludes wick drains as a viable ground improvement option.
- Combination of Methods Two or more of the foregoing options can also be used together to address potential settlement concerns and accelerate the construction process. For example, heavy proof-rolling can be used in conjunction with pre-loading and surcharging. Also, wick drains are frequently used in conjunction with DDC; however, as noted above, there are several major concerns with the use of DDC and wick drains on the Bissonnet Apartments Site.

5.3 Estimated Settlements

Based on existing conditions at the Site and the planned improvements, total settlements in the surficial fill and landfill cap materials are estimated to be on the order of ½- to 1-inch. Differential settlements in the surficial fill and landfill cap materials are anticipated to be about half the estimated total settlement.



Our qualitative evaluation of total and differential settlements in the waste material indicates shallow foundations and slabs-on-grade could experience as much as 2- to 4-inches of total and differential settlement, increasing the combined total settlements in the uncontrolled fill at the Site (i.e., surficial fill, landfill cap and waste materials) to as much a 2½- to 5-inches. Due to the nature and thickness of the uncontrolled fill, it is likely that differential settlements could also range between 2½- and 5-inches.

Ground improvement methods coupled with properly compacted fill will provide good bearing support for slab-on-grade construction and conventional foundations and should substantially mitigate settlement concerns. In general, implementation of appropriate ground improvement methods (i.e., pre-loading and surcharging coupled with heavy proof-rolling) should limit total foundation settlements to approximately 1-inch and differential settlements should be on the order of ½-inch.

5.4 Environmental Considerations

The Site is underlain by 16 to 50+ feet of construction and demolition debris (waste) intermixed with soil. The waste materials include varying amounts of landscape debris, wood products and degradable materials. Decomposition of the degradable waste generates landfill gases, such as methane and hydrogen sulfide which in elevated concentrations, can be explosive or toxic, respectively. Screening for methane gas and other landfill gasses while drilling identified the presence of methane gas and other unusual odors emanating from the boreholes.

SKA has been retained by both Bissonnet 136 and LAC to assist with regulatory compliance, landfill post-closure care and permit issues at the Site. SKA is currently maintaining both the groundwater monitoring well network and the landfill gas management and monitoring network (gas vents and gas monitoring probes) around the perimeter of the Bissonnet 136 property. SKA is also working with TCEQ on behalf of Bissonnet 136 to revoke MSW Permit No. 1247 so that the post-closure care period can be completed.

Development over closed landfills is regulated by TCEQ under 30 Texas Administrative Code (TAC) Chapter 330, Subchapter T. One purpose of the Subchapter T rules and regulations is to ensure that potentially explosive gases are appropriately monitored and/or abated to protect occupants in these buildings. The Subchapter T rules also regulate practices which could contribute landfill leachate. Subchapter T rules



apply to all developments over closed landfills except for single-family or double family homes which are not part of a residential subdivision. A Subchapter T development permit for enclosed structures will be required from TCEQ for Site development. TCEQ will also require a landfill gas venting system with monitoring beneath all enclosed structures on the Site as part of the development permit.

Preliminary discussions with TCEQ have determined that ground improvement activities can be performed under the Subchapter T permit provided the landfill cap is maintained and meets the minimum requirements when ground improvement is completed. A TCEQ development permit separate from the enclosed structure development permit discussed above, should be considered to facilitate the ground improvement activities and minimize impacts to the overall project schedule.



6. CONCLUSIONS AND RECOMMENDATIONS

This section provides geotechnical conclusions and recommendations for design and construction of the planned Site improvements. The conclusions and recommendations presented herein are based on the geotechnical data developed during this investigation and qualitative analyses and evaluation of the overall geotechnical data base for the Site.

6.1 Earthwork, Mass Grading and General Site Development

General Guidelines. Before construction of the proposed residential development and associated amenities can begin, ground improvement and/or mass grading operations will be necessary to establish roadways, building pads and drainage patterns. Earthwork operations should generally be designed and conducted so as not to penetrate or disturb any portion of the landfill cap that covers the entire Site footprint. In addition, the total thickness of surficial fill and landfill cap should be at least 6 feet thick to allow for foundation and underground utility construction without penetrating or disturbing the landfill cap. This would allow 1 to 2 feet as a buffer zone above the landfill cap in most areas and for elevation variances across the Site.

TCEQ requires that the landfill cap for Type IV (MSW) landfills consist of at least 18 inches of compacted clay (SC or CL) plus 6 inches of topsoil (per 30 TAC 330.453(a)). If the landfill cap is penetrated during mass grading, ground improvement activities, foundation or infrastructure construction, it should be repaired or reconstructed as soon as possible using a similar thickness of material. Landfill cap repairs should be accomplished using clay (SC or CL) compacted in accordance with structural or general fill requirements, depending on where the repairs take place. If waste must be removed to facilitate construction, the waste shall be segregated from the overlying soils, stored on plastic sheeting and covered with plastic sheeting, until disposed off-site. The reburial of waste on site is not generally permitted by TCEQ once the landfill is in post-closure care.

The surficial soils range from 4.5 to 12.5+ feet in thickness above the landfill cap. In general, Site elevations are higher across the northern portion of the Site than they are across the southern portion of the Site, whereas the thickness of the surficial fill and landfill cap material varies across the entire Site. To



accommodate the overall Site slope, Goodheart recommends creating a terraced Site with surface grades adjacent to structures in the northern portion of the Site at least 10 to 12 feet higher in elevation than the surface grades adjacent to structures in the southern portion of the Site.

As noted elsewhere in this report, each floor slab should be continuous and maintained on one elevation. Because of the relatively abrupt changes in grade of ground surface elevations to meet the minimum fill requirements over waste, Goodheart anticipates floor slab elevations in adjacent buildings could differ by as much as 10 feet. Grading plans should consider the use of retaining structures to facilitate these abrupt grade changes.

<u>Clearing and Grubbing</u>. Due to the presence of dense vegetation at the Site, including grasses and weeds, areas of thick brush, and widespread scrub trees up to several inches in diameter, site preparation will be a significant consideration for overall Site development. All brush and trees located above the landfill cap, regardless of size, should be cut and properly disposed in accordance with local regulations. Tree trunks/stumps larger than 4 inches in diameter should be grubbed, and roots larger than 1 inch in diameter should be removed. The ground surface in areas where fill and/or structures will be constructed should be inspected by a qualified geotechnical engineer following initial clearing to check for evidence of sinkholes or erosional features that were not previously evident due to heavy vegetation.

A minimum of 6 inches of surface grass and vegetation should be stripped and properly disposed in accordance with local regulations; additional stripping could be required in some areas, depending on how far the root mass penetrates below the ground surface and as identified by a qualified geotechnical engineer during construction. After the building pad areas, site roadways and parking areas have been cleared and stripped, any remaining topsoil (generally in the upper 6-12 inches immediately underlying surface grass and vegetation) should be stripped and stockpiled on site or properly removed and disposed in accordance with local regulations.

<u>Proof-compaction and Subgrade Preparation</u>. After stripping, the exposed subgrade material will consist primarily of lean and/or fat clay fill. The exposed subgrade material is generally suitable for structural fill or general fill anywhere on the Site, as determined by a qualified geotechnical engineer. The exposed



subgrade materials above the landfill cap can be moved around the Site and used for ground improvement (surcharging) as directed by a qualified geotechnical engineer. The exposed subgrade materials can also be left in place and used for support of buildings, foundations, roadways, parking lots, or as subgrade for placement of additional fill to bring the area up to finished subgrade elevation. Proof-compaction and subgrade preparation will generally take place after ground improvement activities have been completed.

Prior to placing any permanent structural fill or beginning foundation construction, exposed subgrade materials that will be left in place should be proof-rolled with at least four passes of a Caterpillar 825K Wedgefoot Soil Compactor (or equivalent) to locate zones of loose and/or unstable soils. Proof-rolling operations should be witnessed by a qualified geotechnical engineer to determine whether soft, loose, or saturated soil and/or detrimental material such as debris and/or degradable materials are present. Zones that exhibit instability during proof-rolling, such as excess rutting or pumping in excess of 1-inch, should be disked, reconditioned, and compacted or removed and replaced with approved fill, as directed by a qualified geotechnical engineer.

If unsuitable soils or other detrimental materials are encountered, the unsuitable material should be removed full depth and replaced with properly compacted fill. Actual depth and volume of undercut should be determined at the time of construction based on observations of a qualified geotechnical engineer. The depth of undercutting shall not extend below the landfill cap. Excavated material should be replaced with properly compacted structural fill, as defined in this report.

<u>Ground Improvement</u>. Ground improvement activities should be performed in areas where total and differential settlement will have a detrimental effect on the planned improvements (building pads, site roadways, parking areas, etc.). Ground improvement activities should take place after site preparation have been performed, and should be designed and constructed in accordance with geotechnical criteria presented in this report and structural design criteria for the project.

Ground improvement activities should consist of overfilling designated areas (building pads, site roadways, parking areas, etc.) with an additional 6 feet of soil and allowing those areas to consolidate for a period of at least three months or until vertical movement has dissipated, as determined by the



geotechnical engineer. Overfilling should extend at least 5 feet beyond the building footprints and 3 feet outside roadway and parking areas. Surcharge materials do not need to meet material and compaction requirements specified below; however, surcharge materials that do not meet the material specifications should not be used as structural fill.

Settlement monitoring should be conducted as described in Section 6.3 of this report to monitor the total amount of movement and to assist in determining when vertical movements have dissipated. Ground improvement activities should be planned and executed as an integral part of the construction sequence.

Structural and General Fill Material. Due to the uneven terrain, construction activities will include a cut and fill grading operation to achieve final grades. Cut areas should not reduce surficial fill and landfill cap thickness to less than 6-feet without the approval of a qualified geotechnical engineer and/or civil design engineer. Compacted structural fill should be used beneath structures and pavements, and either general or structural fill can be used in open areas. Structural fill should generally extend from the bottom of slabs-on-grade (or foundations) down to the top of waste and at least 5 feet outside building footprints. A qualified geotechnical engineer can assist in determining the most efficient means of compaction.

Structural fill used for mass grading and Site earthwork should meet the following minimum requirements:

- 1. Imported structural fill should consist of locally available lean clay soils (CL) with the following properties:
 - Liquid limit (LL) less than 50 and plasticity index (PI) less than 25,
 - Maximum dry density greater than 100 pounds per cubic foot (pcf), when determined according to the Modified Proctor Method (ASTM D 1557)
- 2. Imported structural fill may also consist of locally available granular material (sands and gravels) with the following properties:
 - Granular fraction should consist of at least 50% sands and gravels (GW, GC, SW, SM, or SC) and be well-graded,
 - Fill should contain at least 12% fines (binder material),
 - Maximum dry density greater than 100 pounds per cubic foot (pcf), when determined according to the Modified Proctor Method (ASTM D 1557)



- Structural fill shall not contain more than 5% organic material when tested in accordance with ASTM D 2974 test method. New structural fill shall be free of waste, debris, and frozen or deleterious material.
- 2. Materials unsatisfactory for use as structural fill include soils classified as silt or organic silt (ML, MH, IL, and OH) in the Unified Soil Classification System (ASTM D 2847).
- 3. Cohesive materials used as structural fill shall be placed in 6- to 9-inch-thick loose lifts, moisture-conditioned to within plus or minus 2% of optimum moisture and compacted to at least 95% modified Proctor density (ASTM D1557 / AASHTO T180).
- 4. Granular materials used as structural fill should be placed in maximum 10- to 12-inch-thick loose lifts, moisture-conditioned to within plus or minus 3% of optimum moisture and compacted to at least 95% modified Proctor density (ASTM D1557 / AASHTO T180).
- 5. Fill should be placed where dry and stable conditions exist at design or undercut subgrade.

General fill should not contain more than 8% organic material when tested in accordance with ASTM D 2974 test method, and should be free of waste, debris, and frozen or deleterious material. Cohesive materials used as general fill should be placed in 6- to 9-inch-thick loose lifts, moisture-conditioned to within plus or minus 3% of optimum moisture, and compacted to at least 92% modified Proctor density (ASTM D1557 / AASHTO T180). Granular materials used as general fill should be placed in maximum 12-inch-thick loose lifts, moisture-conditioned as necessary, and compacted to at least 92% modified Proctor density (ASTM D1557 / AASHTO T180).

In general, the surficial fill materials on the Site meet the requirements outlined herein and can be used as structural or general fill; however, structural fill should be approved by a qualified geotechnical engineer before it is moved on-site or imported to the Site. Silt and other materials designated as ML, MH, PT, OL, and OH can be used for landscaping purposes (i.e., construction of berms).

At least 12-inches of well-sorted, compacted granular fill (AASHTO #57 stone) should be placed beneath building slabs and foundations for landfill gas collection, as indicated in Section 6.2. For roadway subbase (i.e., in areas that will be covered by asphalt/concrete pavement), a well-graded, compacted granular fill or crushed aggregate is recommended. Imported granular structural fill can consist of crushed limestone, crushed gravel with sand, or recycled concrete meeting the gradation limits in Table 4. Where wet



subgrade conditions are encountered, free-draining crushed limestone similar to the free draining 1.5- or 3-inch gradations in Table 4 should be used.

TABLE 4: COARSE AGGREGATE GRADATIONS

tion sing)	Sieve Size	3"	2.5"	2"	1.5"	1"	0.5"	No. 4	No. 16	No. 200
da	3-inch	100	95±5	60±15	15±15	3±3				
Gra (% P	1.5-inch				100	95±5	75±5	43±13	25±15	8±4
	1.5-inch FD				40	95±5	45±15	5±5		

FD - Free Draining

6.2 Foundation Design Criteria

There are a number of considerations associated with design and construction of residential structure foundations at the Site, including:

- Existing surficial fill material varies in thickness (0 to 13.5 feet), and was apparently placed as an uncontrolled fill;
- The underlying waste material varies in location and thickness (16 to 50+ feet), and was apparently placed as an uncontrolled fill;
- Waste materials over the Site have settled under their own weight for a period of at least 20 years and as long as 40+ years for some parts of the landfill;
- The surficial fill has added up 500 to as much as 1700 pounds per square foot (psf) of load on the top surface of the landfill, resulting in an unknown amount of consolidation of the waste materials;
- The surficial fill has also settled under its own weight for a period of at least 20 years;
- Although there are no documented voids, sinkholes or depressions on the Site, it is possible or even likely that soft zones and/or voids exist which could affect foundation support; and
- The management of landfill gas will require sub-slab venting systems and well-sorted granular backfill along with robust chemical vapor barriers as required by TCEQ. SKA is designing these systems.

The planned residential structures can be supported on conventional slab-on-grade foundations provided ground improvement and earthwork operations are conducted as recommended herein. Due to the size and nature of the uncontrolled fill beneath the Site, slab-on-grade foundations should be made sufficiently thick and stiff to spread out the wall loads into the slab to reduce applied foundation loads to allowable



limits, to span soft or weak spots and potential small voids in the underlying waste material, to protect against shrinking and/or expansive soils, and to resist potential differential settlements. Individual slabs should also be designed as continuous structures, without expansion joints, and on one level.

Continuous slab-on-grade foundations should be properly reinforced for shear and load transfer, and stiffened, if necessary, using "waffle slabs" and/or post-tensioning. Slabs-on-grade should incorporate sections at least 30 inches wide and 18 inches thick in areas where interior load-bearing walls of 3 kips per linear foot or more will be constructed and around perimeter walls with loads greater than 3 kips per linear foot. Slab-on-grade foundations can be designed with a maximum allowable soil bearing pressure of 3.0 ksf, provided the compacted structural fill and landfill cover material have a minimum unconfined compressive strength of 3.0 ksf. Stiffened slabs will spread the applied load and reduce soil bearing pressures and help control total and differential settlement. As an alternative to using a "ribbed slab design, uniformly thick post-tensioned slabs-on-grade should be designed in accordance with PTI design criteria. Uniformly thick slabs-on-grade will also reduce the complexity of the sub slab landfill gas collection system.

Slabs-on-grade should be supported within the upper horizon of a properly constructed building pad, with at least 12 inches of soil embedment around the perimeter of the slab. The ground surface should be graded so that water flows away from the structure. Goodheart recommends the use of at least 12 inches of a well-sorted crushed aggregate base (AASHTO #57 stone) beneath building slabs and foundations to provide a capillary break with any underlying groundwater, allow for landfill gas collection, and to provide uniform foundation support. A sub-slab soil vapor venting system should be incorporated into the aggregate base, as required by TCEQ (LandScience TerraVent low profile system or equivalent with collection piping). A chemical vapor barrier (LandScience TerraShield or equivalent) should also be provided above the aggregate base material and beneath the slab. SKA can provide specific details regarding the subsurface landfill gas collection system.

Foundations for entry steps and porches should be designed and supported integrally to the building foundation. Asphalt, patio blocks or other materials that can withstand minor displacements without



causing cracking and/or can be easily replaced should be considered for flatwork, driveways and patios, sidewalks or other approaches to steps and porches.

6.3 Post-Construction Settlement

Most of the Site has settled under the weight of the waste material, landfill cap and surficial fill; however, some additional settlement could occur in areas where significant amounts of new fill (4 plus feet) are placed during mass grading operations. Such consolidation could be detrimental to new structures, roadways and parking areas, and utilities, and is very difficult to predict due to the nature and variable thickness of the waste and fill materials at the Site. As noted in Section 5.2.3, ground improvement is recommended to control and/or mitigate settlement, particularly beneath building footprints.

New fills created during mass grading that are greater than 4 feet thick should be monitored with settlement instrumentation to check for new and on-going movements. Settlement instrumentation should consist of 18-inch x 18-inch x ¼-inch thick steel plates with a ¼-inch solid steel rod welded to the center of the plates. The plates should be installed approximately two feet below existing grade with the ¼-inch steel rod extending vertically upward in 3-foot-long sections above the ground surface. A 1-inch diameter steel pipe should be placed over the steel rod starting at the steel base plate so that the rod can move freely (without soil friction) within the fill (the pipe should not be connected to the steel plate). The pipe should extend from approximately 2 inches above the steel plate to between 2- and 3-feet above the final grade, leaving 3- to 4-inches of steel rod exposed above the top of the pipe. The steel plate and rod constructed and installed in this manner will allow for periodic measurements of settlement or consolidation in the fill.

Settlement monitoring should be conducted on a weekly basis for the first month and then monthly thereafter until observed movements (i.e., settlements) and "time rate of settlement" analysis indicates future anticipated total settlements will be less than 1 inch. Qualitative analysis suggests this process could take as much as three to six months or more after completion of fill operations, depending on the thickness and nature of the fill and underlying waste materials. A qualified geotechnical engineer should review the settlement data and determine settlement has slowed to a degree that new construction (roadways, parking lots, buildings, etc.) can proceed.



6.4 Lateral Earth Pressures

Lateral resistance to loads can be provided by sliding friction acting on the base of footings and floor slabs (see Section 6.5 for appropriate values). Resistance to lateral loads can also be obtained in part from passive earth pressure against the face of rigid foundation elements.

An equivalent fluid pressure of 250 pcf can be used to resist short-term lateral loads on foundations in compacted structural fill (CL or CH materials). For sustained loading, an equivalent fluid pressure of 150 pcf can be used. The upper 1 foot of soil should be neglected in determining passive resistance when the soil is not confined by paving or floor slabs.

Retaining structures could be required to transition grades across the Site, particularly between buildings that are relatively close together. Active earth pressures working against retaining structures will vary according to the rigidity of the structure. Walls free to rotate (such as cantilevered retaining walls) should be designed to resist an equivalent fluid pressure of 60 pcf (active condition). Braced walls, which are not free to rotate, should be designed for an equivalent fluid pressure of 75 pcf (at-rest condition). These values assume a hydrostatic level below the base of the structure; design of retaining walls should incorporate drainage behind the walls to eliminate hydrostatic pressures. Also, the influence of surcharge loads should be added to the calculated earth pressures to determine the total lateral stress acting on the walls. A qualified geotechnical engineer should determine appropriate geotechnical design criteria once the type and size of retaining structures have been determined.

6.5 Soil Design Criteria

Soil design criteria have been established by correlation with previous data on similar soils, field testing and laboratory tests. Table 5 summarizes recommended soil design parameters for the Site.



TABLE 5: SOIL DESIGN VALUES

Soil Design Parameter	Cohesive Structural Fill (CL/CH)	Granular Structural Fill (GW, GC, SW, SM, or SC)	Waste Material
Angle of Internal Friction (Degrees)	0	34	20 ¹
Cohesion (psf)	3500	0	500 ¹
Saturated Unit Weight (pcf)	125	115	120 ¹
Coefficient of active earth pressure (k _a)	0.49	0.28	0.49
Coefficient of passive earth pressure (kp)	2.03	3.25	2.03
Coefficient of at-rest earth pressure (k _o)	0.60	0.45	0.50
Coefficient of sliding friction	0.35 ¹	0.50 ¹	
Poisson's Ratio	0.25 ¹	0.3 ¹	
Modulus of vertical subgrade reaction, Kv (K/ft³)	200¹	250 ¹	150¹

^{1 –} Estimated value based on published literature and/or engineering judgement

The Site subsurface materials consist of 4 to 12+ feet of medium stiff to hard clay fill over 23 to 50+ feet of medium dense waste over stiff to very stiff native clays to the depths explored. The subsurface materials within the top 100 feet have normalized shear strength values of 1.5 tsf or greater and average SPT N-values of 15 or greater. In accordance with the 2018 International Building Code (IBC 2018) Section 1613.2.2, the Site has a Seismic Site Classification of D.

6.6 Trench Excavations and Underground Utilities

Stormwater management facilities, including culverts and stormwater structures, water and wastewater (wet) utilities, and gas, electric, and communication (dry) utilities should be designed in accordance with the most recent edition of the City of Houston Infrastructure Design Manual. Stormwater management facilities should also be designed to meet City of Houston code requirements, as complemented by Harris County and the Harris County Flood Control District (HCFCD), and water quality requirements in the Rules and Regulations published by TCEQ. Similarly, wet and dry utilities should also be designed to meet City of Houston and other applicable code requirements. Utilities that will be continually wet such as water lines and lift stations, must have secondary containment per TCEQ requirements. Secondary containment may consist of trenches lined with impermeable membranes.



It is anticipated that various drainage enhancements and improvements could be required, including storm sewers, stormwater detention, drainage structures, and overland (sheet) run-off. Stormwater culverts and wet and dry utilities should be constructed in open trenches in the upper 5-foot horizon of surficial fill (i.e., above the landfill cap). The surficial fill should first be constructed to an elevation not less than one (1) foot above the top of the pipe (or utility). Where the surficial fill consists of compact stable clay material, trench excavations can be made using an open cut with vertical sides to a depth of four feet; cuts deeper than 4 feet should be sloped, protected with a trench box or braced, as necessary. Groundwater and unstable or incompressible material in the bottom of the trench excavation should be removed and undercut areas should be backfilled with compacted structural or flowable fill to the design bedding depth.

Class C pipe bedding should be used for stormwater culverts and wet utilities. Goodheart recommends using a minimum of 3 inches of cement stabilized sand for pipe bedding. Trench excavations should be backfilled as soon as practical after installation of the pipe/utility. Trench backfill should meet the requirements for structural fill outlined in Section 6.1 and be free from stones large enough to interfere with compaction or other deleterious material.

Trench backfill should be placed at the moisture content needed to obtain the required density, in layers no greater than 6 inches deep (loose measurement) and alternated from side to side to bring up the backfill about equally around the pipe/utility. Trench backfill should be compacted to at least 95% Modified Proctor density using mechanical tamps or rammers. Small rollers may be used to compact backfill if feasible. Stormwater culverts should have at least 12 inches of cover above the pipe, and water and wastewater utilities should be designed to meet the cover requirements in the Infrastructure Design Manual.

If the landfill cap is penetrated by trenches, backfill should include at least 2 feet of compacted clay over the waste material. If waste must be removed to facilitate construction, the waste shall be segregated from overlying soils, stored on plastic sheeting and covered with plastic sheeting, until disposed off-site. The reburial of waste on site is not generally permitted by TCEQ once the landfill is in post closure care.



Depending on Contractor preference and the available fill materials, Goodheart recommends the use of either properly compacted lean clay fill or granular material mixed with bentonite as utility trench backfill. The use of either of these materials as utility trench backfill should be considered "best management practices" that would minimize the potential for migration of methane and/or other soil vapors contained in the underlying landfill materials. If a bentonite/fill mixture is used, mixing can be accomplished on-site either in a pugmill or in thin lifts (preliminary estimate of 2-4% bentonite by dry weight) prior to placing in the trench. Goodheart also recommends all utility penetrations at building foundations be designed using flexible connections that can withstand up to 2 inches of displacement and be sealed to prevent landfill gas intrusion. Utility trenches should also be dammed at building foundation with cement stabilized sand to prevent possible lateral movement by landfill gases.

6.7 Site Roads and Pavements

Site preparation and mass grading will likely expose a mixture of lean and fat clays (CL and CH materials) at subgrade level. The fat clays will be subject to shrinking and swelling with changes in moisture content that cause damage to road and parking lot pavements. Lime stabilization of the exposed subgrade is recommended to reduce soil plasticity and swell potential, reduce the required pavement thickness, aid compaction and create a strong, stable base for construction of road and parking lot pavements.

Grading and alignment of roads and parking lot pavements should establish design subgrade elevations. The upper 9 inches of subgrade materials beneath roads and parking areas should be stabilized with 4% hydrated lime in accordance with the material and installation requirements of the current edition of the Texas Highway Department Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges.

A small to moderate amount of long-term settlement (up to 1 inch) should be anticipated beneath pavements that receive significant fill (more than 3 feet). Properly designed and constructed flexible pavement sections should be cost-effective and perform adequately at the Site. Flexible pavement that incorporates lime stabilized subgrade as described above can be designed using a CBR of 8 for the subbase



layer. A qualified geotechnical engineer should determine appropriate geotechnical design criteria and pavement section(s) once the type of pavement for roads and parking areas has been determined.



7. CONSTRUCTION CONSIDERATIONS

7.1 Construction Sequencing

Given the timeline to complete construction, and the ground improvement and grading requirements necessary to develop the Site for the proposed improvements, construction sequencing for this project will be important. As a general guideline, each area (building pads and pavements) should be developed in sequence as follows:

- Clear and grub as necessary, then strip topsoil and organic material and stockpile for reuse.
- Adjust landfill cap thickness above waste to minimum 3-foot thickness.
- Conduct selected ground improvement activities within building footprints and other areas as required.
- Level and proof-roll the subgrade within the building footprint, repairing or correcting any deficient areas.
- Place compacted fill as necessary to achieve final design grades.
- Install geotextile layer, gas collection layer and landfill gas vapor barrier.
- Construct underslab utilities (if required) and building slab.

It is anticipated that existing surficial fill at the Site will be excavated, moved and reused in other portions of the Site. Ground improvement, proof-compaction, and subgrade preparation in the receiving portion(s) of the Site should be complete before the surficial fill is moved from other cut portion(s) of the Site.

7.2 Earthwork Construction

All earthwork and mass grading operations at the Site can be conducted with conventional earth-moving equipment (scrapers, bulldozers, backhoes, wedgefoot rollers, etc.). Utility trenches in the surficial fill can be excavated with conventional backhoes. Clay fill materials should be compacted with wedgefoot (Caterpillar 825K Soil Compactor or equivalent) or sheepsfoot rollers that achieve compaction from the "bottom up". Smooth drum rollers should be used on the top lifts and road subgrades to seal the surface and limit water infiltration.

Contractors should anticipate some volume change as a result of earthwork cut and fill operations. Although there is limited laboratory data available, Goodheart estimates a 3-5% shrinkage factor should be applied to surficial fill materials that are relocated to other areas of the Site and then recompacted to meet project specifications.



7.3 Cut and Fill Slopes

Slopes constructed in the surficial fill materials should not be steeper than 4.0 (horizontal): 1.0 (vertical) as specified in 30 TAC 330.453(c). Fill should be placed in horizontal lifts and properly compacted. Surficial fill slopes should be overfilled and then trimmed back to expose a dense, compacted surface. Temporary slopes cut in the surficial fill (e.g., in utility trenches) above the groundwater table will probably be stable at 1.5 (horizontal): 1.0 (vertical). If temporary slopes are cut through granular materials, they could be subject to drying, wind erosion, and occasional caving or sloughing. Temporary slopes should be monitored for signs of impending failure (surface cracks, continued sloughing and caving, etc.).

Shallow temporary excavations should have a maximum slope of 1.0 horizontal to 1.0 vertical or flatter as required to provide stable side slopes. Excavations should be completed in accordance with OSHA Regulation 1926 Subpart P, Appendix B on "Sloping and Benching". The bottom of excavations should extend a minimum of 1 foot beyond the plan dimensions to allow for adequate working space, and satisfy the over-excavation requirements, as appropriate.

7.4 Groundwater Control

Based on the boring logs, Goodheart does not anticipate cut and fill operations or foundation and trench excavations will extend below the water table. Contractors should establish Site drainage so that surface runoff is directed away from foundation and trench excavations and construct small berms where necessary to prevent surface water from running into excavations. If excavations do extend below the groundwater level, dewatering could be required to enable excavations to be made in the dry. Goodheart anticipates dewatering of shallow excavations can be accomplished with conventional sumps and pumps. Recovered groundwater may require treatment and off-site disposal.



8. GEOTECHNICAL ENGINEERING SERVICES DURING DESIGN AND CONSTRUCTION

8.1 Review of Plans and Specifications

Prior to construction, Goodheart should review the final plans and specifications for conformance with the intent of our recommendations. In general, we should review plans and specifications related to the following:

- 1. Site grading and filling
- 2. Ground improvement plans
- 3. Earth-retaining structures (if applicable)
- 4. Slab-on-grade construction
- 5. Conventional foundations for buildings and Site structures
- 6. Pavement construction
- 7. Site detention ponds

Also, we should review Contractor proposed changes in material specifications during bid evaluation.

8.2 Construction Observations

To a degree, the performance of a project is dependent upon the procedures and quality of construction of the Site development work. Site preparation, over-excavation, placement and compaction of fill, roadway construction, and implementation of erosion and sediment control measures should be performed under the inspection of a qualified and experienced geotechnical engineer.

Goodheart or its designated representative should observe site preparation, ground improvement activities, and grading and foundation installation to check that the work is performed in accordance with the plans and specifications. This would allow us to observe field conditions and to provide recommendations and/or solutions regarding any unusual conditions that are noted during site grading. Further, these observations would permit us to determine that soil conditions are as anticipated and to modify our recommendations, if necessary.

We recommend that Goodheart provide a soil engineer at the Site during the initial stages of construction to assist in developing optimum earthwork construction procedures and in overall implementation of the earthwork program.



Goodheart recommends each building foundation subgrade be inspected and tested by a qualified geotechnical engineer. If subgrade soil fails to meet the minimum unconfined compressive strength, the cover material should be removed full depth and replaced with compacted clay fill. The compacted clay fill should meet the specification provided herein.



Geotechnical Investigation Report

9. LIMITATIONS AND STANDARD OF CARE

The recommendations presented in this report are based on the soils and materials encountered in the boring locations at the time of our borings and on the information and data collected in prior investigations at the Site (referenced CEC, SKA and Goodheart reports). Should conditions encountered during excavation and construction operations differ from those encountered in the borings, Goodheart should be notified so that the recommendations can be reviewed and revised if necessary.

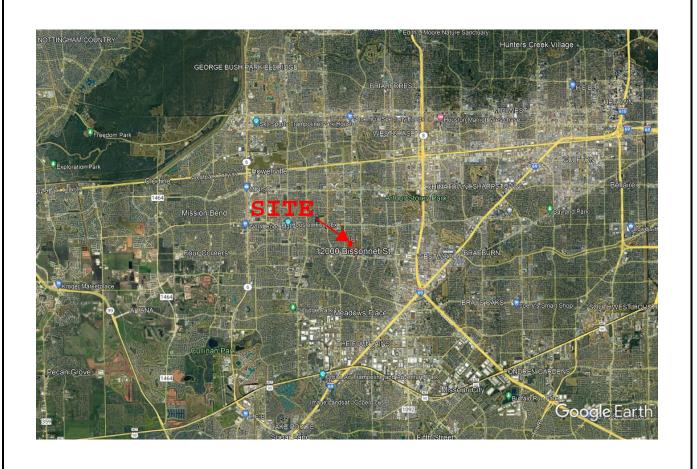
This investigation was performed in accordance with accepted geotechnical engineering practices for determining soil conditions and preparing recommendations for the referenced Site improvements only. The services performed by Goodheart were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the geotechnical engineering profession practicing contemporaneously under similar conditions in the locality of the project. No other representation is made.

Verification of subsurface conditions for purposes of determining the extent of waste materials, difficulty of excavation and implementation of ground improvements, dewatering, and trafficability is beyond the scope of this investigation. In the event that any changes in the nature, design or location of the proposed construction are made, the conclusions and recommendations contained in this report should not be considered valid until the changes are reviewed and the conclusions and recommendations in this report have been modified or verified in writing.

This report was prepared for the sole use of the Client (Lincoln Avenue Capital), the only intended beneficiaries of our work for the specific purposes referenced herein. No other party should rely on the information contained herein without prior written consent of Goodheart and LAC.



FIGURES





Goodheart & Associates, PLLCInfrastructure Engineering

VICINITY MAP BISSONNET APARTMENTS HOUSTON, TX FIGURE 1

DRAWN	JOB NUMBER	DATE
GFG	23-011.001	8/15/2023



Reference: Preliminary Site Plan, prepared by HEDK Architects, 9/6/2022



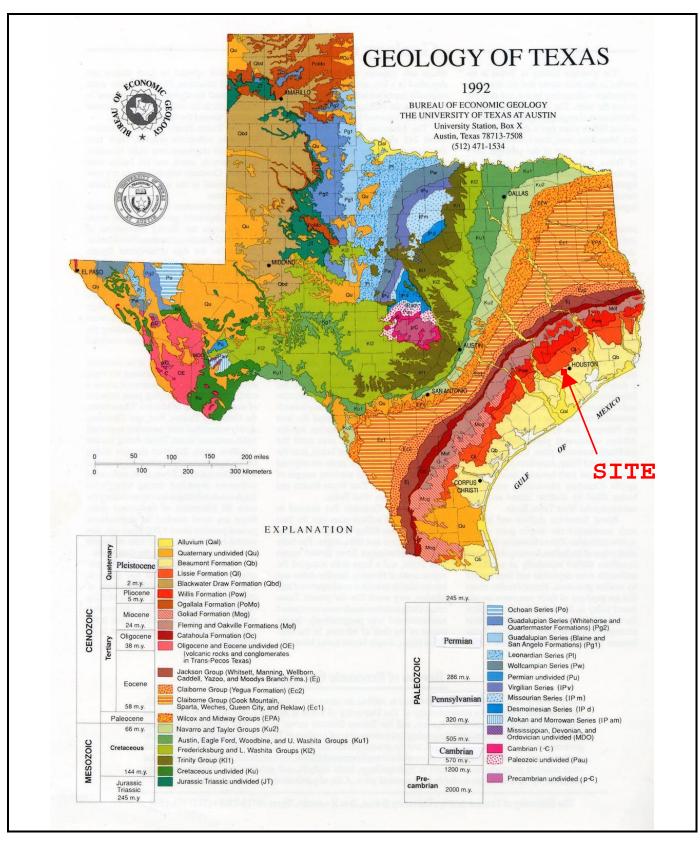
Goodheart & Associates, PLLCInfrastructure Engineering

BORING LOCATION PLAN BISSONNET APARTMENTS HOUSTON, TX FIGURE

2

JOB NUMBER 23-011.001

DATE 8/15/2023





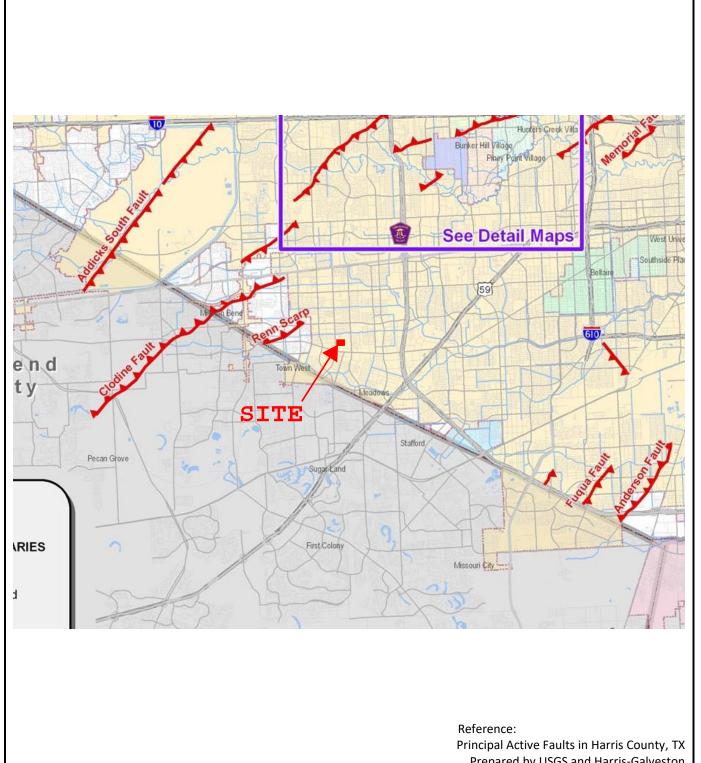
Goodheart & Associates, PLLC Infrastructure Engineering

TEXAS GEOLOGICAL MAP BISSONNET APARTMENTS HOUSTON, TX

FIGURE 3

 DRAWN
 JOB NUMBER
 DATE

 GFG
 23-011.001
 8/15/2023



Prepared by USGS and Harris-Galveston Coastal Subsidence District 2004

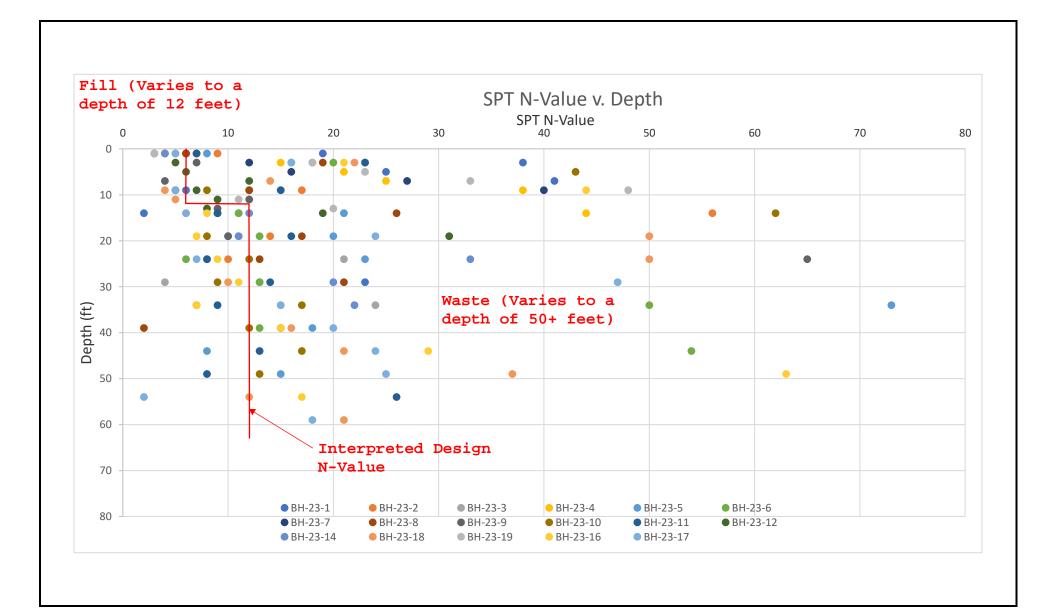


Goodheart & Associates, PLLC Infrastructure Engineering

GEOLOGIC HAZARDS MAP BISSONNET APARTMENTS HOUSTON, TX

FIGURE 4

DRAWN JOB NUMBER DATE 8/15/2023 **GFG** 23-011.001





Goodheart & Associates, PLLC
Infrastructure Engineering

SPT N-VALUES v. DEPTH BISSONNET APARTMENTS HOUSTON, TX

FIGURE 5

 JOB NUMBER
 DATE

 23-011.001
 8/15/2023



APPENDICES

Geotechnical Investigation Report

APPENDIX A

	M	AJOR DIVISIONS		GRAPHIC	SYMBOL	Т	YPICAL NAMES
	oarse 4 sieve)	CLEAN GR	AVELS	9999	GW	Well graded gravels, gravel-sand mixtures, or sand-gravel-cobble mixtures	
eve)	Se Se	(Less than 5% passe	es No. 200 sieve)		GP	Poorty grad tures, or sa	led gravels, gravel-sand mix- nd-gravel-cobble mixtures
SOILS	GRAVELS or less of c passes No.	GRAVELS WITH FINES	Limits plot below "A" line & hatched zone on plasticity chart	華	GM	Silty gravel	s, gravel-sand-silt mixtures
E-GRAINED (% passes No.	(50% fraction p	(More than 12% passes No. 200 sieve)	"A" Sine & heached zone on plasticity chart	177	GC	Clayey grav	vels, gravel-sand-clay mixture
COARSE-GRAINED SOILS Less than 50% passes No. 200 sleve)	coarse . 4 sleve)	CLEAN S			sw	Well graded	d sands, gravelly sands
COARS than 50'	800	(Less than 5% passe	s No. 200 sieve)		SP	Poorly grad	led sands, gravelly sands
Less	5 6	SANDS WITH FINES	Limits plot below "A" line & hatched zone on plasticity chart		SM	Silty sands,	sand-silt mixtures
	(50% fraction	(More than 12% passes No. 200 sieve)	Limits plot above "A" lime & traiched zone on plassicity chart	1/1	sc	Clayey san	ds, sand-clay mixtures
(6/6)	SILTS Units plot below 'A' fine & hetched sone on plessidity chert	SILTS OF LOW (Liquid Limit le:			ML	Inorganic s medium pla	its, clayey silts of low to sticity
OILS 200 st	SIL Undia plot fine a hear	SILTS OF HIGH (Liquid Limit 5			МН	Inorganic si diatomaced	ilts, micaceous or ous silty soils, elastic silts
NED S	YS .weight	CLAYS OF LOW (Liquid Limit les		1//	CL	Inorganic c plasticity, g	lays of low to medium ravelly, sandy, and silty clays
FINE-GRAINED SOILS or more passes No. 200	CLAYS Units plot above 'A' Inc & hardwed sone Inc & hardwed sone	CLAYS OF HIGH (Liquid Limit 5	PLASTICITY 0 or more)	clays, sandy clays of high p			lays of high plasticity, fat by clays of high plasticity
FINE-GRAINED SOILS (50% or more passes No. 200 sleve)	ANIC	ORGANIC SILTS AND PLASTICITY (Liquid L			OL	Organic sitt plasticity, s	s and clays of low to medium andy organic sits and clays
(20	ORGANIC SILTS AND CLAYS	ORGANIC SILTS AND PLASTICITY (Liquid	CLAYS OF HIGH Limit 50 or more)		ОН	Organic sitt plasticity, s	s and clays of high andy organic sitts and clays
	SANIC DILS	PRIMARILY ORGA (dark in color and	organic odor)		PT	Peat	
		NOTE: Coarse-grained soils with with firmits plotting in the PLASTICITY CHA	n between 5% and 12% pas hatched zone on the plastic LRT	sing the No. : ity chart have	dust classif	ications.	F SOIL FRACTIONS
	60		TT TA	ſ	SOIL CO	DMPONENT	PARTICLE SIZE RANGE
PLASTICITY INDEX	50 PI - 10 LL - 30 PI - 20 CL - M	4.45LL525.5 9.79 (LL-20) NE 16; PI 57 0.8 (LL-9)	MH or OH		Boulders Cobbles Gravel Coarse Fine gr Sand Coarse Mediur Fine sa	gravel avel sand sand	Above 12 In. 12 in. to 3 in. 3 In. to No. 4 sieve 3 in. to 3/4 in. 3/4 in. to No. 4 sieve No. 4 to No. 200 sieve No. 4 to No. 10 sieve No. 10 to No. 40 sieve No. 40 to No. 200 sieve Less than No. 200 sieve



Goodheart & Associates, PLLCInfrastructure Engineering

UNIFIED SOIL CLASSIFICATION SYSTEM BISSONNET APARTMENTS

FIGURE

A1

JOB NUMBER 23-011.001



Geodificant & Associates LLC prosperucions (Figuresing)

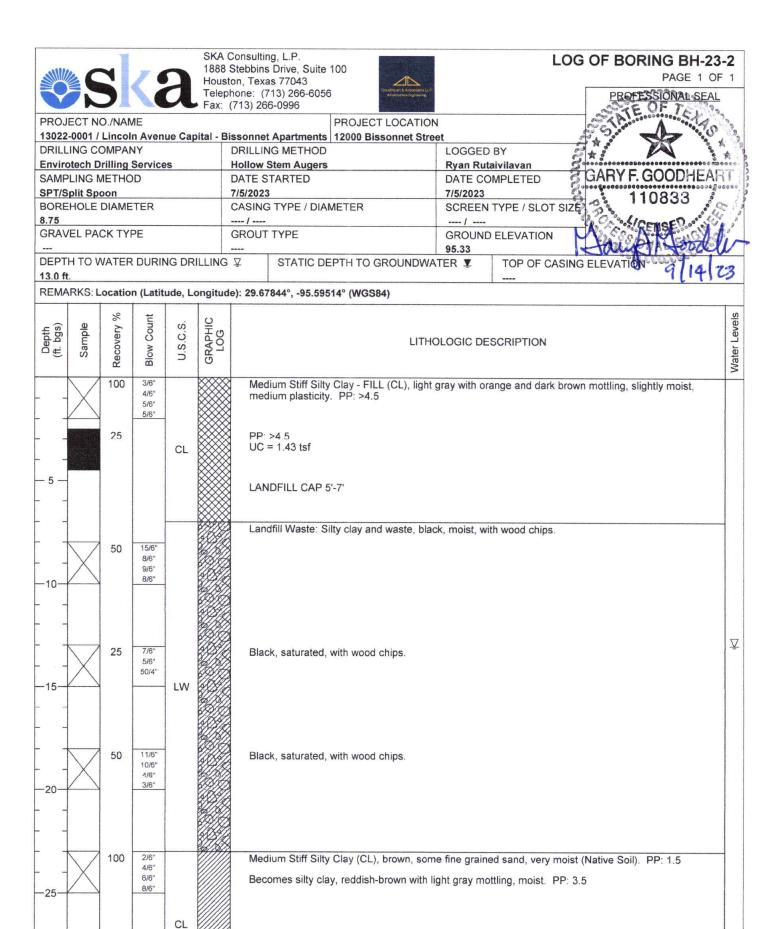
LOG OF BORING BH-23-1

PAGE 1 OF 1

PROFESSIONAL SEAL Fax: (713) 266-0996 PROJECT NO./NAME PROJECT LOCATION 13022-0001 / Lincoln Avenue Capital - Bissonnet Apartments | 12000 Bissonnet Street DRILLING COMPANY DRILLING METHOD LOGGED BY **Hollow Stem Augers Envirotech Drilling Services** Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED SPT/Split Spoon 7/3/2023 7/3/2023 BOREHOLE DIAMETER CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZ 8.75 ---- / --------/ ----**GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 93.12 DEPTH TO WATER DURING DRILLING ♀ STATIC DEPTH TO GROUNDWATER Y TOP OF CASING EL

REMARKS: Location (Latitude, Longitude): 29.67879°, -95.59511° (WGS84)

IXLIVIA	INNO. L	ocalio	n (Lau	ude, L	ongitude). 23.01017 , -33.33311 (WG384)	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
	$\langle \rangle$	100	6/6" 8/6" 11/6" 4/6" 11/6" 20/6"			Medium Stiff Sandy Clay - FILL (CL), brown with light gray, orange, and dark brown mottling, dry, low plasticity. PP: >4.5 Becomes silty clay, gray with dark gray and orange mottling, moist, stiff, medium plasticity. PP: 2.5	
 5	\bigcirc	100	18/6" 13/6" 9/6" 14/6" 11/6" 14/6"	CL		PP: 2.5 LANDFILL CAP 4.5'-6.5' PP: 2.7	
 	\bigotimes	50	27/6" 14/6" 33/6" 3/6" 3/6" 3/6" 5/6"			Landfill Waste: Silty clay and waste, black, moist, with wood chips and plastic. Dark gray-black, moist, with wood chips.	
	X	25	3/6" 1/6" 1/6" 2/6"	LW		Black, moist, with wood chips.	
 - 20	X	100	4/6" 4/6" 6/6" 7/6"			Silty clay, blueish-gray with orange mottling, moist, stiff. PP: 2.5	
 25	X	100	2/6" 2/6" 6/6" 11/6"	CL		Soft Sandy Clay (CL), reddish-brown with light gray mottling, saturated, fine grained (Native Soil). Becomes silty clay, reddish-brown with light gray mottling, very moist. PP: 1.25	_ _ _ _ _ _
	X	100	4/6" 5/6" 18/6" 30/6"	SM		Becomes silty sand, brown, fine grained, saturated, loose.	







SOIL BORING BH-23-3

PAGE 2 OF 2

PROJECT NO./NAME

PROJECT LOCATION

			1	i	1 1	Continued from Previous Page	1
(ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	
-				LW		Landfill Waste: Silty clay and waste, black, moist, with wood, plastic, and ceramic. (continued)	
_	X	100	2/6" 6/6" 18/6"	SM		Loose Silty Sand (SM), dark gray-black, saturated, fine grained (Native Soil). Grades to brown, saturated. PP: 0.75	
35—			30/6"			Borehole Terminated at 35.0 feet.	



21.0 ft.

SKA Consulting, L.P. 1888 Stebbins Drive, Suite 100 Houston, Texas 77043 Telephone: (713) 266-6056



LOG OF BORING BH-23-3

PROFESSIONAL SEAL

GARY F. GOODHEAR

PAGE 1 OF 2

PROJECT NO./NAME

13022-0001 / Lincoln Avenue Capital - Bissonnet Apartments

PROJECT LOCATION
12000 Bissonnet Street

Fax: (713) 266-0996

DRILLING COMPANY **DRILLING METHOD** LOGGED BY **Envirotech Drilling Services Hollow Stem Augers** Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED SPT/Split Spoon 7/5/2023 7/5/2023 BOREHOLE DIAMETER CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.75 ---- / --------/ ----**GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION**

TOP OF CASING ELEVATION

9/14/23

REMARKS: Location (Latitude, Longitude); 29,67844°, -95,59451° (WGS84)

REMA	RKS: L	ocatio	n (Latit	ude, L	ongitude): 29.67844°, -95.59451° (WGS84)	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
	X	75 100	2/6" 3/6" 4/6" 4/6" 7/6" 8/6" 10/6" 11/6"	CL		Medium Stiff Silty Clay - FILL (CL), light gray with orange and dark brown mottling, moist, medium plasticity. PP: 3.0 PP: 2.5	
- 5 - 		50		CH		Medium Stiff Clay (CH), light gray with orange and dark brown mottling, moist, high plasticity. PP: >4.5 LANDFILL CAP 6'-8'	
 -10- 	X	50	4/6" 4/6" 8/6" 7/6"			Landfill Waste: Silty clay and waste, black, moist, with wood, plastic, and ceramic.	_
 -15-	X	25	4/6" 5/6" 6/6" 7/6"			Black, moist, with wood chips.	
 - 20- 	X	100	5/6" 5/6" 6/6" 15/6"	LW		Dark gray with black mottling, moist, with plastic and wood chips. PP: 2.5	Ā
 25 	X	50	3/6" 11/6" 10/6" 8/6"			Black, saturated, with plastic and wood chips.	
	X	25	3/6" 3/6" 1/6" 9/6"			Black, saturated, with wood chips.	



DEPTH TO WATER DURING DRILLING ♀

SKA Consulting, L.P. 1888 Stebbins Drive, Suite 100 Houston, Texas 77043 Telephone: (713) 266-6056 Fax: (713) 266-0996



LOG OF BORING BH-23-4

PAGE 1 OF 1

PROFESSIONAL SEAL

GARY F. GOODHEART

110833

PROJECT LOCATION 13022-0001 / Lincoln Avenue Capital - Bissonnet Apartments | 12000 Bissonnet Street

DRILLING METHOD LOGGED BY **Envirotech Drilling Services Hollow Stem Augers** Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED SPT/Split Spoon 7/10/2023 7/10/2023 **BOREHOLE DIAMETER** CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.75 ---- / --------/ ----**GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 93.58

STATIC DEPTH TO GROUNDWATER I

TOP OF CASING ELE

12.0 ft.

REMARKS:	ocatio	n (Latit	tude, L	ongitude): 29.67827°, -95.59415° (WGS84)	-2
Depth (ft. bgs) Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
	50	1/6" 2/6" 2/6" 3/6" 6/6" 7/6" 8/6" 10/6"	CL		Soft Silty Clay - FILL (CL), light gray with orange and dark brown mottling, moist, medium plasticity. PP: 2.0 Becomes gray with orange and light gray mottling. PP: 2.25	
-5-	100	10/6" 10/6" 11/6" 12/6"			Becomes dark gray with gray mottling. PP: 1.5	
	100	10/6" 11/6" 14/6" 16/6"	СН		Medium Stiff Clay (CH), dark gray with gray mottling, moist, high plasticity. PP: 2.25 LANDFILL CAP 5.5'-7.5'	
	75	16/6" 17/6" 21/6"	CL		Becomes dark gray, stiff. PP: 3.25	
-10	50	17/6" 17/6" 21/6" 23/6" 48/6"	LW		Landfill Waste: Silty clay and waste, black, with wood chips. Black, saturated, with wood, plastic, and metal.	Δ





94.78

LOG OF BORING BH-23-5

PROFESSIONAL SEAL

PAGE 1 OF 2

PROJECT NO./NAME PROJECT LOCATION
13022-0001 / Lincoln Avenue Capital - Bissonnet Apartments 12000 Bissonnet Street

DRILLING COMPANY DRILLING METHOD LOGGED BY **Envirotech Drilling Services Hollow Stem Augers** Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED SPT/Split Spoon 7/5/2023 7/6/2023 BOREHOLE DIAMETER CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.75 ---- / --------/ ----**GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION**

GARY F. GOODHEAR 110833

STATIC DEPTH TO GROUNDWATER 🕎

TOP OF CASING ELEVATION

9/14/23

18.0 f							23
REMA	ARKS: L	ocatio	n (Latit	ude, L	ongitude)	: 29.67849°, -95.59383° (WGS84)	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
		100	2/6" 3/6" 5/6" 5/6" 6/6" 6/6" 10/6" 13/6"	CL		Medium Stiff Silty Clay - FILL (CL), light gray with orange and dark brown mottling, moist, medium plasticity. PP: 4.0 Becomes dark gray. PP: 1.5 Becomes dark gray with orange mottling. PP: 3.0	
		100	4/6" 7/6" 5/6" 4/6"			LANDFILL CAP 7'-9' Becomes gray with dark and light gray mottling. PP: 3.0 Landfill Waste: Silty clay and waste, black, moist, with wood chips.	
 -15		100	23/6" 12/6" 9/6" 11/6"			Dark gray-black, moist, with wood chips and concrete. PP: 3.0	
	X	25	8/6" 9/6" 11/6" 3/6"	LW		Black, saturated, with wood chips, plastic, and concrete.	Ā
 25	X	25	3/6" 14/6" 9/6" 7/6"			Black, saturated, with wood chips.	
	X	75	5/6" 8/6" 5/6" 9/6"			Black and reddish-brown with light gray mottling, saturated-moist, with wood chips and concrete. PP: 3.0	

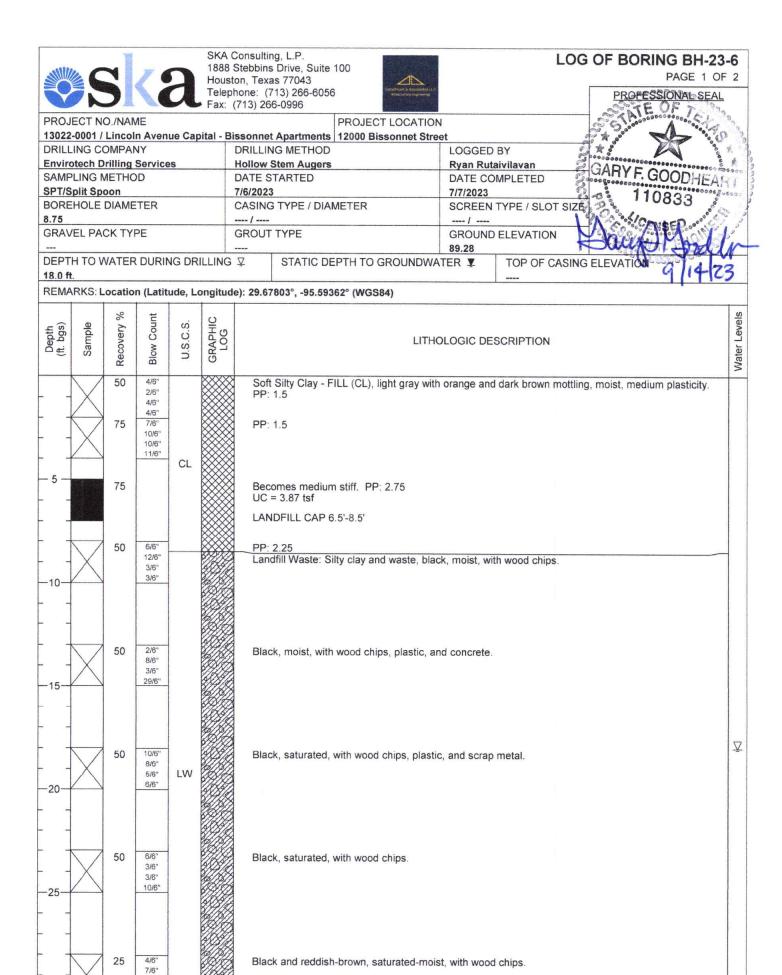
SOIL BORING BH-23-5

PAGE 2 OF 2

PROJECT NO./NAME

PROJECT LOCATION

			1	1	1 1	Continued from Previous Page	1
(fl. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC	LITHOLOGIC DESCRIPTION	Motor Land
35—	X	25	2/6" 25/6" 50/2"			Sand and waste, black, saturated, fine grained, with wood chips and concrete.	
40	X	50	9/6" 8/6" 10/6" 28/6"	LW			
45—	X	25	2/6" 2/6" 6/6" 8/6"			Sand and waste, black, saturated, fine grained, with wood chips and concrete.	
50-	X	75	3/6" 6/6" 9/6" 10/6"	SM		Silty sand and waste, dark gray, saturated, fine grained, with plastic. Loose Silty Sand (SM), brown, saturated, fine grained (Native Soil).	
30						Borehole Terminated at 50.0 feet.	



6/6" 9/6"



PAGE 2 OF 2

PROJECT NO./NAME

PROJECT LOCATION

		%	=		0		
(# pgs)	Sample	Recovery	Blow Count	U.S.C.S.	GRAPHIC	LITHOLOGIC DESCRIPTION	
-							
-	X	25	3/6" 50/2"			Black, saturated, with wood chips.	
5-							
-				LW			
-	X	25	9/6" 7/6" 6/6"			Black, saturated, with wood chips and plastic.	
			5/6"				
1	\bigvee	100	19/6" 29/6"	SM	<i>884187</i> 1	Loose Silty Sand (SM), gray, saturated, fine grained (Native Soil).	_
5-	\triangle		15/6" 39/6"	OW		Borehole Terminated at 45.0 feet.	_
	_						





LOG OF BORING BH-23-7

PROFESSIONAL SEAL

GARY F. GOODHEA!

PAGE 1 OF 1

PROJECT NO./NAME

13022-0001 / Lincoln Avenue Capital - Bissonnet Apartments

PROJECT LOCATION
12000 Bissonnet Street

DRILLING COMPANY **DRILLING METHOD** LOGGED BY **Envirotech Drilling Services Hollow Stem Augers** Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED SPT/Split Spoon 7/10/2023 7/10/2023 BOREHOLE DIAMETER CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.75" ---- / --------/ ----**GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION**

DEPTH TO WATER DURING DRILLING

STATIC DEPTH TO GROUNDWATER

■ 93.85

STATIC DEPTH TO GROUNDWATER

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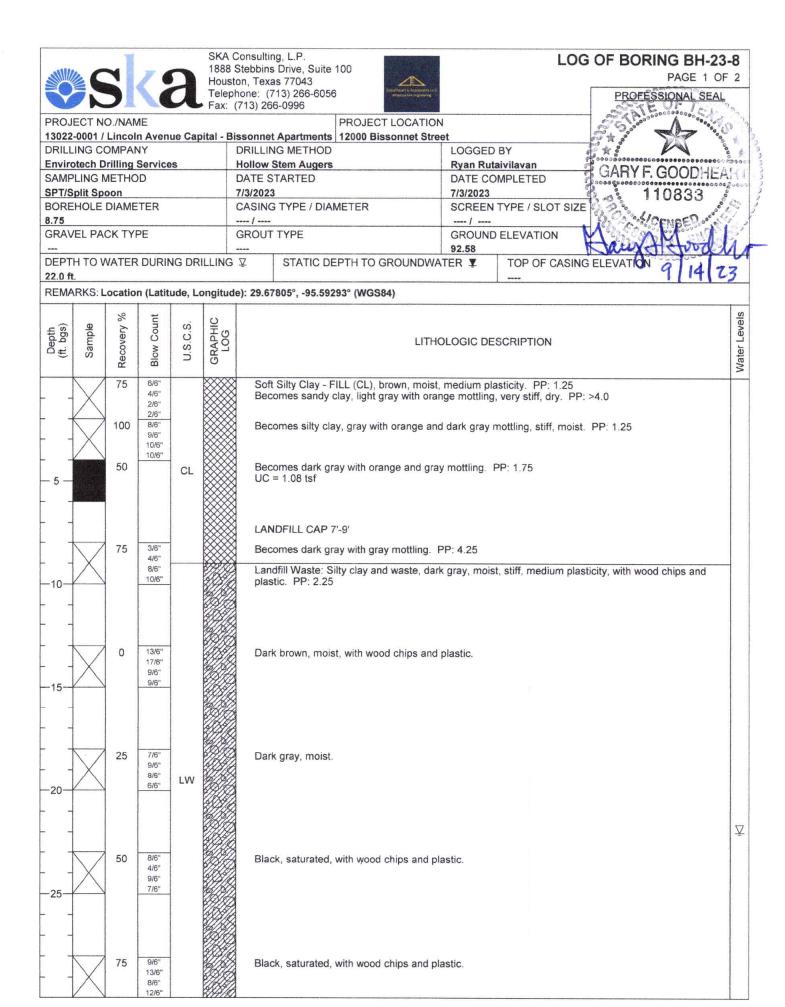
■ 1.11

TOP OF CASING ELEVAT

9/14/73

REMARKS: Location (Latitude, Longitude): 29.67825°, -95.59332° (WGS84)

REMA	RKS: L	ocatio.	n (Latit	ude, L	ongitud	e): 29.67825°, -95.59332° (WGS84)	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
	S Sa	100 100 100 75 75	2/6" 2/6" 4/6" 3/6" 6/6" 6/6" 8/6" 10/6" 10/6" 12/6" 12/6" 12/6" 14/6" 14/6"	CL	GRA	Soft Silty Clay - FILL (CL), light gray with orange and dark brown mottling, moist, medium plasticity. PP: 2.25 PP: 1.5 Becomes dark gray with gray mottling. PP: 2.5 Becomes dark gray with orange and gray mottling, medium stiff. PP: 3.0 Landfill Waste: Silty clay and waste, with concrete. Black and gray, moist, with wood chips. Borehole Terminated at 10.0 feet.	Water





PROJECT NO./NAME

PROJECT LOCATION

1	1	í	1	1 1	Continued from Previous Page	i
Oepth (fl. bgs) Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC	LITHOLOGIC DESCRIPTION	Material analy
-	100	3/6"	LW		Landfill Waste: Silty clay and waste, dark gray, moist, stiff, medium plasticity, with wood chips and plastic. PP: 2.25 (continued)	
-35	100	2/6" 5/6" 6/6"	СН		Stiff Fat Clay (CH), reddish-brown with light gray mottling, moist (Native Soil). PP: 2.0	
-	100	1/6" 1/6" 1/6" 3/6"	SM	<i>////</i>	Loose Silty Sand (SM), brown, saturated, fine grained.	





95.36

LOG OF BORING BH-23-9

PAGE 1 OF 1

PROFESSIONAL SEAL

GARY F. GOODHEAR

110833

PROJECT NO./NAME PROJECT LOCATION 13022-0001 / Lincoln Avenue Capital - Bissonnet Apartments | 12000 Bissonnet Street

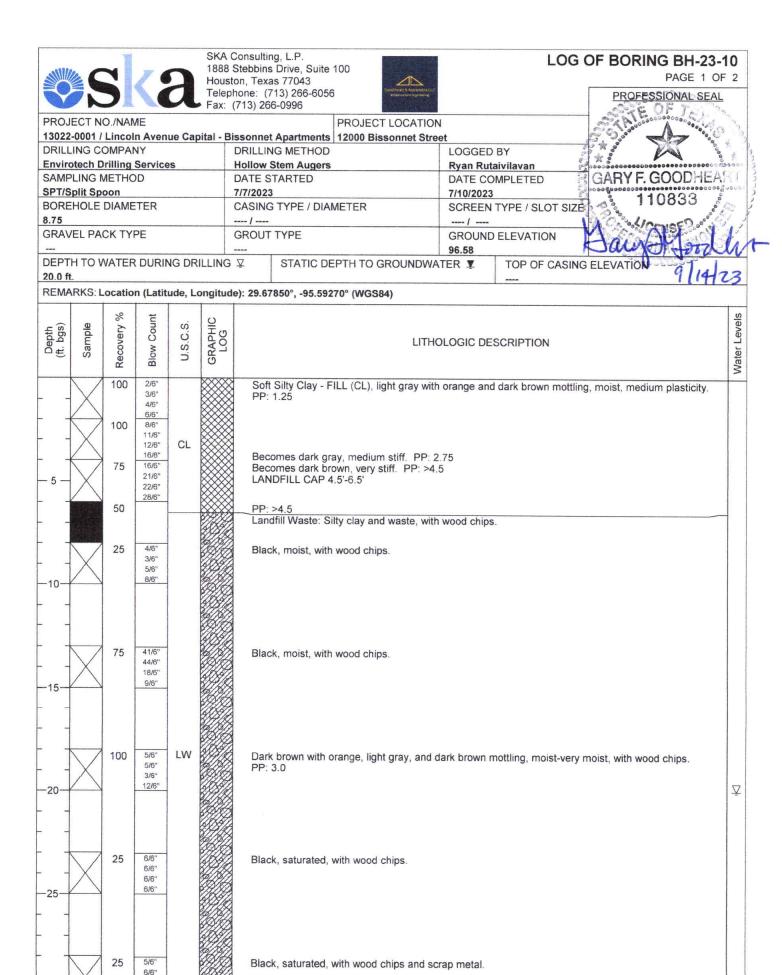
DRILLING COMPANY DRILLING METHOD LOGGED BY **Enviro-Core Hollow Stem Augers** Chuck Doss (TWE) SAMPLING METHOD DATE STARTED DATE COMPLETED SPT/Split Spoon 6/5/2023 6/6/2023 **BOREHOLE DIAMETER** CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE ---- / --------/ ----**GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION**

DEPTH TO WATER DURING DRILLING ♀

STATIC DEPTH TO GROUNDWATER I

TOP OF CASING ELEVA

					71572 00	4 114123			
REMA	ARKS: L	ocatio	n (Latit	ude, L	ongitude	e): 29.678558°, -95.592192° (WGS84)			
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels		
_	X		1/6" 2/6" 2/6"			Soft Sandy Clay - FILL (CL), gray, with calcareous deposits and roots.			
			1/6" 3/6" 4/6"			Becomes gray/tan, stiff, with calcareous deposits and roots.			
- 5 -				CL		Becomes gray/brown, very stiff, with calcareous deposits, sand seams, and roots. PP: 3.25			
	X		2/6" 2/6" 2/6"			Becomes gray, soft, with sand seams.			
	X		2/6" 2/6" 3/6"	СН		LANDFILL CAP 8'-10': Fat Clay (CH), gray, with sand seams.			
-10-	X		2/6" 4/6" 8/6"			Landfill Waste: Clay and waste, gray/tan, with sand seams, iron deposits, and wood chips.			
	X		4/6" 4/6" 5/6"	LW		Tan/brown, with wood chips.			
—15— — 15—	X		4/6" 2/6" 7/6"					Gray, with wood chips and asphalt pieces.	
 - 20-	X		5/6" 5/6" 5/6"			Black, with wood chips.			
 25	X		5/6" 15/6" >50/5"			Waste, with wood chips and asphalt pieces.			
						Borehole Terminated at 25.0 feet.			



3/6"



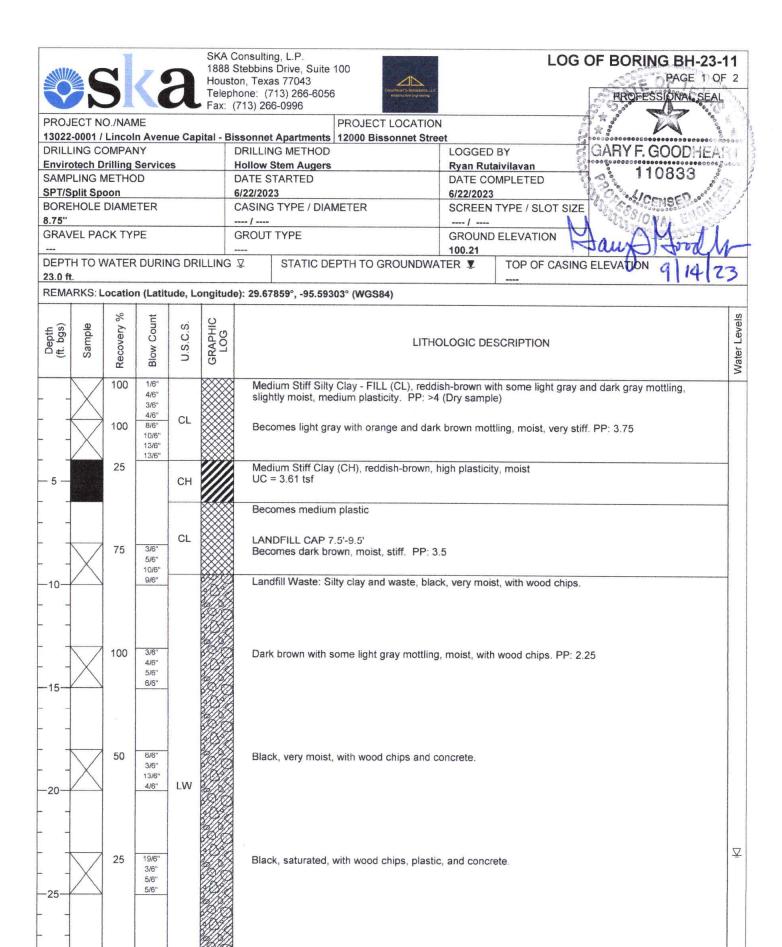
LOG OF BORING BH-23-10

PAGE 2 OF 2

PROJECT NO./NAME

PROJECT LOCATION

						Continued from Previous Page	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
	X	50	12/6" 10/6" 8/6" 9/6"			Black, saturated, with wood chips and plastic.	
 40- 	X	75	9/6" 5/6" 7/6" 9/6"	LW		Black, saturated, with wood chips and plastic. PP: 2.75	
 -45-	X	50	13/6" 7/6" 10/6" 10/6"			Black, saturated, with wood chips and scrap metal.	
-50-	X	75	4/6" 4/6" 9/6" 12/6"	СН		Stiff Fat Clay - Native Material (CH), reddish-brown with light gray mottling, moist. Borehole Terminated at 50.0 feet.	



Black, saturated, with wood chips and brick pieces.

25

5/6"





LOG OF BORING BH-23-11

PAGE 2 OF 2

PROJECT NO./NAME

PROJECT LOCATION

						Continued from Previous Page	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
 - 35	X	25	6/6" 4/6" 5/6" 15/6"			Black, saturated, with wood chips and plastic.	
 -40	X	50	12/6" 5/6" 10/6" 50/2"			Black, saturated, with wood chips, plastic, and rubber.	
 - 45	X	50	5/6" 7/6" 6/6" 25/6"	LW		Black, fine grained, saturated, loose, with wood and plastic.	
 -50-		100	3/6" 3/6" 5/6" 11/6"			Light gray with dark gray mottling, very moist, with wood chips.	
 - 55	X	75	26/6" 16/6" 10/6" 13/6"	СН		Very Stiff Fat Clay (CH), reddish-brown with some light gray mottling, moist (Native Soil). PP: 3.75 Borehole Terminated at 55.0 feet.	





LOG OF BORING BH-23-12

PROFESSIONAL SEAL

PAGE 1 OF 1

PROJECT NO./NAME PROJECT LOCATION 13022-0001 / Lincoln Avenue Capital - Bissonnet Apartments | 12000 Bissonnet Street

Fax: (713) 266-0996

GROUT TYPE

DRILLING COMPANY DRILLING METHOD LOGGED BY Enviro-Core **Hollow Stem Augers** Chuck Doss (TWE) SAMPLING METHOD DATE STARTED DATE COMPLETED SPT/Split Spoon 6/5/2023 6/5/2023 BOREHOLE DIAMETER CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 6" ---- / --------/ ----**GRAVEL PACK TYPE**

GARY F. GOODHEA **GROUND ELEVATION** 100.20

DEPTH TO WATER DURING DRILLING ♀

STATIC DEPTH TO GROUNDWATER Y

TOP OF CASING ELE

REMARKS: Location (Latitude, Longitude): 29 67967° -95 59205° (WGS84)

REMA	RKS: L	ocatio	n (Latit	ude, L	ongitude	e): 29.67967°, -95.59205° (WGS84)	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
- 5			2/6" 2/2" 1/2" 1/6" 3/6"	CL		Soft Sandy Clay - FILL (CL), tan/brown, with iron nodules and roots. Becomes stiff, with iron nodules and calcareous deposits. Becomes brown, stiff, with sand seams, calcareous deposits, and iron nodules. Becomes gray, with sand seams and large calcareous deposits. Medium Stiff Sandy Clay (CL), dark gray, with large calcareous deposits. LANDFILL CAP 11'-13' Landfill Waste: Clay and waste, dark gray, with sand seams, paper, and wood chips.	
15			6/6" 2/6" 7/6" 12/6" 4/6" 7/6" 24/6"	LW		Dark gray, with sand seams and wood chips. Dark gray, with wood chips and concrete pieces.	
-20-						Borehole Terminated at 20.0 feet.	





101.79

LOG OF BORING BH-23-14

PAGE 1 OF 2

PROFESSIONAL SEAL

PROJECT NO./NAME PROJECT LOCATION
13022-0001 / Lincoln Avenue Capital - Bissonnet Apartments 12000 Bissonnet Street

DRILLING COMPANY DRILLING METHOD LOGGED BY **Envirotech Drilling Services Hollow Stem Augers** Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED SPT/Split Spoon 6/21/2023 6/22/2023 BOREHOLE DIAMETER CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.75" ---- / --------/ **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION**

GARY F. GOODHEAU 110833

STATIC DEPTH TO GROUNDWATER I

TOP OF CASING ELEVATION

1114/23

23.0 ft.						<u> </u>	2_
REMA	RKS: L	ocatio.	n (Latit	ude, L	ongitude	: 29.67900°, -95.59435° (WGS84)	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
	X	75	2/6" 2/6" 2/6" 3/6"			Soft Silty Clay - FILL (CL), light gray with orange and dark brown mottling, moist, medium plasticity. PP: 2.5	
- 5 -		50		CL		Becomes medium stiff. PP: 1.75	
-10-	X	100	1/6" 2/6" 3/6" 4/6"	OL.		Becomes stiff. PP: 2.75	
	X	75	3/6" 6/6" 6/6"			LANDFILL CAP 12.5'-14.5' PP: 3.25	
15	X	50	6/6" 5/6" 6/6" 8/6"			Landfill Waste: Silty clay and waste, with wood chips and plastic. Black and reddish-brown, moist, with wood chips.	
-25	X	50	9/6" 9/6" 24/6" 21/6"	LW		Black, saturated, with wood chips.	□
	X	100	7/6" 12/6" 8/6" 8/6"			Black, saturated, with wood chips and plastic. Becomes sandy clay at 29 feet, light gray with orange and dark brown mottling, fine grained, very	





LOG OF BORING BH-23-14

PAGE 2 OF 2

PROJECT NO./NAME

PROJECT LOCATION

				10		Continued from Previous Page	
Depth (ff. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
						moist. PP: 2.5	
35-	X	100	5/6" 6/6" 16/6" 30/6"			Black, saturated, with wood chips and plastic. Dark gray with orange mottling, moist. PP: 3.25	
	X	50	35/6" 17/6" 12/6" 9/6"			Black, saturated, with wood chips, concrete, and plastic.	
 45 	X	25	24/6" 14/6" 8/6" 16/6"	LW		Black, saturated, with wood chips.	
50-	X	50	28/6" 11/6" 13/6" 15/6"			Becomes silty sand, black, fine grained, saturated, with wood chips and rubber.	
55-	X	50	8/6" 4/6" 9/6" 6/6"			Silty clay and waste, black, saturated, with wood chips, plastic, and concrete.	
	X	100	5/6" 8/6" 12/6" 15/6"	СН		Stiff Fat Clay (CH), reddish-brown with some light gray mottling, moist (Native Soil). PP 2.25	
60						Borehole Terminated at 60.0 feet.	





LOG OF BORING BH-23-16

PAGE 1 OF 2

PROFESSIONAL SEAL

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PROJECT NO./NAME
PROJECT LOCATION
13022-0001 / Lincoln Avenue Capital - Bissonnet Apartments 12000 Bissonnet Street

DRILLING COMPANY DRILLING METHOD LOGGED BY **Envirotech Drilling Services Hollow Stem Augers** Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED SPT/Split Spoon 6/20/2023 6/21/2023 **BOREHOLE DIAMETER** CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.75" ---- / --------/ ----**GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 97.55

ARY F. GOODHEA

STATIC DEPTH TO GROUNDWATER 🕎

TOP OF CASING ELEVATION

9/14/23

23.0 f	<u>t</u>						-3
REMA	ARKS: L	ocatio	n (Latit	ude, L	ongitud	e): 29.67889°, -95.59417° (WGS84)	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
	X	100	3/6" 2/6" 3/6" 2/6" 11/6" 10/6" 11/6" 12/6"	CL		Soft Silty Clay - FILL (CL), light gray with orange and dark gray mottling, moist, medium plasticity. PP: 2.25 Becomes light gray with orange and dark brown mottling, medium stiff. PP: 3.0	
- 5 - 		50		СН		Medium Stiff Clay (CH), dark gray with light gray and orange mottling, moist, high plasticity. PP: 3.0 LANDFILL CAP 6.5'-8.5'	-
		25	12/6"	CL		Personne have a deal have a DD 0.75	
-		25	30/6"			Becomes brown-dark brown. PP: 2.75 Landfill Waste: Silty clay and waste, black, moist, with wood chips.	1
10 		25	14/6" 12/6" 4/6" 4/6"				
15 		75	4/6" 4/6" 6/6"			Dark brown-black, moist, with wood chips, plastic, and concrete.	
 -20- 	X		3/6" 4/6" 5/6"	LW		Dank Brown, Morel, With Wood Grips, plastic, and concrete.	
	X	75	9/6" 5/6" 4/6" 10/6"			Black and dark brown, saturated, soft, with wood chips and plastic.	
	X	50	6/6" 4/6" 7/6" 9/6"			Black and dark brown, saturated, with wood chips and plastic.	



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PAGE 2 OF 2

PROJECT NO./NAME

PROJECT LOCATION

		1:	į.			Continued from Previous Page	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
 - 35-	X	50	7/6" 4/6" 3/6" 6/6"			Black, saturated, with wood chips, plastic, ceramic, and concrete.	
 -40-	X	50	5/6" 7/6" 8/6" 7/6"	LW		Black, fine grained, saturated, with wood chips, plastic, and concrete.	
 45	X	25	6/6" 4/6" 25/6" 8/6"			Black, saturated, with wood chips.	
 50	X	50	6/6" 13/6" 50/2"			Black, fine grained, saturated, loose, with wood chips and plastic.	
 55	X	0	6/6" 7/6" 10/6" 12/6"	NR		53'-55' No recovery.	
 60	X	100	10/6" 10/6" 15/6" 13/6"	СН		Stiff Fat Clay (CH), reddish-brown with light gray mottling, moist (Native Soil). Borehole Terminated at 60.0 feet.	





LOG OF BORING BH-23-17

PAGE 1 OF 2

PROFESSIONAL SEAL

PROJECT NO./NAME PROJECT LOCATION 13022-0001 / Lincoln Avenue Capital - Bissonnet Apartments | 12000 Bissonnet Street

DRILLING COMPANY DRILLING METHOD LOGGED BY **Envirotech Drilling Services Hollow Stem Augers** Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED SPT/Split Spoon 6/20/2023 6/20/2023 BOREHOLE DIAMETER CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.75" ----/ ----GRAVEL PACK TYPE **GROUT TYPE GROUND ELEVATION** 99.46

GARY F. GOODHEA

DEPTH TO WATER DURING DRILLING ♀ 17.0 ft.

STATIC DEPTH TO GROUNDWATER I

TOP OF CASING ELE

REMA	RKS: L	ocatio.	n (Latit	ude, L	ongitude): 29.67920°, -95.59423° (WGS84)	_	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels	
 	X	100	2/6" 3/6" 2/6" 3/6" 6/6" 8/6" 8/6" 9/6"	CL		Soft Silty clay - FILL (CL), brown with light gray, orange, and dark brown mottling, moist, medium plasticity. PP: 2.0 Becomes light gray with orange, brown, and dark gray mottling. PP: 2.0		
- 5 - 		50		СН		Medium Stiff Clay (CH), light gray with orange and dark brown mottling, moist, high plasticity. PP: 2.75 UC = 1.67 tsf		
 10	X	100	2/6" 2/6" 3/6" 3/6"	CL		Becomes light gray with orange and dark gray mottling. PP: 2.5		
 	X	50	2/6" 2/6" 4/6"			LANDFILL CAP 11.5'-13.5' Becomes brown with orange mottling. PP 2.0 Landfill Waste: Silty clay and waste, black, with wood chips.		
-15- - 20-	X	25	17/6" 16/6" 8/6" 6/6"				Light gray, moist, with wood chips.	Ā
 -25-	X	50	4/6" 2/6" 5/6" 8/6"	LW		Black and reddish-brown, moist-saturated, with wood and cork-like material.		
	X	25	18/6" 23/6" 24/6" 14/6"			Black, saturated, with wood chips and concrete.		





LOG OF BORING BH-23-17

PAGE 2 OF 2

PROJECT NO./NAME

PROJECT LOCATION

						Continued from Previous Page	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
	X	25	4/6" 4/6" 11/6" 10/6"			Black and light gray, moist-saturated, with wood chips.	
40	X	25	21/6" 10/6" 10/6" 9/6"			Black and reddish-brown, saturated, with wood chips and plastic.	
 - 45- 	X	50	18/6" 12/6" 12/6" 14/6"	LW		Black, saturated, with wood, concrete, and plastic.	
50	X	50	20/6" 12/6" 13/6" 11/6"			Black, saturated, with wood chips, plastic, and concrete.	
 -55- 	X	50	5/6" 1/6" 1/6" 2/6"			Black, saturated, with wood and scrap metal.	
-60-	X	100	5/6" 8/6" 10/6" 13/6"	СН		Stiff Fat Clay (CH), reddish-brown with light gray mottling, moist (Native Soil).	
						Borehole Terminated at 60.0 feet.	





LOG OF BORING BH-23-18

PAGE 1 OF 2

PROFESSIONAL SEAL

110833

PROJECT NO./NAME PROJECT LOCATION

13022-0001 / Lincoln Avenue Capital - Bissonnet Apartments | 12000 Bissonnet Street

DRILLING COMPANY DRILLING METHOD LOGGED BY **Envirotech Drilling Services** GARY F. GOODHEA **Hollow Stem Augers** Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED SPT/Split Spoon 6/19/2023 6/19/2023 **BOREHOLE DIAMETER** CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.75" ---- / --------/ **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION**

105.52 DEPTH TO WATER DURING DRILLING ♀

STATIC DEPTH TO GROUNDWATER I

TOP OF CASING ELEVAT

36.0 f	t					911412)		
REMA	ARKS: L	ocatio	n (Latit	ude, Lo	ongitude	e): 29.67954°, -95.59367° (WGS84)			
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels		
	X	100	2/6" 2/6" 3/6"			Soft Silty Clay - FILL (CL), brown with orange, light gray, and dark brown mottling, moist, medium plasticity. PP: 2.5			
		100	2/6" 8/6" 10/6" 12/6" 14/6"	CL		Becomes silty clay with an increase in sand content, reddish-brown with light gray mottling, fine grained, medium stiff. PP: 3.0			
- 5 -		50	1410			Becomes sandy clay, brown with orange and dark brown mottling, very stiff, slightly moist, low plasticity. UC = 5.08 tsf LANDFILL CAP 5'-7'			
		50	4/6"			Becomes silty clay, light gray, moist, stiff, medium plasticity. PP: 2.75			
		100	10/6" 5/6" 5/6" 2/6" 2/6"			Landfill Waste: Silty clay and waste, gray-dark gray with some orange mottling, moist, methane gas odor, with wood and glass. PP: 1.25			
-10- 		25	2/6" 3/6" 2/6" 3/6" 3/6"			Dark gray-black, moist, with wood chips present. PP: 1.25			
 - 15-		25	3/6" 3/6" 3/6" 5/6"					Brown with gray mottling, fine grained, slightly moist, with wood chips.	
20-		25	50/5"	LW		Brown, moist, with wood and concrete.			
25-		25	50/5"			Brown with dark gray mottling, moist, with wood chips, plastic, and foam.			
	X	75	3/6" 6/6" 4/6" 5/6"			Dark brown with orange and dark gray mottling, moist, with wood chips, plastic, and concrete. PP: 2.5			





LOG OF BORING BH-23-18

PAGE 2 OF 2

PROJECT NO./NAME

PROJECT LOCATION

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Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
-35-	X	75	12/6" 7/6" 8/6" 6/6"			Reddish-brown with dark gray mottling, moist, with wood chips, plastic, and concrete. PP: 2.75	₽
-40	X	100	11/6" 7/6" 9/6" 12/6"			Black and dark gray, saturated, with plastic and wood chips. PP:10	
-45	X	75	10/6" 6/6" 15/6" 20/6"	LW		Black and dark brown, saturated, with plastic and wood chips. PP: 1.5	
50	X	25	30/6" 14/6" 23/6" 18/6"			Black and dark gray, saturated, fine grained, with wood chips.	
-55	X	25	4/6" 5/6" 7/6" 9/6"			Black and dark brown, saturated, fine grained, with wood chips.	
+	X	100	6/6" 10/6" 11/6" 16/6"	SM		Loose Silty Sand (SM), brown, fine grained, very moist (Native Soil). Stiff Fat Clay (CH), reddish-brown with light gray mottling, moist. PP: 4.25	
-60-						Borehole Terminated at 60.0 feet.	



BOREHOLE DIAMETER

GRAVEL PACK TYPE

SPT/Split Spoon

8.75"

SKA Consulting, L.P. 1888 Stebbins Drive, Suite 100 Houston, Texas 77043 Telephone: (713) 266-6056 Fax: (713) 266-0996

CASING TYPE / DIAMETER

GROUT TYPE

6/20/2023

---- / ----



LOG OF BORING BH-23-19

PAGE 1 OF 1

PROFESSIONAL SEAL

110833

The state of the s	ax: (713) 266-0996			SE OF TAIL
PROJECT NO./NAME		PROJECT LOCATION		A Constitution of the Cons
13022-0001 / Lincoln Avenue Capital	I - Bissonnet Apartments	12000 Bissonnet Stree	et	300
DRILLING COMPANY	DRILLING METHOD		LOGGED BY	
Envirotech Drilling Services	Hollow Stem Augers		Ryan Rutaivilavan	## 00000000000000000000000000000000000
SAMPLING METHOD	DATE STARTED		DATE COMPLETED	GARY F. GOODHEAT
SPT/Split Spoon	6/20/2023		6/20/2023	44000

SCREEN TYPE / SLOT SIZE ----/

GROUND ELEVATION 98.45

DEPTH TO WATER DURING DRILLING ♀

STATIC DEPTH TO GROUNDWATER Y

TOP OF CASING ELEVAT

REMARKS: Location (Latitude, Longitude): 29.67945°, -95.59410° (WGS84)

KEIVIA	IKKS. L	ocatio	n (Latit	uae, L	ongitua	9): 29.67945°, -95.59410° (WGS84)	
Depth (ft. bgs)	Sample	Recovery %	Blow Count	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels
		100 100 75 100 75 5	2/6" 1/6" 2/6" 3/6" 7/6" 8/6" 10/6" 11/6" 12/6" 12/6" 12/6" 12/6" 20/6" 37/6" 25/6" 25/6" 15/6" 5/6" 10/6" 10/6" 14/6" 9/6"	LW		Soft Silty Clay - FILL (CL), gray and orange mottling, moist, medium plasticity. PP: 2.0 Becomes dark gray with orange and light gray mottling, medium stiff. PP: 3.75 Becomes dark gray with light gray mottling. PP: 0.5 LANDFILL CAP 6'-8' Becomes dark gray with increasing clay content. PP: 3.25 Landfill Waste: Silty clay and waste, dark gray-black, moist, with wood and cork-like material. Brown-black, moist, with wood chips and cork-like material.	
						Borehole Terminated at 14.0 feet.	



Geotechnical Investigation Report

APPENDIX B

Project No. 23.14.138

Client: Goodheart & Associates, LLC

Project: Lincoln Avenue Capital

Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	uscs	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	рН	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
BH-23-1																		
		1.5-2																
		3.5-4				CL	26.3					83.2						
		5-5.5																
		6-6.5				CL	22.6		44	19	25	79.1						
		8.5-9																
		19-19.5																
		24.5-25																
BH-23-2	2																	
		1-1.5																
		2.5-4.5	1.25		Brown LEAN CLAY with SAND; sand partings, organics (FILL)	CL	26.0	97.4	48	18	30	74.2			1.43	15.0		Multiple shear
		24-24.5																
BH-23-3	8																	
		0.5-1																
		3.5-4				CL	24.0											
		5-7			Tan and brown FAT CLAY	CH			70	24	46	90.3						
		18.5-19																
		34.5-35																
BH-23-4																		
		0.5-1																
		2.5-3				CL	21.5											
		5.5-6																
		7.5-8				CH	21.2		53	20	33	71.6						
		9-9.5																
BH-23-5	j																	
		0.5-1																
		3-3.5				CL	20.2											
		5-7	2.00			CL	19.3	105.1	49	19	30	75.0						
		8.5-9				CL	27.2											
		13-13.5																
		49.5-50																
BH-23-6	5																	
		2-2.5				CL	18.5											
		5-7	2.25		Brown SANDY LEAN CLAY; sand pockets, organics (FILL)	CL	18.0	109.7	46	17	29	68.0			3.87	7.5		Multiple shear
		8-8.5				CL	18.7											
		13-13.5																



Project No. 23.14.138

Client: Goodheart & Associates, LLC

Project: Lincoln Avenue Capital

Boring No.	Sample No.	(ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	рН	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
DI I 00 7		39.5-40																
BH-23-7																		
		1-1.5				- 01	40.4					07.0						
		3-3.5				CL	18.4					67.6						
		5.5-6				01	40.0					70.0						
D11.00.0		7-7.5				CL	18.3					73.3						
BH-23-8		0.5.4																
		0.5-1				01	00.0											
		2.5-3	0.05		D 11 154N 014Y 31 04ND 1	CL	23.0	00.0	40			74.0			4.00	0.5		
		4-6	3.25		Dark brown LEAN CLAY with SAND; sand pockets, organics (FILL)	CL	27.1	88.8	48	20	28	74.9			1.08	8.5		Multiple shear
		8.5-9				CL	22.2											
		34.5-35																
		39.5-40																
BH-23-9																		
		0.5-2																
		2.5-4																
		4-6	2.25			CL	21.8					83.0						
		6.5-8																
		8.5-10																
		10.5-12				CL	31.1					87.9						
		12.5-14																
		14.5-16																
		18.5-20																
		23.5-25																
BH-23- 10																		
		1-1.5																
		3.5-4				CL	18.0					74.2						
		5-5.5																
		6-8	1.75			CL	17.5	104.7	48	17	31	66.3						
		14-14.5																
		19-19.5																
		31-31.5																
		48-48.5																
BH-23- 11																		
<u> </u>		1.5-2																



Project No. 23.14.138

Client: Goodheart & Associates, LLC

Project: Lincoln Avenue Capital

Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	рН	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
		3-3.5				CL	18.3											
		4-6	3.00		Reddish brown FAT CLAY; sand partings (FILL)	CH	20.1	105.5	54	21	33	93.5			3.64	5.5		Slickensid
		8.5-9				CL	18.7											
		14-14.5																
		49-49.5																
		54-54.5																
BH-23- 12																		
		0.5-2																
		2.5-4																
		4.5-6				CL	21.0											
		6.5-8				CL	19.3											
		8.5-10																
		105-12																
		12.5-14																
		15.5-17																
		18.5-20																
BH-23- 14																		
		0.5-1																
		2.5-4.5	1.50			CL	18.8		41	20	21							
		9-9.5				CL	22.0											
		13-13.5				CL	16.0					84.9						
		29.5-30																
		33.5-34																
		59-59.5																
BH-23- 16																		
		0.5-1																
		3-3.5				CL	21.5											
		5-7				СН			56	19	37	66.7						
		8-8.5				CL	19.3											
		58.5-59																
BH-23- 17																		
		0.5-1																
		2.5-3				CL	20.8											
		5-7	2.25		Tan-red FAT CLAY with SAND; organics	СН	23.5	99.2	59	22	37	84.2			1.67	10.8		Multiple



Project No. 23.14.138

Client: Goodheart & Associates, LLC

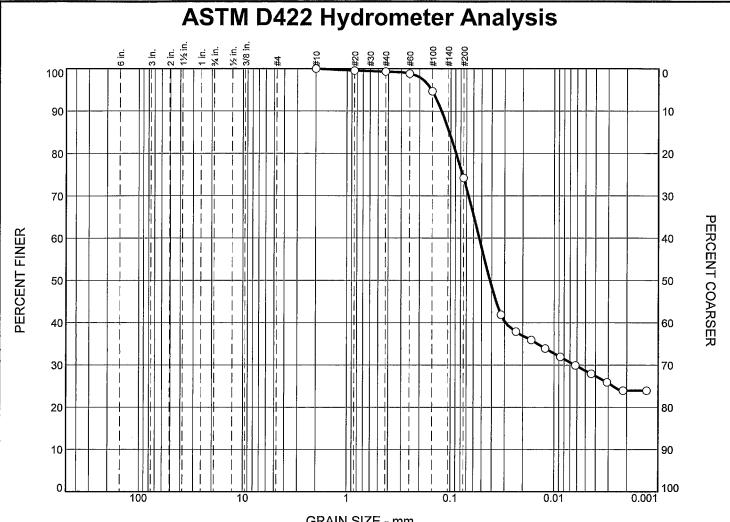
Project: Lincoln Avenue Capital

Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	рН	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Pres. (psi)	Failure Type
		0.5.0				01	00.0											shear
		8.5-9 58.5-59				CL	22.2											
3H-23-		36.3-39																
18																		
		0.5-1																
		2.5-3																
		4-6	4.50		Tan-brown SANDY LEAN CLAY	CL	11.1	115.0	30	19	11	69.7			5.08	3.0		Vertica shear
		6-7				CL	12.1											
		8-9																
		10-10.5																
		13-13.5 28-28.5																
		33-33.5																
		38.5-39																
		43.5-44																
		59.5-60																
BH-23-																		
19																		
		1.5-2																
		3-3.5				CL	20.9											
		5-5.5 7-7.5				CL	17.1											
		7-7.5																





Hydrometer Analyses



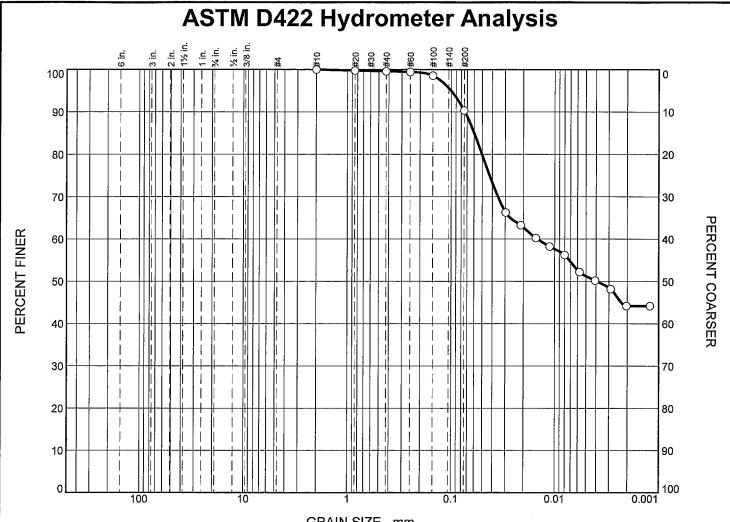
	% +3"	% Gr	avel		% Sand		% F	ines
_	70 +3	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0.0	0.0	0.0	0.0	0.7	25.1	45.5	28.7
+				+				
1								
1								

				SOIL DATA	
	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	uscs
0	BH-23-2		2.5-4.5	Brown LEAN CLAY with SAND; sand partings, organics (FILL)	CL

Tolunay-Wong Engineers, Inc. Houston, Texas Client: Goodheart & Associates, LLC

Project: Lincoln Avenue Capital

Project No.: 23.14.138



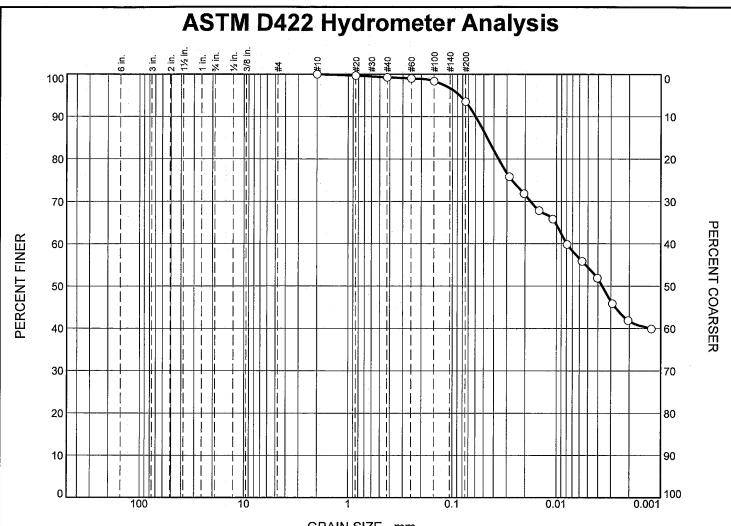
	% +3"	% Gr	avel		% Sand		% F	ines
	% T 3	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0.0	0.0	0.0	0.0	0.4	9.3	39.1	51.2
								·· ··
				+				

			•	SOIL DATA	
	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	uscs
0	BH-23-3		5-7	Tan and brown FAT CLAY	СН

Tolunay-Wong Engineers, Inc. Houston, Texas Client: Goodheart & Associates, LLC

Project: Lincoln Avenue Capital ·

Project No.: 23.14.138



	% +3"	% Gr	avel		% Sand		% F	ines
	% +3	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0.0	0.0	0.0	0.0	0.7	5.8	39.1	54.4
				-				
		·						

			SOIL DATA	
SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	uscs
BH-23-11		4-6	Reddish brown FAT CLAY; sand partings (FILL)	СН
<u> </u>				
		NO.	SOURCE NO. (ft.)	SOURCE SAMPLE DEPTH Material Description

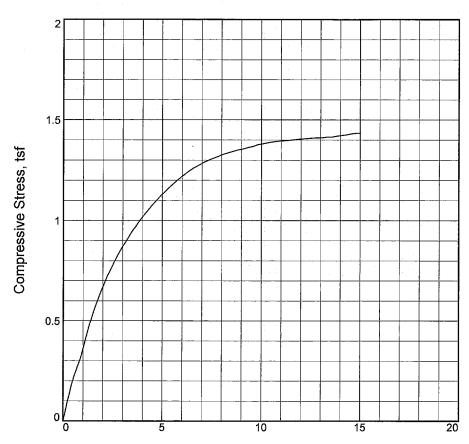
Tolunay-Wong Engineers, Inc. Houston, Texas Client: Goodheart & Associates, LLC

Project: Lincoln Avenue Capital

Project No.: 23.14.138



Unconfined Compression Tests



Axial Strain, %

Sample No.	1		-
Unconfined strength, tsf	1.434		
Undrained shear strength, tsf	0.717		
Failure strain, %	15.0		
Strain rate, %/min.	1.00		
Water content, %	26.0		
Wet density, pcf	122.7		
Dry density, pcf	97.4		
Saturation, %	96.2		
Void ratio	0.7305		
Specimen diameter, in.	2.91		
Specimen height, in.	5.79		
Height/diameter ratio	1.99		

Description: Brown LEAN CLAY with SAND; sand partings, organics (FILL)

LL = 48PL = 18**PI =** 30 Assumed GS= 2.70 Type: Undisturbed Client: Goodheart & Associates, LLC

Project No.: 23.14.138 Date Sampled: 7/23/23

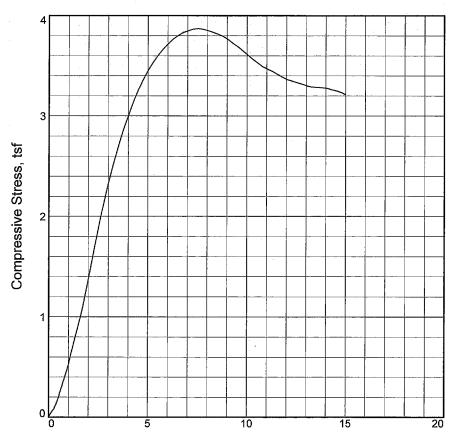
Remarks:

Test method: ASTM D2166 Failure type: Multiple shear

Figure _

Project: Lincoln Avenue Capital

Source of Sample: BH-23-2 **Depth:** 2.5-4.5



Axial Strain, %

Sample No.	1	
Unconfined strength, tsf	3.872	
Undrained shear strength, tsf	1.936	
Failure strain, %	7.5	
Strain rate, %/min.	1.00	
Water content, %	18.0	
Wet density, pcf	129.4	
Dry density, pcf	109.6	
Saturation, %	90.6	
Void ratio	0.5374	
Specimen diameter, in.	2.86	
Specimen height, in.	5.78	
Height/diameter ratio	2.02	

Description: Brown SANDY LEAN CLAY; sand pockets, organics (FILL)

PL = 17 **LL =** 46 **PI =** 29 Type: Undisturbed **Assumed GS=** 2.70 Client: Goodheart & Associates, LLC

Project No.: 23.14.138 Date Sampled: 7/24/23

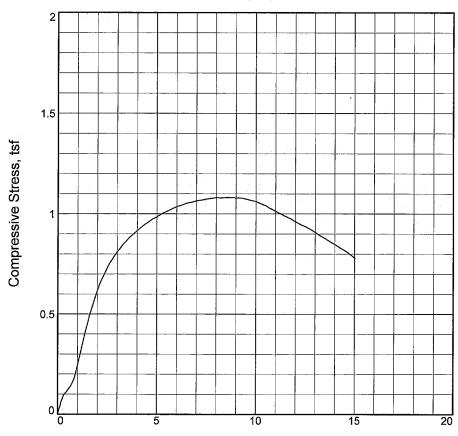
Remarks:

Test method: ASTM D2166 Failure type: Multiple shear

Figure ___

Project: Lincoln Avenue Capital

Source of Sample: BH-23-6 **Depth: 5-7**



Axial Strain, %

6 1 11		
Sample No.	1	
Unconfined strength, tsf	1.082	
Undrained shear strength, tsf	0.541	
Failure strain, %	8.5	
Strain rate, %/min.	1.00	
Water content, %	27.1	
Wet density, pcf	112.9	
Dry density, pcf	88.8	
Saturation, %	81.5	
Void ratio	0.8979	
Specimen diameter, in.	2.90	
Specimen height, in.	5.87	
Height/diameter ratio	2.02	

Description: Dark brown LEAN CLAY with SAND; sand pockets, organics (FILL)

LL = 48PL = 20PI = 28**Assumed GS=** 2.70 Type: Undisturbed Client: Goodheart & Associates, LLC

Project No.: 23.14.138 **Date Sampled:** 7/25/23

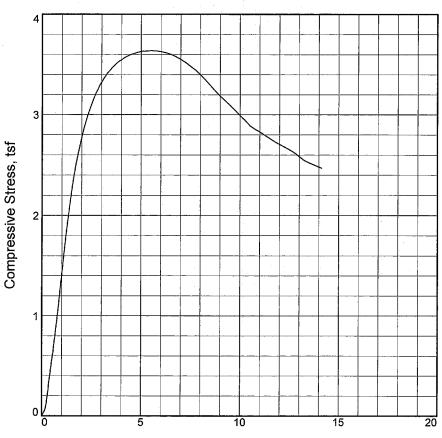
Remarks:

Test method: ASTM D2166 Failure type: Multiple shear

Figure

Project: Lincoln Avenue Capital

Source of Sample: BH-23-8 **Depth:** 4-6



Axial Strain, %

Sample No.	1		
Unconfined strength, tsf	3.638		
Undrained shear strength, tsf	1.819		
Failure strain, %	5.5		
Strain rate, %/min.	1.00		
Water content, %	20.1	-	
Wet density, pcf	126.7		
Dry density, pcf	105.5		
Saturation, %	90.9		
Void ratio	0.5974		
Specimen diameter, in.	2.83		
Specimen height, in.	5.86		
Height/diameter ratio	2.07		

Description: Reddish brown FAT CLAY; sand partings (FILL)

Project No.: 23.14.138

PL = 21 **PI =** 33 Assumed GS= 2.70

Type: Undisturbed

Date Sampled: 7/23/23

Remarks:

LL = 54

Test method: ASTM D2166 Failure type: Slickesided

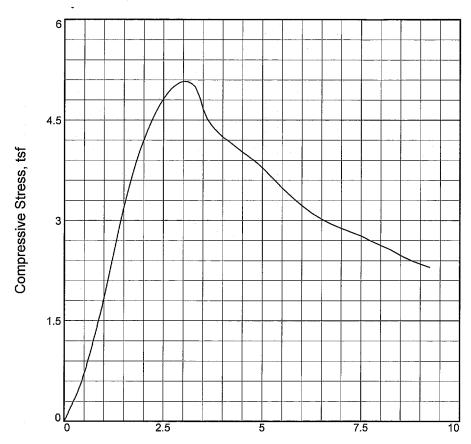
Figure ___

Client: Goodheart & Associates, LLC

Project: Lincoln Avenue Capital

Source of Sample: BH-23-11

Depth: 4-6



Axial Strain, %

Sample No.	1		
Unconfined strength, tsf	5.078		
Undrained shear strength, tsf	2.539		
Failure strain, %	3.0		
Strain rate, %/min.	1.00		
Water content, %	11.1		
Wet density, pcf	127.8		
Dry density, pcf	114.9		
Saturation, %	64.5		
Void ratio	0.4663		
Specimen diameter, in.	2.84		
Specimen height, in.	5.85		
Height/diameter ratio	2.06		

Description: Tan-brown SANDY LEAN CLAY

LL = 30 **PL** = 19 **Pl** = 11 **Assumed GS**= 2.70 **Type:** Undisturbed

Project No.: 23.14.138 **Date Sampled:** 7/23/23

Remarks:

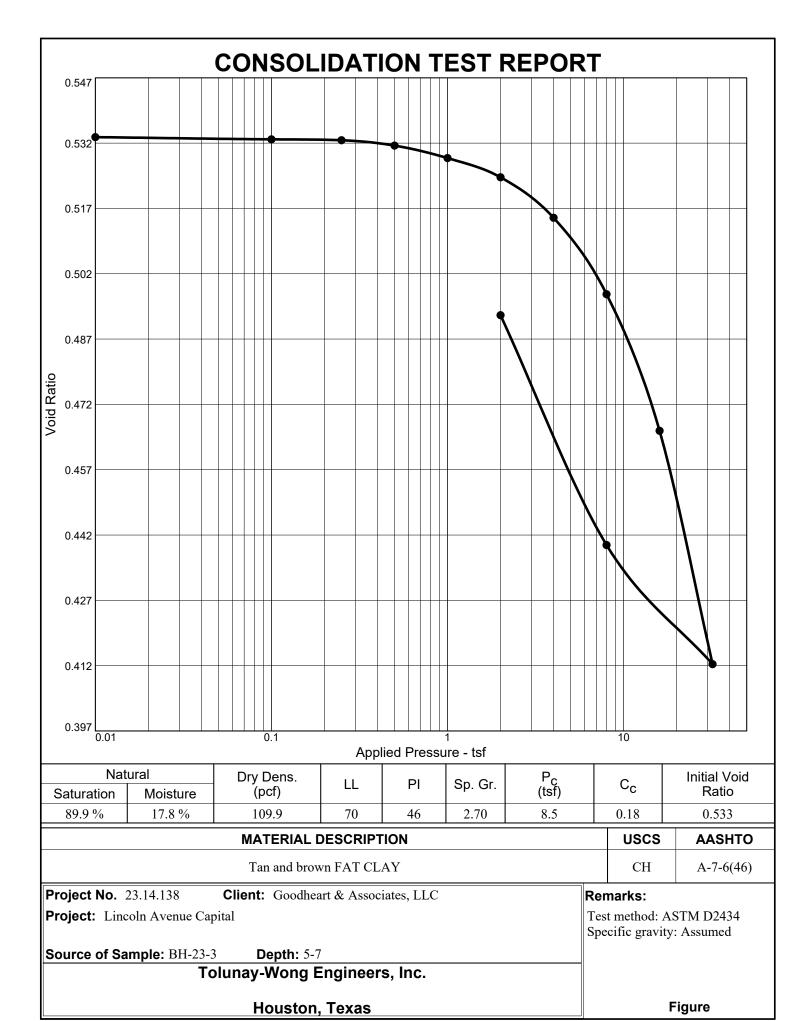
Test method: ASTM D2166 Failure type: Vertical shear

Figure ____

Client: Goodheart & Associates, LLC

Project: Lincoln Avenue Capital

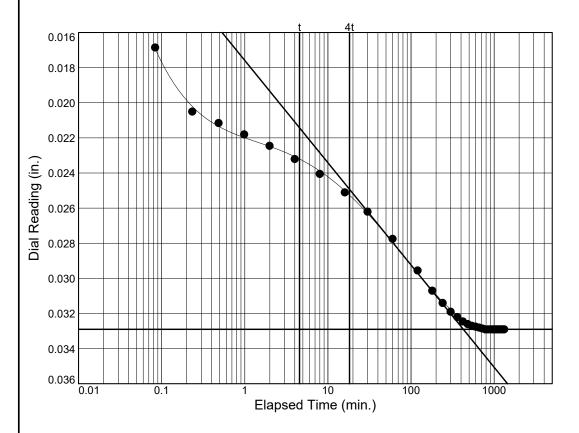
Source of Sample: BH-23-18 Depth: 4-6



Project No.: 23.14.138

Project: Lincoln Avenue Capital

Source of Sample: BH-23-3 Depth: 5-7



Load No.= 9

Load=16.00 tsf

 $D_0 = 0.0211$

 $D_{50} = 0.0270$

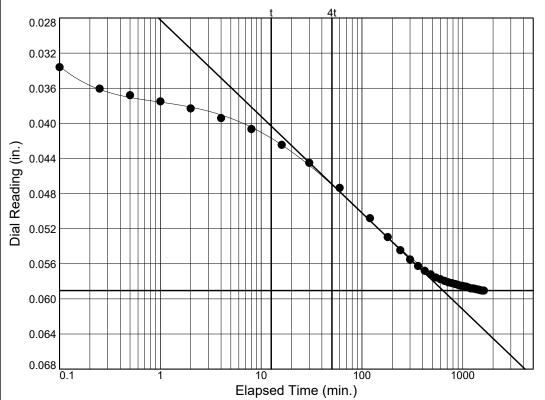
 $D_{100} = 0.0329$

 $T_{50} = 40.92 \text{ min.}$

C_v @ T₅₀

2.3 ft.2/yr.

 $C_{\alpha} = 0.000$



-TOLUNAY-WONG ENGINEERS, INC.-

Load No.= 10

Load=32.00 tsf

 $D_0 = 0.0364$

 $D_{50} = 0.0477$

 $D_{100} = 0.0590$

 $T_{50} = 58.81 \text{ min.}$

C_v @ T₅₀

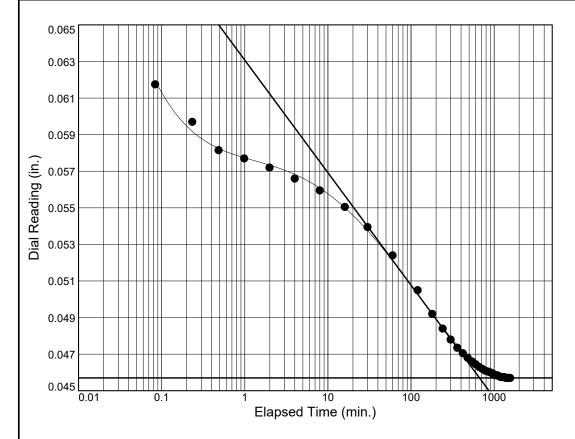
1.5 ft.²/yr.

 $C_{\alpha} = 0.000$

Project No.: 23.14.138

Project: Lincoln Avenue Capital

Source of Sample: BH-23-3 Depth: 5-7



Load No.= 11

Load=8.00 tsf

 $D_0 = 0.0590$

 $D_{50} = 0.0524$

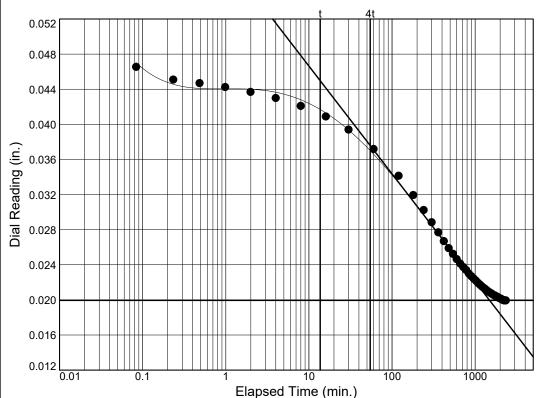
 $D_{100} = 0.0457$

 $T_{50} = 53.78 \text{ min.}$

 $C_{V} @ T_{50}$

1.6 ft.²/yr.

 $C_{\alpha} = 0.000$



-TOLUNAY-WONG ENGINEERS, INC.-

Load No.= 12

Load=2.00 tsf

 $D_0 = 0.0464$

 $D_{50} = 0.0332$

 $D_{100} = 0.0200$

 $T_{50} = 123.41 \text{ min.}$

 $C_{V} @ T_{50}$

 $0.7 \text{ ft.}^{2/\text{yr.}}$

 $C_{\alpha} = 0.000$

CONSOLIDATION TEST DATA

Client: Goodheart & Associates, LLC Project: Lincoln Avenue Capital Project Number: 23.14.138

Location: BH-23-3

Depth: 5-7

Material Description: Tan and brown FAT CLAY

Liquid Limit: 70 Plasticity Index: 46 USCS: CH AASHTO: A-7-6(46)

Testing Remarks: Test method: ASTM D2434 Specific gravity: Assumed

	Test Specimen Data	
NATURAL MOISTURE	VOID RATIO	AFTER TEST
Wet w+t = 142.42 g.	Spec. Gr. = 2.70	Wet w+t = 143.47 g.
Dry w+t = 130.40 g.	Est. Ht. Solids = 0.488 in.	Dry w+t = 130.40 g .
Tare Wt. = 62.73 g.	Init. V.R. = 0.533	Tare Wt. = 62.73 g.
Moisture = 17.8 %	Init. Sat. = 89.9 %	Moisture = 19.3%
UNIT WEIGHT	TEST START	Dry Wt. = 67.67^* g.
Height = 0.748 in.	Height = 0.748 in.	
Diameter = 1.998 in.	Diameter = 1.998 in.	
Weight = 79.69 g.		
Dry Dens. = 109.9 pcf	* Final dry weight used as mineral	solids weight

End-Of-Load Summary												
Pressure (tsf)	Final Dial (in.)	Machine Defl. (in.)	Deformation (in.)	C _V (ft. ² /yr.)	c_{a}	Void Ratio	% Strain					
start	0.00000		0.00000			0.533						
0.01	0.00000	0.00000	0.00000			0.533	0.0 Comprs.					
0.10	0.00045	0.00020	0.00025			0.533	0.0 Comprs.					
0.25	0.00085	0.00050	0.00035			0.533	0.0 Comprs.					
0.50	0.00215	0.00120	0.00095			0.531	0.1 Comprs.					
1.00	0.00435	0.00200	0.00235			0.529	0.3 Comprs.					
2.00	0.00800	0.00350	0.00450			0.524	0.6 Comprs.					
4.00	0.01335	0.00430	0.00904*		0.000	0.515	1.2 Comprs.					
8.00	0.02330	0.00570	0.01760*		0.000	0.497	2.4 Comprs.					
16.00	0.04000	0.00710	0.03290*	2.3	0.000	0.466	4.4 Comprs.					
32.00	0.06805	0.00900	0.05905*	1.5	0.000	0.412	7.9 Comprs.					
8.00	0.05180	0.00610	0.04570*	1.6	0.000	0.440	6.1 Comprs.					
2.00	0.02415	0.00420	0.01995*	0.7	0.000	0.492	2.7 Comprs.					

^{*}CALCULATED USING D₁₀₀ INSTEAD OF FINAL READING

Compression index (C_c), tsf = 0.18 Preconsolidation pressure (P_p), tsf = 8.5 Void ratio at P_p (e_m) = 0.495

Overburden (σ_{VO}), tsf = N/A

Pressure: 0.01 tsf		TEST READ	INGS	Load No. 1
	No.	Elapsed Time	Dial Reading	
	1	0.0000	0.00000	
	2	0.0833	0.00000	
	3	0.2333	0.00000	
	4	0.4833	0.00000	
	5	0.9833	0.00000	
	6	1.9833	0.00000	
	7	3.9833	0.00000	
Void Ratio = 0.533 Compression = 0.0% Pressure: 0.10 tsf		TEST READ	INGS	Load No. 2
		Elapsed	Dial	
	No.	Time	Reading	
	1	0.0000	0.00000	
	2	0.0833	0.00040	
	3 4	0.2333 0.4833	0.00045 0.00045	
	7	0.4033	0.00043	
Void Ratio = 0.533 Compression = 0.0%				
Pressure: 0.25 tsf		TEST READ	INGS	Load No. 3
		Elapsed	Dial	
	No.	Time	Reading	
	1	0.0000	0.00045	
	2 3	0.1000 0.2500	0.00085 0.00085	
	3	0.2300	0.00083	
Void Ratio = 0.533 Compression = 0.0%				
Pressure: 0.50 tsf		TEST READ	INGS	Load No. 4
	No.	Elapsed Time	Dial Reading	
	1	0.0000	0.00085	
	2	0.0833	0.00135	
	3	0.2333	0.00215	
	4	0.4833	0.00215	
	5	0.9833	0.00215	
W-M P-W- = 0.531 2				
Void Ratio = 0.531 Compression = 0.1%				
L TOLU	JNAY-	WONG EN	IGINEERS	, INC

Pressure: 1.00 tsf		TEST READ	INGS	Load No. 5
	No.	Elapsed Time	Dial Reading	
	1	0.0000	0.00215	
	2	0.0833	0.00425	
	3	0.2333	0.00435	
	4	0.4833	0.00435	
	5	0.9833	0.00435	
	6	1.9833	0.00435	
	7	3.9833	0.00435	
Void Ratio = 0.529 Compression = 0.3%				
Pressure: 2.00 tsf	-	TEST READ	INGS	Load No. 6
		Elapsed	Dial	
	No.	Time	Reading	
	1	0.0000	0.00435	
	2	0.1000	0.00700	
	3	0.2500	0.00740	
	4	0.5000	0.00760	
	5	1.0000	0.00780	
	6	2.0000 4.0000	0.00790	
	7 8	8.0000	0.00800 0.00800	
	o	8.0000	0.00800	
Void Ratio = 0.524 Compression = 0.6%				
Pressure: 4.00 tsf		TEST READ	INGS	Load No. 7
	No.	Elapsed Time	Dial Reading	
	1	0.0000	0.00800	
	2	0.1000	0.01170	
	3	0.2500	0.01220	
	4	0.5000	0.01260	
	5	1.0000	0.01285	
	6	2.0000	0.01310	
	7	4.0000	0.01325	
	8	8.0000	0.01335	
	9	16.0000	0.01335	
	10	30.0000	0.01335	
Void Ratio = 0.515 Compression = 1.2%				
11270				

____ TOLUNAY-WONG ENGINEERS, INC. _____

Pressu	re: 8.00 tsf		Load No. 8						
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.01335	14	239.9833	0.02295	27	1019.9833	0.02330	
2	0.0833	0.01815	15	299.9833	0.02300	28	1079.9833	0.02330	
3	0.2333	0.01900	16	359.9833	0.02305	29	1139.9833	0.02330	
4	0.4833	0.01950	17	419.9833	0.02310	30	1199.9833	0.02330	
5	0.9833	0.02005	18	479.9833	0.02315	31	1259.9833	0.02330	
6	1.9833	0.02050	19	539.9833	0.02320	32	1319.9833	0.02330	
7	3.9833	0.02100	20	599.9833	0.02325	33	1379.9833	0.02330	
8	7.9833	0.02145	21	659.9833	0.02328	34	1439.9833	0.02330	
9	15.9833	0.02185	22	719.9833	0.02330	35	1499.9833	0.02330	
10	29.9833	0.02220	23	779.9833	0.02330	36	1559.9833	0.02330	
11	59.9833	0.02250	24	839.9833	0.02330	37	1619.9833	0.02330	
12	119.9833	0.02270	25	899.9833	0.02330	38	1679.9833	0.02330	
13	179.9833	0.02285	26	959.9833	0.02330	39	1739.9833	0.02330	

Void Ratio = 0.497 Compression = 2.4%

Pressu	Pressure: 16.00 tsf TEST READINGS								Load No. 9
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.02330	12	119.9833	0.03665	23	779.9833	0.04000	
2	0.0833	0.02395	13	179.9833	0.03780	24	839.9833	0.04000	
3	0.2333	0.02760	14	239.9833	0.03850	25	899.9833	0.04000	
4	0.4833	0.02825	15	299.9833	0.03900	26	959.9833	0.04000	
5	0.9833	0.02890	16	359.9833	0.03930	27	1019.9833	0.04000	
6	1.9833	0.02955	17	419.9833	0.03955	28	1079.9833	0.04000	
7	3.9833	0.03030	18	479.9833	0.03970	29	1139.9833	0.04000	
8	7.9833	0.03115	19	539.9833	0.03980	30	1199.9833	0.04000	
9	15.9833	0.03220	20	599.9833	0.03985	31	1259.9833	0.04000	
10	29.9833	0.03330	21	659.9833	0.03990	32	1319.9833	0.04000	
11	59.9833	0.03485	22	719.9833	0.03995				

Pressu	re: 32.00 tsf	tsf TEST READINGS							Load No. 10
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.04000	14	240.0000	0.06345	27	1020.0000	0.06755	
2	0.1000	0.04260	15	300.0000	0.06450	28	1080.0000	0.06760	
3	0.2500	0.04505	16	360.0000	0.06525	29	1140.0000	0.06770	
4	0.5000	0.04580	17	420.0000	0.06580	30	1200.0000	0.06780	
5	1.0000	0.04650	18	480.0000	0.06620	31	1260.0000	0.06780	
6	2.0000	0.04730	19	540.0000	0.06655	32	1320.0000	0.06785	
7	4.0000	0.04840	20	600.0000	0.06675	33	1380.0000	0.06790	
8	8.0000	0.04965	21	660.0000	0.06695	34	1440.0000	0.06795	
9	16.0000	0.05145	22	720.0000	0.06710	35	1500.0000	0.06800	
10	30.0000	0.05350	23	780.0000	0.06720	36	1560.0000	0.06805	
11	60.0000	0.05635	24	840.0000	0.06730	37	1620.0000	0.06805	
12	120.0000	0.05980	25	900.0000	0.06740				
13	180.0000	0.06195	26	960.0000	0.06750				

Void Ratio = 0.412 Compression = 7.9% >>> CALCULATED USING D₁₀₀

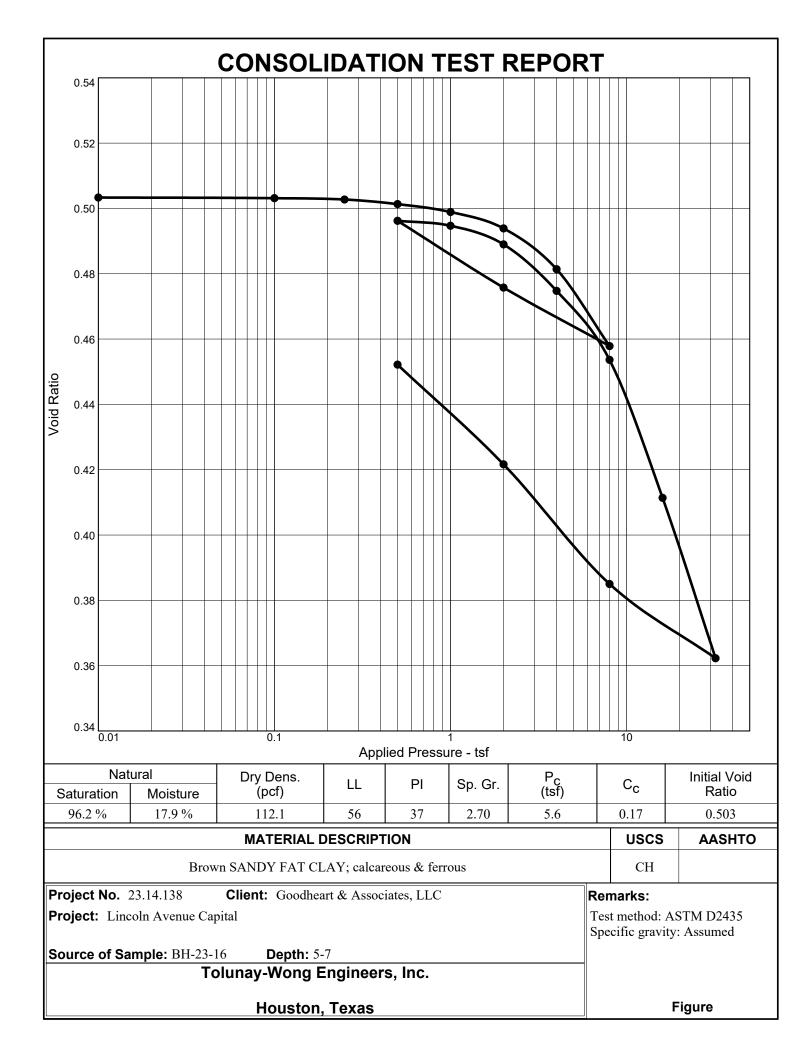
 $D_0 = 0.0364$ $D_{50} = 0.0477$ $D_{100} = 0.0590$ C_v at 58.81 min. = 1.5 ft.2/yr. $C_{\alpha} = 0.000$ Pressure: 8.00 tsf

		,	100	<u>v</u>			<u> </u>		
Pressu	ıre: 8.00 tsf			Т		Load No. 11			
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.06805	13	179.9833	0.05530	25	899.9833	0.05210	
2	0.0833	0.06785	14	239.9833	0.05450	26	959.9833	0.05205	
3	0.2333	0.06580	15	299.9833	0.05390	27	1019.9833	0.05195	
4	0.4833	0.06425	16	359.9833	0.05345	28	1079.9833	0.05195	
5	0.9833	0.06380	17	419.9833	0.05315	29	1139.9833	0.05190	
6	1.9833	0.06330	18	479.9833	0.05290	30	1199.9833	0.05185	
7	3.9833	0.06270	19	539.9833	0.05270	31	1259.9833	0.05185	
8	7.9833	0.06205	20	599.9833	0.05255	32	1319.9833	0.05185	
9	15.9833	0.06115	21	659.9833	0.05240	33	1379.9833	0.05180	
10	29.9833	0.06005	22	719.9833	0.05230	34	1439.9833	0.05180	
11	59.9833	0.05850	23	779.9833	0.05220	35	1499.9833	0.05180	
12	119.9833	0.05660	24	839.9833	0.05215	36	1559.9833	0.05180	

 $\label{eq:compression} \mbox{Void Ratio} = 0.440 \quad \mbox{Compression} = 6.1\% >>> \mbox{CALCULATED USING D}_{100}$

 $D_0 = 0.0590$ $D_{50} = 0.0524$ $D_{100} = 0.0457$ C_v at 53.78 min. = 1.6 ft.2/yr. $C_{\alpha} = 0.000$

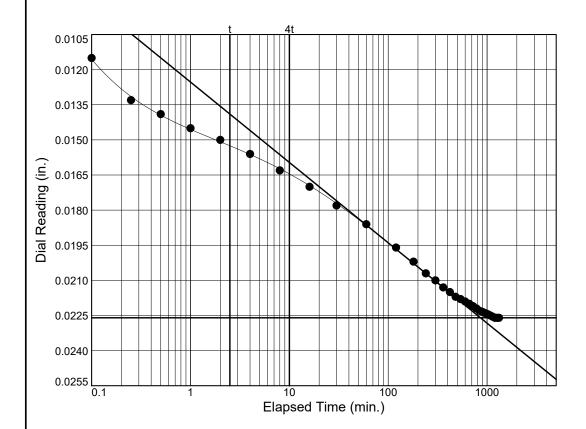
Pressu	ıre: 2.00 tsf			1	EST READIN	GS			Load No. 12
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.05175	18	479.9833	0.03010	35	1499.9833	0.02505	
2	0.0833	0.05075	19	539.9833	0.02945	36	1559.9833	0.02495	
3	0.2333	0.04930	20	599.9833	0.02885	37	1619.9833	0.02485	
4	0.4833	0.04890	21	659.9833	0.02835	38	1679.9833	0.02475	
5	0.9833	0.04845	22	719.9833	0.02795	39	1739.9833	0.02470	
6	1.9833	0.04790	23	779.9833	0.02760	40	1799.9833	0.02460	
7	3.9833	0.04720	24	839.9833	0.02720	41	1859.9833	0.02455	
8	7.9833	0.04630	25	899.9833	0.02690	42	1919.9833	0.02445	
9	15.9833	0.04510	26	959.9833	0.02665	43	1979.9833	0.02440	
10	29.9833	0.04360	27	1019.9833	0.02640	44	2039.9833	0.02435	
11	59.9833	0.04140	28	1079.9833	0.02615	45	2099.9833	0.02425	
12	119.9833	0.03835	29	1139.9833	0.02595	46	2159.9833	0.02420	
13	179.9833	0.03615	30	1199.9833	0.02575	47	2219.9833	0.02415	
14	239.9833	0.03445	31	1259.9833	0.02560	48	2279.9833	0.02415	
15	299.9833	0.03305	32	1319.9833	0.02545	49	2339.9833	0.02415	
16	359.9833	0.03190	33	1379.9833	0.02530				
17	419.9833	0.03090	34	1439.9833	0.02515				



Project No.: 23.14.138

Project: Lincoln Avenue Capital

Source of Sample: BH-23-16 Depth: 5-7



Load No.= 8

Load=8.00 tsf

 $D_0 = 0.0140$

 $D_{50} = 0.0183$

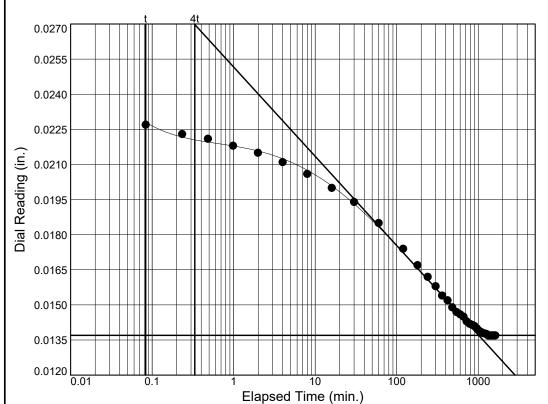
 $D_{100} = 0.0226$

 $T_{50} = 47.41 \text{ min.}$

 $C_{V} @ T_{50}$

2.0 ft.2/yr.

 $C_{\alpha} = 0.000$



-TOLUNAY-WONG ENGINEERS, INC.-

Load No.= 9

Load=2.00 tsf

 $D_0 = 0.0236$

 $D_{50} = 0.0186$

 $D_{100} = 0.0137$

 $T_{50} = 49.12 \text{ min.}$

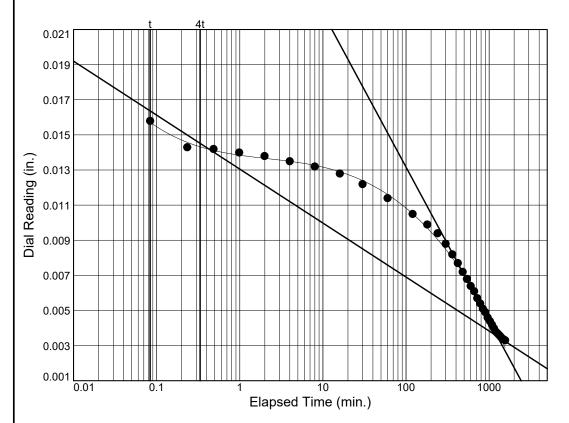
 $C_{V} @ T_{50}$

1.9 ft.²/yr.

 $C_{\alpha} = 0.000$

Project No.: 23.14.138 Project: Lincoln Avenue Capital

Source of Sample: BH-23-16 Depth: 5-7



Load No.= 10

Load=0.50 tsf

 $D_0 = 0.0171$

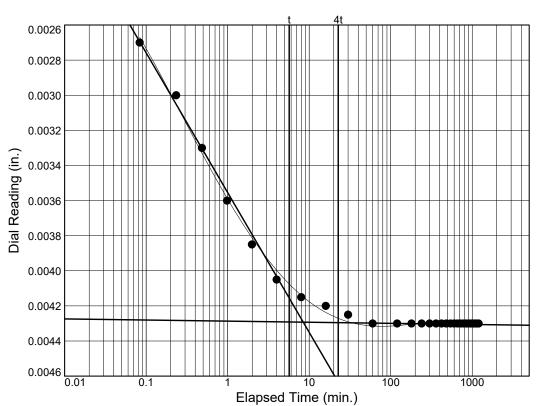
 $D_{50} = 0.0103$

 $D_{100} = 0.0035$

 $T_{50} = 132.02 \text{ min.}$

 $C_{V} @ T_{50}$

0.7 ft.2/yr.



-TOLUNAY-WONG ENGINEERS, INC.-

Load No.= 11

Load=1.00 tsf

 $D_0 = 0.0039$

 $D_{50} = 0.0041$

 $D_{100} = 0.0043$

 $T_{50} = 5.99 \text{ min.}$

 $C_{V} @ T_{50}$

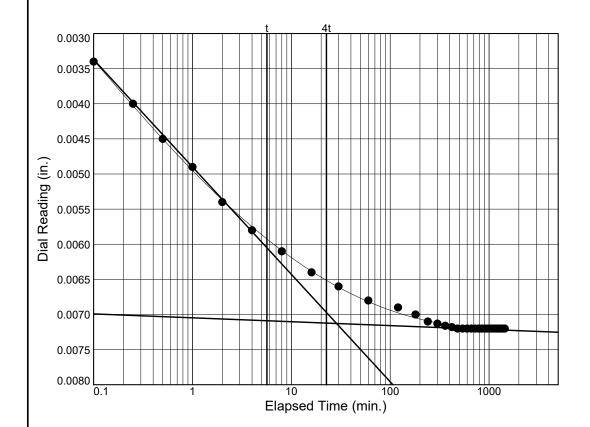
16.6 ft.²/yr.

 $C_{\alpha} = 0.000$

Project No.: 23.14.138

Project: Lincoln Avenue Capital

Source of Sample: BH-23-16 Depth: 5-7



Load No.= 12

Load=2.00 tsf

 $D_0 = 0.0053$

 $D_{50} = 0.0062$

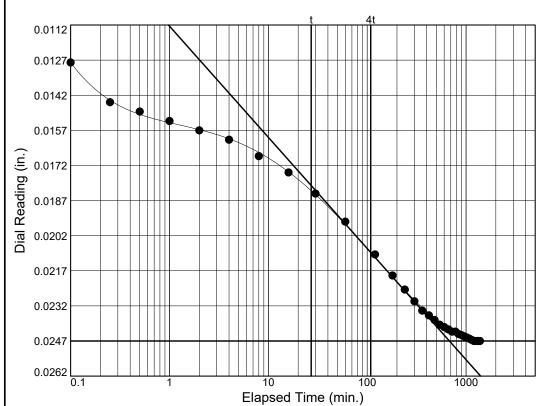
 $D_{100} = 0.0071$

 $T_{50} = 11.03 \text{ min.}$

C_v @ T₅₀

8.9 ft.2/yr.

 $C_{\alpha} = 0.000$



Load No.= 14

Load=8.00 tsf

 $D_0 = 0.0156$

 $D_{50} = 0.0202$

 $D_{100} = 0.0247$

 $T_{50} = 75.06 \text{ min.}$

 $C_{V} @ T_{50}$

1.3 ft.²/yr.

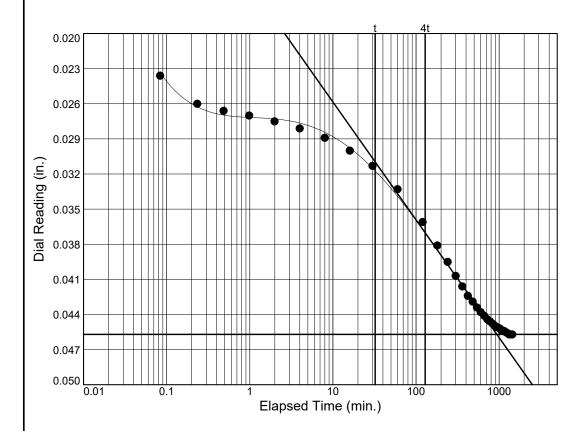
 $C_{\alpha} = 0.000$

Figure

TOLUNAY-WONG ENGINEERS, INC.-

Project No.: 23.14.138 Project: Lincoln Avenue Capital

Source of Sample: BH-23-16 Depth: 5-7



Load No.= 15

Load= 16.00 tsf

 $D_0 = 0.0264$

 $D_{50} = 0.0361$

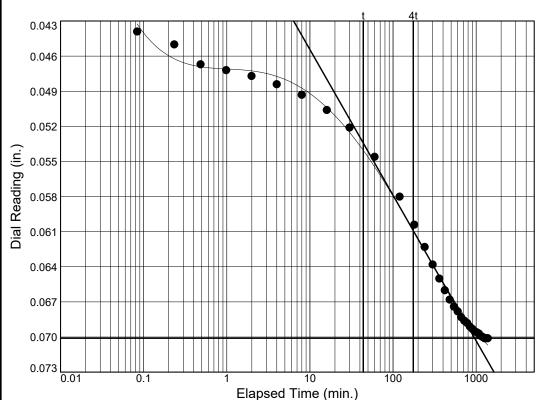
 $D_{100} = 0.0457$

 $T_{50} = 102.42 \text{ min.}$

 $C_{V} @ T_{50}$

0.9 ft.2/yr.

 $C_{\alpha} = 0.000$



-TOLUNAY-WONG ENGINEERS, INC.-

Load No.= 16

Load=32.00 tsf

 $D_0 = 0.0472$

 $D_{50} = 0.0586$

 $D_{100} = 0.0701$

 $T_{50} = 114.16 \text{ min.}$

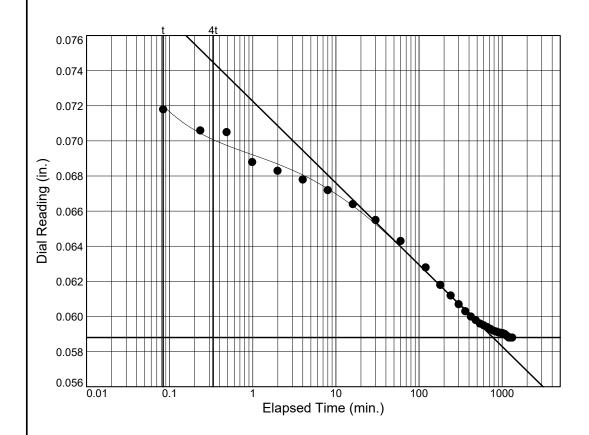
 $C_{V} @ T_{50}$

 $0.7 \text{ ft.}^{2/\text{yr.}}$

 $C_{\alpha} = 0.000$

Project No.: 23.14.138 Project: Lincoln Avenue Capital

Source of Sample: BH-23-16 Depth: 5-7



Load No.= 17 Load=8.00 tsf $D_0 = 0.0739$ $D_{50} = 0.0664$ $D_{100} = 0.0588$ $T_{50} = 15.27 \text{ min.}$

 $\mathsf{C}_v \mathbin{@} \mathsf{T}_{50}$ 5.5 ft.2/yr.

 $C_{\alpha} = 0.000$

CONSOLIDATION TEST DATA

Client: Goodheart & Associates, LLC Project: Lincoln Avenue Capital Project Number: 23.14.138

Location: BH-23-16

Depth: 5-7

Material Description: Brown SANDY FAT CLAY; calcareous & ferrous Liquid Limit: 56 Plasticity Index: 37

USCS: CH

Testing Remarks: Test method: ASTM D2435 Specific gravity: Assumed

~p************************************		
	Test Specimen Data	
NATURAL MOISTURE	VOID RATIO	AFTER TEST
Wet w+t = 143.86 g.	Spec. Gr. = 2.70	Wet w+t = 143.60 g .
Dry w+t = 131.50 g .	Est. Ht. Solids = 0.497 in.	Dry w+t = 131.50 g .
Tare Wt. = 62.57 g.	Init. V.R. $= 0.503$	Tare Wt. = 62.57 g.
Moisture = 17.9 %	Init. Sat. = 96.2 %	Moisture = 17.6 %
UNIT WEIGHT	TEST START	Dry Wt. = 68.93* g.
Height = 0.747 in.	Height = 0.747 in.	
Diameter = 1.998 in.	Diameter = 1.998 in.	
Weight = 81.29 g.		
Dry Dens. = 112.1 pcf	* Final dry weight used as mineral solids	weight

			End-Of-	Load Sum	mary			
Pressure (tsf)	Final Dial (in.)	Machine Defl. (in.)	Deformation (in.)	C _V (ft. ² /yr.)	c_{lpha}	Void Ratio	% Strain	
start	0.00000		0.00000			0.503		
0.01	0.00000	0.00000	0.00000			0.503	0.0 Comprs.	
0.10	0.00030	0.00020	0.00010			0.503	0.0 Comprs.	
0.25	0.00080	0.00050	0.00030			0.503	0.0 Comprs.	
0.50	0.00220	0.00120	0.00100			0.501	0.1 Comprs.	
1.00	0.00420	0.00200	0.00220			0.499	0.3 Comprs.	
2.00	0.00820	0.00350	0.00470			0.494	0.6 Comprs.	
4.00	0.01520	0.00430	0.01090*		0.000	0.481	1.5 Comprs.	
8.00	0.02830	0.00570	0.02260*	2.0	0.000	0.458	3.0 Comprs.	
2.00	0.01730	0.00360	0.01370*	1.9	0.000	0.476	1.8 Comprs.	
0.50	0.00470	0.00140	0.00354*	0.7		0.496	0.5 Comprs.	
1.00	0.00640	0.00210	0.00429*	16.6	0.000	0.495	0.6 Comprs.	
2.00	0.01080	0.00360	0.00713*	8.9	0.000	0.489	1.0 Comprs.	
4.00	0.01860	0.00440	0.01420^*		0.000	0.475	1.9 Comprs.	
8.00	0.03050	0.00580	0.02470*	1.3	0.000	0.454	3.3 Comprs.	
16.00	0.05280	0.00710	0.04570*	0.9	0.000	0.411	6.1 Comprs.	
32.00	0.07910	0.00900	0.07010*	0.7	0.000	0.362	9.4 Comprs.	
8.00	0.06600	0.00720	0.05880*	5.5	0.000	0.385	7.9 Comprs.	
2.00	0.04640	0.00600	0.04060*			0.422	5.4 Comprs.	
0.50	0.02850	0.00330	0.02543*			0.452	3.4 Comprs.	
*CALCULATE	ED LISING DA	on INSTEAD	OF FINAL READI	NG				

*CALCULATED USING D₁₀₀ INSTEAD OF FINAL READING

TOLUNAY-WONG ENGINEERS, INC. _

	0.473 Load No. 1
No. Elapsed Dial	Load No. 1
No. Elapsed Time Reading Dial Reading 1 0.0000 0.00000 2 0.0833 0.00000 3 0.2333 0.00000 4 0.4833 0.00000 5 0.9833 0.00000 6 1.9833 0.00000 7 3.9833 0.00000 TEST READINGS Elapsed Dial Reading 1 0.0000 0.00000 2 0.1000 0.00000 2 0.1000 0.00030 3 0.2500 0.00030	Load No. 1
No. Time Reading 1 0.0000 0.00000 2 0.0833 0.00000 3 0.2333 0.00000 4 0.4833 0.00000 5 0.9833 0.00000 6 1.9833 0.00000 7 3.9833 0.00000	
1 0.0000 0.00000 2 0.0833 0.00000 3 0.2333 0.00000 4 0.4833 0.00000 5 0.9833 0.00000 6 1.9833 0.00000 7 3.9833 0.00000	
2 0.0833 0.00000 3 0.2333 0.00000 4 0.4833 0.00000 5 0.9833 0.00000 6 1.9833 0.00000 7 3.9833 0.00000 Void Ratio = 0.503 Compression = 0.0% Pressure: 0.10 tsf TEST READINGS Elapsed Dial Reading 1 0.0000 0.00000 1 0.00000 2 0.1000 0.00030 3 0.2500 0.00030 3 0.2500 0.00030	
3 0.2333 0.00000 4 0.4833 0.00000 5 0.9833 0.00000 6 1.9833 0.00000 7 3.9833 0.00000 Pressure: 0.10 tsf TEST READINGS Elapsed No. Time Reading 1 0.0000 0.00000 1 0.0000 0.00000 2 0.1000 0.00030 3 0.2500 0.00030	
5	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
Void Ratio = 0.503 Compression = 0.0% Pressure: 0.10 tsf TEST READINGS Elapsed Dial Reading 1 0.0000 0.00000 2 0.1000 0.00030 3 0.2500 0.00030	
Pressure: 0.10 tsf TEST READINGS Elapsed Dial No. Time Reading 1 0.0000 0.00000 2 0.1000 0.00030 3 0.2500 0.00030	
No. Elapsed Time Reading 1 0.0000 0.00000 2 0.1000 0.00030 3 0.2500 0.00030	
No. Time Reading 1 0.0000 0.00000 2 0.1000 0.00030 3 0.2500 0.00030	Load No. 2
2 0.1000 0.00030 3 0.2500 0.00030	
3 0.2500 0.00030	
$4 \qquad 0.5000 \qquad 0.00030$	
Void Ratio = 0.503 Compression = 0.0%	
Pressure: 0.25 tsf TEST READINGS	Load No. 3
Elapsed Dial No. Time Reading	
1 0.0000 0.00030	
2 0.0833 0.00060	
3 0.2333 0.00080	
4 0.4833 0.00080	
Void Ratio = 0.503 Compression = 0.0%	
Pressure: 0.50 tsf TEST READINGS	Load No. 4
Elapsed Dial No. Time Reading	
$1 \qquad 0.0000 \qquad 0.00080$	
$2 \qquad 0.0833 \qquad 0.00200$	
3 0.2333 0.00200	
4 0.4833 0.00220	
5 0.9833 0.00220	
Void Ratio = 0.501 Compression = 0.1%	
TOLUNAY-WONG ENGINEERS, INC	

	TEST READ	Load No. 5	
No.	Elapsed Time	Dial Reading	
1	0.0000	0.00220	
2	0.1000	0.00340	
3	0.2500	0.00400	
4	0.5000	0.00420	
5	1.0000	0.00420	
6	2.0000	0.00420	
7	4.0000	0.00420	
8	8.0000	0.00420	

Void Ratio = 0.499 Compression = 0.3%

Pressure: 2.00 tsf		TEST READ	Load No. 6	
	No.	Elapsed Time	Dial Reading	
	1	0.0000	0.00420	
	2	0.0833	0.00740	
	3	0.2333	0.00810	
	4	0.4833	0.00820	
	5	0.9833	0.00820	
	6	1.9833	0.00820	
	7	3.9833	0.00820	
	8	7.9833	0.00820	

Void Ratio = 0.494 Compression = 0.6%

	-	D:-I			D:-1		F 1	D:-I	
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.00820	14	239.9833	0.01500	27	1019.9833	0.01520	
2	0.0833	0.01150	15	299.9833	0.01510	28	1079.9833	0.01520	
3	0.2333	0.01190	16	359.9833	0.01516	29	1139.9833	0.01520	
4	0.4833	0.01230	17	419.9833	0.01518	30	1199.9833	0.01520	
5	0.9833	0.01260	18	479.9833	0.01519	31	1259.9833	0.01520	
6	1.9833	0.01290	19	539.9833	0.01520	32	1319.9833	0.01520	
7	3.9833	0.01320	20	599.9833	0.01520	33	1379.9833	0.01520	
8	7.9833	0.01350	21	659.9833	0.01520	34	1439.9833	0.01520	
9	15.9833	0.01380	22	719.9833	0.01520	35	1499.9833	0.01520	
10	29.9833	0.01410	23	779.9833	0.01520	36	1559.9833	0.01520	
11	59.9833	0.01440	24	839.9833	0.01520	37	1619.9833	0.01520	
12	119.9833	0.01470	25	899.9833	0.01520	38	1679.9833	0.01520	
13	179.9833	0.01490	26	959.9833	0.01520	39	1739.9833	0.01520	

Void Ratio = 0.481 Compression = 1.5%

_____ TOLUNAY-WONG ENGINEERS, INC. _____

Pressu	re: 8.00 tsf			Т	EST READIN	GS			Load No. 8
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.01520	12	120.0000	0.02530	23	780.0000	0.02790	
2	0.1000	0.01720	13	180.0000	0.02590	24	840.0000	0.02800	
3	0.2500	0.01900	14	240.0000	0.02640	25	900.0000	0.02805	
4	0.5000	0.01960	15	300.0000	0.02670	26	960.0000	0.02810	
5	1.0000	0.02020	16	360.0000	0.02700	27	1020.0000	0.02815	
6	2.0000	0.02070	17	420.0000	0.02720	28	1080.0000	0.02820	
7	4.0000	0.02130	18	480.0000	0.02740	29	1140.0000	0.02825	
8	8.0000	0.02200	19	540.0000	0.02750	30	1200.0000	0.02830	
9	16.0000	0.02270	20	600.0000	0.02760	31	1260.0000	0.02830	
10	30.0000	0.02350	21	660.0000	0.02770	32	1320.0000	0.02830	
11	60.0000	0.02430	22	720.0000	0.02780				

 $\label{eq:compression} \mbox{Void Ratio} = 0.458 \quad \mbox{Compression} = 3.0\% >>> \mbox{CALCULATED USING } \mbox{D_{100}}$

 $D_0 = 0.0140$ $D_{50} = 0.0183$ $D_{100} = 0.0226$ C_v at 47.41 min. = 2.0 ft.2/yr. $C_{\alpha} = 0.000$

Pressu	Pressure: 2.00 tsf			Т	EST READIN	GS			Load No. 9
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.02840	14	239.9833	0.01980	27	1019.9833	0.01750	
2	0.0833	0.02630	15	299.9833	0.01940	28	1079.9833	0.01745	
3	0.2333	0.02590	16	359.9833	0.01900	29	1139.9833	0.01740	
4	0.4833	0.02570	17	419.9833	0.01880	30	1199.9833	0.01738	
5	0.9833	0.02540	18	479.9833	0.01850	31	1259.9833	0.01736	
6	1.9833	0.02510	19	539.9833	0.01830	32	1319.9833	0.01730	
7	3.9833	0.02470	20	599.9833	0.01820	33	1379.9833	0.01730	
8	7.9833	0.02420	21	659.9833	0.01810	34	1439.9833	0.01730	
9	15.9833	0.02360	22	719.9833	0.01790	35	1499.9833	0.01730	
10	29.9833	0.02300	23	779.9833	0.01780	36	1559.9833	0.01730	
11	59.9833	0.02210	24	839.9833	0.01775	37	1619.9833	0.01730	
12	119.9833	0.02100	25	899.9833	0.01770				
13	179.9833	0.02030	26	959.9833	0.01760				

 $\label{eq:compression} \mbox{Void Ratio} = 0.476 \quad \mbox{Compression} = 1.8\% >>> \mbox{CALCULATED USING } \mbox{D}_{100}$

 $D_0 = 0.0236$ $D_{50} = 0.0186$ $D_{100} = 0.0137$ C_v at 49.12 min. = 1.9 ft.2/yr. $C_{\alpha} = 0.000$

Pressu	re: 0.50 tsf			Т	EST READIN	GS			Load No. 10
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.01730	13	179.9833	0.01130	25	899.9833	0.00630	
2	0.0833	0.01720	14	239.9833	0.01080	26	959.9833	0.00600	
3	0.2333	0.01570	15	299.9833	0.01020	27	1019.9833	0.00580	
4	0.4833	0.01560	16	359.9833	0.00960	28	1079.9833	0.00560	
5	0.9833	0.01540	17	419.9833	0.00910	29	1139.9833	0.00540	
6	1.9833	0.01520	18	479.9833	0.00860	30	1199.9833	0.00520	
7	3.9833	0.01490	19	539.9833	0.00820	31	1259.9833	0.00510	
8	7.9833	0.01460	20	599.9833	0.00780	32	1319.9833	0.00500	
9	15.9833	0.01420	21	659.9833	0.00750	33	1379.9833	0.00490	
10	29.9833	0.01360	22	719.9833	0.00710	34	1439.9833	0.00480	
11	59.9833	0.01280	23	779.9833	0.00680	35	1499.9833	0.00475	
12	119.9833	0.01190	24	839.9833	0.00650	36	1559.9833	0.00470	

Pressu	Pressure: 1.00 tsf			Ţ	EST READIN	GS			Load No. 11
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.00470	11	59.9833	0.00640	21	659.9833	0.00640	
2	0.0833	0.00480	12	119.9833	0.00640	22	719.9833	0.00640	
3	0.2333	0.00510	13	179.9833	0.00640	23	779.9833	0.00640	
4	0.4833	0.00540	14	239.9833	0.00640	24	839.9833	0.00640	
5	0.9833	0.00570	15	299.9833	0.00640	25	899.9833	0.00640	
6	1.9833	0.00595	16	359.9833	0.00640	26	959.9833	0.00640	
7	3.9833	0.00615	17	419.9833	0.00640	27	1019.9833	0.00640	
8	7.9833	0.00625	18	479.9833	0.00640	28	1079.9833	0.00640	
9	15.9833	0.00630	19	539.9833	0.00640	29	1139.9833	0.00640	
10	29.9833	0.00635	20	599.9833	0.00640	30	1199.9833	0.00640	

Pressu	re: 2.00 tsf			Т	EST READIN	GS			Load No. 12
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.00640	13	180.0000	0.01060	25	900.0000	0.01080	
2	0.1000	0.00700	14	240.0000	0.01070	26	960.0000	0.01080	
3	0.2500	0.00760	15	300.0000	0.01073	27	1020.0000	0.01080	
4	0.5000	0.00810	16	360.0000	0.01076	28	1080.0000	0.01080	
5	1.0000	0.00850	17	420.0000	0.01078	29	1140.0000	0.01080	
6	2.0000	0.00900	18	480.0000	0.01080	30	1200.0000	0.01080	
7	4.0000	0.00940	19	540.0000	0.01080	31	1260.0000	0.01080	
8	8.0000	0.00970	20	600.0000	0.01080	32	1320.0000	0.01080	
9	16.0000	0.01000	21	660.0000	0.01080	33	1380.0000	0.01080	
10	30.0000	0.01020	22	720.0000	0.01080	34	1440.0000	0.01080	
11	60.0000	0.01040	23	780.0000	0.01080				
12	120.0000	0.01050	24	840.0000	0.01080				

Void Ratio = 0.489 Compression = 1.0% >>> CALCULATED USING D₁₀₀

 $D_0 = 0.0053$ $D_{50} = 0.0062$ $D_{100} = 0.0071$ C_v at 11.03 min. = 8.9 ft.2/yr. $C_{\alpha} = 0.000$

Pressu	re: 4.00 tsf			Ţ	EST READIN	GS			Load No. 13
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.01080	12	119.9833	0.01590	23	779.9833	0.01830	
2	0.0833	0.00990	13	179.9833	0.01650	24	839.9833	0.01838	
3	0.2333	0.01120	14	239.9833	0.01700	25	899.9833	0.01843	
4	0.4833	0.01150	15	299.9833	0.01730	26	959.9833	0.01846	
5	0.9833	0.01180	16	359.9833	0.01750	27	1019.9833	0.01848	
6	1.9833	0.01210	17	419.9833	0.01770	28	1079.9833	0.01850	
7	3.9833	0.01240	18	479.9833	0.01790	29	1139.9833	0.01855	
8	7.9833	0.01290	19	539.9833	0.01800	30	1199.9833	0.01858	
9	15.9833	0.01350	20	599.9833	0.01810	31	1259.9833	0.01860	
10	29.9833	0.01410	21	659.9833	0.01820	32	1319.9833	0.01860	
11	59.9833	0.01490	22	719.9833	0.01825	33	1379.9833	0.01860	

Void Ratio = 0.475 Compression = 1.9%

Pressu	re: 8.00 tsf			Т	EST READIN	GS			Load No. 14
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.01860	12	120.0000	0.02680	23	780.0000	0.03010	
2	0.1000	0.01860	13	180.0000	0.02770	24	840.0000	0.03020	
3	0.2500	0.02030	14	240.0000	0.02830	25	900.0000	0.03025	
4	0.5000	0.02070	15	300.0000	0.02880	26	960.0000	0.03030	
5	1.0000	0.02110	16	360.0000	0.02920	27	1020.0000	0.03035	
6	2.0000	0.02150	17	420.0000	0.02940	28	1080.0000	0.03040	
7	4.0000	0.02190	18	480.0000	0.02960	29	1140.0000	0.03045	
8	8.0000	0.02260	19	540.0000	0.02980	30	1200.0000	0.03050	
9	16.0000	0.02330	20	600.0000	0.02990	31	1260.0000	0.03050	
10	30.0000	0.02420	21	660.0000	0.03000	32	1320.0000	0.03050	
11	60.0000	0.02540	22	720.0000	0.03010	33	1380.0000	0.03050	

Load No. 15

 $\label{eq:compression} \mbox{Void Ratio} = 0.454 \quad \mbox{Compression} = 3.3\% >>> \mbox{CALCULATED USING } \mbox{D_{100}}$

 $D_0 = 0.0156$ $D_{50} = 0.0202$ $D_{100} = 0.0247$ C_v at 75.06 min. = 1.3 ft.2/yr. $C_{\alpha} = 0.000$

Pressi	ure: 16.00 tsf			I	EST READIN	GS			
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.03050	13	179.9833	0.04520	25	899.9833	0.05210	
2	0.0833	0.03070	14	239.9833	0.04660	26	959.9833	0.05220	
3	0.2333	0.03310	15	299.9833	0.04780	27	1019.9833	0.05230	
4	0.4833	0.03370	16	359.9833	0.04870	28	1079.9833	0.05250	
5	0.9833	0.03410	17	419.9833	0.04950	29	1139.9833	0.05250	
6	1.9833	0.03460	18	479.9833	0.05000	30	1199.9833	0.05260	
7	3.9833	0.03520	19	539.9833	0.05050	31	1259.9833	0.05270	
8	7.9833	0.03600	20	599.9833	0.05090	32	1319.9833	0.05280	
9	15.9833	0.03710	21	659.9833	0.05120	33	1379.9833	0.05280	
10	29.9833	0.03840	22	719.9833	0.05150	34	1439.9833	0.05280	
11	59.9833	0.04040	23	779.9833	0.05170				
12	119.9833	0.04320	24	839.9833	0.05190				

TOLUNAY-WONG ENGINEERS, INC.

Pressu	re: 32.00 tsf			Т	EST READIN	GS			Load No. 16
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.05280	12	119.9833	0.06700	23	779.9833	0.07780	
2	0.0833	0.05290	13	179.9833	0.06940	24	839.9833	0.07810	
3	0.2333	0.05400	14	239.9833	0.07130	25	899.9833	0.07830	
4	0.4833	0.05570	15	299.9833	0.07280	26	959.9833	0.07850	
5	0.9833	0.05620	16	359.9833	0.07400	27	1019.9833	0.07860	
6	1.9833	0.05670	17	419.9833	0.07500	28	1079.9833	0.07870	
7	3.9833	0.05740	18	479.9833	0.07580	29	1139.9833	0.07890	
8	7.9833	0.05830	19	539.9833	0.07640	30	1199.9833	0.07900	
9	15.9833	0.05960	20	599.9833	0.07680	31	1259.9833	0.07910	
10	29.9833	0.06110	21	659.9833	0.07730	32	1319.9833	0.07910	
11	59.9833	0.06360	22	719.9833	0.07760	33	1379.9833	0.07910	

Void Ratio = 0.362 Compression = 9.4% >>> CALCULATED USING D₁₀₀

 $D_0 = 0.0472$ $D_{50} = 0.0586$ $D_{100} = 0.0701$ C_v at 114.16 min. = 0.7 ft.2/yr. $C_{\alpha} = 0.000$

Pressure: 8.00 tsf TEST READINGS Load No. 17

Elapsed Dial Elapsed Dial Elapsed Dial

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.07910	12	119.9833	0.07000	23	779.9833	0.06640
2	0.0833	0.07900	13	179.9833	0.06900	24	839.9833	0.06635
3	0.2333	0.07780	14	239.9833	0.06840	25	899.9833	0.06630
4	0.4833	0.07770	15	299.9833	0.06790	26	959.9833	0.06627
5	0.9833	0.07600	16	359.9833	0.06750	27	1019.9833	0.06625
6	1.9833	0.07550	17	419.9833	0.06720	28	1079.9833	0.06620
7	3.9833	0.07500	18	479.9833	0.06700	29	1139.9833	0.06610
8	7.9833	0.07440	19	539.9833	0.06680	30	1199.9833	0.06600
9	15.9833	0.07360	20	599.9833	0.06670	31	1259.9833	0.06600
10	29.9833	0.07270	21	659.9833	0.06660	32	1319.9833	0.06600
11	59.9833	0.07150	22	719.9833	0.06650			

TOLUNAY-WONG ENGINEERS, INC.

Pressu	re: 2.00 tsf			Т	EST READIN	GS			Load No. 18
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.06600	13	180.0000	0.05660	25	900.0000	0.04860	
2	0.1000	0.06560	14	240.0000	0.05540	26	960.0000	0.04800	
3	0.2500	0.06450	15	300.0000	0.05440	27	1020.0000	0.04760	
4	0.5000	0.06420	16	360.0000	0.05350	28	1080.0000	0.04730	
5	1.0000	0.06400	17	420.0000	0.05270	29	1140.0000	0.04710	
6	2.0000	0.06370	18	480.0000	0.05200	30	1200.0000	0.04690	
7	4.0000	0.06330	19	540.0000	0.05130	31	1260.0000	0.04670	
8	8.0000	0.06280	20	600.0000	0.05080	32	1320.0000	0.04660	
9	16.0000	0.06210	21	660.0000	0.05030	33	1380.0000	0.04650	
10	30.0000	0.06120	22	720.0000	0.04980	34	1440.0000	0.04640	
11	60.0000	0.05990	23	780.0000	0.04940	35	1500.0000	0.04640	
12	120.0000	0.05800	24	840.0000	0.04900				

Void Ratio = 0.422 Compression = 5.4%

Pressu	re: 0.50 tsf			T	EST READIN	GS			Load No. 19
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	
1	0.0000	0.04640	15	299.9833	0.03780	29	1139.9833	0.03050	
2	0.0833	0.04610	16	359.9833	0.03700	30	1199.9833	0.03020	
3	0.2333	0.04520	17	419.9833	0.03630	31	1259.9833	0.02980	
4	0.4833	0.04500	18	479.9833	0.03560	32	1319.9833	0.02950	
5	0.9833	0.04490	19	539.9833	0.03500	33	1379.9833	0.02920	
6	1.9833	0.04470	20	599.9833	0.03440	34	1439.9833	0.02900	
7	3.9833	0.04450	21	659.9833	0.03390	35	1499.98	0.02890	
8	7.9833	0.04420	22	719.9833	0.03340	36	1559.98	0.02880	
9	15.9833	0.04370	23	779.9833	0.03290	37	1619.98	0.02870	
10	29.9833	0.04310	24	839.9833	0.03240	38	1679.98	0.02860	
11	59.9833	0.04220	25	899.9833	0.03200	39	1739.98	0.02855	
12	119.9833	0.04080	26	959.9833	0.03160	40	1799.98	0.02850	
13	179.9833	0.03960	27	1019.9833	0.03120				
14	239.9833	0.03860	28	1079.9833	0.03080				

Void Ratio = 0.452 Compression = 3.4%

APPENDIX 3 BORING LOGS AND CROSS SECTIONS

SKA Consulting, L.P.
1888 Stebbins Drive, Suite 100
Houston, Texas 77043
Telephone: (713) 266-6056
Fax: (713) 266-0996

MONITORING WELL MW-1

PAGE 1 OF 1

PROFESSIONAL SEAL

PAUL MICHAEL SCHULTZ

68765

CENSE

ONALES

PROJECT NO./NAME PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX DRILLING COMPANY DRILLING METHOD LOGGED BY **Envirotech Drilling Services** Hollow Stem Auger John Sanders SAMPLING METHOD DATE STARTED DATE COMPLETED 5' Split Spoon 3/26/2019 3/26/2019 **BOREHOLE DIAMETER** CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION**

DEPTH TO WATER DURING DRILLING \slash STATIC 12.5 ft. 9.9 ft.

20/40 Silica Sand

STATIC DEPTH TO GROUNDWATER ▼ 10 TC 9.9 ft. 179.

79.38

TOP OF CASING ELEVATION 79.21

2/24/21

REMARKS: Location (Latitude, Longitude): 29.681804°, -95.587451°

Bentonite

Depth (ft. bgs)	Sample	Recovery %	PID (mdd)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels	WELL DIAGRAM
		0		NR		0'-5' No recovery (hydrovac).		Concrete →Bentonite
- 5 - - 5 - 			0.1	CL		5'-7' Sandy clay, soft, low plasticity, moist. 7'-10' Silty sand, reddish brown, dry, loose, fine grained.		
		100	0.2	SM			<u></u>	Well Casing
 		100	0.2	SC		10'-15' Clayey sand, light gray, very moist, medium dense, very fine grained.12.5' grades to wet, loose, sand content increasing with depth.	Ā	
15 		50	0.2	SM		15'-17.5' Silty sand, reddish brown, loose, fine grained, wet. 17.5'-20' No recovery.		Silica Sand
				NR		20-30' Silty sand, reddish brown, loose, fine grained, wet.		■ Well Screen
		100	0.2			g		
25			0.1	SM				
		100	0.2	-				
			0.2			Bottom of borehole at 30.0 feet.	:	

SKA Consulting, L.P. **MONITORING WELL MW-2** 1888 Stebbins Drive, Suite 100 PAGE 1 OF 1 SSIONAL SEAL OF TEXA NO. Houston, Texas 77043 Telephone: (713) 266-6056 Fax: (713) 266-0996 PROJECT NO./NAME PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX DRILLING COMPANY **DRILLING METHOD** LOGGED BY PAUL MICHAEL SCHULT **Envirotech Drilling Services** Hollow Stem Auger John Sanders DATE COMPLETED SAMPLING METHOD DATE STARTED 68765 5' Split Spoon 3/26/2019 3/26/2019 SCREEN TYPE / SLOT SIZE **BOREHOLE DIAMETER** CASING TYPE / DIAMETER 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 20/40 Silica Sand **Bentonite** 80.74 DEPTH TO WATER DURING DRILLING ♥ STATIC DEPTH TO GROUNDWATER \(\mathbb{Y}\) TOP OF CASING ELEVATION 80.69 10.7 ft. REMARKS: Location (Latitude, Longitude): 29.679006°, -95.587399° Water Levels GRAPHIC LOG U.S.C.S. Sample Recovery Depth (ft. bgs) PID (ppm) LITHOLOGIC DESCRIPTION WELL DIAGRAM 0'-5' No recovery (hydrovac). Concrete NR 0 ◆Bentonite 5'-11.5' Sandy clay, gray with orange mottling, moist, stiff, low 0.0 plasticity. 0.0 7' grades to light gray with orange mottling. 100 CL 0.0 -Well Casing 10' grades to light gray with slight orange mottling. Ţ 0.1 11.5'-12.5' Clayey sand, light gray, medium dense, very fine grained, SC ∇ 80 12.5'-14' Silty sand, reddish brown, wet, loose, fine grained. 0.1 SM 14'-15' No recovery. NR 15 15'-30' Silty sand, reddish brown, wet, loose, fine grained. 0.1 100 → Silica Sand 0.0 -20 Well Screen 0.1 100 SM 0.2 -25 0.3

100

0.3

SKA Consulting, L.P. **MONITORING WELL MW-3** 1888 Stebbins Drive, Suite 100 PAGE 1 OF 1 Houston, Texas 77043 PROFESSIONAL SEA Telephone: (713) 266-6056 Fax: (713) 266-0996 PROJECT NO./NAME PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX **DRILLING COMPANY DRILLING METHOD** LOGGED BY PAUL MICHAEL SCHULT **Envirotech Drilling Services Hollow Stem Auger** John Sanders SAMPLING METHOD DATE STARTED DATE COMPLETED 68765 5' Split Spoon 3/25/2019 3/25/2019 **BOREHOLE DIAMETER** CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 20/40 Silica Sand Bentonite 82.76 DEPTH TO WATER DURING DRILLING ▼ STATIC DEPTH TO GROUNDWATER ▼ TOP OF CASING ELEVATION 82.80 15.0 ft. 10.1 ft. REMARKS: Location (Latitude, Longitude): 29.675590°, -95.589820° Water Levels GRAPHIC LOG U.S.C.S. Sample Depth (ft. bgs) Recovery PID (mdd) LITHOLOGIC DESCRIPTION WELL DIAGRAM 0'-5' No recovery (hydrovac). Concrete NR 0 → Bentonite 5'-11' Silty clay, light gray with orange mottling, moist, stiff, medium 0.2 0.2 100 CL 0.2 Well Casing Ā 10' grades to dark gray, soft, with small rocks present. 0.2 11'-12' Clayey sand, reddish brown, moist, medium dense, very fine SC 0.1 grained. 12'-15' No recovery. 40 NR ∇ 15'-25' Silty sand, wet, loose, fine grained. 0.1 100 Silica Sand 0.1 -20 SM Well Screen 0.5 100 0.3 25 25'-30' No recovery.

NR

0

SKA Consulting, L.P. **MONITORING WELL MW-4** 1888 Stebbins Drive, Suite 100 PAGE 1 OF 1 Houston, Texas 77043 Telephone: (713) 266-6056 PROFESSIONAL SEAL Fax: (713) 266-0996 PROJECT NO./NAME PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX DRILLING COMPANY DRILLING METHOD LOGGED BY PAUL MICHAEL SCHULT **Envirotech Drilling Services** Hollow Stem Auger John Sanders SAMPLING METHOD DATE STARTED DATE COMPLETED 5' Split Spoon 3/27/2019 3/27/2019 **BOREHOLE DIAMETER** CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" GRAVEL PACK TYPE **GROUT TYPE GROUND ELEVATION** 20/40 Silica Sand Bentonite DEPTH TO WATER DURING DRILLING ♀ STATIC DEPTH TO GROUNDWATER \(\mathbf{Y}\) TOP OF CASING ELEVATION 82.93 REMARKS: Location (Latitude, Longitude): 29.675602°, -95.592330° Water Levels GRAPHIC LOG U.S.C.S. Sample Recovery Depth (ft. bgs) PID (mdd) LITHOLOGIC DESCRIPTION WELL DIAGRAM 0'-5' No recovery (hydrovac). Concrete NR 0 ◆Bentonite 5'-7.5' Silty clay, dark gray, moist, soft, medium plasticity. 0.3 5.5' grades to brown with gray mottling, stiff. CL 0.3 100 7.5'-10' Sandy clay, brown with gray mottling, moist, stiff, low plasticity. CL Well Casing 0.2 10 10'-12' Clayey sand, reddish brown, wet, loose, very fine grained. SC 0.3 12'-15' No recovery 40 ∇ NR 15'-22.5' Silty sand, reddish brown, wet, loose, fine grained. 0.3 100 18' observed 2" silty clay layer, reddish brown with light gray mottling. SM (Silty clay interbedded) Silica Sand 0.3 20 Well Screen 0.3 50 22.5'-25' No recovery. NR 25 25'-30' Silty sand, reddish brown, wet, loose, fine grained.

0.3

0.2

100

SM

SKA Consulting, L.P. **MONITORING WELL MW-5** 1888 Stebbins Drive, Suite 100 PAGE 1 OF 1 Houston, Texas 77043 Telephone: (713) 266-6056 PROFESSIONAL SEAL Transition of the state of the Fax: (713) 266-0996 PROJECT NO./NAME PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX DRILLING COMPANY **DRILLING METHOD** LOGGED BY **Envirotech Drilling Services** Hollow Stem Auger John Sanders PAUL MICHAEL SCHULTZ SAMPLING METHOD DATE STARTED DATE COMPLETED 5' Split Spoon 3/27/2019 3/27/2019 68765 **BOREHOLE DIAMETER** CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 20/40 Silica Sand **Bentonite** 79.23 DEPTH TO WATER DURING DRILLING ♀ STATIC DEPTH TO GROUNDWATER I TOP OF CASING ELEVATION 79.16 REMARKS: Location (Latitude, Longitude): 29.679843°, -95.595761° Water Levels GRAPHIC LOG U.S.C.S. Sample Depth (ft. bgs) Recovery PID (mdd) LITHOLOGIC DESCRIPTION WELL DIAGRAM 0'-5' No recovery (hydrovac). Concrete NR 0 ◆Bentonite 5'-7.5' Silty clay, light gray with reddish-brown mottling, moist, stiff, medium plasticity. CL 50 7.5'-10' No recovery. NR Well Casing V 10'-11' Clay, reddish brown, moist, stiff, high plasticity, calcareous СН nodules, light gray silty clay intrusions. 1.0 11'-14' Clayey sand, light gray with reddish brown mottling, very moist, ∇ loose, very fine grained. SC 100 0.7 14'-22.5' Silty sand, brown, wet, loose, fine grained. 15 0.4 100 SM Silica Sand 0.4 20-Well Screen 0.9 50 22.5'-25' No recovery. NR 25 25'-30' Silty sand, brown, wet, loose, fine grained. 0.7

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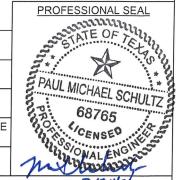
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0.7

SKA Consulting, L.P. 1888 Stebbins Drive, Suite 100 Houston, Texas 77043 Telephone: (713) 266-6056 Fax: (713) 266-0996 PROJECT NO./NAME

MONITORING WELL MW-6

PAGE 1 OF 1



PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX DRILLING COMPANY **DRILLING METHOD** LOGGED BY **Envirotech Drilling Services** Hollow Stem Auger John Sanders DATE COMPLETED SAMPLING METHOD DATE STARTED 5' Split Spoon 3/28/2019 3/28/2019 SCREEN TYPE / SLOT SIZE CASING TYPE / DIAMETER **BOREHOLE DIAMETER** 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 20/40 Silica Sand Bentonite 76.72 DEPTH TO WATER DURING DRILLING ▼ STATIC DEPTH TO GROUNDWATER ▼ TOP OF CASING FLEVATION

INO DIVILLINO T	STATIC DEL TIL TO GROOMDWATER &	TOP OF CASING LLL VATION	-1-
	8.6 ft.	76.38	

REMA	ARKS: L	_ocatio	n (Latit	ude, L	ongitud	e): 29.684678°, -95.590931°			
Depth (ft. bgs)	Sample	Recovery %	OIA (mdd)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels	WEI	LL DIAGRAM
		0		NR		0'-5' No recovery (hydrovac).			Concrete
- 5 - - 5 - 		60	0.1	CL SC		5'-6' Silty clay, light gray, moist, stiff, medium plasticity, abundant calcareous nodules, high silt content. 6'-8' Clayey sand, reddish brown, very moist, medium dense, very fine grained, abrupt change from layer above.			→ Bentonite
				NR		8'-10' No recovery.	Ţ.		—Well Casing
		100	0.2	SM		10'-22.5' Silty sand, reddish brown, wet, loose, fine grained. 15' grades to very fine grained.			⊸ Silica Sand
 -20- 		50	0.3			22.5'-25' No recovery.			—Well Screen
 25-			-	NR		25'-28' Silty sand, brown, wet, loose, fine grained.			
		60	0.4	SM		28'-30' No recovery.			
				NR		Bottom of borehole at 30.0 feet.			

SKA Consutling, L.P. MONITORING WELL MW-7 1888 Stebbins Drive, Suite 100 PAGE 1 OF 1 Houston, Texas 77043 Telephone: (713) 266-6056 PROFESSIONAL SEAL Fax: (713) 266-0996 PROJECT LOCATION PROJECT NO./NAME 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX **DRILLING COMPANY DRILLING METHOD** LOGGED BY **Envirotech Drilling Services** Direct Push/Hollow Stem Auger Chris Siegel SAMPLING METHOD DATE STARTED DATE COMPLETED PAUL MICHAEL SCHULT 5' Core Barrel w/ Disp. Sleeves 6/27/2019 6/27/2019 68765 CASING TYPE / DIAMETER BOREHOLE DIAMETER SCREEN TYPE / SLOT SIZE 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 20/40 Silica Sand **Bentonite** 77.68 DEPTH TO WATER DURING DRILLING ♀ STATIC DEPTH TO GROUNDWATER ₹ TOP OF CASING ELEVATION 81.10 REMARKS: Location (Latitude, Longitude): 29.684464°, -95.588180° Water Levels GRAPHIC LOG Depth (ft. bgs) Recovery PID (ppm) U.S.C. WELL DIAGRAM LITHOLOGIC DESCRIPTION 0'-2.5' Fill:Silty clay, brown, medium plasticity, stiff, moist. Concrete FILL 100 2.5'-22' Fill: Clay, caliche, gray, hard, dry. 5 100 Bentonite 10

FILL

SM

100

100

100

100

20

22'-30' Silty sand, gray, loose, fine grained, saturated.

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Well Casing

←Silica Sand

Well Screen

SKA Consutling, L.P. **MONITORING WELL MW-8** 1888 Stebbins Drive, Suite 100 PAGE 1 OF 1 Houston, Texas 77043 Telephone: (713) 266-6056 **PROFESSIONAL SEAL** Fax: (713) 266-0996 PROJECT NO./NAME PROJECT LOCATION 12000 Bissonnet Street, Houston, TX 5019-0001 / Doty and Olshan Landfills **DRILLING METHOD** DRILLING COMPANY LOGGED BY **Envirotech Drilling Services** Direct Push/Hollow Stem Auger Chris Siegel PAUL MICHAEL SCHUL DATE COMPLETED SAMPLING METHOD DATE STARTED 6/28/2019 5' Core Barrel w/ Disp. Sleeves 6/28/2019 68765 CASING TYPE / DIAMETER **BOREHOLE DIAMETER** SCREEN TYPE / SLOT SIZE 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 20/40 Silica Sand **Bentonite** 78.28 DEPTH TO WATER DURING DRILLING ♀ STATIC DEPTH TO GROUNDWATER 🛂 TOP OF CASING ELEVATION 82.54 REMARKS: Location (Latitude, Longitude): 29.684459°, -95.589776° Water Levels GRAPHIC LOG U.S.C.S. Depth (ft. bgs) Recovery PID (ppm) LITHOLOGIC DESCRIPTION WELL DIAGRAM 0'-7' Fill: Silty clay, gray, medium plasticity, stiff, moist. Concrete ◆Bentonite 100 FILL Well Casing 5 7'-8' Fill: Concrete pieces with gray clay. FILL 100 Silica Sand 8'-15' Silty sand, gray, loose, fine grained, saturated. 10 Well Screen SM 100 -15 Bottom of borehole at 15.0 feet.

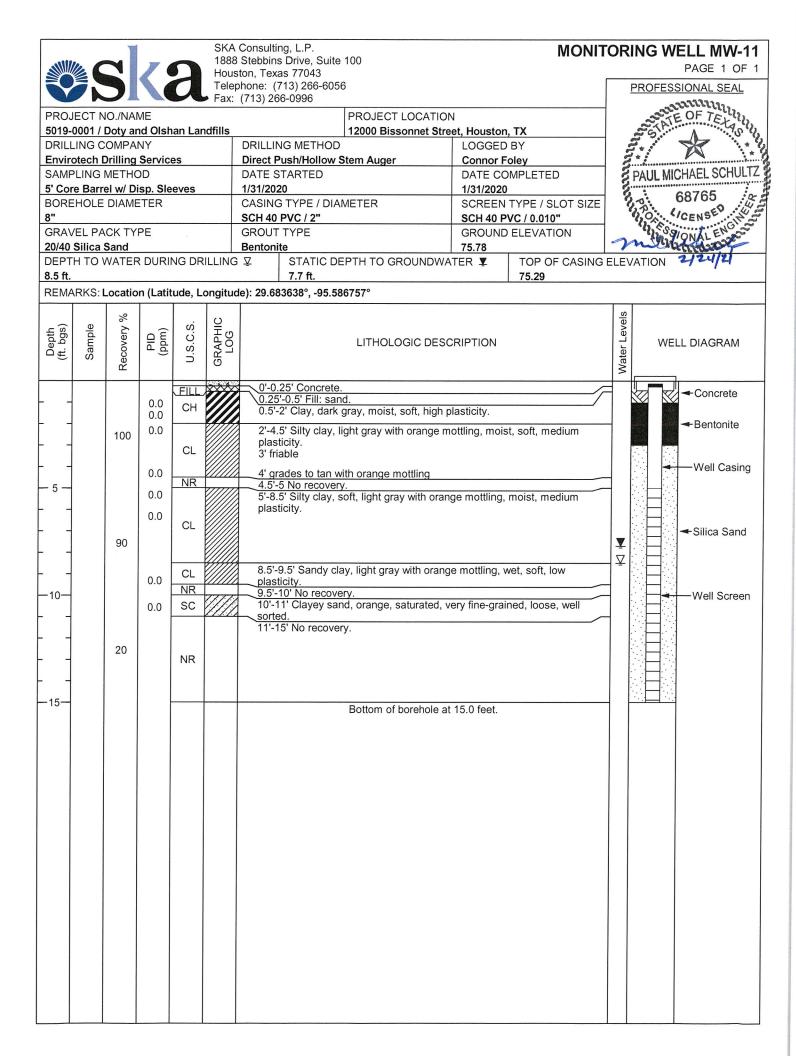
SKA Consutling, L.P. **MONITORING WELL MW-9** 1888 Stebbins Drive, Suite 100 PAGE 1 OF 1 Houston, Texas 77043 Telephone: (713) 266-6056 PROFESSIONAL SEAL Fax: (713) 266-0996 PROJECT NO./NAME PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX **DRILLING COMPANY DRILLING METHOD** LOGGED BY **Envirotech Drilling Services** Direct Push/Hollow Stem Auger Chris Siegel SAMPLING METHOD DATE STARTED DATE COMPLETED PAUL MICHAEL SCHULTZ 7/1/2019 5' Core Barrel w/ Disp. Sleeves 7/1/2019 CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE **BOREHOLE DIAMETER** 68765 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 20/40 Silica Sand **Bentonite** DEPTH TO WATER DURING DRILLING ♀ STATIC DEPTH TO GROUNDWATER \(\mathbb{Y}\) TOP OF CASING ELEVATION 19.0 ft. 87.11 REMARKS: Location (Latitude, Longitude): 29.683035°, -95.593853° Water Levels GRAPHIC LOG U.S.C.S. Depth (ft. bgs) Recovery PID (ppm) LITHOLOGIC DESCRIPTION WELL DIAGRAM 0'-5' Fill: Clay, gray, high plasticity, soft, moist. Concrete FILL 100 5 5'-18' Fill: Silty clay, gray, medium plasticity, stiff, shells present. → Bentonite 100 8' Grades to light gray, shells no longer present. 10'-13' Rocks and gravel present **FILL** 100 -Well Casing 15 100 $\bar{\Delta}$ Silica Sand 18'-30' Silty sand, tan, loose, fine grained, saturated. Y 20 Well Screen 100 SM

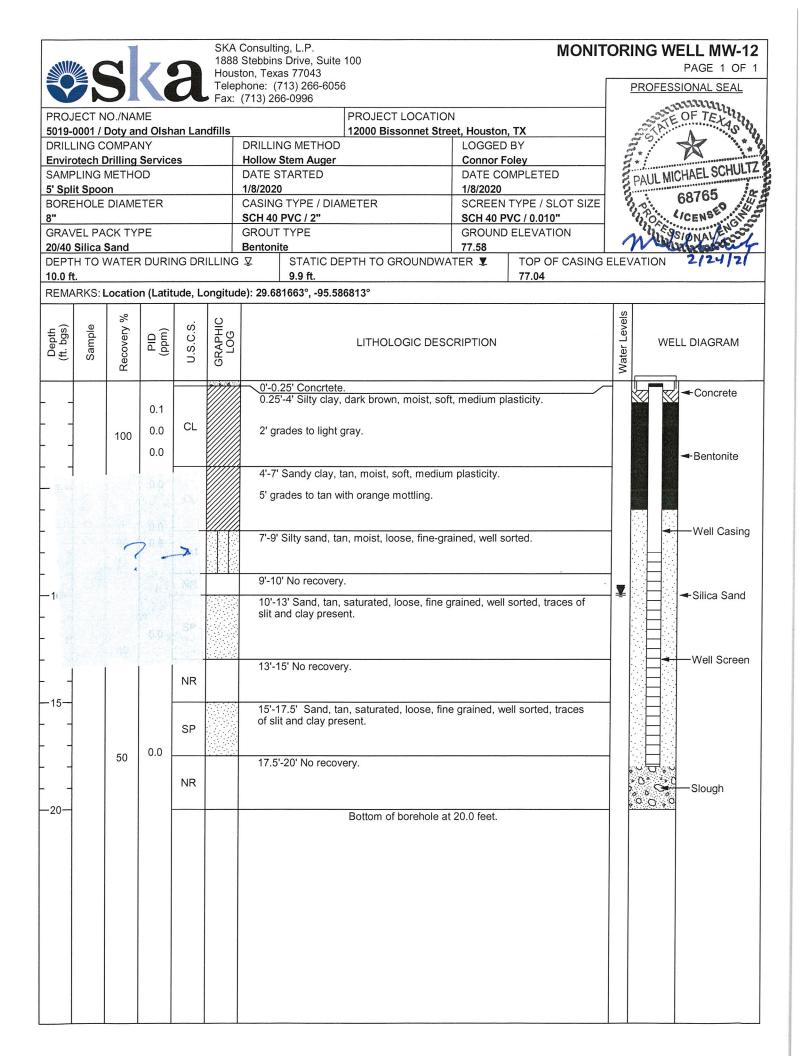
Slough

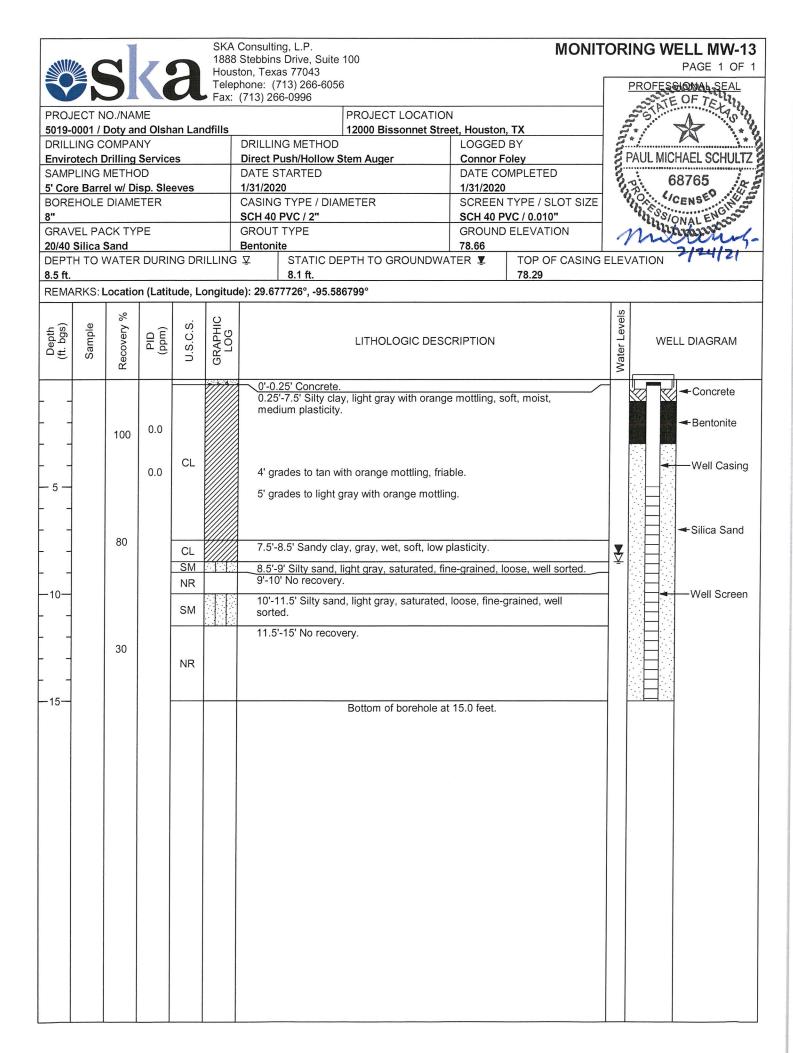
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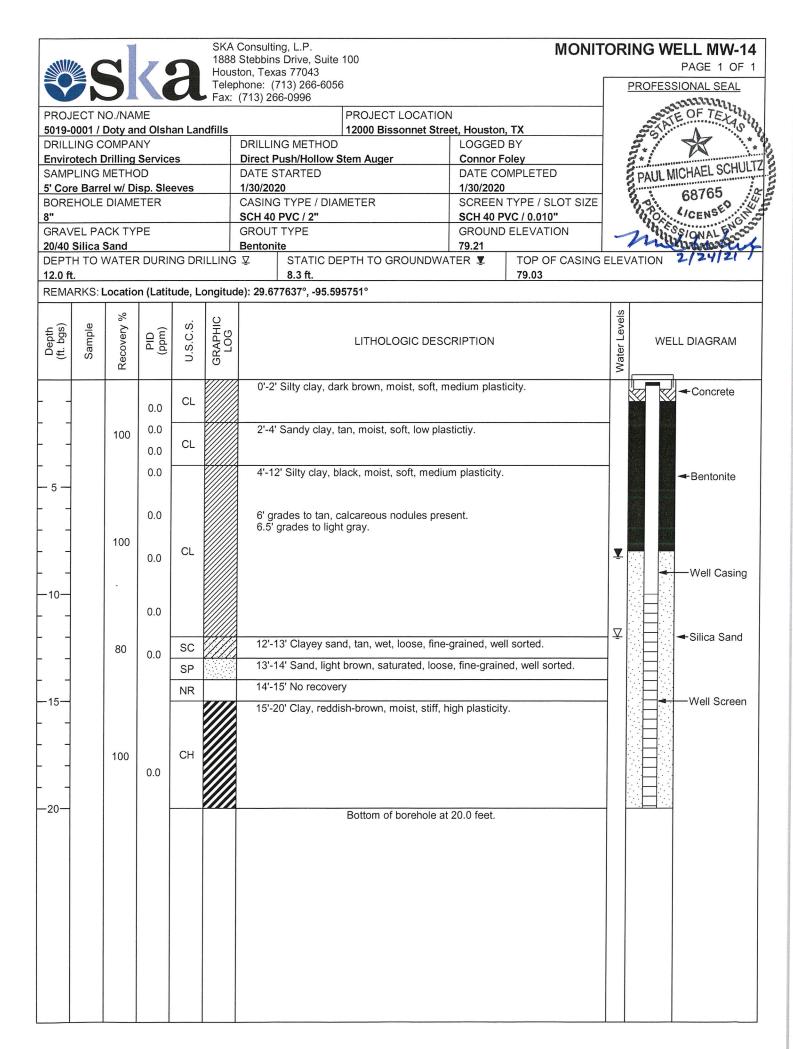
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SKA Consutling, L.P. **MONITORING WELL MW-10** 1888 Stebbins Drive, Suite 100 PAGE 1 OF 1 Houston, Texas 77043 Telephone: (713) 266-6056 PROFESSIONAL SEAL Fax: (713) 266-0996 PROJECT NO./NAME PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX DRILLING METHOD DRILLING COMPANY LOGGED BY **Envirotech Drilling Services** Direct Push/Hollow Stem Auger Chris Siegel DATE COMPLETED SAMPLING METHOD DATE STARTED 7/1/2019 4' Core Barrel w/ Disp. Sleeves 7/1/2019 CASING TYPE / DIAMETER **BOREHOLE DIAMETER** SCREEN TYPE / SLOT SIZE 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 20/40 Silica Sand **Bentonite** 83.26 DEPTH TO WATER DURING DRILLING ♀ STATIC DEPTH TO GROUNDWATER I TOP OF CASING ELEVATION 86.22 REMARKS: Location (Latitude, Longitude): 29.677891°, -95.594149° Water Levels GRAPHIC LOG U.S.C.S. Sample Depth (ft. bgs) Recovery PID (ppm) LITHOLOGIC DESCRIPTION WELL DIAGRAM 0'-7' Fill: Clay, gray, high plasticity, soft, moist. Concrete 100 FILL 5 Bentonite 100 7'-12' Fill: gray clay and waste materials (plastic trash bags). **FILL** 10-100 -Well Casing 12'-14' Clay, brown, high plasticity, moist, soft. СН ∇ Silica Sand 100 14'-24' Silty sand, brown, loose, fine grained, saturated. V Well Screen 100 SM 20 100 Slough Bottom of borehole at 24.0 feet.

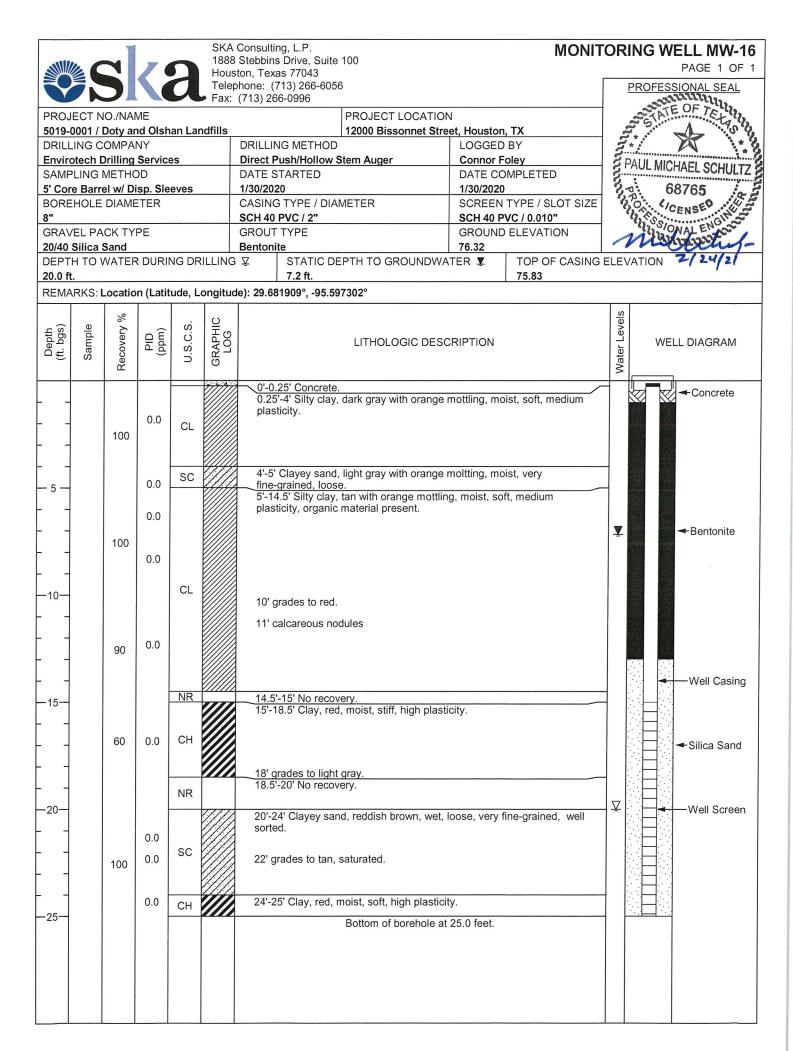


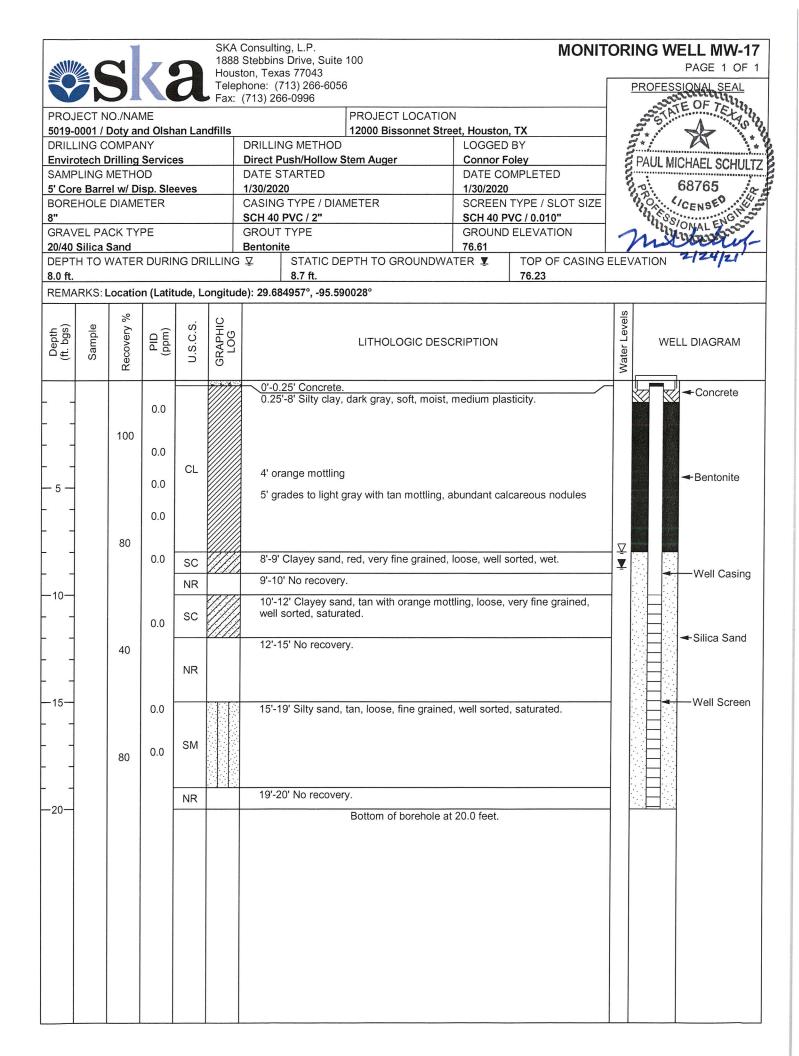


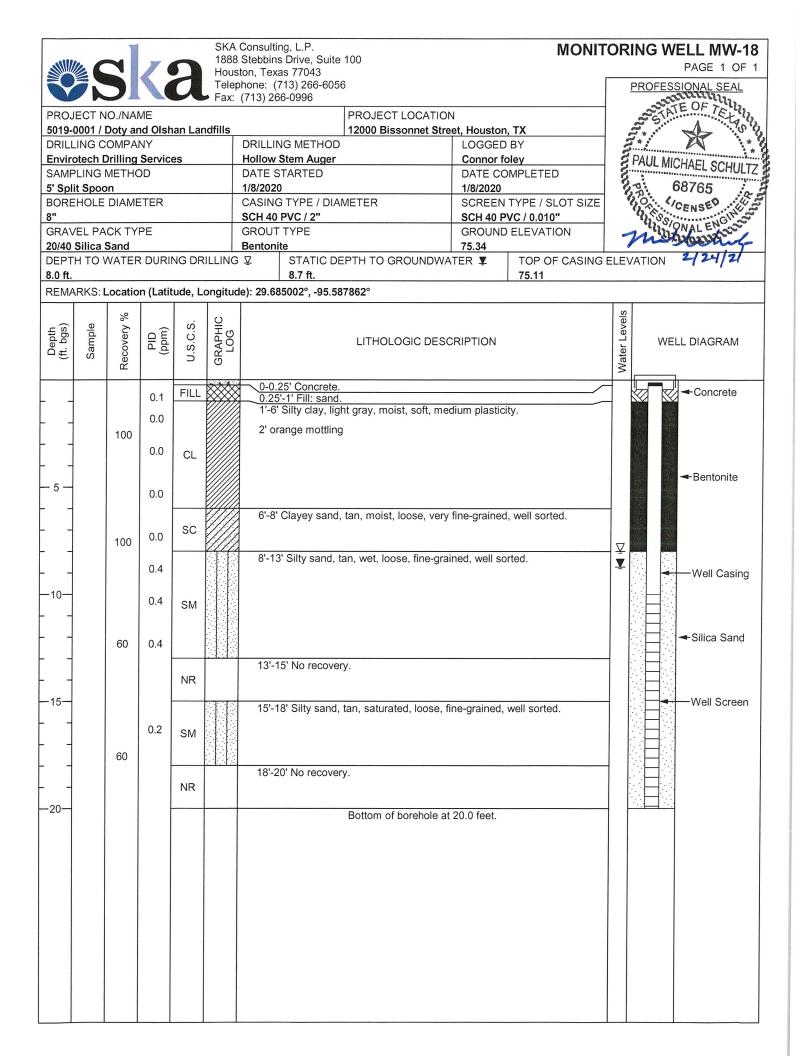




SKA Consulting, L.P. **MONITORING WELL MW-15** 1888 Stebbins Drive, Suite 100 PAGE 1 OF 1 Houston, Texas 77043 Telephone: (713) 266-6056 PROFESSIONAL SEAL Fax: (713) 266-0996 188838383838 PROJECT LOCATION PROJECT NO./NAME 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX **DRILLING COMPANY DRILLING METHOD** LOGGED BY **Envirotech Drilling Services** Hollow Stem Auger Connor Foley PAUL MICHAEL SCHULTZ SAMPLING METHOD DATE STARTED DATE COMPLETED 5' Split Spoon 1/9/2020 1/9/2020 68765 BOREHOLE DIAMETER SCREEN TYPE / SLOT SIZE CASING TYPE / DIAMETER 8" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 20/40 Silica Sand 79.28 DEPTH TO WATER DURING DRILLING ♀ STATIC DEPTH TO GROUNDWATER \(\mathbb{T}\) TOP OF CASING ELEVATION 20.0 ft. 10.2 ft. 79.02 REMARKS: Location (Latitude, Longitude): 29.679595°, -95.596956° Water Levels GRAPHIC LOG U.S.C.S. Sample Depth (ft. bgs) Recovery PID (ppm) LITHOLOGIC DESCRIPTION WELL DIAGRAM 0'-0.25' Concrete. Concrete 0.25'-8' Silty clay, black, moist, soft, medium plasticity. 0.4 100 CL 5 0.1 6' grades to light gray with orange mottling, abundant calcareous nodules. 0.0 100 Bentonite 8'-9' Clay, light gray with orange mottling, moist, soft, high plasticity. CH 0.1 9'-10' No recovery. NR **V** 10'-14' Silty clay, light gray with orange mottling, very moist, soft, medium plasticity. 0.0 CL 100 0.0 14'-21.5' Clay, red with gray mottling, moist, soft, high plasticity. 15' stiff 0.1 Well Casing 100 0.0 ∇ 20 20' wet 0.0 Silica Sand 21.5'-30' No recovery. Apparent saturated sand. 30 Well Screen 25 NR 0





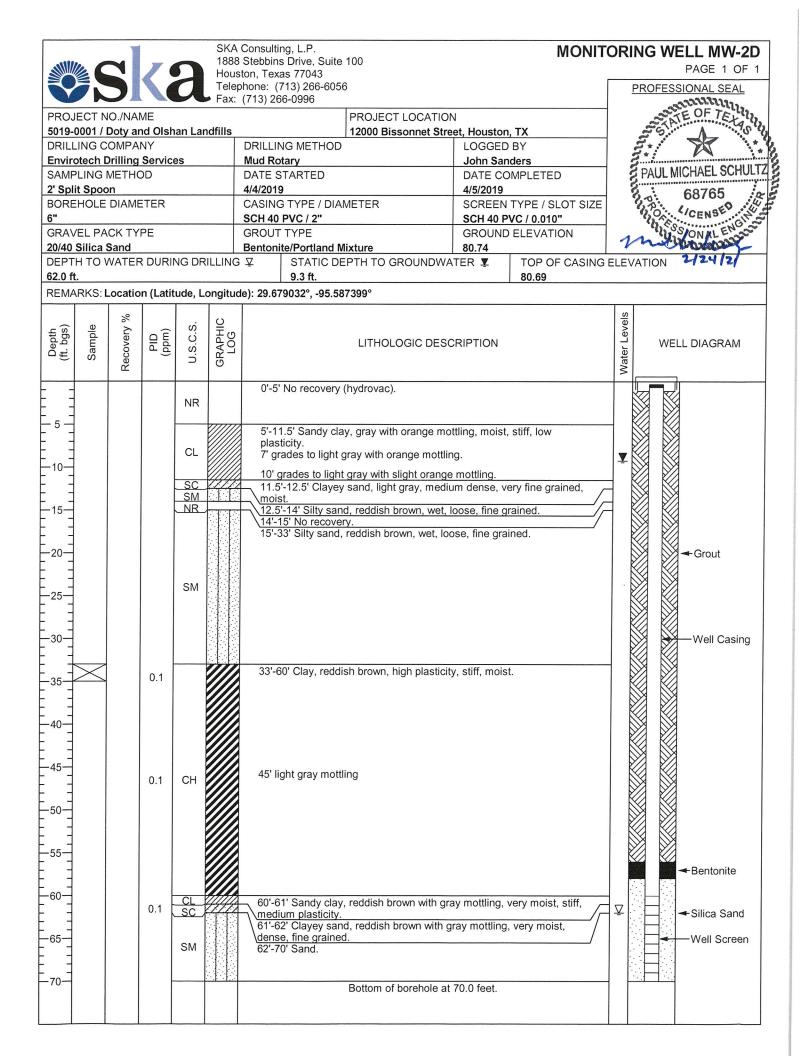


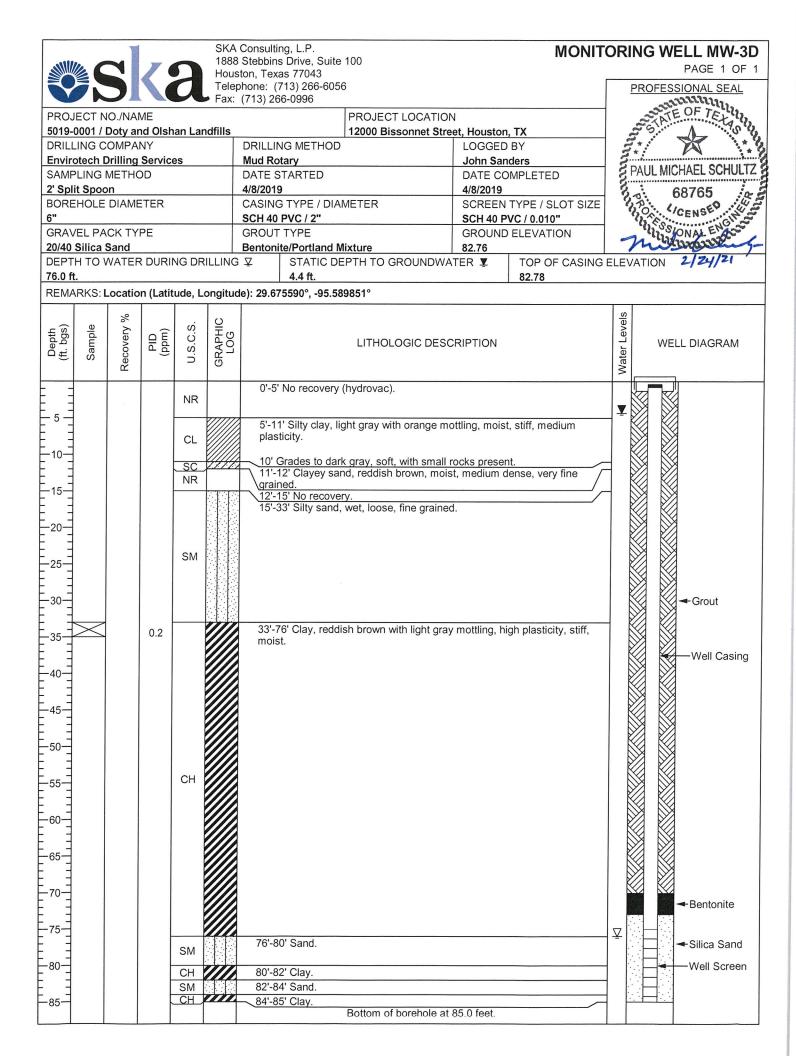
SKA Consulting, L.P. **MONITORING WELL MW-1D** 1888 Stebbins Drive, Suite 100 PAGE 1 OF 1 Houston, Texas 77043 Telephone: (713) 266-6056 PROFESSIONAL SEAL Service Contraction Fax: (713) 266-0996 PROJECT LOCATION PROJECT NO./NAME 12000 Bissonnet Street, Houston, TX 5019-0001 / Doty and Olshan Landfills **DRILLING COMPANY DRILLING METHOD** LOGGED BY **Envirotech Drilling Services** Mud Rotary John Sanders PAUL MICHAEL SCHUL SAMPLING METHOD DATE STARTED DATE COMPLETED 2' Split Spoon 4/5/2019 4/5/2019 68765 **BOREHOLE DIAMETER** CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 6" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** Bentonite/Portland Mixture 20/40 Silica Sand STATIC DEPTH TO GROUNDWATER I TOP OF CASING ELEVATION 63.0 ft. 4.9 ft. 79.26 REMARKS: Location (Latitude, Longitude): 29.681942°, -95.587453° Water Levels GRAPHIC LOG Sample Depth (ft. bgs) Recovery U.S.C.S. PID (ppm) LITHOLOGIC DESCRIPTION WELL DIAGRAM 0-5' No recovery (hydrovac). NR 5 5'-7' Sandy clay, soft, low plasticity, moist. CL 7'-10' Silty sand, reddish brown, dry, loose, fine grained. SM 10-15' Clayey sand, light gray, very moist, medium dense, very fine SC 12.5' grades to wet, loose, sand content increasing with depth. 15'-17.5' Silty sand, reddish brown, loose, fine grained, wet. SM 17.5'-20' No recovery. NR 20'-46.5' Silty sand, reddish brown, wet, loose, fine grained. Grout 30 Well Casing SM 35 40 0.2 46.5'-63' Clay, reddish brown with gray mottling, stiff, high plasticity. -50 -55 -60 Bentonite ∇ 63'-75' Sand. 65

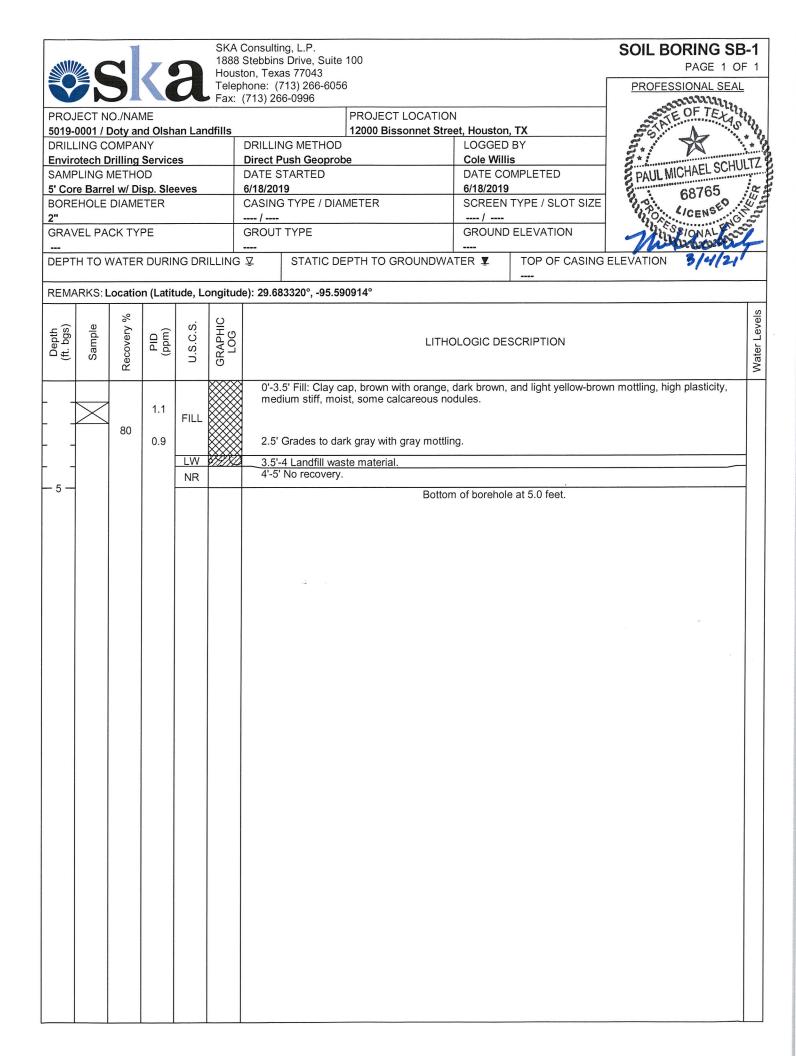
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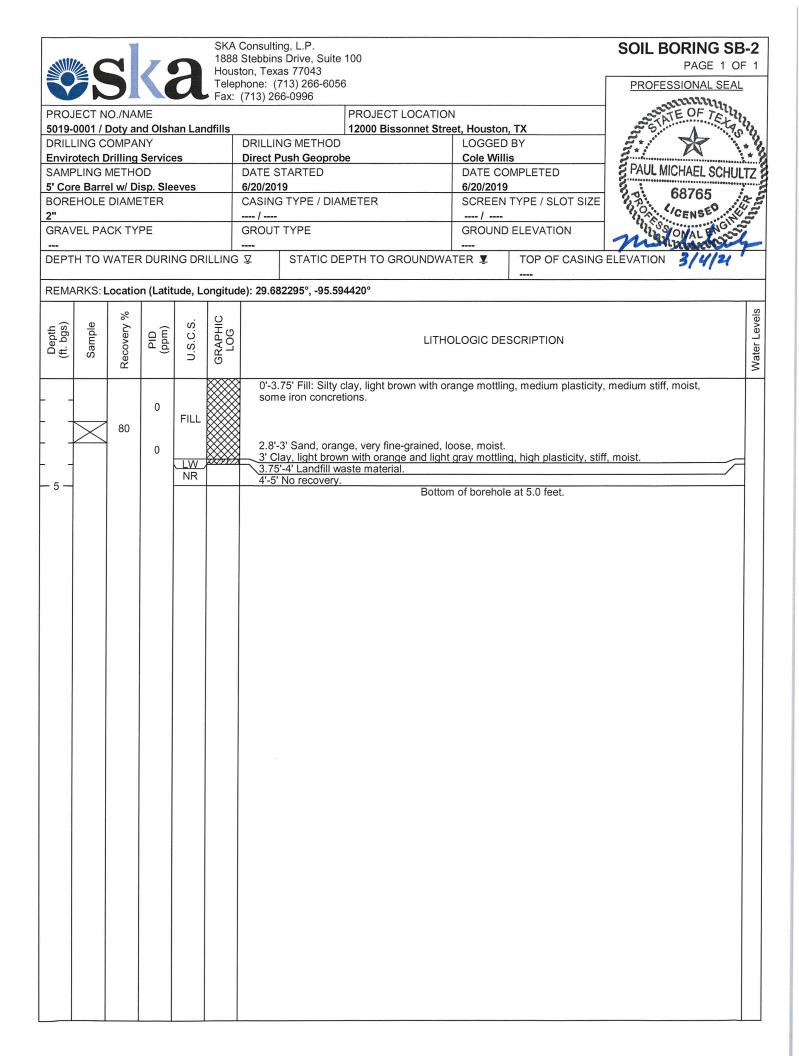
←Silica Sand

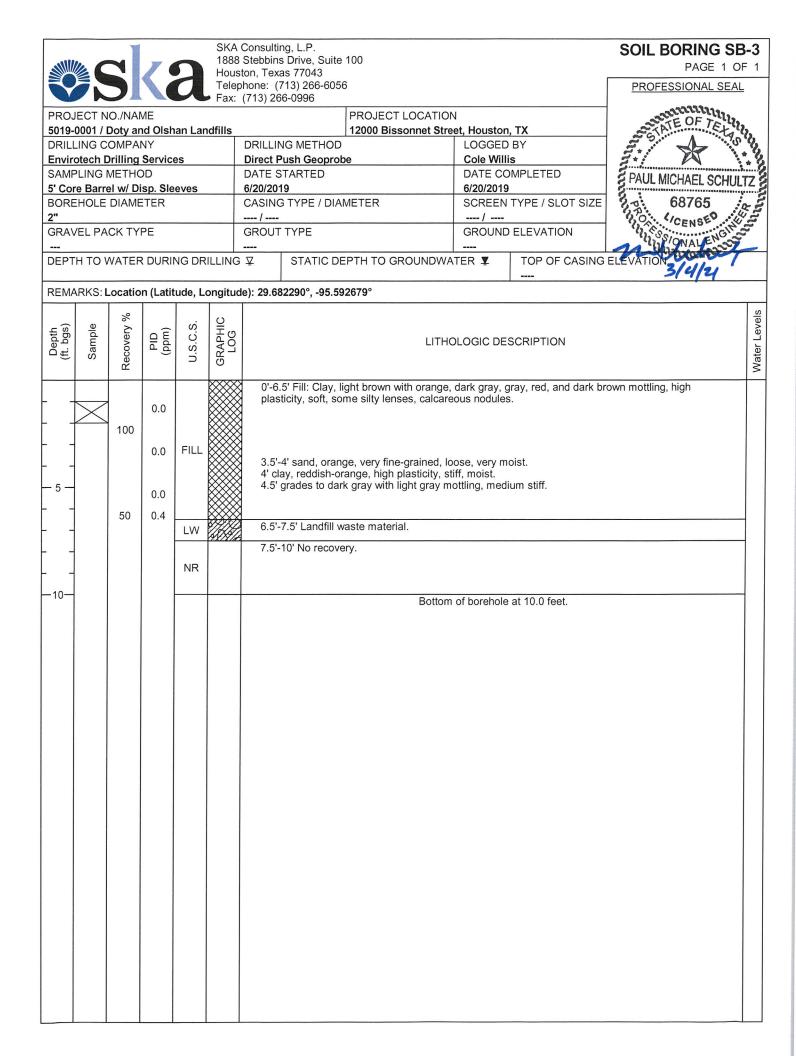
Well Screen

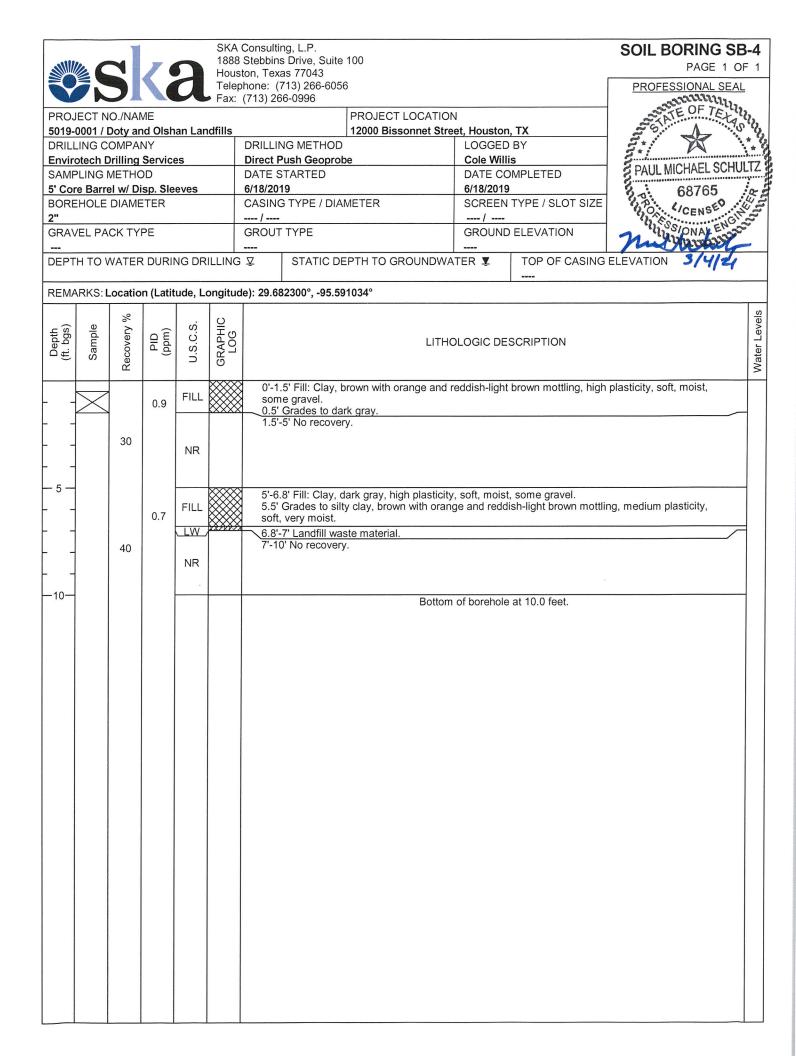


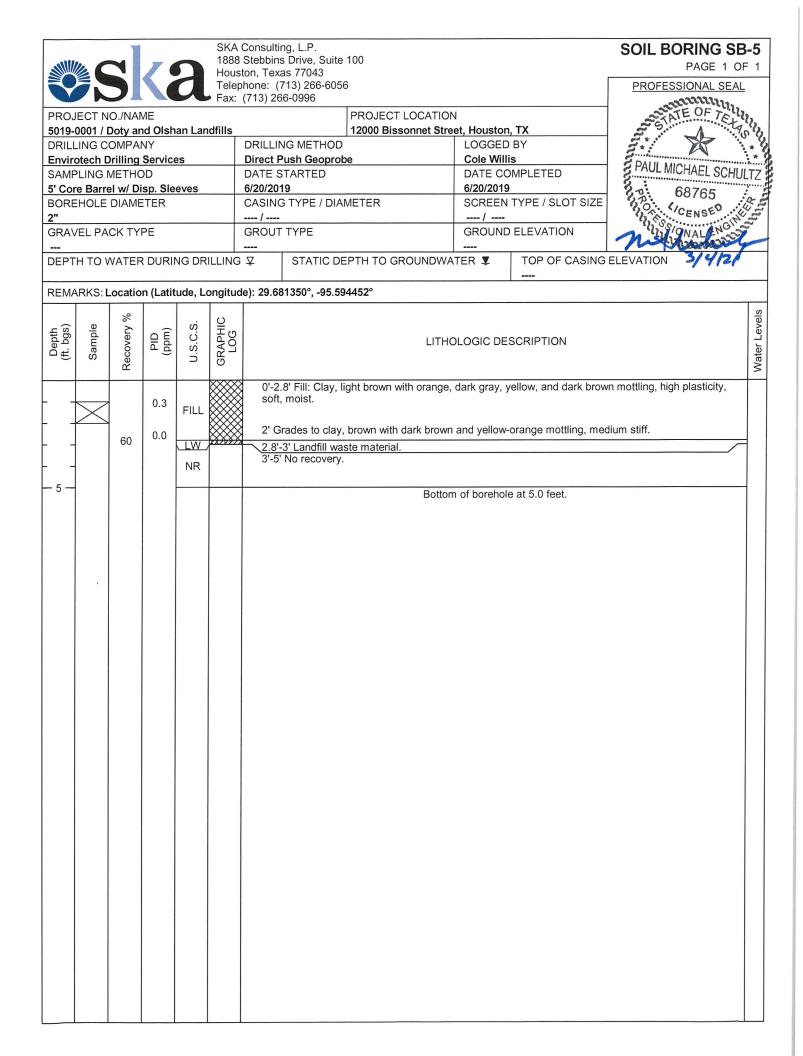


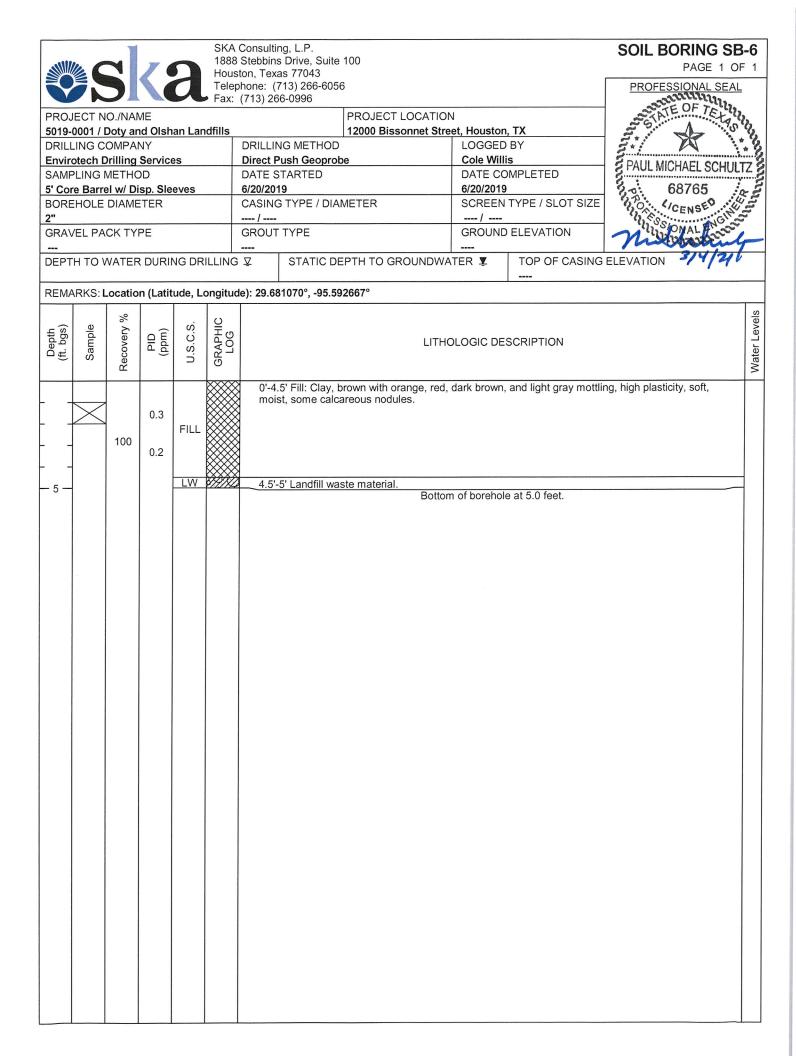














SAMPLING METHOD

2"

BOREHOLE DIAMETER

GRAVEL PACK TYPE

5' Core Barrel w/ Disp. Sleeves

SKA Consulting, L.P. 1888 Stebbins Drive, Suite 100 Houston, Texas 77043 Telephone: (713) 266-6056

6/18/2019

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SOIL BORING SB-7

PAGE 1 OF 1

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PAUL MICHAEL SCHULTZ

68765

PROJECT LOCATION

STATIC DEPTH TO GROUNDWATER ₹

12000 Bissonnet Street, Houston, TX **DRILLING METHOD** LOGGED BY Direct Push Geoprobe Cole Willis DATE COMPLETED DATE STARTED 6/18/2019 SCREEN TYPE / SLOT SIZE CASING TYPE / DIAMETER

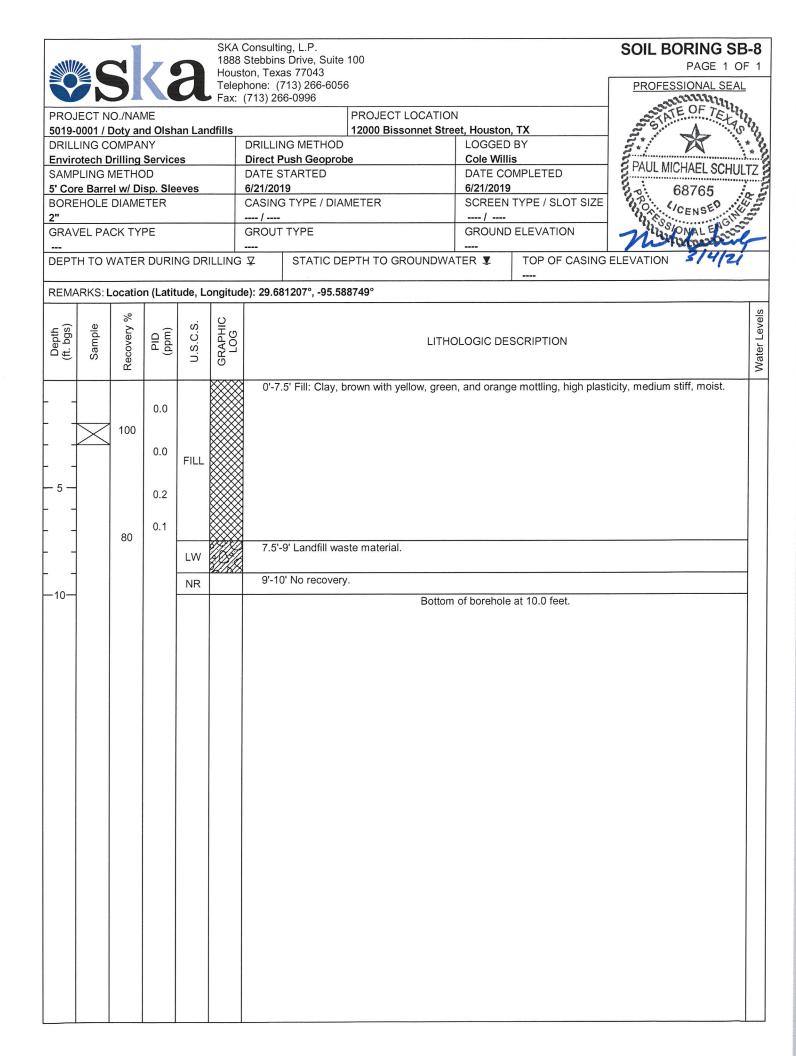
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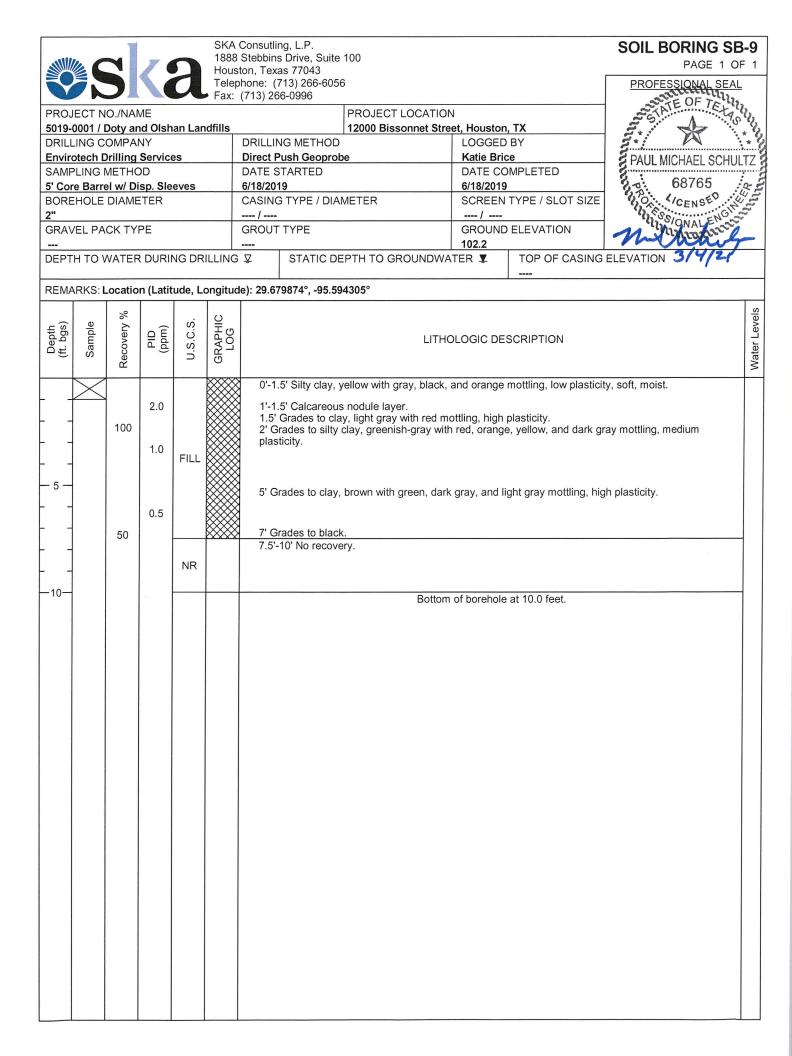
GROUND ELEVATION GROUT TYPE

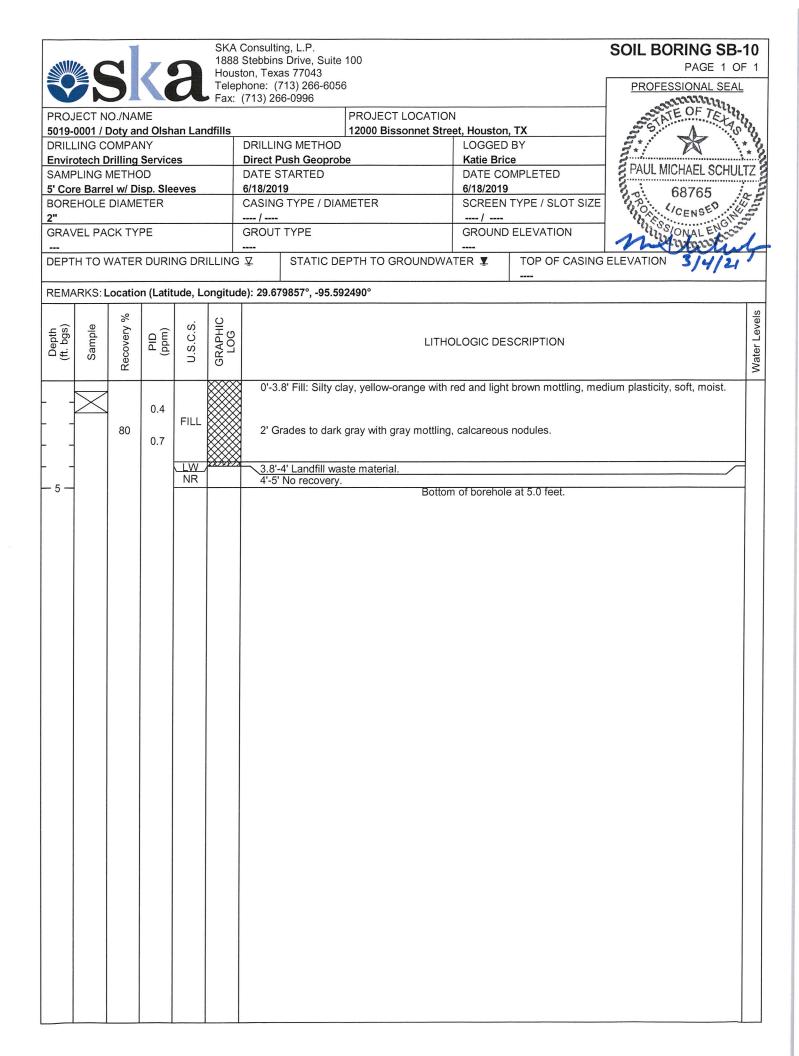
TOP OF CASING ELEVATION

REMARKS: Location (Latitude, Longitude); 29.681078°, -95.590844°

REMA	MARKS: Location (Latitude, Longitude): 29.681078°, -95.590844°											
Depth (ft. bgs)	Sample	Recovery %	PID (ppm)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels					
	\times	40	0.7	FILL		0'-2' Fill: Silty clay, light brown with orange and black mottling, medium plasticity, soft, moist. 1' Grades to clay, brown with orange, red, and dark brown mottling, medium stiff. 2'-5' No recovery.						
5 -				NR								
 		90	0.8	FILL		5'-9.5' Fill: Clay, brown with orange, red, and dark brown mottling, medium plasticity, medium stiff, moist.						
			0.6	NR		8' grades to dark gray with gray mottling, high plasticity, stiff. 9.5'-10' No recovery. 10'-10.8' Clay, dark gray with gray mottling, high plasticity, stiff, moist.	-					
		20	0.9	FILL		10'-10.8' Clay, dark gray with gray mottling, high plasticity, stiff, moist. 10.8'-11' Landfill waste material. 11'-15' No recovery.						
				NR		Bottom of borehole at 15.0 feet.						
						Bottom of borenole at 15.0 feet.						









DEPTH TO WATER DURING DRILLING ♀

SKA Consulting, L.P. 1888 Stebbins Drive, Suite 100 Houston, Texas 77043

Telephone: (713) 266-6056 Fax: (713) 266-0996

PROJECT LOCATION

5019-0001 / Doty and Olshan Landfills	12000 Bissonnet Stre	et, Houston, 1X
DRILLING COMPANY	DRILLING METHOD	LOGGED BY
Envirotech Drilling Services	Direct Push Geoprobe	Cole Willis
SAMPLING METHOD	DATE STARTED	DATE COMPLETED
5' Core Barrel w/ Disp. Sleeves	6/18/2019	6/18/2019
BOREHOLE DIAMETER	CASING TYPE / DIAMETER	SCREEN TYPE / SLOT SIZE
2"	/	/
GRAVEL PACK TYPE	GROUT TYPE	GROUND ELEVATION

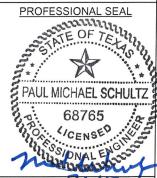
STATIC DEPTH TO GROUNDWATER 💆

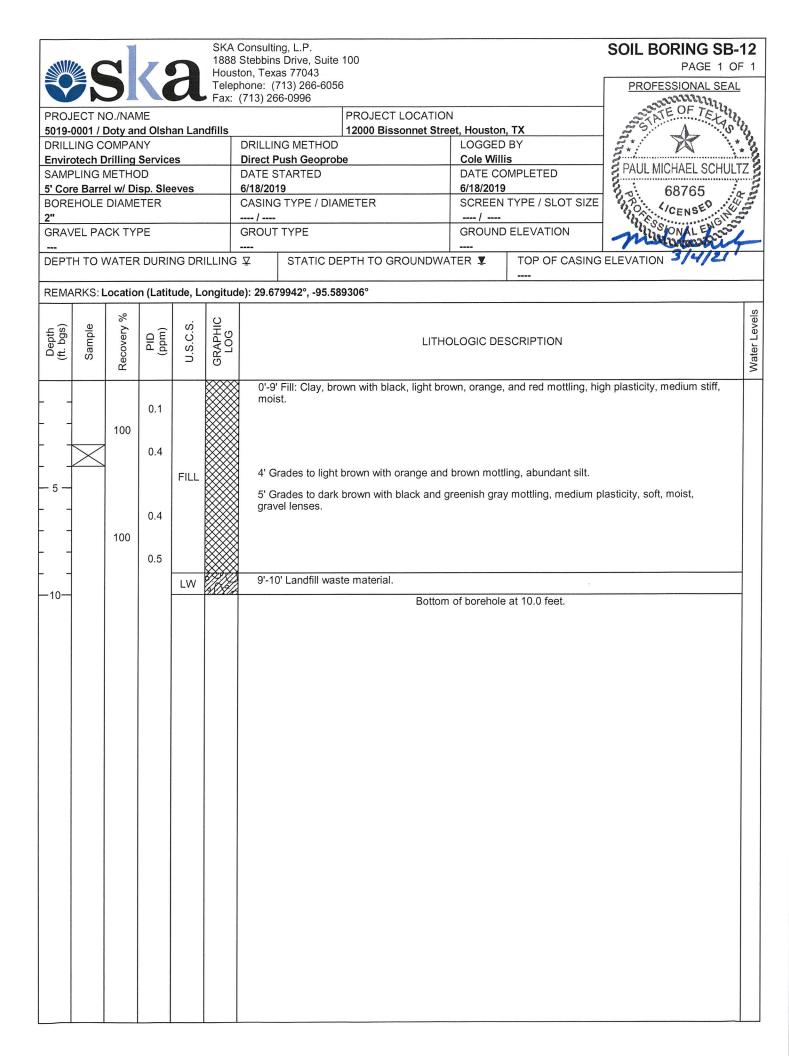
TOP OF CASING ELEVATION

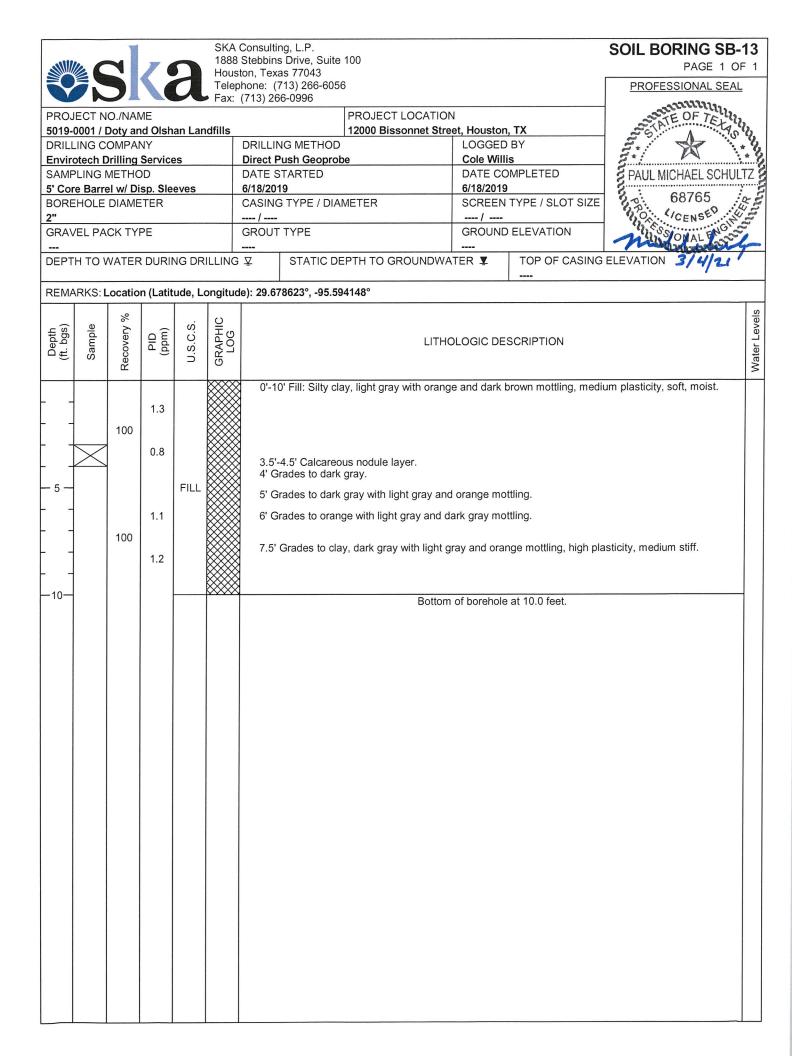
DEF	1110 4	VAILI	COOKII	10 DI	ILLING	₹ STATIC DEPTH TO GROUNDWATER ₹ TOP OF CASING ELEVATION > 1/1-1	
REMARKS: Location (Latitude, Longitude): 29.679884°, -95.590904°							
Depth (ft. bgs)	Sample	Recovery %	OIA (mdd)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	
		80	0.3	FILL		0'-4' Fill: Clay, brown with light gray and orange mottling, high plasticity, medium stiff, moist.	
-				NR	****	4'-5' No recovery.	1
- 5 - 		100	0.5	FILL		5'-10' Fill: Clay, dark brown with light gray and orange mottling, high plasticity, medium stiff, moist.	
 			0.5	1166		7.5'-8' Clayey sand, light brown, fine-grained, loose, moist. 8' Grades to clay, dark gray with dark brown, light gray, and orange mottling, high plasticity, medium stiff, moist.	
						Bottom of borehole at 10.0 feet.	

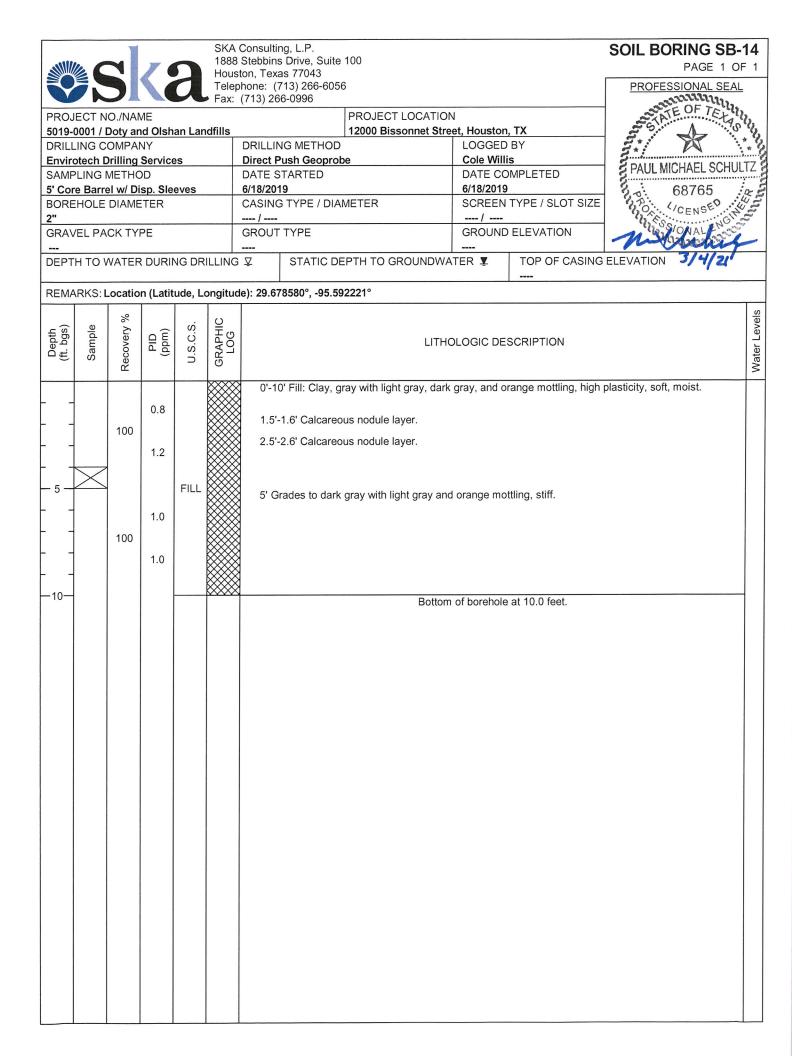
SOIL BORING SB-11

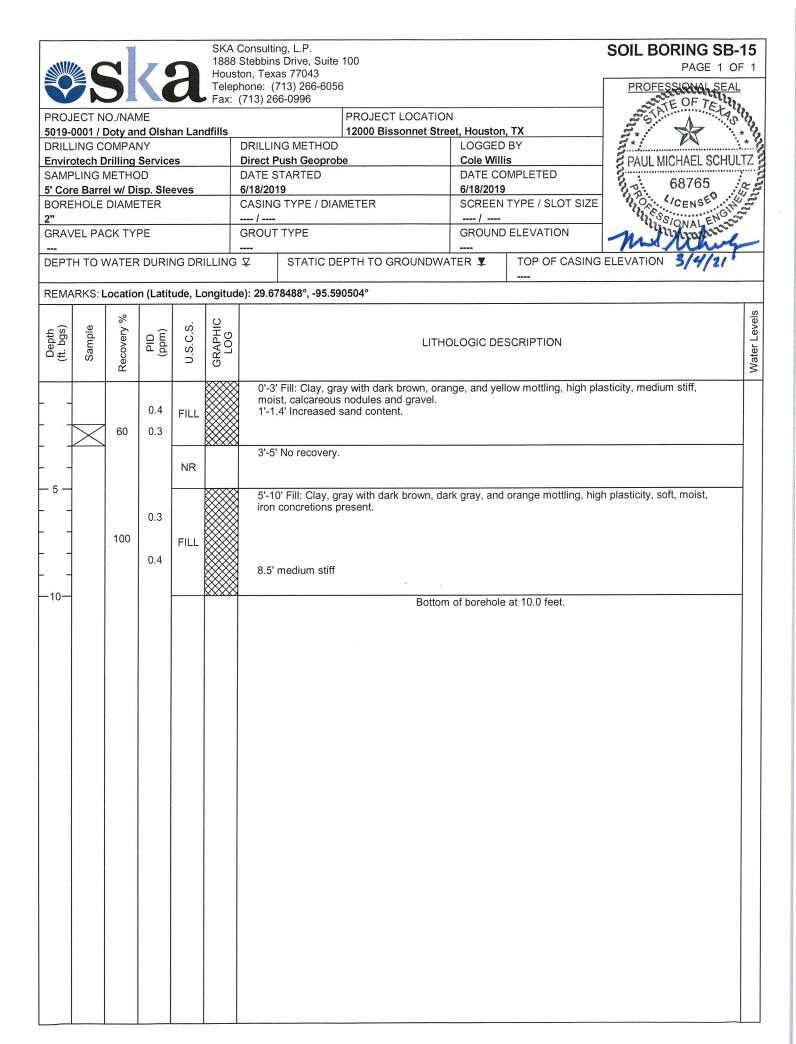
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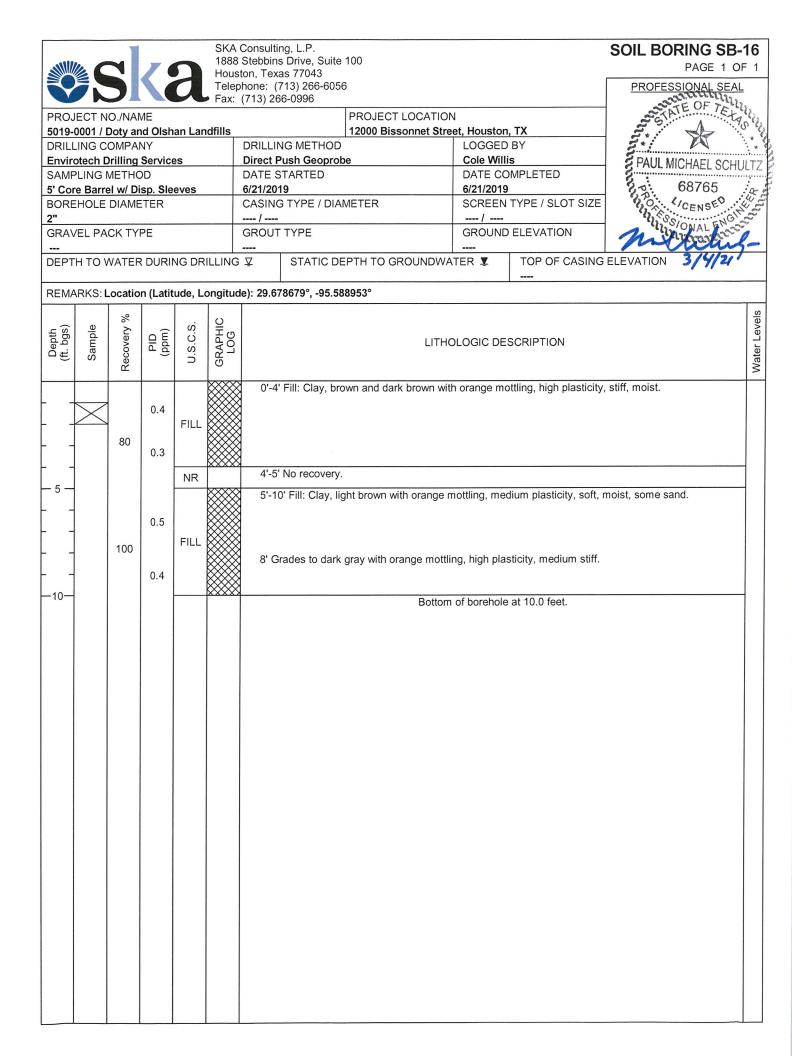


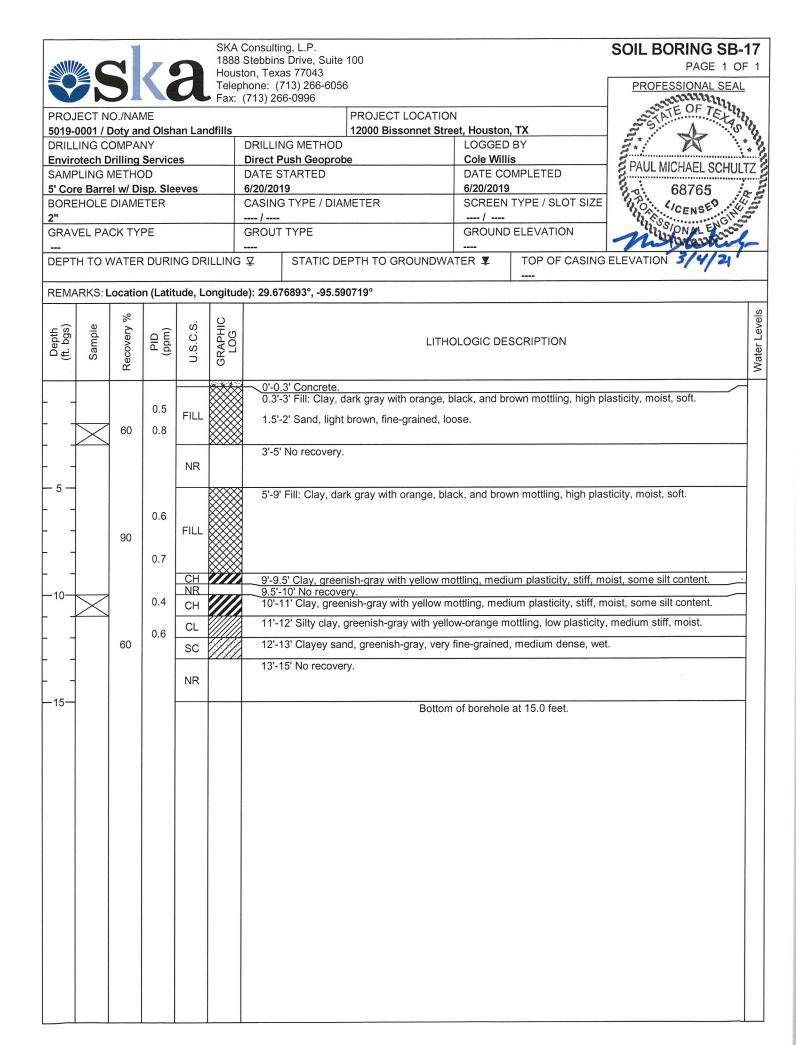


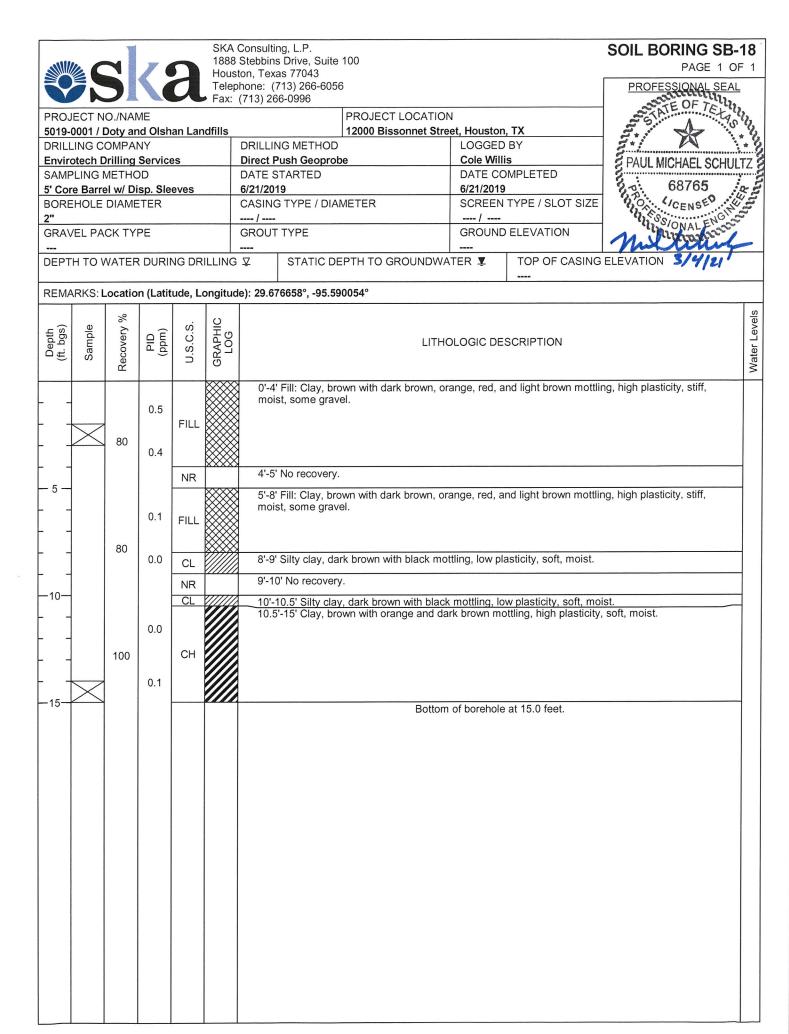


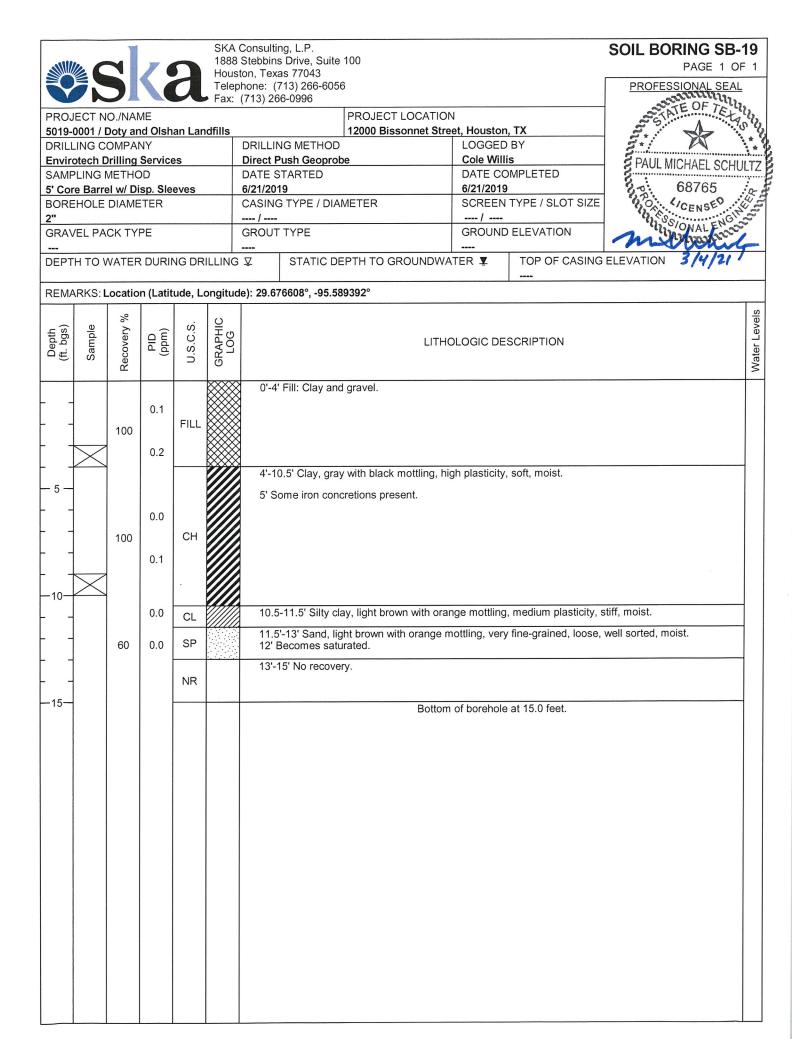


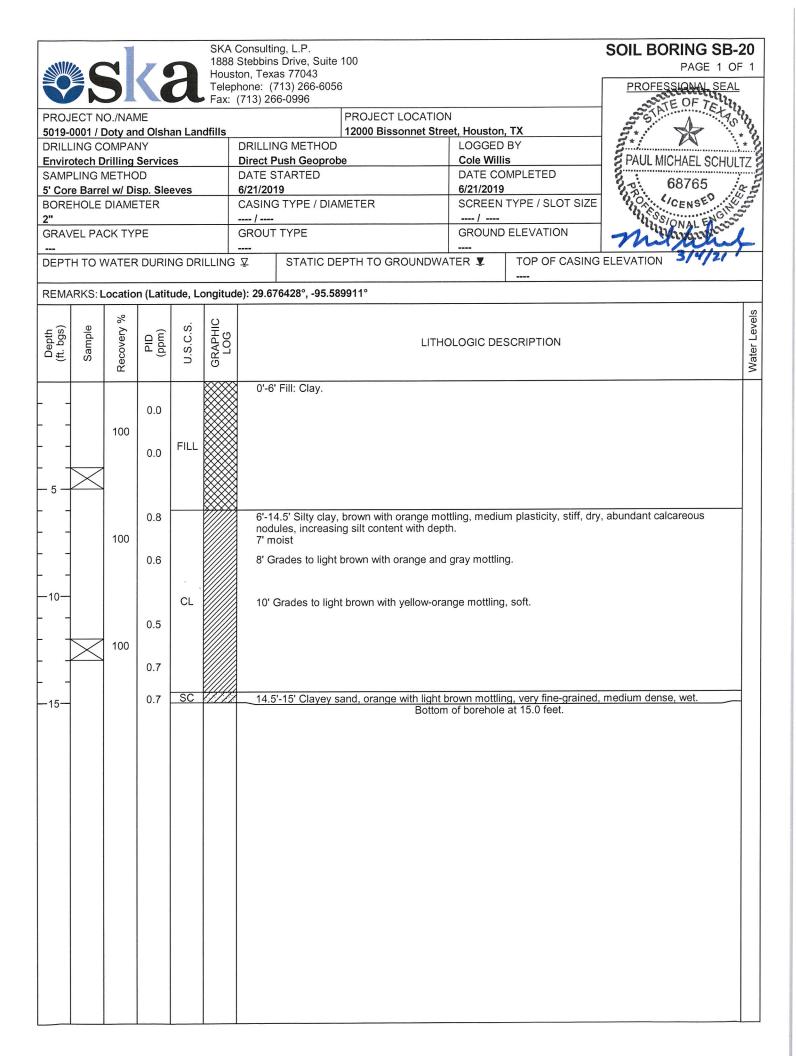


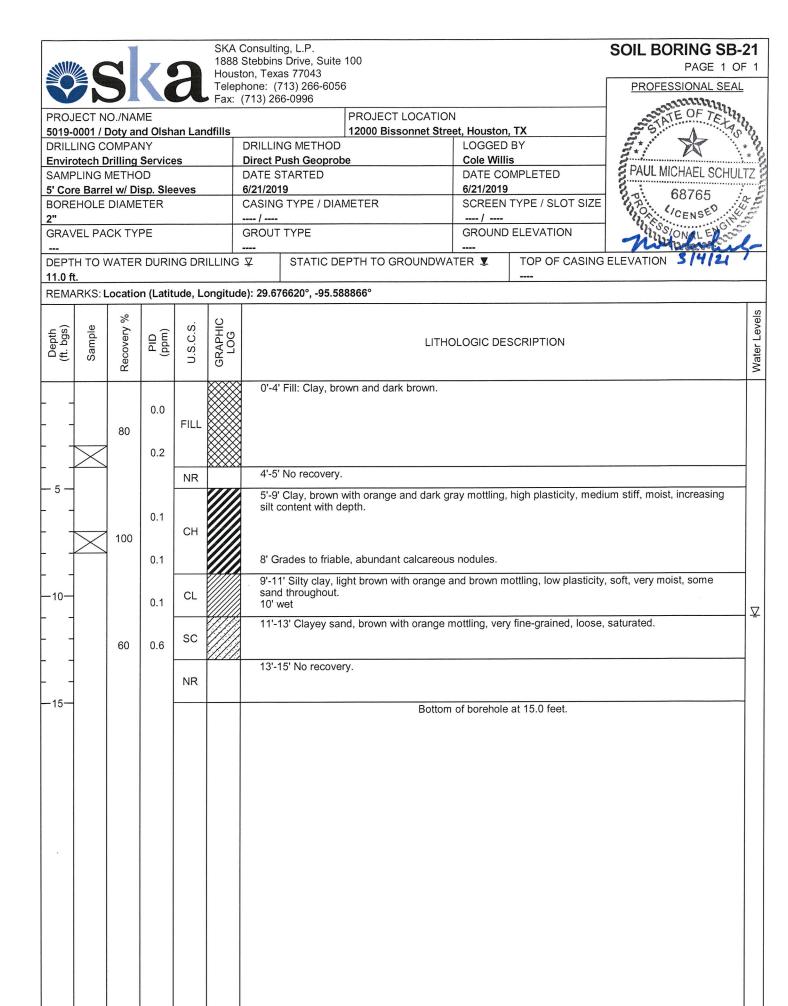


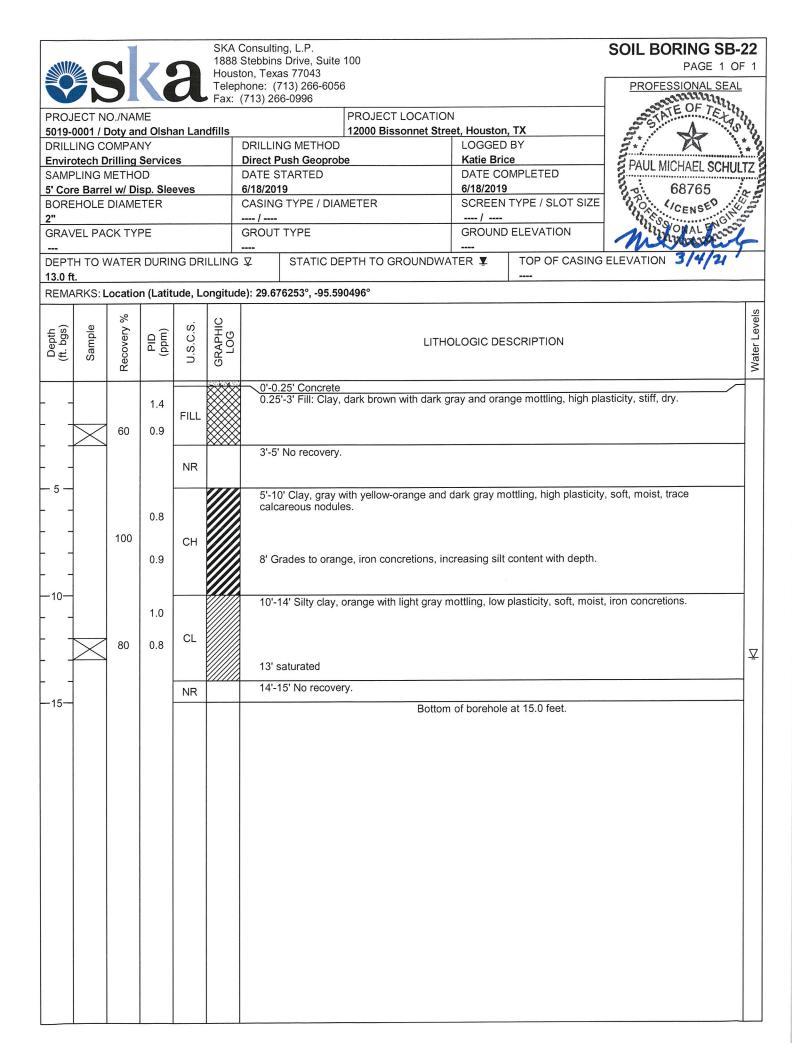


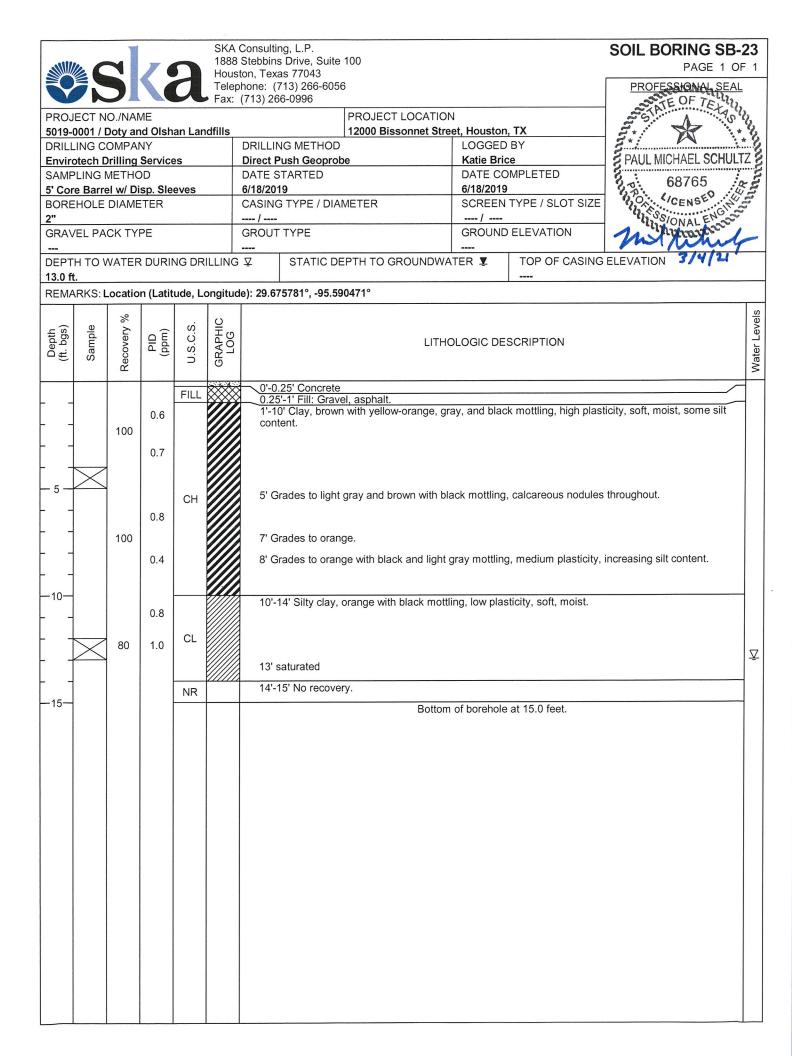


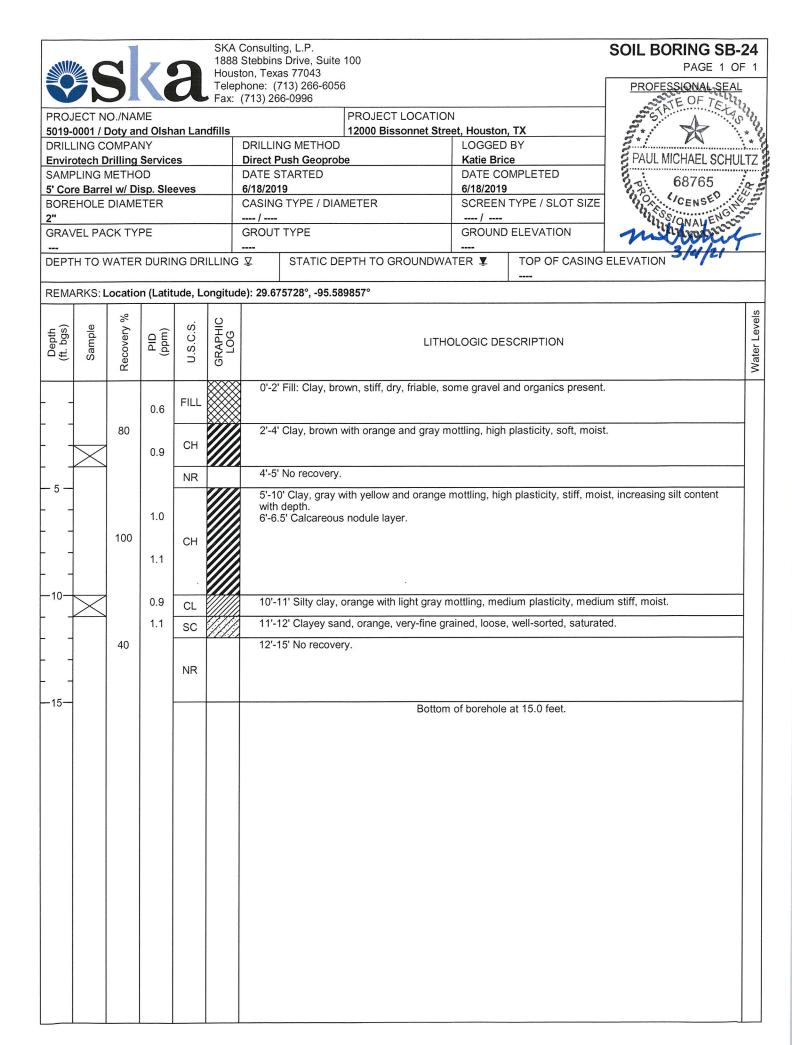




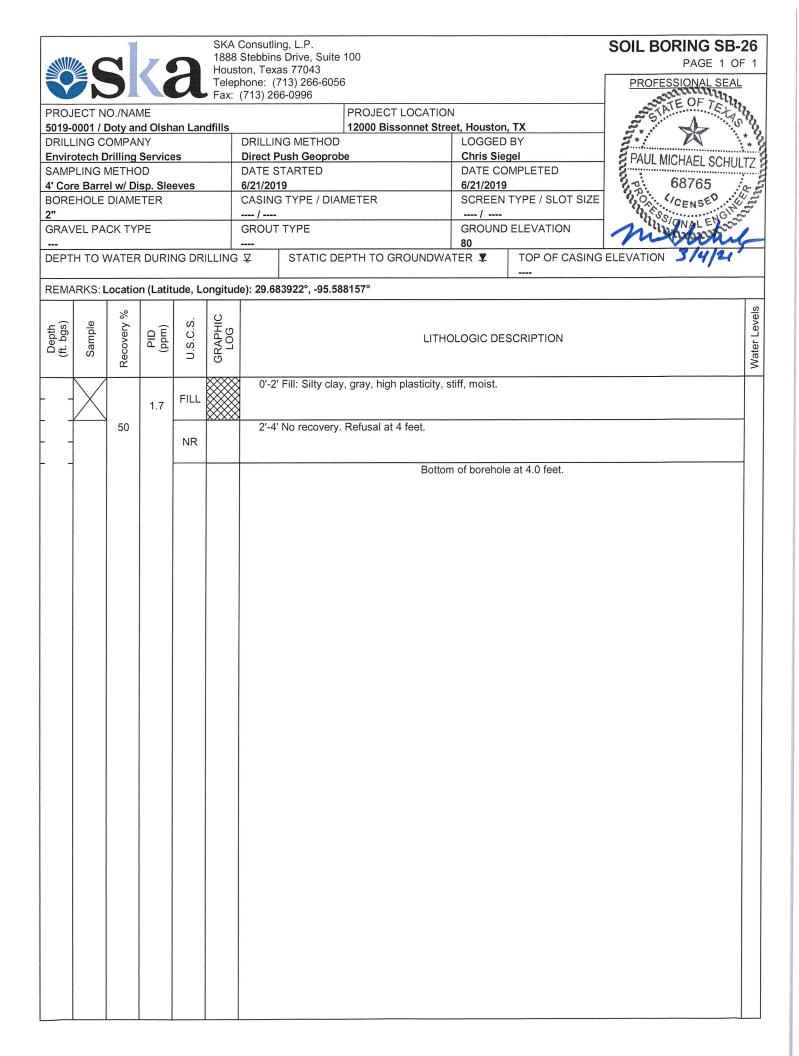


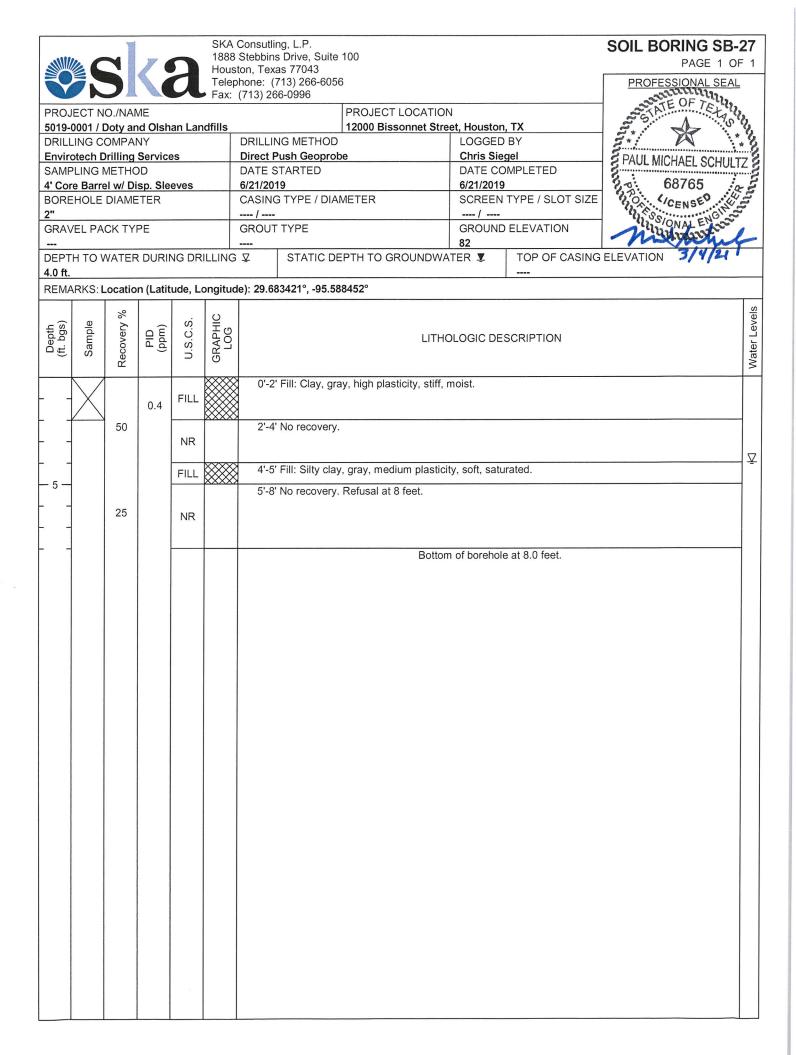


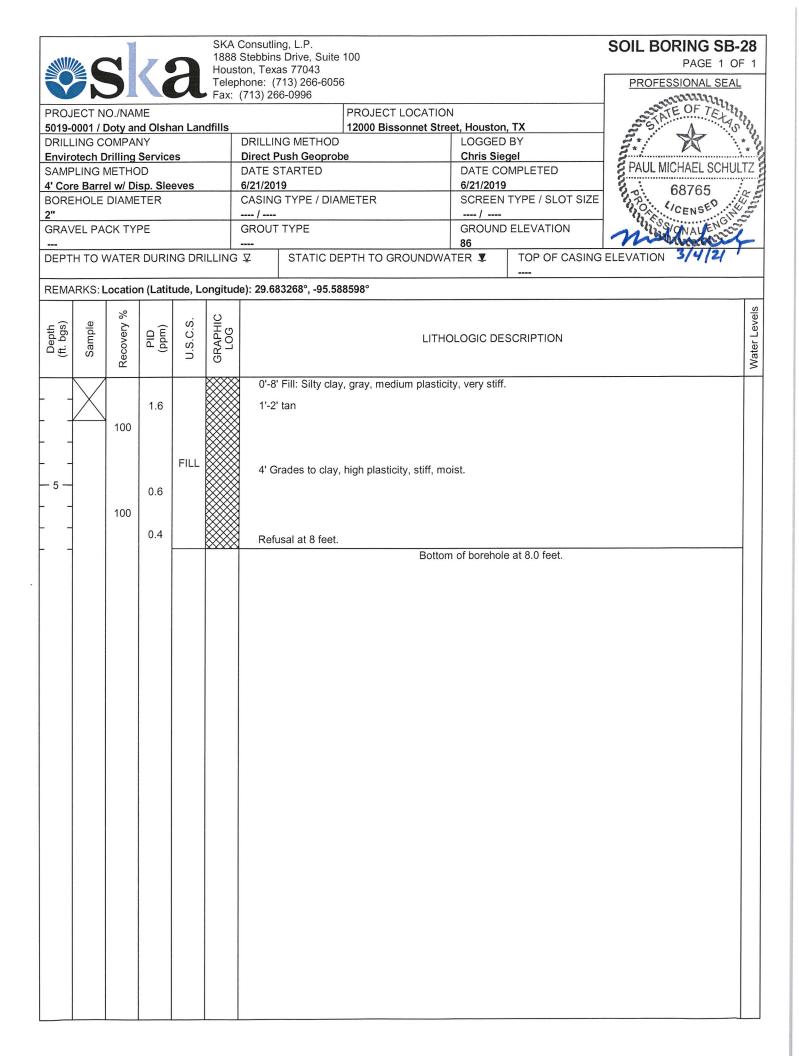


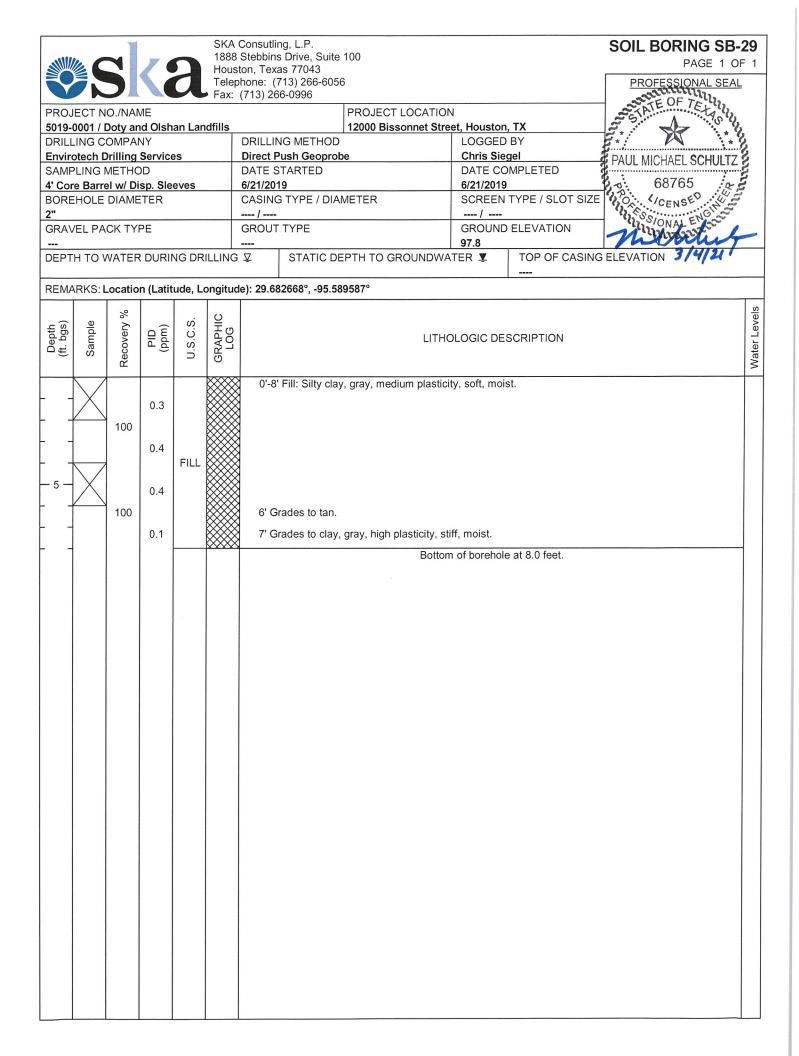


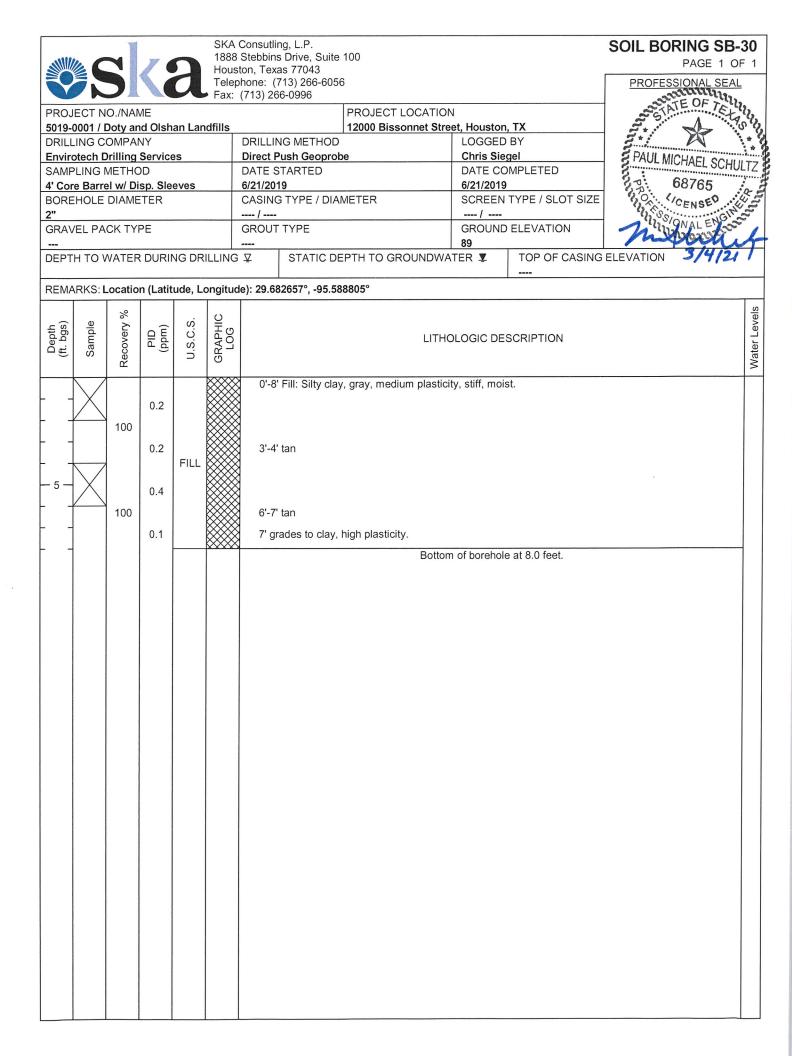


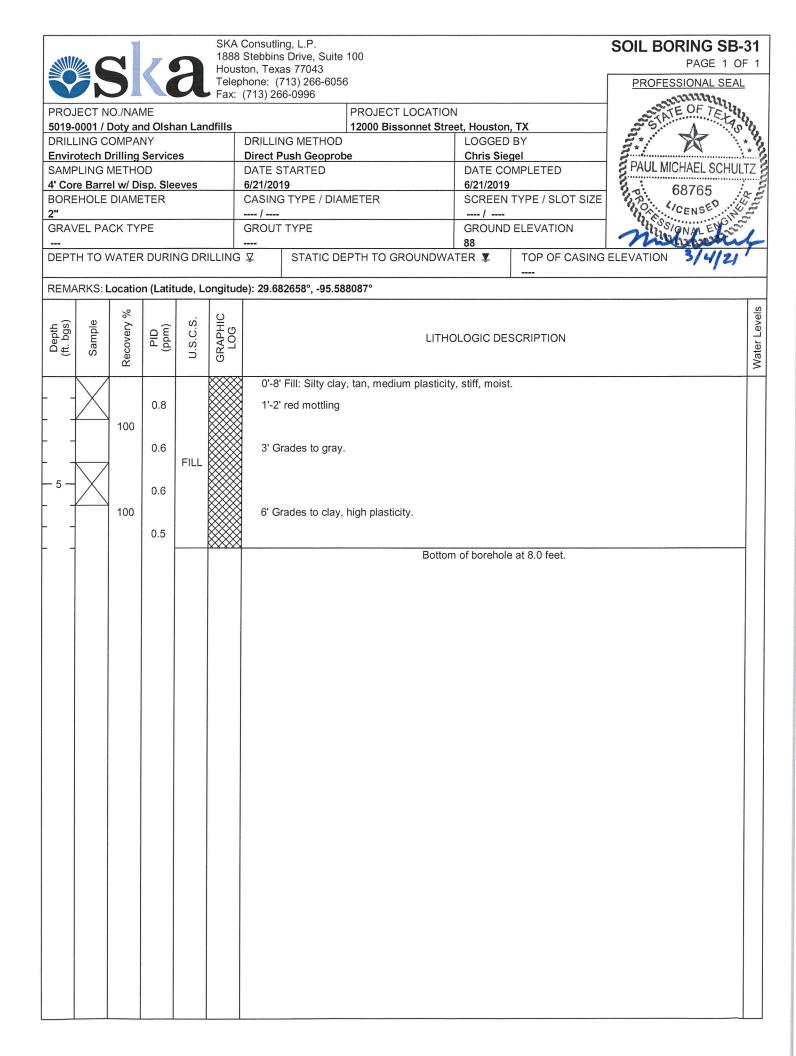




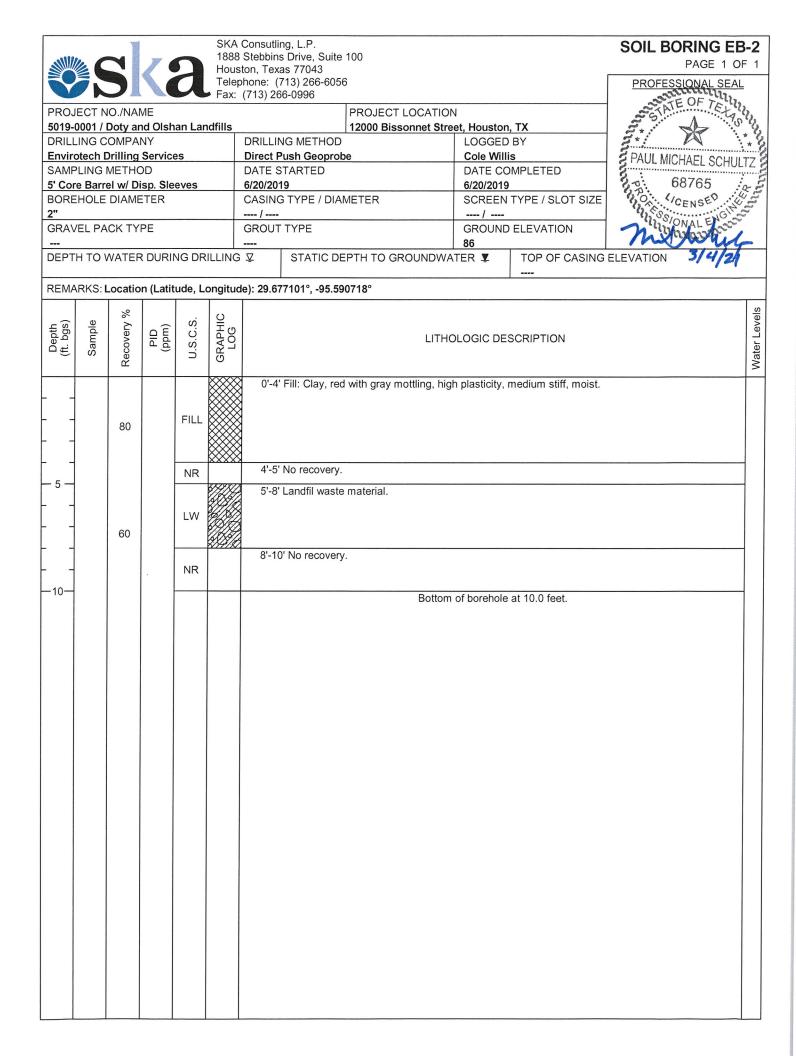


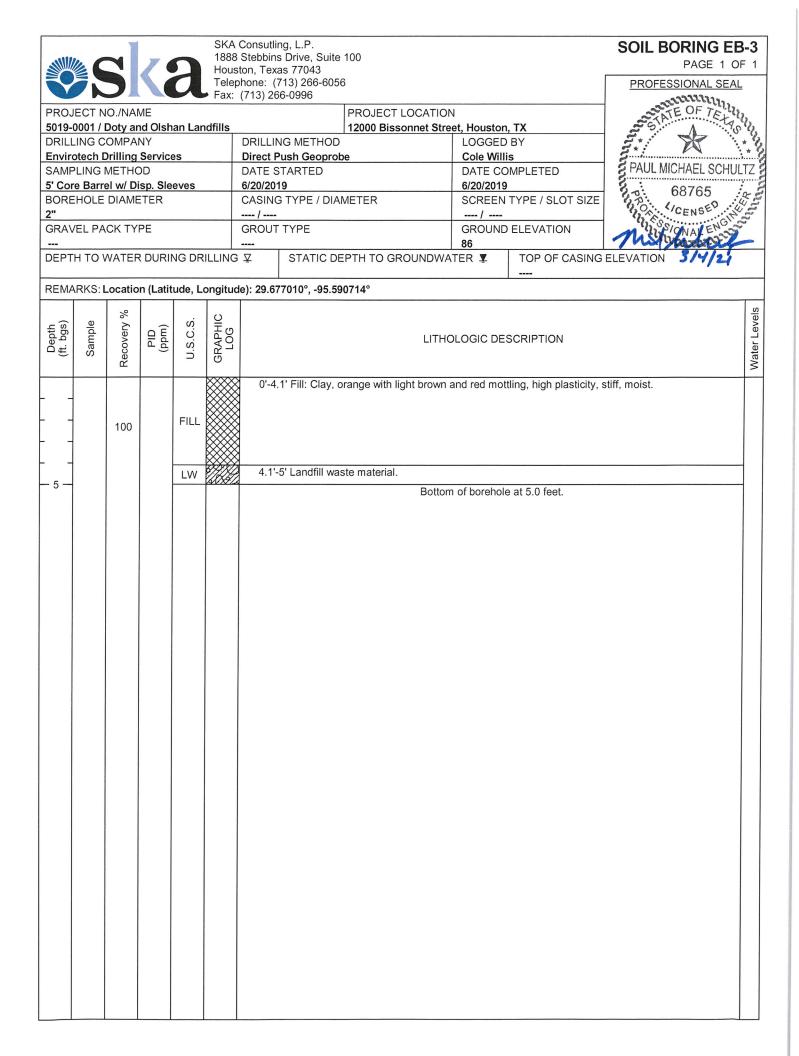


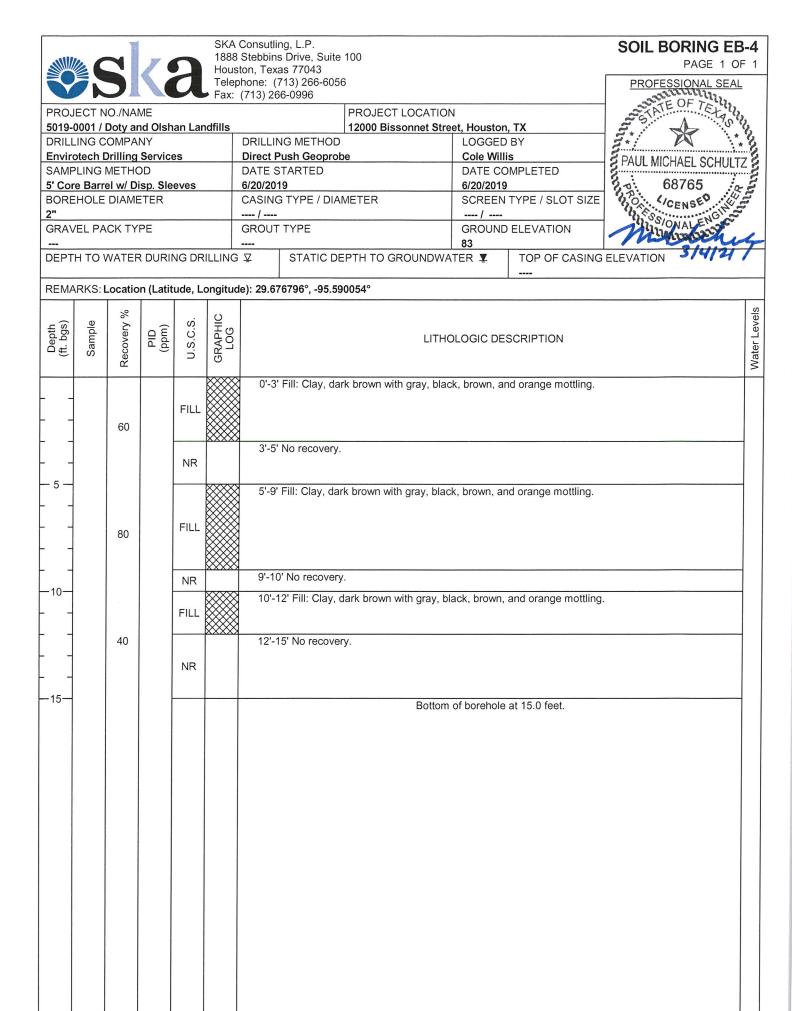


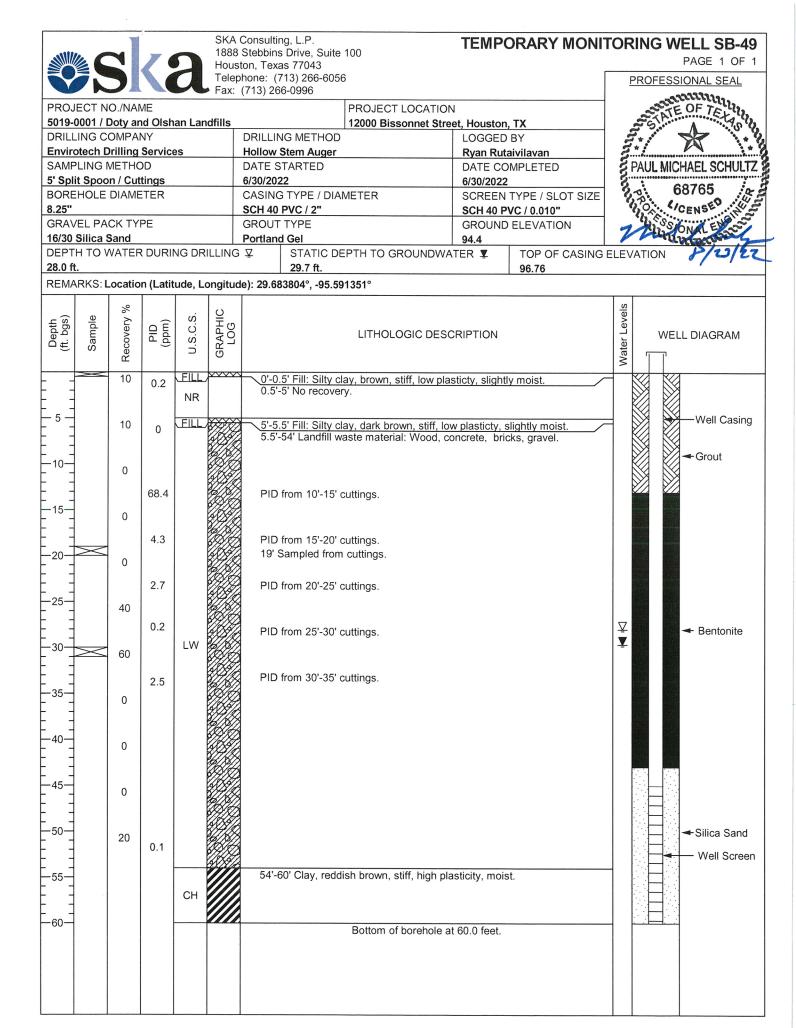


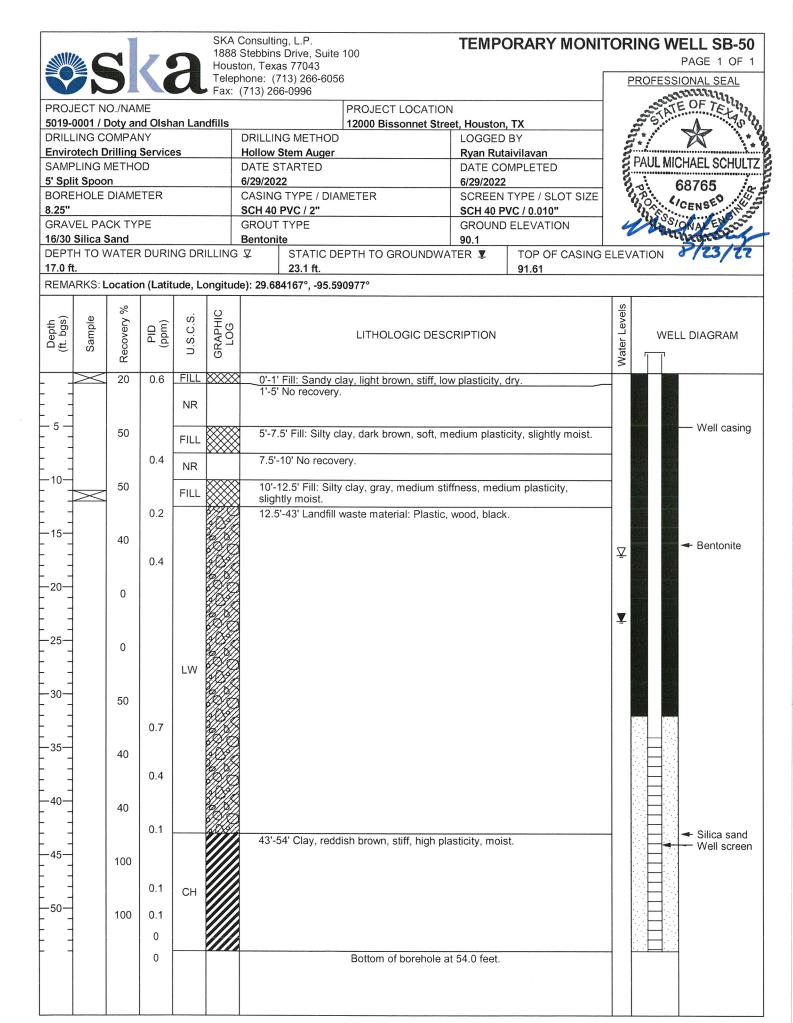
SKA Consutling, L.P. **SOIL BORING EB-1** 1888 Stebbins Drive, Suite 100 PROFESSIONAL SEAL OF TEXT PAGE 1 OF 1 Houston, Texas 77043 Telephone: (713) 266-6056 Fax: (713) 266-0996 PROJECT NO./NAME PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX **DRILLING METHOD DRILLING COMPANY** LOGGED BY **Envirotech Drilling Services** PAUL MICHAEL SCHUI **Direct Push Geoprobe** Cole Willis SAMPLING METHOD DATE COMPLETED DATE STARTED 68765 5' Core Barrel w/ Disp. Sleeves 6/20/2019 6/20/2019 BOREHOLE DIAMETER CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE ---- / --------/ ----**GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** DEPTH TO WATER DURING DRILLING ▼ STATIC DEPTH TO GROUNDWATER ₹ TOP OF CASING ELEVATION REMARKS: Location (Latitude, Longitude): 29.677226°, -95.590700° Water Levels GRAPHIC LOG U.S.C.S. Sample Recovery Depth (ft. bgs) PID (ppm) LITHOLOGIC DESCRIPTION 0'-4.5' Fill: Clay, brown with light brown, orange, dark brown, and black mottling, high plasticity, medium stiff, moist, some calcareous nodules. 0.1 FILL 90 0.0 NR 4.5'-5' No recovery. 5 5'-13' Fill: Clay, brown with light brown, orange, dark brown, and black mottling, high plasticity, medium stiff, moist, some calcareous nodules. 0.3 100 0.4 **FILL** 10 10' Grades to silty clay, brown with black, yellow, orange, and dark brown mottling, low plasticity, 0.3 11' Grades to clay, gray with dark gray, yellow, and orange mottling, high plasticity, soft, moist. 60 0.2 13'-15' No recovery. NR 15'-18' Landfill waste material. LW 60 18'-20' No recovery. NR -20 Bottom of borehole at 20.0 feet.











SKA Consulting, L.P. **TEMPORARY MONITORING WELL SB-51** 1888 Stebbins Drive, Suite 100 PAGE 1 OF 1 Houston, Texas 77043 Telephone: (713) 266-6056 PROFESSIONAL SEAL Fax: (713) 266-0996 PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX **DRILLING COMPANY DRILLING METHOD** LOGGED BY **Envirotech Drilling Services** Hollow Stem Auger Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED 5' Split Spoon / Cuttings 7/1/2022 7/1/2022 CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE **BOREHOLE DIAMETER** 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 16/30 Silica Sand **Bentonite** 95.8 STATIC DEPTH TO GROUNDWATER \(\mathbb{Y}\) DEPTH TO WATER DURING DRILLING ▼ TOP OF CASING ELEVATION 30.2 ft. 97.70 REMARKS: Location (Latitude, Longitude): 29.683731°, -95.590462° Levels GRAPHIC LOG Sample U.S.C.S. Depth (ft. bgs) Recovery PID (ppm) LITHOLOGIC DESCRIPTION WELL DIAGRAM Water 0 0'-5' No recovery. NR 0.1 2'-3' Sampled from cuttings. 50 5'-7' Fill: Silty clay, gray, soft, medium plasticity, moist. FILL 7'-58' Landfill waste material: Wood, rocks, plastic, black. 0.1 PID from 5'-10' cuttings. 10-Well casing 0 0.2 PID from 10'-15' cuttings. 0 0.4 PID from 15'-20' cuttings. 20 0 → Bentonite 0.5 22'-23' Sampled from cuttings. 25 0 5 28'-29' Sampled from cuttings. \blacksquare 30 0 LW 4.7 PID from 30'-35' cuttings. 35 0 40 0 45 0 50 0 ← Silica sand Well screen 40 0.3 58'-60' Clay, reddish brown, stiff, high plasticity, moist. СН 60-Bottom of borehole at 60.0 feet.

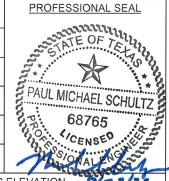


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TEMPORARY MONITORING WELL SB-52

PAGE 1 OF 1

Fax: (713) 266-0996 PROJECT NO./NAME PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX LOGGED BY DRILLING COMPANY **DRILLING METHOD Envirotech Drilling Services** Hollow Stem Auger Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED 5' Split Spoon / Cuttings 7/6/2022 7/6/2022 BOREHOLE DIAMETER CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 16/30 Silica Sand **Bentonite** 82.3



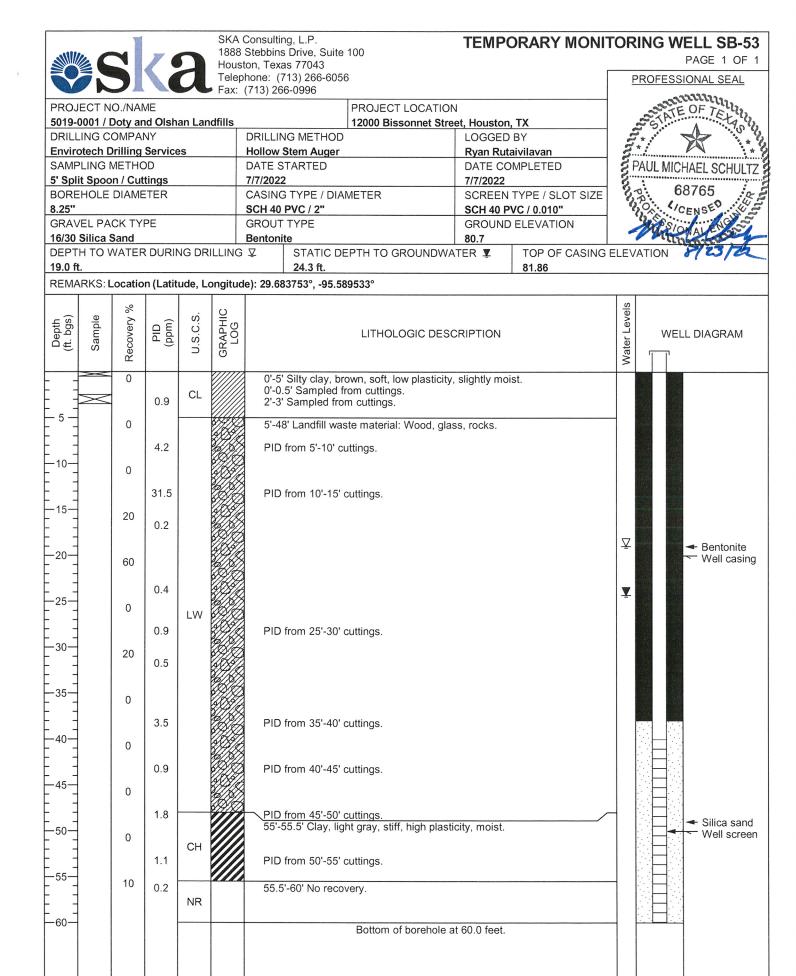
DEPTH TO WATER DURING DRILLING ♀ 17.0 ft.

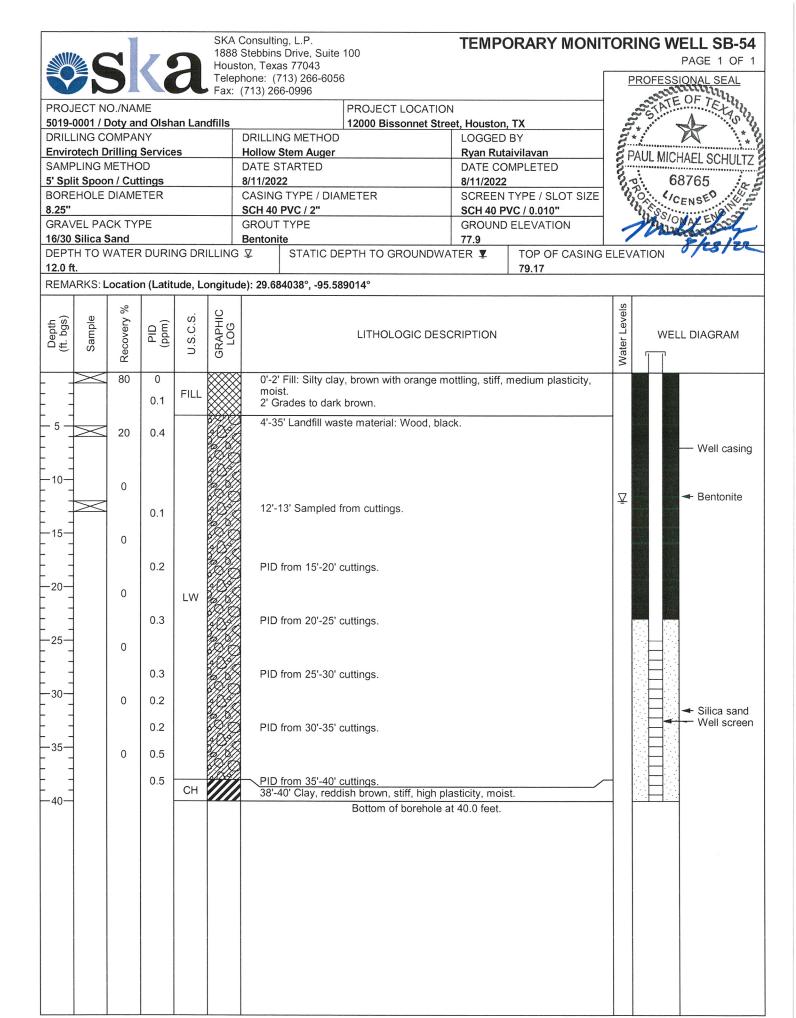
STATIC DEPTH TO GROUNDWATER \(\mathbb{Y}\) 19.4 ft.

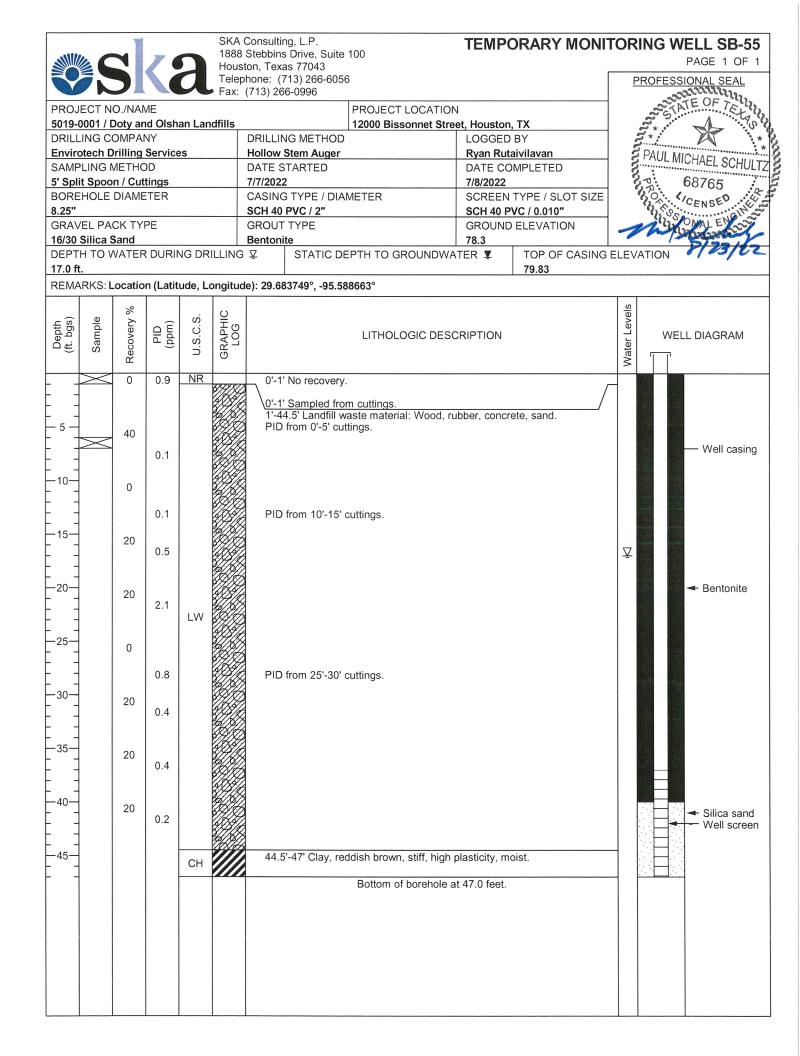
TOP OF CASING ELEVATION 84.03

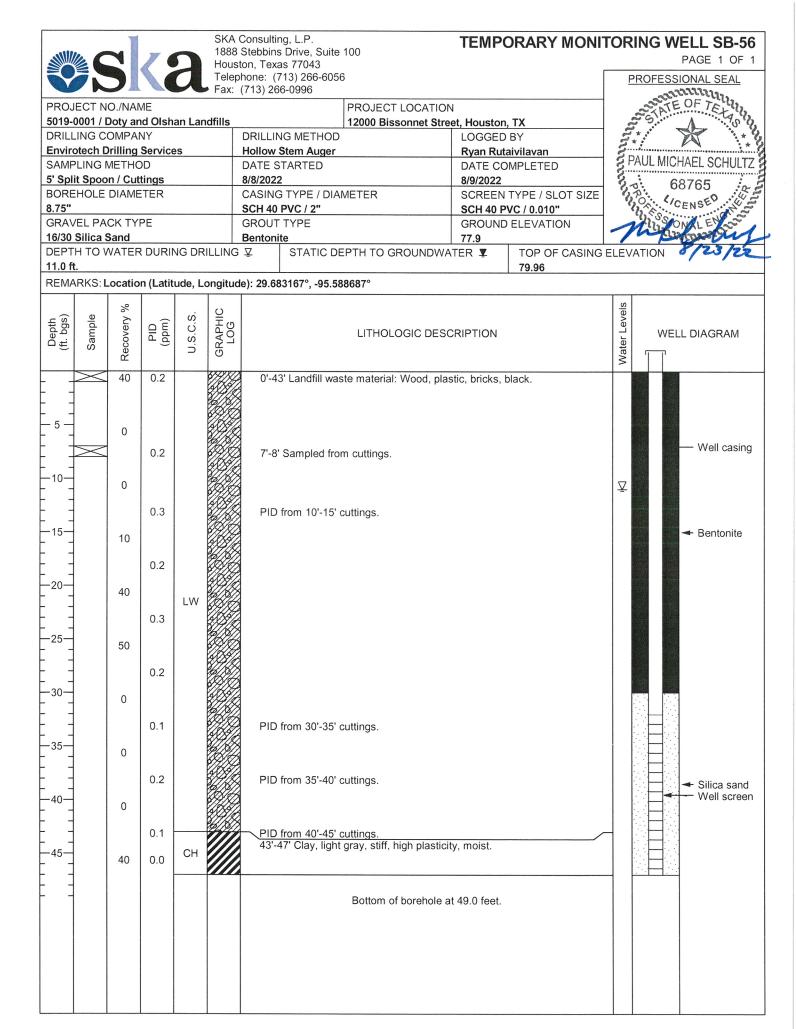
REMARKS: Location (Latitude, Longitude): 29.684085°, -95.589997°

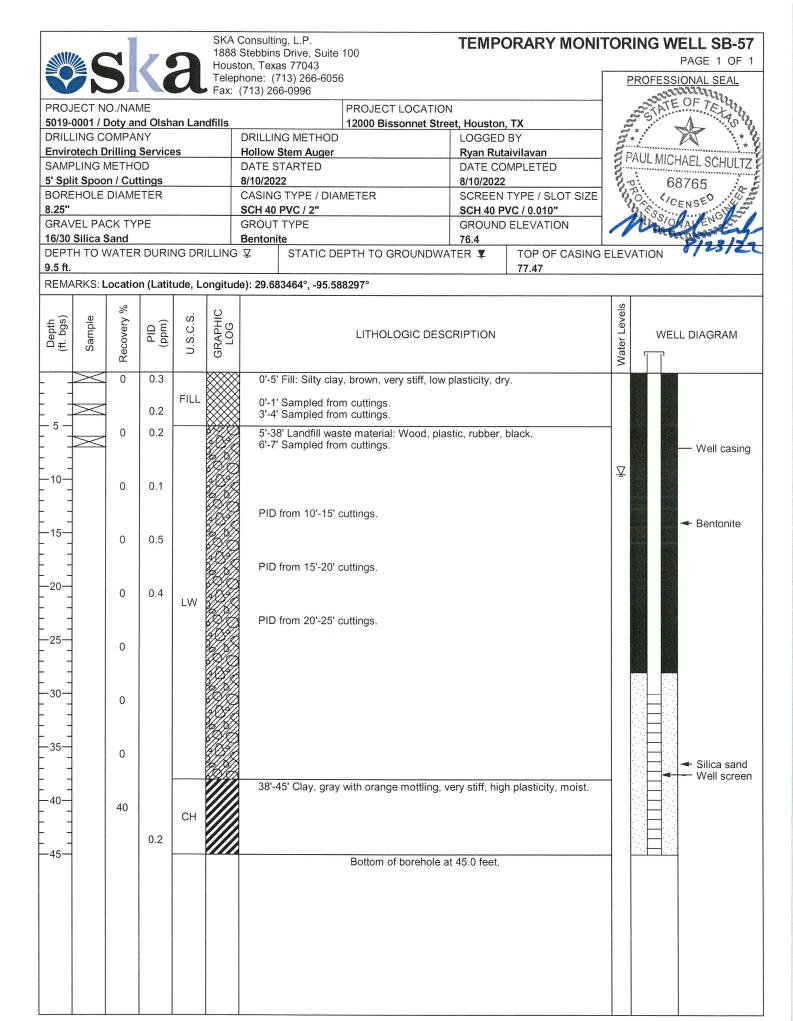
Т		 %			T): 29.684085°, -95.589997°	/els		
Depth (ft. bgs)	Sample	Recovery	PID (mdd)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels	WEI	LL DIAGRAM
 	><	0				0'-30' Lanfill waste material: Wood, plastic, rope. 0'-0.5' Sampled from cuttings.			
- 5 - - - -		0	0.3			PID from 5'-10' cuttings.			— Well casing
-10-		0	0.3			FID HOM 5-10 Cultings.			
-15-	>		0.1	LW		12'-13' Sampled from cuttings.			
-		0	5.7	_,,		PID from 15'-20' cuttings.	Ā		→ Bentonite
-20-		0					Ā		
-25-		0	12.7			PID from 20'-25' cuttings.			
-			1.4			PID from 25'-30' cuttings.			
-30— - -		80	0.6	SP		30'-34' Sand, light gray, wet.			
-35-		40	0.8	NR		34'-35' No recovery.	1		
=		40	0.5	SP		35'-37' Sand, light gray, wet. 37'-40' No recovery.	-		
-40-			0.0	NR		•			
-		40		SP		40'-42' Sand, light gray, wet.			
4			0.5	NR		42'-45' No recovery.			Silica sand
-45-		50		СН		45'-47.5' Clay, reddish brown, stiff, high plasticity, moist.			Well screen
=			0.3	NR		47.5'-50' No recovery.			
-50— -		100	0.1	СН		50'-55' Clay, light brown, stiff, high plasticity, moist.			
-55-			0.1			Bottom of borehole at 55.0 feet.	+		-

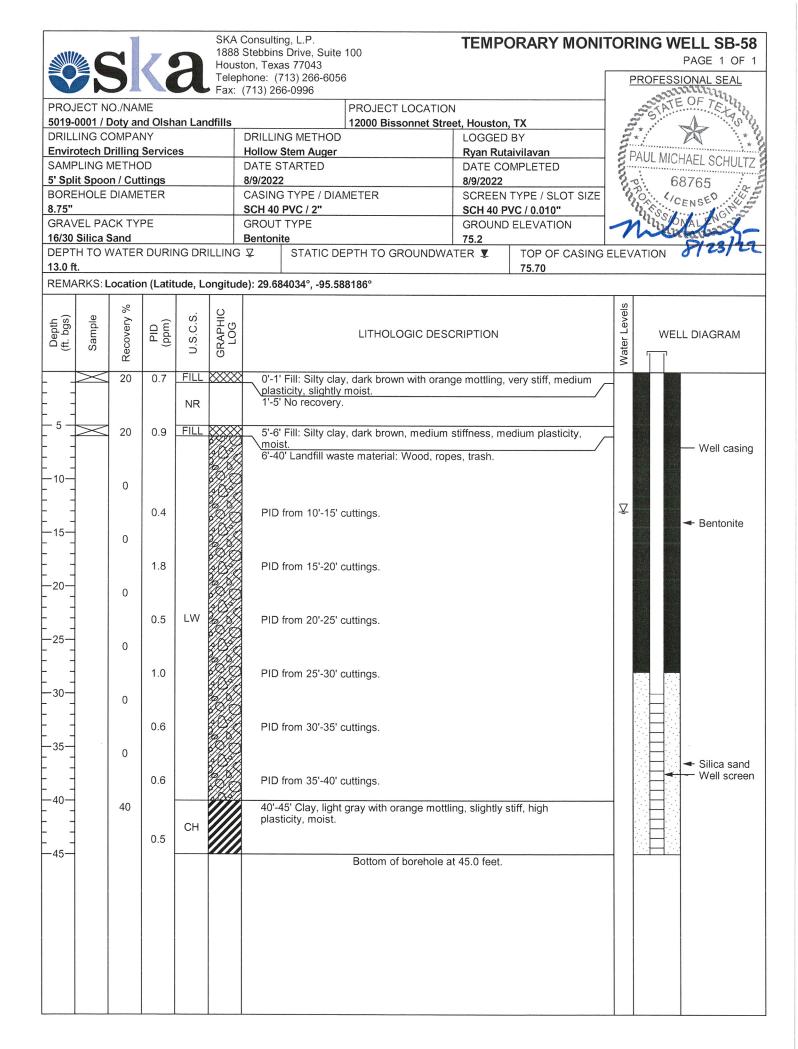


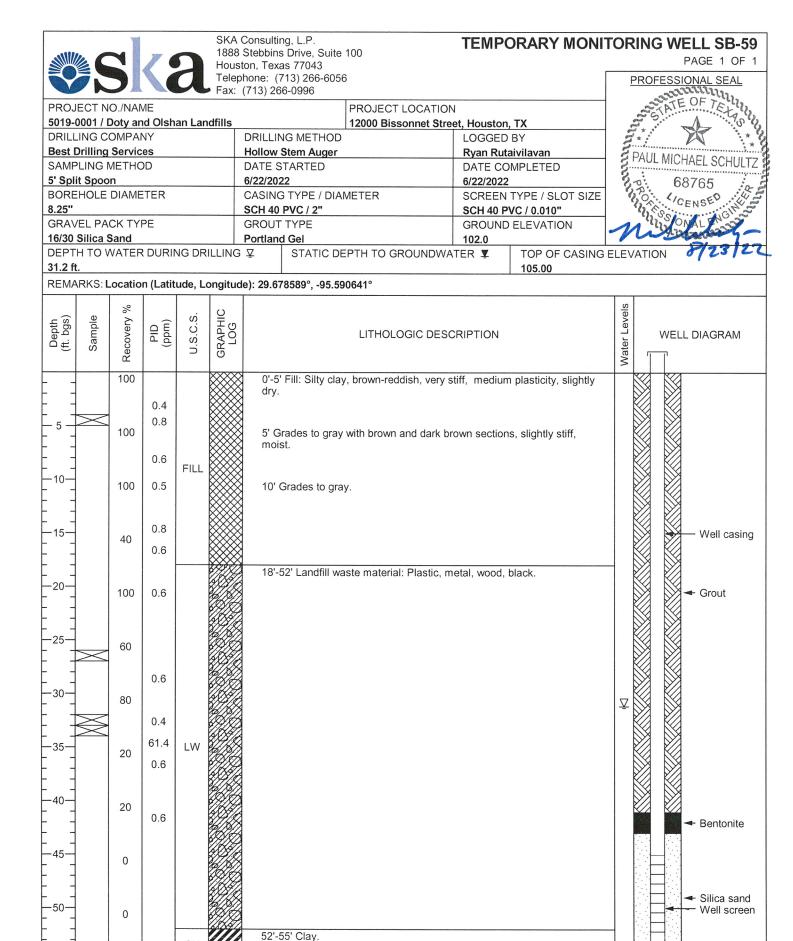












Bottom of borehole at 55.0 feet.

СН

55



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TEMPORARY MONITORING WELL SB-60

PAGE 1 OF 1

PROJECT NO./NAME PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX **DRILLING COMPANY DRILLING METHOD** LOGGED BY **Best Drilling Services** Hollow Stem Auger Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED 5' Split Spoon 6/22/2022 6/22/2022 BOREHOLE DIAMETER CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 16/30 Silica Sand Portland Gel 97.5

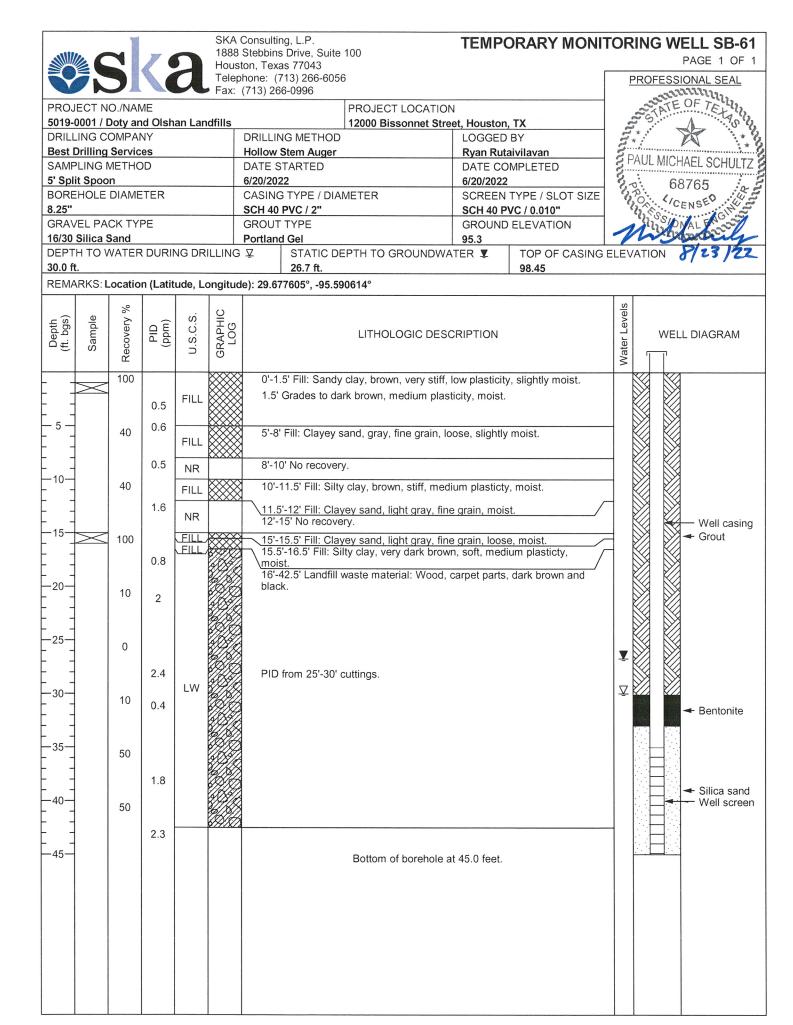
PROFESSIONAL SEAL SSIC. OF TELLIN PAUL MICHAEL SCHULT 68765

DEPTH TO WATER DURING DRILLING ♀

TOP OF CASING ELEVATION 100.54

REMARKS: Location (Latitude, Longitude): 29.678112°, -95.590602°

Depth (ft. bgs)	Sample	Recovery %	PID (mdd)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels	WE	ELL DIAGRAM
 - 5 - 		100	0.7 2.7 0.5	FILL		0'-10' Fill: Silty clay, brown, stiff, medium plasticity, slightly moist.			
-10-	>	40	0.8	NR		10'-13' No recovery.			
 15 		20	0.4	FILL		13'-15' Fill: Sandy clay, gray, stiff, medium plasticity, moist. 15'-53' Landfill waste material: Wood, plastic, rocks, rubber, mud, black.	_		Well casing
-20-		20	0.4						← Grout
-25 -		0							
-30-		20	0.7						
-35-		20	46.5	LW					
-40- -40-		20	1.2						→ Bentonite
-45- -45-		20	1						
-50-									Silica sand Well screen
				СН		53'-55' Clay, reddish brown, stiff, high plasticity, moist.		H	
-55-						Bottom of borehole at 55.0 feet.			





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TEMPORARY MONITORING WELL SB-62

PAGE 1 OF 1

Fax: (713) 266-0996 PROJECT NO./NAME PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX DRILLING COMPANY **DRILLING METHOD** LOGGED BY Best Drilling Services Hollow Stem Auger Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED 5' Split Spoon 6/21/2022 6/21/2022 **BOREHOLE DIAMETER** CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 8.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" GRAVEL PACK TYPE **GROUT TYPE GROUND ELEVATION** 16/30 Silica Sand Portland Gel

PROFESSIONAL SEAL OF TEXAS PAUL MICHAEL SCHL 68765

DEPTH TO WATER DURING DRILLING ♀ 17.0 ft.

STATIC DEPTH TO GROUNDWATER I 16.2 ft.

TOP OF CASING ELEVATION

87.69

REMARKS: Location (Latitude, Longitude): 29 676948° -29 676948°

REMA	RKS: L	.ocatio	n (Latit	ude, L	ongitude): 29.676948°, -29.676948°			
Depth (ft. bgs)	Sample	Recovery %	PID (mdd)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels	WE	LL DIAGRAM
	\times	60	0.7	FILL		0'-3' Fill: Sandy clay, light brown, very stiff, dry. 1.5' Grades to brown, moist.			
-			0.5	NR		3'-5' No recovery.			
5 —		60	0.7	FILL		5'-8' Fill: Silty clay, very dark brown, slightly soft, medium plasticity, moist.			
1			0.9	NR		8'-10' No recovery.			
10-		40	13.6	FILL		10'-12' Fill: Silty clay, dark brown, slightly soft, medium plasticity, moist.			← Grout
-				NR		12'-15' No recovery.			
15—		40	0.9	LW		15'-25' Landfill waste material: Gravel, rocks, glass, wet.	Ž Ž		— Well casin
-		40	0.4	LVV					→ Bentonite
25—		30		СН		25'-26.5' Silty clay, light gray, soft, medium plasticity, very moist.			:
			0.4	NR		26.5'-30' No recovery.			
30-		60		СН		30'-32' Sandy clay, gray, medium stiffenes, medium plasticity, moist. 32'-33' Silty clay, gray, medium stiffenes, medium plasticity, moist.			→ Silica sand Well scree
, =			0.6	NR		33'-35' No recovery.			
35—						Bottom of borehole at 35.0 feet.			



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TEMPORARY MONITORING WELL SB-63

PAGE 1 OF 1

Fax: (713) 266-0996 PROJECT NO./NAME PROJECT LOCATION 5019-0001 / Doty and Olshan Landfills 12000 Bissonnet Street, Houston, TX **DRILLING METHOD** DRILLING COMPANY LOGGED BY **Best Drilling Services** Hollow Stem Auger Ryan Rutaivilavan SAMPLING METHOD DATE STARTED DATE COMPLETED 5' Split Spoon 6/21/2022 6/21/2022 BOREHOLE DIAMETER CASING TYPE / DIAMETER SCREEN TYPE / SLOT SIZE 6.25" SCH 40 PVC / 2" SCH 40 PVC / 0.010" **GRAVEL PACK TYPE GROUT TYPE GROUND ELEVATION** 16/30 Silica Sand Portland Gel 87.3

PROFESSIONAL SEAL OF TEXA OF TEXAS PAUL MICHAEL SCHULTZ 68765

DEPTH TO WATER DURING DRILLING ♀

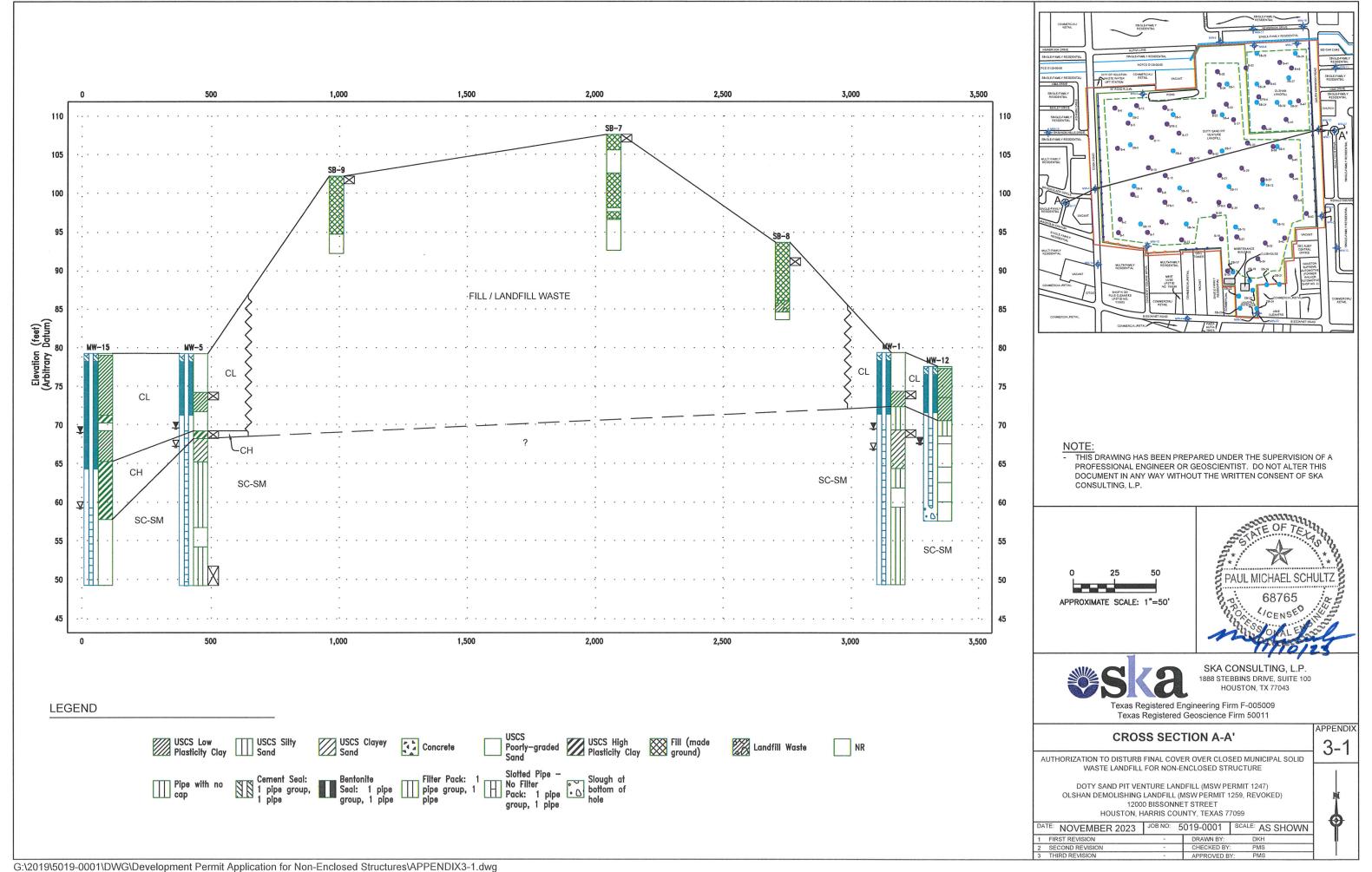
STATIC DEPTH TO GROUNDWATER 👤

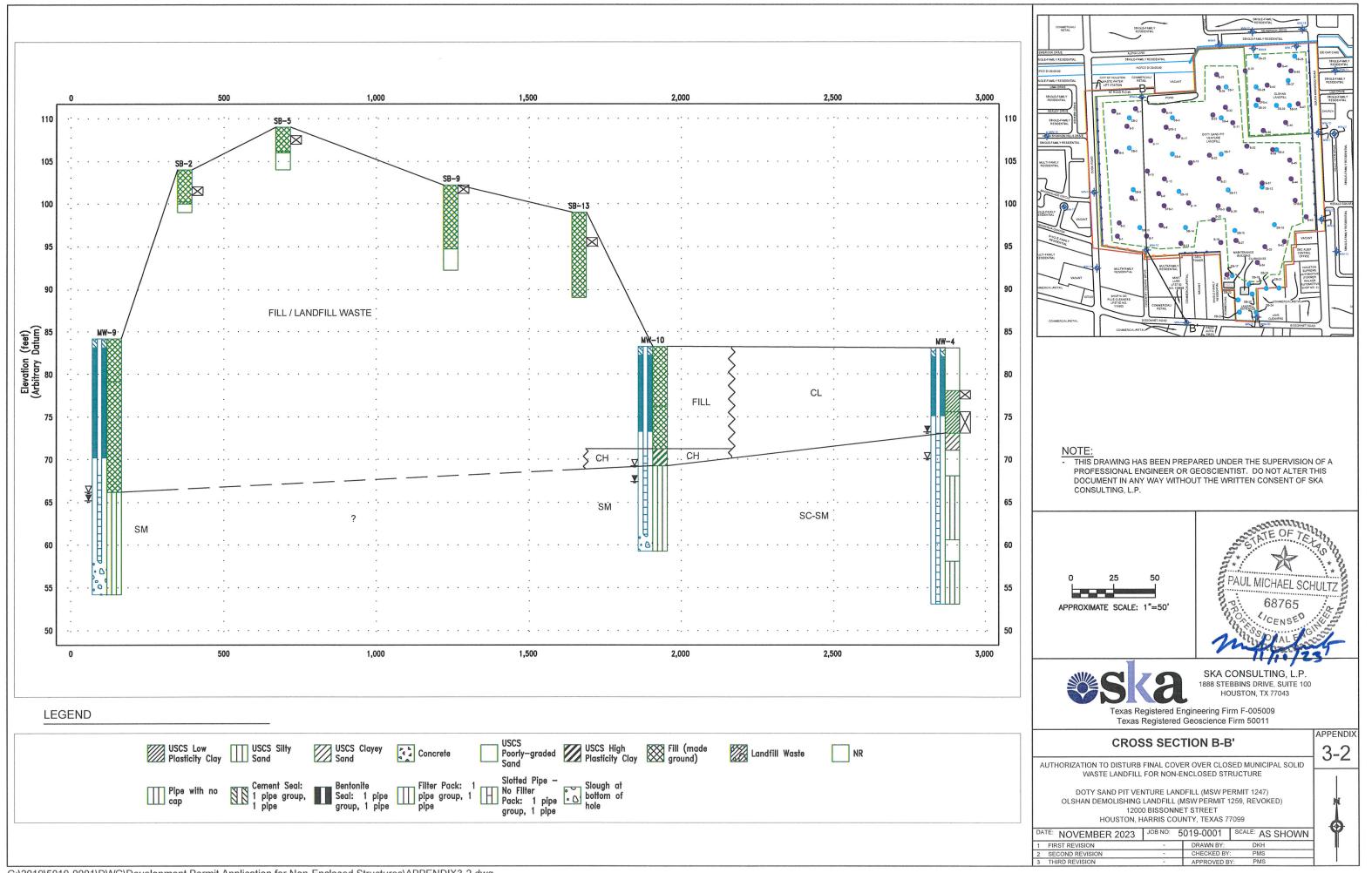
TOP OF CASING ELEVATION

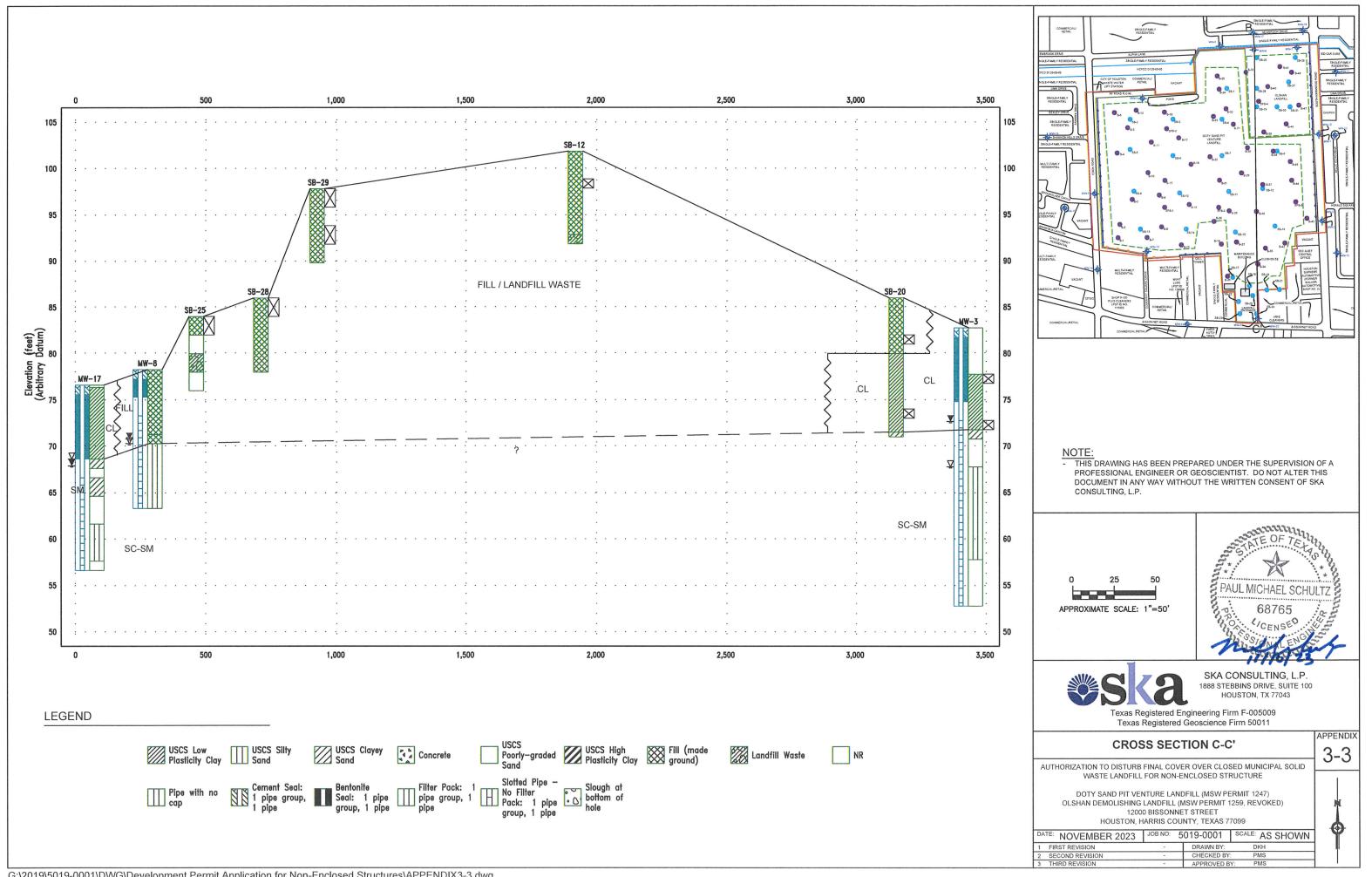
90.21

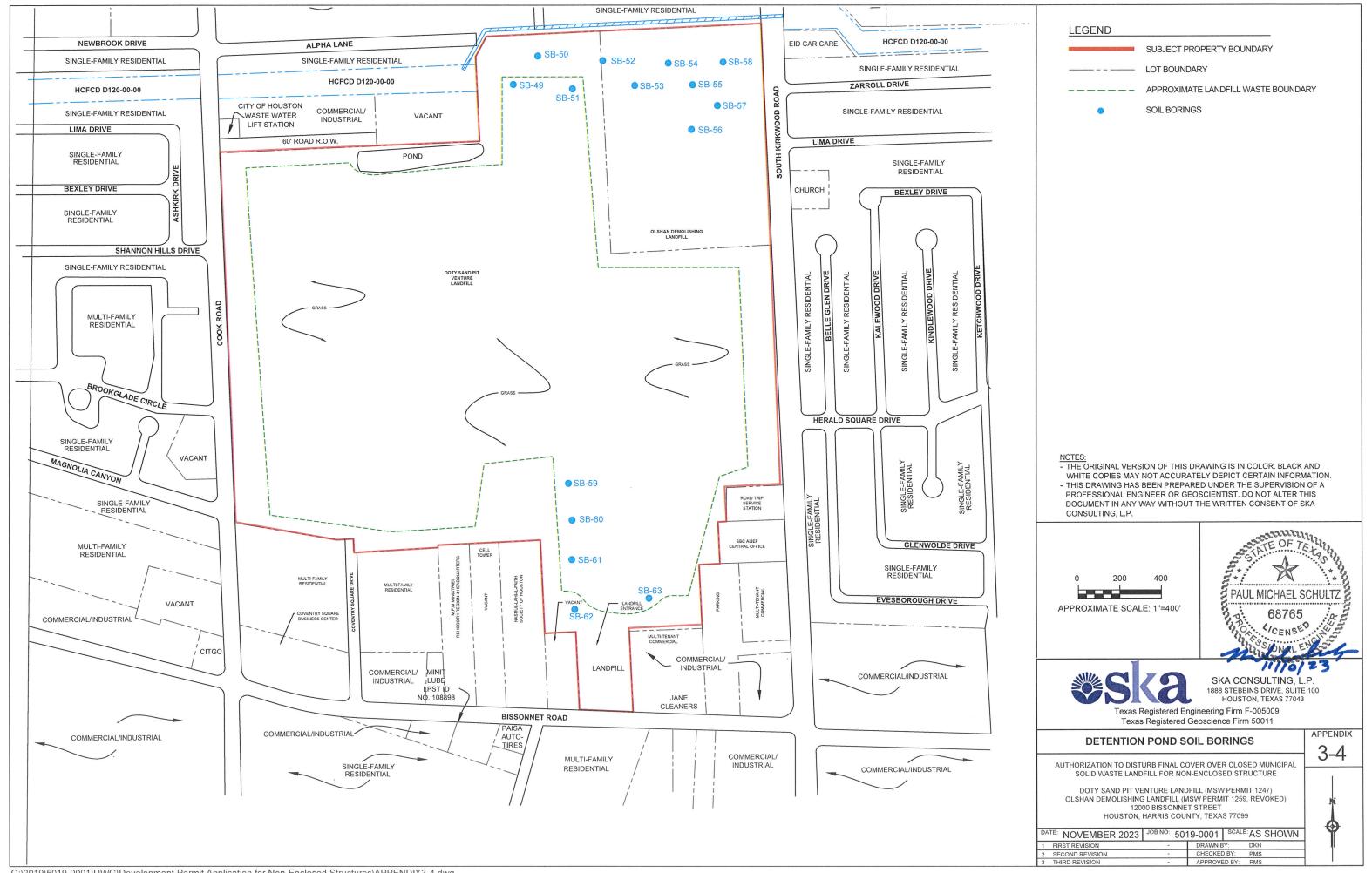
REMARKS: Location (Latitude Longitude): 29 677081° -95 589468°

REMA	ARKS: L	.ocatio	n (Latit	ude, L	ongitude)): 29.677081°, -95.589468°		 	
Depth (ft. bgs)	Sample	Recovery %	OIA (mdd)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	Water Levels	WEL T	L DIAGRAM
	×	40	0.4 0.8 0.5	FILL		0'-6' Fill: Silty clay and sandy clay, brown, orange and gray, stiff, medium plasticity, moist. 6'-13' Landfill waste material.			← Grout
- 10 		60	6.0						
 -15-		00	14.2	NR	******	13'-15' No recovery.			— Well casing
 		20	2.4	LW NR		15'-16' Landfill waste material: Wood chips, plastic, cans. 16'-20' No recovery.			→ Bentonite
-20- 		30	1.1	LW		20'-21.5' Landfill waste material: Wood chips, plastic, mud. 21.5'-25' No recovery.	- - - - - - -		
 25 		40		LW		25'-25.5' Landfill waste material. 25.5'-27' Silty clay, dark gray, stiff, medium plasticity, moist.		-	✓ Silica sand✓ Well screen
			0.4	NR		27'-30' No recovery. Bottom of borehole at 30.0 feet.			
						BOTTOITI OI BOTETIOLE AT 30.0 TEET.			









APPENDIX 4 WATER WELL SEARCH

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

	Soil Layer Information							
	Вои	ındary		Classification		Saturated hydraulic		
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	conductivity micro m/sec	Soil Reaction (pH)	
2	5 inches	33 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 6.6	
3	33 inches	64 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 6.6	

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE SEARCH DISTANCE (miles)

Federal USGS 1.000

Federal FRDS PWS Nearest PWS within 1 mile

State Database 1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
	USGS40001165953	1/4 - 1/2 Mile West
H47	USGS40001165890	1/4 - 1/2 Mile SSW
M65	USGS40001165944	1/2 - 1 Mile East
P93	USGS40001165993	1/2 - 1 Mile ENE
R100	USGS40001165828	1/2 - 1 Mile SSE
Q102	USGS40001166032	1/2 - 1 Mile WNW
Q103	USGS40001166033	1/2 - 1 Mile WNW
S106	USGS40001165882	1/2 - 1 Mile WSW

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

		LOCATION
MAP ID	WELL ID	FROM TP

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID WELL ID LOCATION FROM TP

No PWS System Found

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

		LOCATION
MAP ID	WELL ID	FROM TP
	TXHG60000006995	1/8 - 1/4 Mile North
A2	TXHG60000006996	1/8 - 1/4 Mile North
A3	TXPLU6000001629	1/8 - 1/4 Mile North
B4	TXPLU6000095516	1/4 - 1/2 Mile SW
C5	TXMON6000136088	1/4 - 1/2 Mile SSW
C6	TXMON6000172270	1/4 - 1/2 Mile SSW
C7	TXMON6000136083	1/4 - 1/2 Mile SSW
C8	TXMON6000136084	1/4 - 1/2 Mile SSW
C9	TXPLU6000012868	1/4 - 1/2 Mile SSW
C10	TXPLU6000011115	1/4 - 1/2 Mile SSW
C11	TXPLU6000011109	1/4 - 1/2 Mile SSW
C12	TXPLU6000011112	1/4 - 1/2 Mile SSW
C13	TXPLU6000011110	1/4 - 1/2 Mile SSW
C14	TXPLU6000012869	1/4 - 1/2 Mile SSW
C15	TXMON6000219466	1/4 - 1/2 Mile SW
C16	TXMON6000219465	1/4 - 1/2 Mile SW
D17	TXWDB8000080627	1/4 - 1/2 Mile SE
B18	TXPLU6000007519	1/4 - 1/2 Mile SW
E19	TXPLU6000100541	1/4 - 1/2 Mile NW
E20	TXPLU6000100542	1/4 - 1/2 Mile NW
B21	TXMON6000253931	1/4 - 1/2 Mile SW
B22 B23	TXMON6000253926 TXMON6000253921	1/4 - 1/2 Mile SW 1/4 - 1/2 Mile SW
B24	TXPLU6000129465	1/4 - 1/2 Mile SW
B25	TXPLU6000129463	1/4 - 1/2 Mile SW
B26	TXPLU6000129404 TXPLU6000129463	1/4 - 1/2 Mile SW
B27	TXPLU600007515	1/4 - 1/2 Mile SW
B28	TXPLU6000007514	1/4 - 1/2 Mile SW
B29	TXMON6000054175	1/4 - 1/2 Mile SW
B30	TXMON6000054170	1/4 - 1/2 Mile SW
F31	TXPLU6000007516	1/4 - 1/2 Mile SW
D32	TXWDB8000080626	1/4 - 1/2 Mile SSE
F33	TXPLU6000007520	1/4 - 1/2 Mile SW
G34	TXMON6000079830	1/4 - 1/2 Mile SE
G35	TXPLU6000075584	1/4 - 1/2 Mile SE
G36	TXHG60000001870	1/4 - 1/2 Mile SE
H37	TXBR40000088679	1/4 - 1/2 Mile SSW
H39	TXWDB8000085777	1/4 - 1/2 Mile SSW
H40	TXEQ70000009012	1/4 - 1/2 Mile SSW
J42	TXMON6000414837	1/4 - 1/2 Mile SW
J43	TXMON6000414844	1/4 - 1/2 Mile SW
J44	TXMON6000414853	1/4 - 1/2 Mile SW
J45	TXMON6000414796	1/4 - 1/2 Mile SW

GEOCHECK[®] - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
		-
H46	TXHG60000000358	1/4 - 1/2 Mile SSW
J48	TXMON6000474777	1/4 - 1/2 Mile SW
J49	TXMON6000489189	1/4 - 1/2 Mile SW
K50	TXMON6000143153	1/4 - 1/2 Mile NNE
K51	TXMON6000143152	1/4 - 1/2 Mile NNE
J52	TXMON6000438743	1/4 - 1/2 Mile SW
J53	TXMON6000438742	1/4 - 1/2 Mile SW
J54	TXMON6000438745	1/4 - 1/2 Mile SW
J55	TXMON6000454274	1/4 - 1/2 Mile SW
J56	TXMON6000454264	1/4 - 1/2 Mile SW
157	TXWDB8000082417	1/2 - 1 Mile West
I58	TXEQ7000009020	1/2 - 1 Mile West
159	TXPLU6000007517	1/2 - 1 Mile West
160	TXHG6000001047	1/2 - 1 Mile West
L61	TXMON6000439298	1/2 - 1 Mile SW
L62	TXMON6000432324	1/2 - 1 Mile SW
L63	TXMON6000489176	1/2 - 1 Mile SW
M64	TXWDB8000081351	1/2 - 1 Mile East
L66	TXMON6000474773	1/2 - 1 Mile SW
L67	TXMON6000438746	1/2 - 1 Mile SW
M68	TXEQ7000009037	1/2 - 1 Mile East
M69	TXHG6000000367	1/2 - 1 Mile East
70	TXHG60000012846	1/2 - 1 Mile NE
N71	TXMON6000364058	1/2 - 1 Mile WSW
N72	TXMON6000364060	1/2 - 1 Mile WSW
N73	TXMON6000364059	1/2 - 1 Mile WSW
N74	TXMON6000364056	1/2 - 1 Mile WSW
75	TXMON6000403268	1/2 - 1 Mile SE
076	TXMON6000411640	1/2 - 1 Mile WSW
077	TXMON6000411641	1/2 - 1 Mile WSW
O78	TXMON6000394249	1/2 - 1 Mile WSW
O79	TXMON6000386004	1/2 - 1 Mile WSW
O80	TXMON6000386070	1/2 - 1 Mile WSW
O81	TXMON6000386084	1/2 - 1 Mile WSW
O82	TXMON6000394250	1/2 - 1 Mile WSW
O83	TXMON6000386077	1/2 - 1 Mile WSW
O84	TXMON6000394252	1/2 - 1 Mile WSW
O85	TXMON6000394251 TXMON6000448417	1/2 - 1 Mile WSW 1/2 - 1 Mile WSW
O86		.,
O87	TXMON6000448430	1/2 - 1 Mile WSW
O88	TXMON6000448423	1/2 - 1 Mile WSW
O89	TXMON6000448428	1/2 - 1 Mile WSW
P90	TXHG6000000366	1/2 - 1 Mile ENE
P91	TXWDB8000082419	1/2 - 1 Mile ENE 1/2 - 1 Mile ENE
P92	TXEQ7000009002	1/2 - 1 Mile ENE 1/2 - 1 Mile ESE
94 95	TXWDB8000076028 TXWDB8000092010	1/2 - 1 Mile ESE 1/2 - 1 Mile NNW
96 Q97	TXWDB8000082418 TXWDB8000077124	1/2 - 1 Mile SSE 1/2 - 1 Mile WNW
	TXWDB8000077124 TXWDB8000085779	1/2 - 1 Mile WNW
Q98 R99	TXEQ7000009039	1/2 - 1 Mile VVNVV
R99 R101	TXHG60000002247	1/2 - 1 Mile SSE 1/2 - 1 Mile SSE
NIUI	1 A1 1G00000002241	1/2 - 1 Wille 33E

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

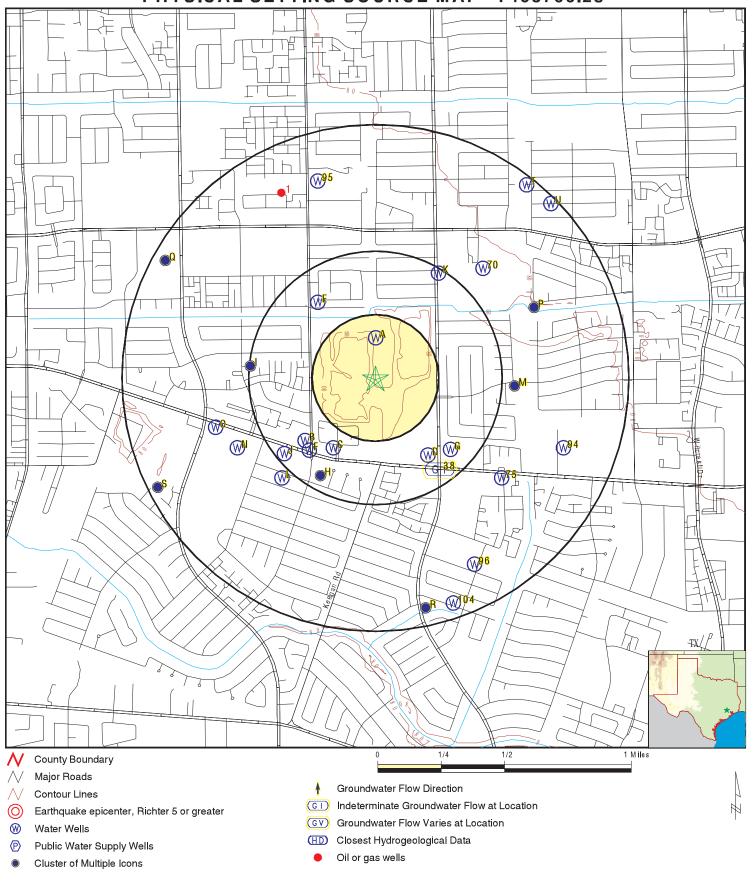
MAP ID	WELL ID	LOCATION FROM TP
104	TXWDB8000077441	1/2 - 1 Mile SSE
S105	TXEQ7000009038	1/2 - 1 Mile WSW
S107	TXHG6000000359	1/2 - 1 Mile WSW
S108	TXWDB8000076448	1/2 - 1 Mile WSW
T109	TXPLU6000174435	1/2 - 1 Mile NE
T110	TXMON6000466844	1/2 - 1 Mile NE
Q111	TXHG6000005042	1/2 - 1 Mile WNW
Q112	TXEQ7000009386	1/2 - 1 Mile WNW
U113	TXPLU6000153535	1/2 - 1 Mile NE
U114	TXMON6000408690	1/2 - 1 Mile NE
Q115	TXEQ7000009385	1/2 - 1 Mile WNW
Q116	TXHG6000005041	1/2 - 1 Mile WNW

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	TXOG90001088944	1/2 - 1 Mile NNW

PHYSICAL SETTING SOURCE MAP - 7408766.2s



SITE NAME: 12.085-Acre Kirkwood Crossing Property 12000 Bissonnet Street

ADDRESS:

Houston TX 77099 LAT/LONG: 29.68039 / 95.591502 CLIENT: CONTACT: SKA Consulting, LP Courtney Sims

INQUIRY #: 7408766.2s

DATE: August 04, 2023 12:52 pm

Map ID Direction Distance

Elevation Database EDR ID Number

A1 North TX WELLS TXHG60000006995

1/8 - 1/4 Mile Higher

> Database: Water Well Database Well #: 8037 127172 Permittee: Houston, City of Permit #: 2/1/2007 Start Date of Permit: 2/1/2007 Exp Date of Permit: Other Usage: Active: Inactive Year Drilled: 2000 Diameter: 8

Depth (ft): 450 Depth to 1st Screen (ft): 400

A2 North TX WELLS TXHG60000006996

1/8 - 1/4 Mile Higher

> Database: Water Well Database Well #: 8038 Permittee: Houston, City of Permit #: 127173 Exp Date of Permit: Start Date of Permit: 2/1/2007 2/1/2007 Usage: Other Active: Inactive Year Drilled: 2001 Diameter: Depth (ft): 450 Depth to 1st Screen (ft): 400

A3 North TX WELLS TXPLU6000001629

1/8 - 1/4 Mile Lower

Database: Submitted Drillers Reports Database (Plugged)

Well Report #:Not ReportedPlugging Rpt #:9568Well Type:MonitorBorehole Depth (ft):20

B4 SW TX WELLS TXPLU6000095516 1/4 - 1/2 Mile

1/4 - 1/2 Mile Higher

Database: Submitted Drillers Reports Database (Plugged)

Well Report #: Not Reported Plugging Rpt #: 20339
Well Type: Monitor Borehole Depth (ft): 20

C5
SSW
TX WELLS TXMON6000136088

1/4 - 1/2 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #: 138443 Well Type: New Well Proposed Use: New Well Borehole Depth (ft): 20

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

Map ID Direction Distance

Elevation Database EDR ID Number

C6 SSW **TX WELLS** TXMON6000172270

1/4 - 1/2 Mile Higher

> Database: Submitted Drillers Reports Database

Well Type: Well Report #: 175150 New Well Borehole Depth (ft): Proposed Use: Monitor 24 Injurious Water Quality: Plugging Rpt #: 73437 no

C7 SSW

1/4 - 1/2 Mile Higher

> Database: Submitted Drillers Reports Database

Well Report #: 138438 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft): 19.5 Injurious Water Quality: Not Reported Plugging Rpt #: 73435

SSW 1/4 - 1/2 Mile Higher

> Database: Submitted Drillers Reports Database

Well Report #: 138439 New Well Well Type: Proposed Use: Monitor Borehole Depth (ft): 17

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

SSW **TX WELLS** TXPLU6000012868 1/4 - 1/2 Mile

Higher

Higher

Submitted Drillers Reports Database (Plugged) Database:

Well Report #: 175150 Plugging Rpt #: 73437 Well Type: Monitor Borehole Depth (ft): 24

C10

TX WELLS TXPLU6000011115 SSW 1/4 - 1/2 Mile

Database: Submitted Drillers Reports Database (Plugged)

Well Report #: 222866 Plugging Rpt #: 73439 Well Type: Monitor Borehole Depth (ft): 24

TX WELLS

TX WELLS

TXMON6000136083

TXMON6000136084

Map ID Direction Distance

Elevation Database EDR ID Number

C11 SSW **TX WELLS** TXPLU6000011109 1/4 - 1/2 Mile

Higher

Database: Submitted Drillers Reports Database (Plugged)

Well Report #: Not Reported Plugging Rpt #: 73432 Monitor Well Type: Borehole Depth (ft): 0

C12 SSW **TX WELLS** TXPLU6000011112

1/4 - 1/2 Mile Higher

Submitted Drillers Reports Database (Plugged) Database:

Well Report #: Not Reported Plugging Rpt #: 73430 Well Type: Monitor Borehole Depth (ft): 0

SSW 1/4 - 1/2 Mile **TX WELLS** TXPLU6000011110

Higher

Submitted Drillers Reports Database (Plugged) Database:

Well Report #: 138438 Plugging Rpt #: 73435 Well Type: Monitor Borehole Depth (ft): 20

TX WELLS TXPLU6000012869

C14 SSW 1/4 - 1/2 Mile Higher

> Database: Submitted Drillers Reports Database (Plugged)

22285 Well Report #: Plugging Rpt #: 73438 Well Type: Monitor Borehole Depth (ft): 24

C15 **TX WELLS** TXMON6000219466 1/4 - 1/2 Mile

Higher

Submitted Drillers Reports Database Database:

Well Report #: 222866 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft): 24 Injurious Water Quality: Plugging Rpt #: 73439 no

Map ID Direction Distance

Elevation Database EDR ID Number

C16 SW **TX WELLS** TXMON6000219465

1/4 - 1/2 Mile Higher

> Database: Submitted Drillers Reports Database

Well Type: Well Report #: 222865 New Well Borehole Depth (ft): Proposed Use: Monitor 24

Injurious Water Quality: Plugging Rpt #: Not Reported no

D17 SE

TX WELLS TXWDB8000080627 1/4 - 1/2 Mile

Higher

Well #: Database: **Groundwater Database** 6520404 Primary Water Use: Domestic Elevation (ft):

Well Depth (ft): 331 Observation Type:

Miscellaneous Measurements Water Quality Review: 112CHCTL - Chicot Aquifer, Lower No Aquifer:

Well Type: Withdrawal of Water

B18 SW 1/4 - 1/2 Mile **TX WELLS** TXPLU6000007519

Higher

Submitted Drillers Reports Database (Plugged) Database:

Well Report #: 19171 Not Reported Plugging Rpt #: Well Type: Monitor Borehole Depth (ft): 20

E19 NW **TX WELLS** TXPLU6000100541 1/4 - 1/2 Mile

Higher

Submitted Drillers Reports Database (Plugged) Database:

Well Report #: Not Reported Plugging Rpt #: 3726 Well Type: Withdrawal of Water Borehole Depth (ft):

E20

NW **TX WELLS** TXPLU6000100542 1/4 - 1/2 Mile

Higher

Database: Submitted Drillers Reports Database (Plugged)

Well Report #: Not Reported Plugging Rpt #: 3727 Well Type: Withdrawal of Water Borehole Depth (ft): 0

Map ID Direction Distance

Elevation Database EDR ID Number

B21 SW TX WELLS TXMON6000253931

1/4 - 1/2 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #:257875Well Type:New WellProposed Use:Environmental Soil BoringBorehole Depth (ft):12Injurious Water Quality:Not ReportedPlugging Rpt #:131517

B22 SW TX WELLS TXMON6000253926

1/4 - 1/2 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #:257870Well Type:New WellProposed Use:Environmental Soil BoringBorehole Depth (ft):12Injurious Water Quality:Not ReportedPlugging Rpt #:131516

P22

B23 SW 1/4 - 1/2 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #: 257865 Well Type: New Well Proposed Use: Environmental Soil Boring Borehole Depth (ft): 12 Injurious Water Quality: Not Reported Plugging Rpt #: 131515

B24 SW TX WELLS TXPLU6000129465 1/4 - 1/2 Mile

Higher

Database: Submitted Drillers Reports Database (Plugged)

Well Report #: 257875 Plugging Rpt #: 131517
Well Type: Environmental Soil Boring Borehole Depth (ft): 12

B25 SW TX WELLS TXPLU6000129464

1/4 - 1/2 Mile Higher

Database: Submitted Drillers Reports Database (Plugged)

Well Report #: 257870 Plugging Rpt #: 131516
Well Type: Environmental Soil Boring Borehole Depth (ft): 12

TX WELLS

TXMON6000253921

Map ID Direction Distance

Elevation Database EDR ID Number **B26**

SW **TX WELLS** TXPLU6000129463

1/4 - 1/2 Mile Higher

> Database: Submitted Drillers Reports Database (Plugged)

Well Report #: 257865 Plugging Rpt #: 131515 Well Type: Borehole Depth (ft): **Environmental Soil Boring** 12

B27

1/4 - 1/2 Mile Higher

> Submitted Drillers Reports Database (Plugged) Database:

19167 Well Report #: Not Reported Plugging Rpt #: Well Type: Monitor Borehole Depth (ft): 20

B28 SW 1/4 - 1/2 Mile **TX WELLS** TXPLU6000007514

Higher

Database: Submitted Drillers Reports Database (Plugged)

Well Report #: Not Reported Plugging Rpt #: 19166 Well Type: Monitor Borehole Depth (ft): 20

B29 SW 1/4 - 1/2 Mile **TX WELLS** TXMON6000054175

Higher

Database: Submitted Drillers Reports Database

Well Report #: 55303 Well Type: New Well Borehole Depth (ft): Proposed Use: Monitor 20 Injurious Water Quality: Plugging Rpt #: Not Reported Not Reported

B30 TX WELLS TXMON6000054170

1/4 - 1/2 Mile Higher

> Database: Submitted Drillers Reports Database

Well Report #: 55298 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft):

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

TX WELLS

TXPLU6000007515

Map ID Direction Distance

Elevation Database EDR ID Number

F31 SW **TX WELLS** TXPLU6000007516

1/4 - 1/2 Mile Higher

> Database: Submitted Drillers Reports Database (Plugged)

Well Report #: Not Reported Plugging Rpt #: 19168 Monitor Borehole Depth (ft): Well Type: 20

D32 SSE **TX WELLS** TXWDB8000080626

1/4 - 1/2 Mile Higher

Groundwater Database Well #: Database: 6520402 Primary Water Use: Unused Elevation (ft): 86

Well Depth (ft): 688 Observation Type: Miscellaneous Measurements Water Quality Review: No Aquifer: 112CHCTL - Chicot Aquifer, Lower

Well Type: Withdrawal of Water

F33 SW 1/4 - 1/2 Mile **TX WELLS** TXPLU6000007520

Higher

Database: Submitted Drillers Reports Database (Plugged)

Well Report #: Not Reported 19172 Plugging Rpt #: Well Type: Monitor Borehole Depth (ft): 20

G34 SE **TX WELLS** TXMON6000079830

1/4 - 1/2 Mile Higher

Higher

Submitted Drillers Reports Database Database:

Well Report #: New Well 81241 Well Type: Proposed Use: Monitor Borehole Depth (ft): 20 Injurious Water Quality: Plugging Rpt #: 31162 no

G35 SE 1/4 - 1/2 Mile **TX WELLS** TXPLU6000075584

Database: Submitted Drillers Reports Database (Plugged)

Well Report #: 81241 Plugging Rpt #: 31162 Well Type: Monitor Borehole Depth (ft): 20

Map ID Direction Distance

Elevation Database EDR ID Number G36

TX WELLS TXHG6000001870

1/4 - 1/2 Mile Higher

Database: Water Well Database Well #: 2894

Permittee: Southwestern Bell Telephone Co.

 Permit #:
 16056
 Start Date of Permit:
 11/1/1982

 Exp Date of Permit:
 10/31/1983
 Usage:
 Public Supply

 Active:
 Inactive
 Year Drilled:
 1966

 Diameter:
 4
 Depth (ft):
 331

Depth to 1st Screen (ft): 306

H37
SSW
TX WELLS TXBR40000088679
1/4 - 1/2 Mile

1/4 - 1/2 Mile Higher

Database: Brackish Resources Aquifer Characterization System Database

Well ID: 96794 Well Type: Oil or Gas

Well Use: Resource production

Data Source: RRC GAU Q Paper/Digital Geophysical Logs

Well Depth (ft): -99999

Total Hole Depth (ft): 1410

Drill Date: 99999

Well Bottom Elevation (ft): -99999

Bottom Hole Elevation (ft): -99999

Kelly Bushing Height (ft): 0

Remarks: KB=0

38 Site ID: 108667
SE Groundwater Flow: VARIES AQUIFLOW 58921

SE Groundwater Flow: VARIES
1/4 - 1/2 Mile
Shallowest Water Table Depth: 6.8

Higher Snailowest water Table Depth: 6.8 Deepest Water Table Depth: 9.05

Average Water Table Depth: Not Reported 2-28-98

H39
SSW
TX WELLS
TXWDB8000085777
1/4 - 1/2 Mile

1/4 - 1/2 Mile Higher

Database: Groundwater Database Well #: 6520410
Primary Water Use: Public Supply Elevation (ft): 86

Well Depth (ft): 1180 Observation Type: USGS Current Observation Well Water Quality Review: No Aquifer: 121EVGL - Evangeline Aquifer

Well Type: Withdrawal of Water

H40
SSW
TX WELLS TXEQ70000009012
1/4 - 1/2 Mile

1/4 - 1/2 Mile Higher

Database: Public Water Supply Sources Databases

PWS ID: 1010013 Water Source: G1010013DI

Locating Agency: TCEQ Elevation: 85

Construction Information:

Record #:2Well Interval:CASINGTop Depth (ft):0Bottom Depth (ft):685Casing Above Surface:Not ReportedDiameter (in):16

Type of Well Opening: Not Reported Casing Material: UNKNOWN
Opening Material: Not Reported Opening Length (ft): Not Reported
Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #:3Well Interval:CASINGTop Depth (ft):580Bottom Depth (ft):696Casing Above Surface:Not ReportedDiameter (in):11

Type of Well Opening: Not Reported Casing Material: UNKNOWN
Opening Material: Opening Length (ft): Not Reported
Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 4 Well Interval: WELL OPENINGS

Top Depth (ft):696Bottom Depth (ft):725Casing Above Surface:Not ReportedDiameter (in):11

Type of Well Opening: SCREEN - TYPE NOT KNOWN Casing Material: Not Reported

Opening Material: UNKNOWN Opening Length (ft): 29

Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #:5Well Interval:CASINGTop Depth (ft):725Bottom Depth (ft):765Casing Above Surface:Not ReportedDiameter (in):11

Type of Well Opening: Not Reported Casing Material: UNKNOWN
Opening Material: Not Reported Opening Length (ft): Not Reported
Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 6 Well Interval: WELL OPENINGS

Top Depth (ft): 765 Bottom Depth (ft): 785 Casing Above Surface: Not Reported Diameter (in): 11

Type of Well Opening: SCREEN - TYPE NOT KNOWN Casing Material: Not Reported

Opening Material: UNKNOWN Opening Length (ft): 20

Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #:7Well Interval:CASINGTop Depth (ft):785Bottom Depth (ft):815Casing Above Surface:Not ReportedDiameter (in):11

Type of Well Opening: Not Reported Casing Material: UNKNOWN
Opening Material: Not Reported Opening Length (ft): Not Reported
Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: Well Interval: WELL OPENINGS

Top Depth (ft): 815 Bottom Depth (ft): 884 Casing Above Surface: Not Reported Diameter (in): 11

Type of Well Opening: SCREEN - TYPE NOT KNOWN Casing Material: Not Reported

Opening Material: UNKNOWN Opening Length (ft): 69

Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #:9Well Interval:CASINGTop Depth (ft):884Bottom Depth (ft):915

Casing Above Surface: Not Reported Diameter (in): 11 UNKNOWN Type of Well Opening: Not Reported Casing Material: Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 10 Well Interval: WELL OPENINGS

Top Depth (ft):915Bottom Depth (ft):944Casing Above Surface:Not ReportedDiameter (in):11

Type of Well Opening: SCREEN - TYPE NOT KNOWN Casing Material: Not Reported

Opening Material: UNKNOWN Opening Length (ft): 29

Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #:11Well Interval:CASINGTop Depth (ft):944Bottom Depth (ft):980Casing Above Surface:Not ReportedDiameter (in):11

Type of Well Opening: Not Reported Casing Material: UNKNOWN Opening Material: Not Reported Opening Method: Not Reported Packer Material: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 12 Well Interval: WELL OPENINGS

Top Depth (ft): 980 Bottom Depth (ft): 1005

Casing Above Surface: Not Reported Diameter (in): 11

Type of Well Opening: SCREEN - TYPE NOT KNOWN Casing Material: Not Reported

Opening Material: UNKNOWN Opening Length (ft): 25

Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #:13Well Interval:CASINGTop Depth (ft):1005Bottom Depth (ft):1145Casing Above Surface:Not ReportedDiameter (in):11

Type of Well Opening: Not Reported Casing Material: UNKNOWN Opening Material: Not Reported Opening Method: Opening Method: Vot Reported Packer Material: UNKNOWN Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 14 Well Interval: WELL OPENINGS

Top Depth (ft): 1145 Bottom Depth (ft): 1175

Casing Above Surface: Not Reported

Type of Well Opening: SCREEN - TYPE NOT KNOWN Casing Material: Not Reported Opening Length (ft):

Opening Material: UNKNOWN

Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 15 Well Interval: **CASING** Bottom Depth (ft): Top Depth (ft): 1175 1190

Casing Above Surface: Not Reported Diameter (in): 11

Type of Well Opening: Not Reported Casing Material: UNKNOWN Opening Material: Not Reported Opening Length (ft): Not Reported Packer Material: Opening Method: Not Reported Not Reported

Water Level Information:

Date Water Level Measure: 19731228 Feet below Ground Surface:

Collecting Agency: DRILL Collection Method: **REPORTED - METHOD NOT KNOWN**

Diameter (in):

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19960117 Feet below Ground Surface: -273.34

Collecting Agency: **USGS** Collection Method: STEEL TAPE Remarks: Not Reported

Water Level Information:

Date Water Level Measure: Feet below Ground Surface: -328.0 19910114

Collection Method: STEEL TAPE Collecting Agency: USGS

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19920115 Feet below Ground Surface: -345.0

Collecting Agency: USGS Collection Method: STEEL TAPE Not Reported Remarks:

Water Level Information:

Feet below Ground Surface: Date Water Level Measure: 19930113 -328.0

Collection Method: AIR LINE Collecting Agency: USGS Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19940105 Feet below Ground Surface: -310.0

Collecting Agency: **USGS** Collection Method: AIR LINE Remarks: Not Reported

Water Level Information:

19950113 Date Water Level Measure: Feet below Ground Surface: -280.0

Collecting Agency: **USGS** Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19960926 Feet below Ground Surface: -330.0

Collecting Agency: USGS Collection Method: ELECTRIC TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19970123 Feet below Ground Surface: -279.0 Collecting Agency: USGS Collection Method: AIR LINE

Remarks: Not Reported

West FED USGS USGS40001165953 1/4 - 1/2 Mile

Higher

Organization ID: USGS-TX Organization Name: USGS Texas Water Science Center

Monitor Location: LJ-65-20-416 Well Type: Description: Not Reported HUC: 12040104 Drainage Area: Not Reported Drainage Area Units: Not Reported Not Reported Contrib Drainage Area: Not Reported Contrib Drainage Area Unts:

Aquifer: Coastal lowlands aquifer system Formation Type: Chicot and Evangeline Aquifers

Aquifer Type: Confined multiple aquifer Construction Date:

Well Depth: 872 Well Depth Units: ft

Well Hole Depth: Not Reported Well Hole Depth Units: Not Reported

Ground water levels, Number of Measurements: 40 Level reading date: 2005-02-04 Feet below surface: 289.11 Feet to sea level: Not Reported

Feet below surface: 289.11
Note: Not Reported

Level reading date: 2004-11-05 Feet below surface: 279

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2004-09-21 Feet below surface: 354

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2004-04-07 Feet below surface: 339

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2004-01-21 Feet below surface: 274

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2003-10-31 Feet below surface: 278

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2003-09-12 Feet below surface: 357

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2003-04-11 Feet below surface: 420

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2003-01-27 Feet below surface: 262.14
Feet to sea level: Not Reported Note: Not Reported

Not Reported

Level reading date:2002-11-14Feet below surface:274.4Feet to sea level:Not ReportedNote:Not Reported

Level reading date: 2002-09-27 Feet below surface: 352

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2002-06-05 Feet below surface: 290

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-05-13 Feet below surface: 350

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2002-02-28 Feet below surface: 265

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2001-09-21 Feet below surface: 370

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2001-04-27 Feet below surface: 387

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2001-01-05 Feet below surface: 290

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2000-12-05 Feet below surface: 292

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2000-10-05 Feet below surface: 388

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1998-05-21 Feet below surface: 368

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1998-01-27 Feet below surface: 267.58

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1998-01-27 Feet below surface: 269

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1997-11-05 Feet below surface: 283

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1997-09-11 Feet below surface: 376

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1997-05-02 Feet below surface: 356

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1997-01-27 Feet below surface: 270.39
Feet to sea level: Not Reported Note: Not Reported

1996-09-26

Level reading date:

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1996-01-17 Feet below surface: 267.26

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1996-01-17 Feet below surface: 272

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1995-01-13 Feet below surface: 281

Feet to sea level: Not Reported Note: The site had been pumped recently.

Feet below surface:

378

Level reading date: 1995-01-13 Feet below surface: 280.23

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1994-01-04 Feet below surface: 277

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1993-01-13 Feet below surface: 291

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1992-09-09 Feet below surface: 374

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1992-01-15 Feet below surface: 297

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1991-01-14 Feet below surface: 307

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1990-01-19 Feet below surface: 296.15

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1989-01-17 Feet below surface: 304.21

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1988-01-06 Feet below surface: 280.31

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1986-01-15 Feet below surface: 285.4

Feet to sea level: Not Reported Note: Not Reported

J42 SW TX WELLS TXMON6000414837

1/4 - 1/2 Mile Higher

Higher

Database: Submitted Drillers Reports Database

Well Report #: 422815 Well Type: New Well Proposed Use: Nonitor Borehole Depth (ft): 20

Injurious Water Quality: no Plugging Rpt #: Not Reported

J43

SW TX WELLS TXMON6000414844 1/4 - 1/2 Mile

Database: Submitted Drillers Reports Database

Well Report #: 422812 Well Type: New Well Proposed Use: New Well Sprehole Depth (ft): 20

Injurious Water Quality: no Plugging Rpt #: Not Reported

J44 SW TX WELLS TXMON6000414853

1/4 - 1/2 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #: 422810 Well Type: New Well

Proposed Use: Monitor Borehole Depth (ft): 12

Injurious Water Quality: no Plugging Rpt #: Not Reported

J45 SW TX WELLS TXMON6000414796

1/4 - 1/2 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #: 422817 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft): 40

Injurious Water Quality: no Plugging Rpt #: Not Reported

1/4 - 1/2 Mile Higher

Higher

Database: Water Well Database Well #: 1374 214795 Permittee: Houston, City of Permit #: Start Date of Permit: 2/1/2021 Exp Date of Permit: 1/31/2022 Public Supply Usage: Active: Active Year Drilled: 1972 Diameter: 16 700 Depth (ft): 1195 Depth to 1st Screen (ft):

H47 SSW 1/4 - 1/2 Mile

Organization ID: USGS-TX Organization Name: USGS Texas Water Science Center

Monitor Location: LJ-65-20-410 Type: Well HUC: Description: Not Reported 12040104 Drainage Area: Not Reported **Drainage Area Units:** Not Reported Contrib Drainage Area: Not Reported Contrib Drainage Area Unts: Not Reported

Aquifer: Coastal lowlands aquifer system

Formation Type: Evangeline Aquifer Aquifer Type: Confined multiple aquifer

Construction Date: 197201 Well Depth: 1195
Well Depth Units: ft Well Hole Depth: 1195

Well Hole Depth Units: ft

Ground water levels, Number of Measurements: 24 Level reading date: 2005-02-04

Feet below surface: 280.60 Feet to sea level: Not Reported

Feet below surface: 280.60 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2004-11-05 Feet below surface: 292.94

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2004-01-22 Feet below surface: 271.86
Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2003-10-31 Feet below surface: 255.89

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2003-01-27 Feet below surface: 259.31

FED USGS

USGS40001165890

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-11-14 Feet below surface: 273.12
Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-02-27 Feet below surface: 263.48
Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2001-01-17 Feet below surface: 298.52 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2000-12-05 Feet below surface: 292.42 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1998-01-26 Feet below surface: 270

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1997-11-05 Feet below surface: 293

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1997-09-12 Feet below surface: 334

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1997-05-02 Feet below surface: 310

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1997-01-23 Feet below surface: 279

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1996-09-26 Feet below surface: 330

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1996-01-17 Feet below surface: 273.34 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1996-01-17 Feet below surface: 272

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1995-01-13 Feet below surface: 280

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1994-01-05 Feet below surface: 310

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1993-01-13 Feet below surface: 328

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1992-01-15 Feet below surface: 345

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1991-01-14 Feet below surface: 328

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1990-01-19 Feet below surface: 312

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1972-01 Feet below surface: 225

Feet to sea level: Not Reported Note: The site had been pumped recently.

Map ID Direction Distance

Elevation Database EDR ID Number

J48 SW **TX WELLS** TXMON6000474777

1/4 - 1/2 Mile Higher

> Database: Submitted Drillers Reports Database

Well Report #: 487476 New Well Well Type: Borehole Depth (ft): Proposed Use: Monitor 40

Injurious Water Quality: Plugging Rpt #: Not Reported no

J49 SW **TX WELLS** TXMON6000489189

1/4 - 1/2 Mile Higher

> Database: Submitted Drillers Reports Database

Well Report #: 503830 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft): 40

Injurious Water Quality: no Plugging Rpt #: Not Reported

TX WELLS TXMON6000143153

NNE 1/4 - 1/2 Mile Lower

> Database: Submitted Drillers Reports Database

145647 Well Report #: New Well Well Type: Proposed Use: Monitor Borehole Depth (ft): 30

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

NNE **TX WELLS** TXMON6000143152 1/4 - 1/2 Mile Lower

Database: Submitted Drillers Reports Database

Well Report #: 145646 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft):

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

J52 SW

TX WELLS TXMON6000438743 1/4 - 1/2 Mile

Higher

Database: Submitted Drillers Reports Database

Well Report #: 448823 Well Type: New Well Borehole Depth (ft): Proposed Use: Monitor 40

Injurious Water Quality: no Plugging Rpt #: Not Reported

Map ID Direction Distance

Elevation Database EDR ID Number J53

SW 1/4 - 1/2 Mile

TX WELLS TXMON6000438742

Higher

Database: Submitted Drillers Reports Database

Well Type: Well Report #: 448825 New Well Monitor Borehole Depth (ft): Proposed Use: 40

Injurious Water Quality: Plugging Rpt #: Not Reported no

J54 SW **TX WELLS** TXMON6000438745

1/4 - 1/2 Mile Higher

> Database: Submitted Drillers Reports Database

Well Report #: 448804 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft): 20

Injurious Water Quality: no Plugging Rpt #: Not Reported

SW 1/4 - 1/2 Mile **TX WELLS** TXMON6000454274 Higher

Database: Submitted Drillers Reports Database

Well Report #: 465909 New Well Well Type: Proposed Use: Monitor Borehole Depth (ft): 40

Injurious Water Quality: no Plugging Rpt #: Not Reported

SW **TX WELLS** TXMON6000454264 1/4 - 1/2 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #: 465907 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft):

Injurious Water Quality: Plugging Rpt #: Not Reported no

I57 West **TX WELLS** TXWDB8000082417

1/2 - 1 Mile Higher

> Groundwater Database Well #: Database: 6520416 Primary Water Use: **Public Supply** Elevation (ft):

Well Depth (ft): 872 Observation Type: **USGS Current Observation Well** Water Quality Review: Yes Aquifer: 121EVGL - Evangeline Aquifer

Well Type: Withdrawal of Water

Map ID Direction Distance

Elevation Database EDR ID Number

158
West TX WELLS TXEQ7000009020
1/2 - 1 Mile

Higher

Database: Public Water Supply Sources Databases

PWS ID: 1010013 Water Source: G1010013DR

Locating Agency: TCEQ Elevation: 84

Construction Information:

Record #: 1 Well Interval: ANNULAR CEMENT

Top Depth (ft):0Bottom Depth (ft):570Casing Above Surface:Not ReportedDiameter (in):0

Type of Well Opening: Not Reported Casing Material: Not Reported Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 4 Well Interval: WELL OPENINGS

Top Depth (ft):577Bottom Depth (ft):866Casing Above Surface:Not ReportedDiameter (in):10

Type of Well Opening: SCREEN - TYPE NOT KNOWN Casing Material: Not Reported

Opening Material: UNKNOWN Opening Length (ft): 289
Opening Method: Opening Interval = Top Of Shallowest Screen To Bottom Of Deepest Screen

Packer Material: Not Reported

Water Level Information:

Date Water Level Measure: 19860115 Feet below Ground Surface: -285.4 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19880106 Feet below Ground Surface: -280.31 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19890117 Feet below Ground Surface: -304.21 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19900119 Feet below Ground Surface: -296.15 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19910114 Feet below Ground Surface: -307.0 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19920115 Feet below Ground Surface: -297.0 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19930113 Feet below Ground Surface: -291.0 Collecting Agency: USGS Collection Method: AIR LINE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19940104 Feet below Ground Surface: -277.0 Collecting Agency: USGS Collection Method: AIR LINE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19950113 Feet below Ground Surface: -280.23 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19960117 Feet below Ground Surface: -267.26
Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19960926 Feet below Ground Surface: -378.0

Collecting Agency: USGS Collection Method: ELECTRIC TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19970127 Feet below Ground Surface: -270.39 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

I59
West TX WELLS TXPLU6000007517

1/2 - 1 Mile Higher

Database: Submitted Drillers Reports Database (Plugged)

Well Report #: Not Reported Plugging Rpt #: 19169

Well Type: Borehole Depth (ft): Monitor 18

160 West 1/2 - 1 Mile **TX WELLS** TXHG60000001047

Higher

Water Well Database Well #: 2068 Database: 214827 Permittee: Houston, City of Permit #: Start Date of Permit: 2/1/2021 Exp Date of Permit: 1/31/2022 Usage: **Public Supply** Active: Active Year Drilled: Diameter: 10

1971 Depth (ft): 872 Depth to 1st Screen (ft): 606

L61 SW 1/2 - 1 Mile **TX WELLS** TXMON6000439298

Higher

Database: Submitted Drillers Reports Database

Well Report #: 448799 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft):

Plugging Rpt #: Injurious Water Quality: Not Reported

L62 **TX WELLS** TXMON6000432324

SW 1/2 - 1 Mile Higher

> Database: Submitted Drillers Reports Database

Well Report #: 442262 Well Type: New Well Borehole Depth (ft): Proposed Use: Monitor 20

Injurious Water Quality: Plugging Rpt #: Not Reported no

L63 **TX WELLS** SW TXMON6000489176

1/2 - 1 Mile Higher

> Submitted Drillers Reports Database Database:

503826 Well Report #: Well Type: New Well Proposed Use: Monitor Borehole Depth (ft): 40

Injurious Water Quality: Plugging Rpt #: Not Reported

M64 East 1/2 - 1 Mile **TX WELLS** TXWDB8000081351

Lower

Well #: 6520516 Database: Groundwater Database

Public Supply Primary Water Use: Elevation (ft):

Observation Type: Well Depth (ft): 960 **USGS Current Observation Well**

Water Quality Review: No Aquifer: 121EVGL - Evangeline Aquifer

Well Type: Withdrawal of Water

M65
East FED USGS USGS40001165944

1/2 - 1 Mile Lower

Organization ID: USGS-TX Organization Name: USGS Texas Water Science Center

Monitor Location: LJ-65-20-516 Type: Well Description: Not Reported HUC: 12040104 Drainage Area: Not Reported Drainage Area Units: Not Reported Contrib Drainage Area Unts: Not Reported Contrib Drainage Area: Not Reported

Aquifer: Coastal lowlands aquifer system

Formation Type: Chicot and Evangeline Aquifers
Aquifer Type: Confined multiple aquifer

Aquifer Type:Confined multiple aquiferConstruction Date:197511Well Depth:960Well Depth Units:ftWell Hole Depth:965Well Hole Depth Units:ft

Ground water levels, Number of Measurements: 26 Level reading date: 2005-02-04

Feet below surface: 282.89 Feet to sea level: Not Reported

Note: Not Reported

Level reading date: 2004-11-05 Feet below surface: 306

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2004-09-21 Feet below surface: 361

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2004-04-07 Feet below surface: 342

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2004-01-21 Feet below surface: 294

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2003-11-04 Feet below surface: 308

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2003-09-12 Feet below surface: 364

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2003-04-10 Feet below surface: 388

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2003-01-30 Feet below surface: 277.78

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-11-13 Feet below surface: 289.21
Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-06-06 Feet below surface: 280.15
Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-02-27 Feet below surface: 273.47
Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2001-09-25 Feet below surface: 359

Feet to sea level: Not Reported Note: The site was being pumped.

2001-01-17 Level reading date: Feet below surface: 329.42 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2000-12-05 Feet below surface: 330.73 Feet to sea level: Not Reported Not Reported Note:

Level reading date: 1998-05-21 Feet below surface:

Feet to sea level: Not Reported Note: The site was being pumped.

1998-01-27 Level reading date: Feet below surface: 276.30

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1997-11-06 Feet below surface: 291.32 Feet to sea level: Not Reported Not Reported Note:

Level reading date: 1997-01-23 Feet below surface: 280.96

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1996-01-19 Feet below surface:

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1995-01-19 Feet below surface: 337

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1994-01-12 Feet below surface: 300.11 Feet to sea level: Not Reported Note:

Not Reported

1994-01-05 Level reading date: Feet below surface: 314

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1993-01-13 Feet below surface: 314

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1990-01-23 Feet below surface:

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1975-12 Feet below surface: 246

Feet to sea level: Not Reported Note: The site had been pumped recently.

L66 **TX WELLS** TXMON6000474773 SW

1/2 - 1 Mile Higher

> Database: Submitted Drillers Reports Database

Well Report #: 487474 New Well Well Type: Borehole Depth (ft): Monitor Proposed Use: 40

Injurious Water Quality: Plugging Rpt #: Not Reported no

L67 TX WELLS TXMON6000438746

1/2 - 1 Mile Higher

> Database: Submitted Drillers Reports Database

Well Report #: 448802 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft): 45

Injurious Water Quality: Plugging Rpt #: Not Reported no

Map ID Direction Distance

Elevation Database EDR ID Number M68

East TX WELLS TXEQ7000009037

1/2 - 1 Mile Lower

Database: Public Water Supply Sources Databases

PWS ID: 1010013 Water Source: G1010013EH

Locating Agency: TCEQ Elevation: 83

Construction Information:

Record #: 1 Well Interval: ANNULAR CEMENT

Top Depth (ft):0Bottom Depth (ft):690Casing Above Surface:Not ReportedDiameter (in):0

Type of Well Opening: Not Reported Casing Material: Not Reported Opening Material: Not Reported Opening Method: Opening Method: Not Reported Opening Method: Not

Construction Information:

Record #: 2 Well Interval: OPENING INTERVAL

Top Depth (ft):700Bottom Depth (ft):960Casing Above Surface:Not ReportedDiameter (in):0

Type of Well Opening: UNKNOWN Casing Material: Not Reported

Opening Material: UNKNOWN Opening Length (ft): 232
Opening Method: Opening Interval = Top Of Shallowest Screen To Bottom Of Deepest Screen

Packer Material: Not Reported

Geologic Information:

Record #: 1 Top Geo Unit Below Surface (ft): 0
Bottom Geo Unit Below Surface (ft): 3 Geo Unit Thickness (ft): 3

Geo Unit Description: SURFACE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 2 Top Geo Unit Below Surface (ft): 3
Bottom Geo Unit Below Surface (ft): 15 Geo Unit Thickness (ft): 12

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 3 Top Geo Unit Below Surface (ft): 15
Bottom Geo Unit Below Surface (ft): 39 Geo Unit Thickness (ft): 24

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Record #: 4 Top Geo Unit Below Surface (ft): 39
Bottom Geo Unit Below Surface (ft): 160 Geo Unit Thickness (ft): 121

Geo Unit Description: CLAY, SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 5 Top Geo Unit Below Surface (ft): 160
Bottom Geo Unit Below Surface (ft): 20

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 6 Top Geo Unit Below Surface (ft): 180
Bottom Geo Unit Below Surface (ft): 260 Geo Unit Thickness (ft): 80

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 7 Top Geo Unit Below Surface (ft): 260
Bottom Geo Unit Below Surface (ft): 332 Geo Unit Thickness (ft): 72

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 8 Top Geo Unit Below Surface (ft): 332
Bottom Geo Unit Below Surface (ft): 58

Geo Unit Description: SAND, CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 9 Top Geo Unit Below Surface (ft): 390 Bottom Geo Unit Below Surface (ft): 420 Geo Unit Thickness (ft): 30

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 10 Top Geo Unit Below Surface (ft): 420 Bottom Geo Unit Below Surface (ft): 460 Geo Unit Thickness (ft): 40

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Record #: 11 Top Geo Unit Below Surface (ft): 460
Bottom Geo Unit Below Surface (ft): 590 Geo Unit Thickness (ft): 130

Geo Unit Description: SAND, ROCK

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 12 Top Geo Unit Below Surface (ft): 590 Bottom Geo Unit Below Surface (ft): 603 Geo Unit Thickness (ft): 13

Geo Unit Description: CLAY ROCK

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 13 Top Geo Unit Below Surface (ft): 603 Bottom Geo Unit Below Surface (ft): 670 Geo Unit Thickness (ft): 67

Geo Unit Description: SAND, ROCK

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 14 Top Geo Unit Below Surface (ft): 670 Bottom Geo Unit Below Surface (ft): 700 Geo Unit Thickness (ft): 30

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 15 Top Geo Unit Below Surface (ft): 700

Bottom Geo Unit Below Surface (ft): 710 Geo Unit Thickness (ft): 10

Geo Unit Description: SAND, ROCK

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 16 Top Geo Unit Below Surface (ft): 710 Bottom Geo Unit Below Surface (ft): 749 Geo Unit Thickness (ft): 39

Geo Unit Description: CLAY ROCK

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 17 Top Geo Unit Below Surface (ft): 749
Bottom Geo Unit Below Surface (ft): 959 Geo Unit Thickness (ft): 210

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Record #: 18 Top Geo Unit Below Surface (ft): 959
Bottom Geo Unit Below Surface (ft): 960 Geo Unit Thickness (ft): 1

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19960119 Feet below Ground Surface: -282.27 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19930113 Feet below Ground Surface: -314.0 Collecting Agency: USGS Collection Method: AIR LINE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19940105 Feet below Ground Surface: -314.0 Collecting Agency: USGS Collection Method: AIR LINE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19940112 Feet below Ground Surface: -300.11

Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19950119 Feet below Ground Surface: -294.84

Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19970123 Feet below Ground Surface: -280.96

Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

M69
East TX WELLS TXHG60000000367

1/2 - 1 Mile Lower

> Water Well Database Well #: Database: 1383 Permittee: Houston, City of Permit #: 214797 Start Date of Permit: 2/1/2021 Exp Date of Permit: 1/31/2022 Usage: **Public Supply** Active: Active Year Drilled: 1975 Diameter: 16 Depth (ft): Depth to 1st Screen (ft): 950 710

Map ID Direction Distance

Elevation Database EDR ID Number

70 NE **TX WELLS** TXHG60000012846

1/2 - 1 Mile Lower

> Water Well Database Database: Well #: 13945

Christ, The Incarnate Word Church Permittee:

208998 5/1/2020 Start Date of Permit: Permit #: Exp Date of Permit: 4/30/2021 Other Usage: Active: Inactive Year Drilled: NULL Diameter: 4 Depth (ft): 0

0 Depth to 1st Screen (ft):

N71 WSW 1/2 - 1 Mile **TX WELLS** TXMON6000364058

Higher

Database: Submitted Drillers Reports Database

Well Report #: 369543 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft): 25

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

N72 wsw **TX WELLS** TXMON6000364060 1/2 - 1 Mile

Database: Submitted Drillers Reports Database

Well Report #: 369545 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft): 20

Injurious Water Quality: Not Reported Not Reported Plugging Rpt #:

TX WELLS TXMON6000364059

N73 WSW 1/2 - 1 Mile Higher

Higher

Database: Submitted Drillers Reports Database

Well Report #: 369544 New Well Well Type: Borehole Depth (ft): Proposed Use: Monitor 20

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

TXMON6000364056 **TX WELLS** 1/2 - 1 Mile

Higher

Database: Submitted Drillers Reports Database

Well Report #: 369541 Well Type: New Well Borehole Depth (ft): Proposed Use: Monitor 25

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

Map ID Direction Distance

Elevation Database EDR ID Number

75 SE 1/2 - 1 Mile

TX WELLS TXMON6000403268

TXMON6000411640

TX WELLS

Higher

Database: Submitted Drillers Reports Database

Well Report #: 409941 New Well Well Type: Monitor Borehole Depth (ft): Proposed Use: 15

Injurious Water Quality: Plugging Rpt #: yes Not Reported

O76 WSW

1/2 - 1 Mile Higher

> Database: Submitted Drillers Reports Database

Well Report #: 419398 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft): 35

Injurious Water Quality: no Plugging Rpt #: Not Reported

WSW 1/2 - 1 Mile **TX WELLS** TXMON6000411641

Higher

Database: Submitted Drillers Reports Database

Well Report #: 419397 New Well Well Type: Proposed Use: Monitor Borehole Depth (ft): 35

Injurious Water Quality: no Plugging Rpt #: Not Reported

078 WSW **TX WELLS** TXMON6000394249 1/2 - 1 Mile

Higher

Database: Submitted Drillers Reports Database

Well Report #: 400692 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft):

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

O79 WSW **TX WELLS** TXMON6000386004 1/2 - 1 Mile

Higher

Database: Submitted Drillers Reports Database

Well Report #: 392097 Well Type: New Well Borehole Depth (ft): Proposed Use: Monitor 30

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

Map ID Direction Distance

Elevation Database EDR ID Number

080 WSW TX WELLS TXMON6000386070

1/2 - 1 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #: 392166 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft): 30

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

O81
WSW
TX WELLS TXMON6000386084

1/2 - 1 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #: 392180 Well Type: New Well Proposed Use: New Well Sprehole Depth (ft): 55

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

O82
WSW
TX WELLS
TXMON6000394250
1/2 - 1 Mile

Higher

Database: Submitted Drillers Reports Database

Well Report #:400693Well Type:New WellProposed Use:MonitorBorehole Depth (ft):25

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

O83
WSW TX WELLS TXMON6000386077

1/2 - 1 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #: 392173 Well Type: New Well Proposed Use: Nonitor Borehole Depth (ft): 25

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

O84
WSW
TX WELLS
1/2 - 1 Mile
TX WELLS

Higher

Database: Submitted Drillers Reports Database

Well Report #: 400695 Well Type: New Well Proposed Use: Nonitor Borehole Depth (ft): 55

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

Map ID Direction Distance

Elevation Database EDR ID Number

085 WSW TX WELLS TXMON6000394251

1/2 - 1 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #: 400694 Well Type: New Well Proposed Use: Monitor Borehole Depth (ft): 25

Injurious Water Quality: Not Reported Plugging Rpt #: Not Reported

O86
WSW TX WELLS TXMON6000448417

1/2 - 1 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #: 460085 Well Type: New Well Proposed Use: Injection Borehole Depth (ft): 25

Injurious Water Quality: no Plugging Rpt #: Not Reported

087
WSW
TX WELLS
TXMON6000448430
1/2 - 1 Mile

Higher

Database: Submitted Drillers Reports Database

Well Report #:460090Well Type:New WellProposed Use:InjectionBorehole Depth (ft):25

Injurious Water Quality: no Plugging Rpt #: Not Reported

O88
WSW
TX WELLS
TXMON6000448423

1/2 - 1 Mile Higher

Database: Submitted Drillers Reports Database

Well Report #: 460086 Well Type: New Well Proposed Use: Injection Borehole Depth (ft): 25

Injurious Water Quality: no Plugging Rpt #: Not Reported

O89
WSW
TX WELLS
TXMON6000448428

Higher

Database: Submitted Drillers Reports Database

Well Report #: 460088 Well Type: New Well Proposed Use: Injection Borehole Depth (ft): 25

Injurious Water Quality: no Plugging Rpt #: Not Reported

Map ID Direction Distance

Elevation Database EDR ID Number

P90 ENE **TX WELLS** TXHG60000000366

1/2 - 1 Mile Lower

> Database: Water Well Database Well #: 1382 Houston, City of Permit #: 42079 Permittee: 1/31/1994 Start Date of Permit: 2/1/1993 Exp Date of Permit: Public Supply Usage: Active: Inactive Year Drilled: 1967 Diameter: 16

Depth (ft): 945 Depth to 1st Screen (ft): 710

P91

ENE TX WELLS TXWDB8000082419 1/2 - 1 Mile

Lower

Database: **Groundwater Database** Well #: 6520509 Primary Water Use: Unused Elevation (ft): 80

Well Depth (ft): 945 Historical Observation Well Observation Type: Water Quality Review: Yes Aquifer: 121EVGL - Evangeline Aquifer

Well Type: Withdrawal of Water

TX WELLS TXEQ7000009002

1/2 - 1 Mile Lower

> Database: Public Water Supply Sources Databases

PWS ID: 1010013 Water Source: G1010013CZ

TNRCC Locating Agency: Elevation:

Construction Information:

ANNULAR CEMENT Well Interval: Record #: 1

Bottom Depth (ft): Top Depth (ft): 0 695 Casing Above Surface: Diameter (in): Not Reported

Type of Well Opening: Not Reported Casing Material: Not Reported Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

OPENING INTERVAL Record #: 2 Well Interval:

Top Depth (ft): 714 Bottom Depth (ft): 934 Casing Above Surface: Not Reported 0 Diameter (in):

Type of Well Opening: UNKNOWN Casing Material: Not Reported

UNKNOWN Opening Material: Opening Length (ft): 220 Opening Method: Opening Interval = Top Of Shallowest Screen To Bottom Of Deepest Screen

Packer Material: Not Reported

Water Level Information:

Date Water Level Measure:

Collecting Agency:

Remarks:

19870107 **USGS** Not Reported Feet below Ground Surface:

Collection Method:

-426.0

REPORTED - METHOD NOT KNOWN

Water Level Information:

Date Water Level Measure:

Collecting Agency:

Remarks:

19900123 USGS

Not Reported

Feet below Ground Surface:

Collection Method:

-362.93

REPORTED - METHOD NOT KNOWN

Water Level Information:

Date Water Level Measure:

Collecting Agency:

Remarks:

19670614 **TWDB** Not Reported Feet below Ground Surface:

Collection Method:

-172.0 STEEL TAPE

Water Level Information:

Date Water Level Measure:

Collecting Agency:

Remarks:

19860114 USGS

Not Reported

Feet below Ground Surface:

Collection Method:

REPORTED - METHOD NOT KNOWN

Water Level Information:

Date Water Level Measure:

Collecting Agency:

Remarks:

19880106 USGS

Not Reported

Feet below Ground Surface:

Collection Method:

-423.27

REPORTED - METHOD NOT KNOWN

Water Level Information:

Date Water Level Measure:

Collecting Agency:

Remarks:

19890117

USGS

Not Reported

Feet below Ground Surface:

Collection Method:

-346.0

REPORTED - METHOD NOT KNOWN

Water Level Information:

Date Water Level Measure:

Collecting Agency:

Remarks:

19910114 USGS Not Reported Feet below Ground Surface:

Collection Method:

-420.0 STEEL TAPE

Water Level Information:

Date Water Level Measure:

Collecting Agency:

Remarks:

19920115 **USGS** Not Reported Feet below Ground Surface:

Collection Method:

-358.0 STEEL TAPE

Water Level Information:

Date Water Level Measure:

Collecting Agency:

Remarks:

19930111 **USGS** Not Reported Feet below Ground Surface:

Collection Method:

-350.67 STEEL TAPE

Water Level Information:

19940113 Date Water Level Measure: Feet below Ground Surface: -346.17 Collecting Agency: **USGS** Collection Method: STEEL TAPE

Remarks: Not Reported

FED USGS USGS40001165993 1/2 - 1 Mile

Lower

Organization ID: **USGS-TX** Organization Name: **USGS Texas Water Science Center**

Monitor Location: LJ-65-20-509 Type: Well Description: Not Reported HUC: 12040104 Not Reported Drainage Area: Not Reported **Drainage Area Units:** Contrib Drainage Area: Not Reported Contrib Drainage Area Unts: Not Reported

Aquifer: Coastal lowlands aquifer system

Formation Type: **Evangeline Aquifer** Aquifer Type: Not Reported

Construction Date: 19670526 Well Depth: 945

Well Depth Units: ft Well Hole Depth:

Not Reported Well Hole Depth Units: Not Reported

Ground water levels, Number of Measurements: 12 Level reading date: 1994-01-13

Feet to sea level: Feet below surface: 346.17 Not Reported Note: Not Reported

1993-01-11 Level reading date: Feet below surface: 350.67

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1992-01-15 Feet below surface: Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1992-01-15 Feet below surface: Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1991-01-14 Feet below surface: 420

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1990-01-23 Feet below surface: 362.93 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1989-01-17 Feet below surface: 346

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1989-01-17 Feet below surface:

Feet to sea level: The site had been pumped recently. Not Reported Note:

Level reading date: 1988-01-06 Feet below surface:

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1987-01-07 Feet below surface: 426

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1986-01-14 Feet below surface:

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1967-06-14 Feet below surface: 172

Feet to sea level: Not Reported Note: Not Reported

Map ID Direction Distance

Elevation Database EDR ID Number

ESE 1/2 - 1 Mile Higher

Database: Groundwater Database Well #: 6520511
Primary Water Use: Public Supply Elevation (ft): 84
Well Depth (ft): 205 Observation Type: None

Well Depth (ft): 205 Observation Type: Water Quality Review: No Aquifer:

Well Type: Withdrawal of Water

95 NNW TX WELLS TXWDB8000092010

1/2 - 1 Mile Lower

Database:Groundwater DatabaseWell #:6520403Primary Water Use:DomesticElevation (ft):81

Well Depth (ft): 65 Observation Type: Miscellaneous Measurements
Water Quality Review: Yes Aquifer: 112CHCTU - Chicot Aquifer, Upper

Well Type: Withdrawal of Water

96 SSE TX WELLS TXWDB8000082418

1/2 - 1 Mile Higher

Higher

Database: Groundwater Database Well #: 6520417
Primary Water Use: Public Supply Elevation (ft): 86

Well Depth (ft): 1012 Observation Type: USGS Current Observation Well Aquifer: USGS Current Observation Well 121EVGL - Evangeline Aquifer Well Type: Withdrawal of Water

Q97
WNW
TX WELLS
1/2 - 1 Mile
Higher

Database: Groundwater Database Well #: 6520421
Primary Water Use: Public Supply Elevation (ft): 86

Well Depth (ft): 1684 Observation Type: USGS Current Observation Well Water Quality Review: No Aquifer: 121EVGL - Evangeline Aquifer Well Type: Withdrawal of Water

Q98
WNW
TX WELLS
TXWDB8000085779
1/2 - 1 Mile

Database: Groundwater Database Well #: 6520422

Primary Water Use: Public Supply Elevation (ft): 86
Well Depth (ft): Observation Type: USGS Current Observation Well

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TX WELLS

TXWDB8000076028

112CHCTL - Chicot Aquifer, Lower

Water Quality Review: No Aquifer: 121EVGL - Evangeline Aquifer

Well Type: Withdrawal of Water

R99 SSE TX WELLS TXEQ7000009039

1/2 - 1 Mile Lower

Database: Public Water Supply Sources Databases

PWS ID: 1010013 Water Source: G1010013EJ

Locating Agency: TCEQ Elevation: 83

Construction Information:

Record #: 2 Well Interval: OPENING INTERVAL

Top Depth (ft):715Bottom Depth (ft):1034Casing Above Surface:Not ReportedDiameter (in):0

Type of Well Opening: UNKNOWN Casing Material: Not Reported

Opening Material: UNKNOWN Opening Length (ft): 319
Opening Method: Opening Interval = Top Of Shallowest Screen To Bottom Of Deepest Screen

Packer Material: Not Reported

Geologic Information:

Record #: 1 Top Geo Unit Below Surface (ft): 0
Bottom Geo Unit Below Surface (ft): 4 Geo Unit Thickness (ft): 4

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 2 Top Geo Unit Below Surface (ft): 4
Bottom Geo Unit Below Surface (ft): 28 Geo Unit Thickness (ft): 24

Geo Unit Description: SAND, CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 3 Top Geo Unit Below Surface (ft): 28
Bottom Geo Unit Below Surface (ft): 150 Geo Unit Thickness (ft): 122

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 4 Top Geo Unit Below Surface (ft): 150
Bottom Geo Unit Below Surface (ft): 200 Geo Unit Thickness (ft): 50

Geo Unit Description: SAND, CLAY STRIPS

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Geologic Information:

Record #: 5 Top Geo Unit Below Surface (ft): 200
Bottom Geo Unit Below Surface (ft): 313 Geo Unit Thickness (ft): 113

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 6 Top Geo Unit Below Surface (ft): 313
Bottom Geo Unit Below Surface (ft): 354 Geo Unit Thickness (ft): 41

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 7 Top Geo Unit Below Surface (ft): 354
Bottom Geo Unit Below Surface (ft): 450 Geo Unit Thickness (ft): 96

Geo Unit Description: CLAY, SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 8 Top Geo Unit Below Surface (ft): 450
Bottom Geo Unit Below Surface (ft): 463 Geo Unit Thickness (ft): 13

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 9 Top Geo Unit Below Surface (ft): 463
Bottom Geo Unit Below Surface (ft): 460 Geo Unit Thickness (ft): 17

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 10 Top Geo Unit Below Surface (ft): 480 Bottom Geo Unit Below Surface (ft): 520 Geo Unit Thickness (ft): 40

Geo Unit Description: SAND, ROCK BREAK

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 11 Top Geo Unit Below Surface (ft): 520 Bottom Geo Unit Below Surface (ft): 600 Geo Unit Thickness (ft): 80

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Geologic Information:

Record #: 12 Top Geo Unit Below Surface (ft): 600
Bottom Geo Unit Below Surface (ft): 612 Geo Unit Thickness (ft): 12

Geo Unit Description: SAND, CLAY STRIPS

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 13 Top Geo Unit Below Surface (ft): 612 Bottom Geo Unit Below Surface (ft): 660 Geo Unit Thickness (ft): 48

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 14 Top Geo Unit Below Surface (ft): 660
Bottom Geo Unit Below Surface (ft): 665 Geo Unit Thickness (ft): 5

Sotion Geo Unit Below Surface (it): 665 Geo Unit Thickness (it):

Geo Unit Description: SAND, ROCK BREAK

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 15 Top Geo Unit Below Surface (ft): 665
Bottom Geo Unit Below Surface (ft): 710 Geo Unit Thickness (ft): 45

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 16 Top Geo Unit Below Surface (ft): 710
Bottom Geo Unit Below Surface (ft): 95
Geo Unit Thickness (ft): 95

Geo Unit Description: CLAY STRIPS AND SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 17 Top Geo Unit Below Surface (ft): 805 Bottom Geo Unit Below Surface (ft): 823 Geo Unit Thickness (ft): 18

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 18 Top Geo Unit Below Surface (ft): 823
Bottom Geo Unit Below Surface (ft): 1040 Geo Unit Thickness (ft): 217

Geo Unit Description: SHALE, CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Geologic Information:

Record #: 19 Top Geo Unit Below Surface (ft): 1040 Bottom Geo Unit Below Surface (ft): 1118 Geo Unit Thickness (ft): 78

Geo Unit Description: SHALE, ROCK

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 20 Top Geo Unit Below Surface (ft): 1118 Bottom Geo Unit Below Surface (ft): 160 Geo Unit Thickness (ft): 42

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19781200 Feet below Ground Surface: -269.0

Collecting Agency: USGS

Collection Method: REPORTED - METHOD NOT KNOWN

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19880106 Feet below Ground Surface: -260.8

Collecting Agency: USGS

Collection Method: REPORTED - METHOD NOT KNOWN

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19870127 Feet below Ground Surface: -262.31

Collecting Agency: USGS

Collection Method: REPORTED - METHOD NOT KNOWN

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19890117 Feet below Ground Surface: -307.15

Collecting Agency: USGS

Collection Method: REPORTED - METHOD NOT KNOWN

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19900123 Feet below Ground Surface: -293.76

Collecting Agency: USGS

Collection Method: REPORTED - METHOD NOT KNOWN

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19920114 Feet below Ground Surface: -294.47 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19930113 Feet below Ground Surface: -291.03 Collecting Agency: **USGS** Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19940113 Feet below Ground Surface: -315.34 Collecting Agency: **USGS** Collection Method: STEEL TAPE

Remarks: 04

Water Level Information:

Date Water Level Measure: 19950113 Feet below Ground Surface: -282.85 STEEL TAPE

USGS Collection Method: Collecting Agency:

Remarks: Not Reported

Water Level Information:

Water Level Information:

Date Water Level Measure: 19960123 Feet below Ground Surface: -273.83 STEEL TAPE

USGS Collecting Agency: Collection Method: Remarks: Not Reported

19970123 -278.2 Date Water Level Measure: Feet below Ground Surface:

Collecting Agency: **USGS** Collection Method: STEEL TAPE

Remarks: Not Reported

R100 **SSE FED USGS** USGS40001165828

1/2 - 1 Mile Lower

> Organization ID: USGS-TX Organization Name: **USGS Texas Water Science Center**

Monitor Location: LJ-65-20-414 Type: Well

Description: lat/long updated with Garmin gps on 2/3/2010

HUC: 12040104 Drainage Area: Not Reported Drainage Area Units: Not Reported Contrib Drainage Area: Not Reported

Contrib Drainage Area Unts: Not Reported Aquifer: Coastal lowlands aquifer system

Formation Type: Chicot and Evangeline Aquifers

197812 Aquifer Type: Confined single aquifer Construction Date: Well Depth: 1038 Well Depth Units: ft Well Hole Depth: 1160 Well Hole Depth Units: ft

2005-02-04 Ground water levels, Number of Measurements: 29 Level reading date:

Feet below surface: 272.20 Feet to sea level: Not Reported

Note: Not Reported

Level reading date: 2004-11-05 Feet below surface: 303

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2004-09-21 Feet below surface: 356 Feet to sea level: Not Reported Note: The site was being pumped. Level reading date: 2004-04-02 Feet below surface:

Feet to sea level: Not Reported The site was being pumped. Note:

Level reading date: 2004-01-21 Feet below surface:

Feet to sea level: Not Reported Note: Not Reported

2003-11-04 Level reading date: Feet below surface: 282

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2003-09-11 Feet below surface: 356

Feet to sea level: Not Reported The site was being pumped. Note:

Level reading date: 2003-05-15 Feet below surface: 353

Feet to sea level: Not Reported The site was being pumped.

Level reading date: 2003-01-30 Feet below surface: 274.20 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-11-14 Feet below surface: 288.01 Feet to sea level: Not Reported Note: Not Reported

2002-09-27 Feet below surface: Level reading date: 344

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2002-06-05 Feet below surface: 282.79 Feet to sea level: Not Reported Note: Not Reported

2002-02-28 Feet below surface: 267.61 Level reading date: Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2001-11-15 Feet below surface: 291.14 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2001-01-12 Feet below surface: 299.11 Feet to sea level: Not Reported Not Reported Note:

Level reading date: 2000-12-05 Feet below surface: 299.34 Feet to sea level: Not Reported Note: Not Reported

1998-01-26 Level reading date: Feet below surface: 274.16

Not Reported Feet to sea level: Note: The site had been pumped recently.

Level reading date: 1997-11-06 Feet below surface: 275.43 Not Reported Note:

Feet to sea level: Not Reported

Level reading date: 1997-01-23 Feet below surface: 278.2 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1996-01-23 Feet below surface: 273.83

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1995-01-13 Feet below surface: 282.85 Feet to sea level: Not Reported Note: Not Reported

1994-01-13 Feet below surface: Level reading date: 315.34

The site had been pumped recently. Feet to sea level: Not Reported Note:

1993-01-13 Level reading date: Feet below surface: 291.03 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1992-01-14 Feet below surface: 294.47

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1990-01-23 Feet below surface: 293.76 Feet to sea level: Not Reported Not Reported Note:

Level reading date: 1989-01-17 Feet below surface: 307.15

Feet to sea level: Not Reported Note: Not Reported

1988-01-06 260.80 Level reading date: Feet below surface:

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1987-01-27 Feet below surface: 262.31

Feet to sea level: Not Reported Not Reported Note:

Level reading date: 1978-12 Feet below surface: 269

Feet to sea level: Not Reported Note: Not Reported

R101 SSE **TX WELLS** TXHG60000002247 1/2 - 1 Mile

Lower

Water Well Database Well #: 3272 Database: Permittee: Houston, City of Permit #: 214880 Start Date of Permit: 2/1/2021 Exp Date of Permit: 1/31/2022 Public Supply Usage: Active: Active Year Drilled: 1990 Diameter: 16 Depth (ft): 1500 Depth to 1st Screen (ft): 0

Q102 WNW 1/2 - 1 Mile Higher

Organization ID: USGS-TX Organization Name: **USGS Texas Water Science Center**

Monitor Location: LJ-65-20-421 Type: Well Description: Not Reported HUC: 12040104 Drainage Area: Drainage Area Units: Not Reported Not Reported Not Reported Contrib Drainage Area Unts: Contrib Drainage Area: Not Reported

Aquifer: Coastal lowlands aquifer system

Formation Type: **Evangeline Aquifer** Aquifer Type: Confined single aquifer

Construction Date: Not Reported Well Depth:

Well Depth Units: Well Hole Depth: Not Reported Well Hole Depth Units: Not Reported

Ground water levels, Number of Measurements: 17 Level reading date: 2004-11-12

Feet below surface: 324.22 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2004-09-01 Feet below surface:

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2004-04-02 Feet below surface: 384

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2004-01-23 Feet below surface: 348

Feet to sea level: Not Reported Note: Not Reported

FED USGS

USGS40001166032

Level reading date: 2003-10-30 Feet below surface: 364

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2003-09-11 Feet below surface: 422

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2003-04-09 Feet below surface: 386

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2003-02-02 Feet below surface: 349.68

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-11-12 Feet below surface: 357

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-09-10 Feet below surface: 413

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2002-05-31 Feet below surface: 334.09
Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-02-26 Feet below surface: 331.90

Feet to sea level: Not Reported Note:

Level reading date: 2001-09-19 Feet below surface: 424

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2001-04-25 Feet below surface: 442

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2001-01-04 Feet below surface: 394.86

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2000-12-05 Feet below surface: 403

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2000-10-06 Feet below surface: 456

Feet to sea level: Not Reported Note: The site was being pumped.

Q103 WNW 1/2 - 1 Mile

Higher

Organization ID: USGS-TX Organization Name: USGS Texas Water Science Center

Monitor Location: LJ-65-20-422 Type: Well HUC: 12040104 Description: Not Reported Drainage Area: Not Reported Drainage Area Units: Not Reported Contrib Drainage Area: Not Reported Contrib Drainage Area Unts: Not Reported

Aquifer: Coastal lowlands aquifer system

Formation Type: Chicot and Evangeline Aquifers

Aquifer Type: Confined single aquifer Construction Date: 19980227

Well Depth: 995 Well Depth Units: ft

Well Hole Depth: Not Reported Well Hole Depth Units: Not Reported

Ground water levels, Number of Measurements: 18 Level reading date: 2005-01-24 Feet below surface: 330.63 Feet to sea level: Not Reported

Feet below surface: 330.63 Feet to sea level: Not Note: Not Reported

Level reading date: 2004-09-10 Feet below surface: 347

FED USGS

USGS40001166033

Not Reported

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2004-04-02 Feet below surface: 336

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2004-01-23 Feet below surface: 286

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2003-10-30 Feet below surface: 298

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2003-09-11 Feet below surface: 360

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2003-04-09 Feet below surface: 327

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2003-02-07 Feet below surface: 286.33
Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-11-12 Feet below surface: 285

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-09-26 Feet below surface: 347

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2002-05-31 Feet below surface: 278

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-04-29 Feet below surface: 335

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2002-02-26 Feet below surface: 275.30

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2001-09-19 Feet below surface: 368

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2001-04-25 Feet below surface: 392

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date:2001-01-04Feet below surface:334.11Feet to sea level:Not ReportedNote:Not Reported

Level reading date: 2000-12-05 Feet below surface: 342

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2000-10-06 Feet below surface: 398

Feet to sea level: Not Reported Note: The site was being pumped.

104 SSE 1/2 - 1 Mile

Withdrawal of Water

Higher

Well Type:

TX WELLS TXWDB8000077441

Database: Groundwater Database Well #: 6520414
Primary Water Use: Public Supply Elevation (ft): 86

Well Depth (ft): 1038 Observation Type: USGS Current Observation Well Water Quality Review: No Aquifer: 121EVGL - Evangeline Aquifer

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Map ID Direction Distance

Elevation Database EDR ID Number

S105 WSW TX WELLS TXEQ70000009038 1/2 - 1 Mile

Higher

Database: Public Water Supply Sources Databases

PWS ID: 1010013 Water Source: G1010013EI

Locating Agency: TCEQ Elevation: 85

Construction Information:

Record #: 1 Well Interval: ANNULAR CEMENT

Top Depth (ft):0Bottom Depth (ft):600Casing Above Surface:Not ReportedDiameter (in):0

Type of Well Opening: Not Reported Casing Material: Not Reported Opening Material: Not Reported Opening Method: Not Reported Packer Material: Not Reported Not Reported Packer Material: Not Reported

Construction Information:

Record #: 2 Well Interval: OPENING INTERVAL

Top Depth (ft):610Bottom Depth (ft):985Casing Above Surface:Not ReportedDiameter (in):0

Type of Well Opening: UNKNOWN Casing Material: Not Reported

Opening Material: UNKNOWN Opening Length (ft): 375
Opening Method: Opening Interval = Top Of Shallowest Screen To Bottom Of Deepest Screen

Packer Material: Not Reported

Water Level Information:

Date Water Level Measure: 19940104 Feet below Ground Surface: -277.0 Collecting Agency: USGS Collection Method: AIR LINE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19910114 Feet below Ground Surface: -295.0 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19920115 Feet below Ground Surface: -345.26 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19930113 Feet below Ground Surface: -283.64 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19950113 Feet below Ground Surface: -277.01 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19960117 Feet below Ground Surface: -264.74 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19960926 Feet below Ground Surface: -334.0

Collecting Agency: USGS Collection Method: ELECTRIC TAPE

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19970127 Feet below Ground Surface: -262.37 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: Not Reported

\$106 WSW FED USGS USG\$40001165882 1/2 - 1 Mile

Higher

Organization ID: USGS-TX Organization Name: USGS Texas Water Science Center

Monitor Location: LJ-65-20-412 Well Type: Not Reported Description: HUC: 12040104 Drainage Area: Not Reported **Drainage Area Units:** Not Reported Contrib Drainage Area: Not Reported Contrib Drainage Area Unts: Not Reported

Aquifer: Coastal lowlands aquifer system Formation Type: Chicot and Evangeline Aquifers

Aquifer Type: Confined multiple aquifer Construction Date: 19731127
Well Depth: 1000 Well Depth Units: ft
Well Hole Depth: 1000 Well Hole Depth Units: ft

Ground water levels, Number of Measurements: 38 Level reading date: 2005-02-15 Feet below surface: 278.59 Feet to sea level: Not Reported

Note: Not Reported

Level reading date: 2004-11-05 Feet below surface: 285

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2004-09-21 Feet below surface: 342

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2004-04-07 Feet below surface: 324

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2004-01-22 Feet below surface: 278

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2003-10-31 Feet below surface: 288

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2003-04-11 Feet below surface: 333

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2003-01-31 Feet below surface: 261.86 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-11-14 Feet below surface: 279

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-09-27 Feet below surface: 333

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2002-06-04 Feet below surface: 268

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2002-05-13 Feet below surface: 331

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2002-02-27 Feet below surface: 258.74
Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2001-09-21 Feet below surface: 333

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2001-04-27 Feet below surface: 350

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 2001-01-12 Feet below surface: 296.20 Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2000-12-05 Feet below surface: 299

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 2000-10-04 Feet below surface: 363

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1998-05-21 Feet below surface: 330

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1998-01-27 Feet below surface: 260.76
Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1998-01-27 Feet below surface: 260

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1997-11-05 Feet below surface: 277

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1997-09-11 Feet below surface: 336

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1997-05-02 Feet below surface: 315

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1997-01-27 Feet below surface: 262.37

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1996-09-26 Feet below surface: 334

Feet to sea level: Not Reported Note: The site was being pumped.

Level reading date: 1996-01-17 Feet below surface: 268

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1996-01-17 Feet below surface: 264.74

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1995-01-13 Feet below surface: 277

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1995-01-13 Feet below surface: 277.01

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1994-01-04 Feet below surface: 277

Feet to sea level: Not Reported Note: Not Reported

Level reading date: 1993-01-13 Feet below surface: 283.64

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1993-01-13 Feet below surface: 281

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1992-01-15 Feet below surface: 345.26

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1991-01-14 Feet below surface: 295

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1990-01-19 Feet below surface: 293

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1990-01-19 Feet below surface: 290.77

Feet to sea level: Not Reported Note: The site had been pumped recently.

Level reading date: 1973-12-28 Feet below surface: 197

Feet to sea level: Not Reported Note: The site had been pumped recently.

S107
WSW
TX WELLS
1/2 - 1 Mile
Higher

Database: Water Well Database Well #: 1375 Permittee: Houston, City of Permit #: 214796 Start Date of Permit: 2/1/2021 Exp Date of Permit: 1/31/2022 Usage: **Public Supply** Active: Active Year Drilled: 1990 Diameter: 16 Depth (ft): 1000 Depth to 1st Screen (ft): 610

\$108
WSW
TX WELLS
TXWDB8000076448
1/2 - 1 Mile

Database: Groundwater Database Well #: 6520412
Primary Water Use: Public Supply Elevation (ft): 85

Well Depth (ft): 1000 Observation Type: USGS Current Observation Well

Water Quality Review: Yes Aquifer: 112CEVG - Chicot and Evangeline Aquifers

Well Type: Withdrawal of Water

Higher

TXHG60000000359

Map ID Direction Distance

Elevation Database EDR ID Number

T109
NE TX WELLS TXPLU6000174435

1/2 - 1 Mile Lower

Database: Submitted Drillers Reports Database (Plugged)

Well Report #: 479475 Plugging Rpt #: 177632
Well Type: Monitor Borehole Depth (ft): 35

T110
NE TX WELLS TXMON6000466844

1/2 - 1 Mile Lower

Database: Submitted Drillers Reports Database

Well Report #:479475Well Type:New WellProposed Use:MonitorBorehole Depth (ft):35Injurious Water Quality:noPlugging Rpt #:177632

Q111
WNW TX WELLS TXHG60000005042
1/2 - 1 Mile

Higher

Database: Water Well Database Well #: 6076 Permittee: Houston, City of Permit #: 215025 Start Date of Permit: 2/1/2021 Exp Date of Permit: 1/31/2022 Public Supply Usage: Active: Active Year Drilled: 1976 Diameter: 14 Depth (ft): 1020 Depth to 1st Screen (ft): 650

Q112
WNW
TX WELLS
TXEQ70000009386
1/2 - 1 Mile

Higher

Database: Public Water Supply Sources Databases

PWS ID: 1010013 Water Source: G1010013RO

Locating Agency: TCEQ Elevation: 84

Construction Information:

Record #: 1 Well Interval: ANNULAR CEMENT

Top Depth (ft):0Bottom Depth (ft):39Casing Above Surface:Not ReportedDiameter (in):42

Type of Well Opening: Not Reported Casing Material: Not Reported Opening Material: Not Reported Opening Method: Opening Method: Opening Method: Not Reported Open

Construction Information:

Record #: 2 Well Interval: CASING

50 Top Depth (ft): Bottom Depth (ft): Casing Above Surface: Not Reported Diameter (in): 36 Type of Well Opening: Not Reported Casing Material: STEEL Not Reported Opening Material: Not Reported Opening Length (ft): Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 3 Well Interval: ANNULAR CEMENT

Top Depth (ft):0Bottom Depth (ft):650Casing Above Surface:Not ReportedDiameter (in):30

Type of Well Opening: Not Reported Casing Material: Not Reported Opening Material: Not Reported Opening Method: Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 4 Well Interval: **CASING** 3 Bottom Depth (ft): 650 Top Depth (ft): Casing Above Surface: Diameter (in): 24 Type of Well Opening: Not Reported Casing Material: STEEL Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

CASING Record #: 5 Well Interval: Top Depth (ft): 590 Bottom Depth (ft): 660 Casing Above Surface: Not Reported Diameter (in): 18 **STEEL** Type of Well Opening: Not Reported Casing Material: Not Reported Opening Length (ft): Not Reported Opening Material: Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: Well Interval: WELL OPENINGS

Top Depth (ft):660Bottom Depth (ft):691Casing Above Surface:Not ReportedDiameter (in):18

Casing Above Surface: Not Reported Diameter (in): 18
Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): 31 Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

CASING Record #: Well Interval: Top Depth (ft): 691 Bottom Depth (ft): 718 Casing Above Surface: Not Reported Diameter (in): 18 Not Reported STEEL Type of Well Opening: Casing Material: Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: Well Interval: WELL OPENINGS

Top Depth (ft): 718 Bottom Depth (ft): 743

Casing Above Surface: Not Reported

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported

Opening Length (ft): 25

Packer Material: Not Reported

Diameter (in): 18

Opening Material: STAINLESS STEEL

Opening Method: Not Reported

Construction Information:

CASING Record #: 9 Well Interval: Top Depth (ft): 743 Bottom Depth (ft): 776 Casing Above Surface: Not Reported Diameter (in): 18 Type of Well Opening: Not Reported Casing Material: STEEL

Opening Material:Not ReportedOpening Length (ft):Not ReportedOpening Method:Not ReportedPacker Material:Not Reported

Construction Information:

Record #: 10 Well Interval: WELL OPENINGS

Top Depth (ft): 776 Bottom Depth (ft): 846

Casing Above Surface: Not Reported Diameter (in): 14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL

Opening Length (ft): 70 Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: Well Interval: **CASING** 11 Top Depth (ft): 846 Bottom Depth (ft): 852 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: STEEL

Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 12 Well Interval: WELL OPENINGS

Top Depth (ft): 852 Bottom Depth (ft): 906

Cooling Above Surface: Not Reported Pigmeter (in): 14

Casing Above Surface: Not Reported Diameter (in): 14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL

Opening Length (ft): 54 Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #:13Well Interval:CASINGTop Depth (ft):906Bottom Depth (ft):930Casing Above Surface:Not ReportedDiameter (in):14

Type of Well Opening: Not Reported Casing Material: STEL
Opening Material: Not Reported Opening Length (ft): Not Reported
Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 14 Well Interval: WELL OPENINGS

Top Depth (ft):930Bottom Depth (ft):940Casing Above Surface:Not ReportedDiameter (in):14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): 10 Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

CASING Record #: 15 Well Interval: Top Depth (ft): 940 Bottom Depth (ft): 954 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: **STEEL** Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: Well Interval: WELL OPENINGS

Top Depth (ft):954Bottom Depth (ft):968Casing Above Surface:Not ReportedDiameter (in):14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): 14 Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

Record #: 17 Well Interval: **CASING** 968 995 Top Depth (ft): Bottom Depth (ft): Casing Above Surface: Not Reported Diameter (in): 14 Casing Material: Type of Well Opening: Not Reported STEEL Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 18 Well Interval: ANNULAR GRAVEL PACK

Top Depth (ft):600Bottom Depth (ft):995Casing Above Surface:Not ReportedDiameter (in):32

Type of Well Opening: Not Reported Casing Material: Not Reported Opening Material: Not Reported Opening Method: Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Geologic Information:

Record #: 1 Top Geo Unit Below Surface (ft): 0
Bottom Geo Unit Below Surface (ft): 57 Geo Unit Thickness (ft): 57

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 2 Top Geo Unit Below Surface (ft): 57
Bottom Geo Unit Below Surface (ft): 120 Geo Unit Thickness (ft): 63

Geo Unit Description: SAND, CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 3 Top Geo Unit Below Surface (ft): 120
Bottom Geo Unit Below Surface (ft): 138 Geo Unit Thickness (ft): 18

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 4 Top Geo Unit Below Surface (ft): 138
Bottom Geo Unit Below Surface (ft): 228 Geo Unit Thickness (ft): 90

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 5 Top Geo Unit Below Surface (ft): 228 Bottom Geo Unit Below Surface (ft): 261 Geo Unit Thickness (ft): 33

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 6 Top Geo Unit Below Surface (ft): 261
Bottom Geo Unit Below Surface (ft): 79
Geo Unit Thickness (ft): 79

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 7 Top Geo Unit Below Surface (ft): 340
Bottom Geo Unit Below Surface (ft): 360 Geo Unit Thickness (ft): 20

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 8 Top Geo Unit Below Surface (ft): 360 Bottom Geo Unit Below Surface (ft): 398 Geo Unit Thickness (ft): 38

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 9 Top Geo Unit Below Surface (ft): 398

Bottom Geo Unit Below Surface (ft): 400 Geo Unit Thickness (ft): 2

Geo Unit Description: ROCK

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 10 Top Geo Unit Below Surface (ft): 400
Bottom Geo Unit Below Surface (ft): 408 Geo Unit Thickness (ft): 8

Geo Unit Description: HARD SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 11 Top Geo Unit Below Surface (ft): 408 Bottom Geo Unit Below Surface (ft): 432 Geo Unit Thickness (ft): 24

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 12 Top Geo Unit Below Surface (ft): 432 Bottom Geo Unit Below Surface (ft): 440 Geo Unit Thickness (ft): 8

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 13 Top Geo Unit Below Surface (ft): 440 Bottom Geo Unit Below Surface (ft): 505 Geo Unit Thickness (ft): 65

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 14 Top Geo Unit Below Surface (ft): 505 Bottom Geo Unit Below Surface (ft): 513 Geo Unit Thickness (ft): 8

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 15 Top Geo Unit Below Surface (ft): 513 Bottom Geo Unit Below Surface (ft): 552 Geo Unit Thickness (ft): 39

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Record #: 16 Top Geo Unit Below Surface (ft): 552
Bottom Geo Unit Below Surface (ft): 558 Geo Unit Thickness (ft): 6

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 17 Top Geo Unit Below Surface (ft): 558
Bottom Geo Unit Below Surface (ft): 602 Geo Unit Thickness (ft): 44

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 18 Top Geo Unit Below Surface (ft): 602
Bottom Geo Unit Below Surface (ft): 608 Geo Unit Thickness (ft): 6

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 19 Top Geo Unit Below Surface (ft): 608 Bottom Geo Unit Below Surface (ft): 626 Geo Unit Thickness (ft): 18

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 20 Top Geo Unit Below Surface (ft): 626
Bottom Geo Unit Below Surface (ft): 660 Geo Unit Thickness (ft): 34

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 21 Top Geo Unit Below Surface (ft): 660
Bottom Geo Unit Below Surface (ft): 704 Geo Unit Thickness (ft): 44

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 22 Top Geo Unit Below Surface (ft): 704
Bottom Geo Unit Below Surface (ft): 716 Geo Unit Thickness (ft): 12

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Record #: 23 Top Geo Unit Below Surface (ft): 716
Bottom Geo Unit Below Surface (ft): 742 Geo Unit Thickness (ft): 26

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 24 Top Geo Unit Below Surface (ft): 742 Bottom Geo Unit Below Surface (ft): 768 Geo Unit Thickness (ft): 26

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 25 Top Geo Unit Below Surface (ft): 768
Bottom Geo Unit Below Surface (ft): 940 Geo Unit Thickness (ft): 172

Geo Unit Description: SAND W/ SMALL HARD

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 26 Top Geo Unit Below Surface (ft): 940 Bottom Geo Unit Below Surface (ft): 950 Geo Unit Thickness (ft): 10

Geo Unit Description: HARD SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 27 Top Geo Unit Below Surface (ft): 950 Bottom Geo Unit Below Surface (ft): 972 Geo Unit Thickness (ft): 22

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 28 Top Geo Unit Below Surface (ft): 972
Bottom Geo Unit Below Surface (ft): 44
Geo Unit Thickness (ft): 84

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19980216 Feet below Ground Surface: -277

Collecting Agency: DRILL

Collection Method: REPORTED - METHOD NOT KNOWN

Map ID Direction Distance

 Elevation
 Database
 EDR ID Number

 U113
 TX WELLS
 TXPLU6000153535

NE 1/2 - 1 Mile Lower

Database: Submitted Drillers Reports Database (Plugged)

Well Report #: 415483 Plugging Rpt #: 155834
Well Type: Monitor Borehole Depth (ft): 17

U114 NE

NE TX WELLS TXMON6000408690

1/2 - 1 Mile Lower

Database: Submitted Drillers Reports Database

Well Report #:415483Well Type:New WellProposed Use:MonitorBorehole Depth (ft):17Injurious Water Quality:noPlugging Rpt #:155834

Q115
WNW TX WELLS TXEQ70000009385
1/2 - 1 Mile

Higher

Database: Public Water Supply Sources Databases

PWS ID: 1010013 Water Source: G1010013RN

Locating Agency: TCEQ Elevation: 84

Construction Information:

Record #: 1 Well Interval: ANNULAR CEMENT

Top Depth (ft):0Bottom Depth (ft):50Casing Above Surface:Not ReportedDiameter (in):36

Type of Well Opening: Not Reported Casing Material: Not Reported Opening Material: Not Reported Opening Method: Opening Method: Not Reported Opening Method: Not

Construction Information:

Record #: 2 Well Interval: CASING
Top Depth (ft): 0 Bottom Depth (ft): 50

Casing Above Surface: Not Reported Diameter (in): 30 STEEL Type of Well Opening: Not Reported Casing Material: Not Reported Opening Length (ft): Not Reported Opening Material: Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 3 Well Interval: ANNULAR CEMENT

Top Depth (ft): 0 Bottom Depth (ft): 1070
Casing Above Surface: Not Reported Diameter (in): 26

Casing Above Surface:Not ReportedDiameter (in):26Type of Well Opening:Not ReportedCasing Material:Not Reported

Type of Well Opening: Not Reported Casing Material: Not Reported Opening Material: Not Reported Opening Length (ft): Not Reported

Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: Well Interval: **CASING** 4 Bottom Depth (ft): Top Depth (ft): 3 1070 Casing Above Surface: Diameter (in): 20 Type of Well Opening: Casing Material: STEEL Not Reported Not Reported Not Reported Opening Material: Opening Length (ft): Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

CASING Record #: 5 Well Interval: Top Depth (ft): 1010 Bottom Depth (ft): 1081 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported STEEL Casing Material: Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: Well Interval: WELL OPENINGS

Top Depth (ft):1081Bottom Depth (ft):1114Casing Above Surface:Not ReportedDiameter (in):14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

Well Interval: **CASING** Record #: 1114 Top Depth (ft): Bottom Depth (ft): 1138 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: STEEL Opening Material: Not Reported Opening Length (ft): Not Reported Not Reported Packer Material: Not Reported Opening Method:

Construction Information:

Record #: Well Interval: WELL OPENINGS

Top Depth (ft): 1138 Bottom Depth (ft): 1144
Casing Above Surface: Not Reported Diameter (in): 14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

Record #: Well Interval: **CASING** Top Depth (ft): 1144 Bottom Depth (ft): 1168 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Casing Material: Not Reported STEEL Opening Material: Not Reported Opening Length (ft): Not Reported

Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 10 Well Interval: WELL OPENINGS

Top Depth (ft): 1168 Bottom Depth (ft): 1174
Casing Above Surface: Not Reported Diameter (in): 14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

Record #: Well Interval: **CASING** Top Depth (ft): 1174 Bottom Depth (ft): 1198 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: **STEEL** Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 12 Well Interval: WELL OPENINGS

Top Depth (ft):1198Bottom Depth (ft):1204Casing Above Surface:Not ReportedDiameter (in):14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

CASING Record #: 13 Well Interval: 1230 Top Depth (ft): 1204 Bottom Depth (ft): Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: STEEL Not Reported Opening Material: Not Reported Opening Length (ft): Packer Material: Opening Method: Not Reported Not Reported

Construction Information:

Record #: 14 Well Interval: WELL OPENINGS

Top Depth (ft):1230Bottom Depth (ft):1274Casing Above Surface:Not ReportedDiameter (in):14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

Record #: 15 Well Interval: **CASING** Top Depth (ft): 1274 Bottom Depth (ft): 1296 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: STEEL

Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 16 Well Interval: WELL OPENINGS

Top Depth (ft): 1296 Bottom Depth (ft): 1304 Casing Above Surface: Not Reported Diameter (in): 14

WIRE-WOUND SCREEN Type of Well Opening:

STAINLESS STEEL Casing Material: Not Reported Opening Material: Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

17 Well Interval: **CASING** Record #: Top Depth (ft): 1304 Bottom Depth (ft): 1330 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: STEEL Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

18 WELL OPENINGS Record #: Well Interval:

Top Depth (ft): 1330 Bottom Depth (ft): 1342 Not Reported Casing Above Surface: Diameter (in): 14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

Record #: 19 Well Interval: **CASING** Bottom Depth (ft): Top Depth (ft): 1342 1346 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: STEEL Opening Material: Not Reported Opening Length (ft): Not Reported Packer Material: Opening Method: Not Reported Not Reported

Construction Information:

WELL OPENINGS Record #: 20 Well Interval:

Top Depth (ft): 1346 Bottom Depth (ft): 1378 Not Reported Casing Above Surface: Diameter (in): 14

WIRE-WOUND SCREEN Type of Well Opening:

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

CASING Record #: 21 Well Interval: Top Depth (ft): 1378 Bottom Depth (ft): 1402

Casing Above Surface: Not Reported Diameter (in): 14

Type of Well Opening: Not Reported Casing Material: STEEL
Opening Material: Not Reported Opening Length (ft): Not Reported
Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 22 Well Interval: WELL OPENINGS
Top Depth (ft): 1402 Bottom Depth (ft): 1408

Top Depth (ft): 1402 Bottom Depth (ft): 1402
Casing Above Surface: Not Reported Diameter (in): 14
Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

CASING Record #: 23 Well Interval: Top Depth (ft): 1408 Bottom Depth (ft): 1432 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: STEEL Opening Material: Not Reported Opening Length (ft): Not Reported Packer Material: Opening Method: Not Reported Not Reported

Construction Information:

Record #: 24 Well Interval: WELL OPENINGS

Top Depth (ft): 1432 Bottom Depth (ft): 1488
Casing Above Surface: Not Reported Diameter (in): 14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

Record #: 25 Well Interval: **CASING** Top Depth (ft): 1488 Bottom Depth (ft): 1516 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: **STEEL** Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 26 Well Interval: WELL OPENINGS

Top Depth (ft):1516Bottom Depth (ft):1522Casing Above Surface:Not ReportedDiameter (in):14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

 Record #:
 27
 Well Interval:
 CASING

 Top Depth (ft):
 1522
 Bottom Depth (ft):
 1554

Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: STEEL Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 28 Well Interval: WELL OPENINGS

Top Depth (ft):1554Bottom Depth (ft):1560Casing Above Surface:Not ReportedDiameter (in):14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

Record #: 29 Well Interval: **CASING** Top Depth (ft): 1560 Bottom Depth (ft): 1586 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: **STEEL** Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 30 Well Interval: WELL OPENINGS

Top Depth (ft):1586Bottom Depth (ft):1602Casing Above Surface:Not ReportedDiameter (in):14

Type of Well Opening: WIRE-WOUND SCREEN

 Casing Material:
 Not Reported
 Opening Material:
 STAINLESS STEEL

 Opening Length (ft):
 Not Reported
 Opening Method:
 Not Reported

Packer Material: Not Reported

Construction Information:

Record #: 31 Well Interval: **CASING** Top Depth (ft): 1602 Bottom Depth (ft): 1618 Casing Above Surface: Not Reported Diameter (in): 14 STEEL Type of Well Opening: Not Reported Casing Material: Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 32 Well Interval: WELL OPENINGS

Top Depth (ft):1618Bottom Depth (ft):1642Casing Above Surface:Not ReportedDiameter (in):14

Type of Well Opening: WIRE-WOUND SCREEN

Casing Material: Not Reported Opening Material: STAINLESS STEEL Opening Length (ft): Not Reported Opening Method: Not Reported

Packer Material: Not Reported

Construction Information:

Record #: 33 Well Interval: CASING

Bottom Depth (ft): 1667 Top Depth (ft): 1642 Casing Above Surface: Not Reported Diameter (in): 14 Type of Well Opening: Not Reported Casing Material: STEEL Opening Material: Not Reported Opening Length (ft): Not Reported Opening Method: Not Reported Packer Material: Not Reported

Construction Information:

Record #: 34 Well Interval: ANNULAR GRAVEL PACK

Top Depth (ft):1070Bottom Depth (ft):1684Casing Above Surface:Not ReportedDiameter (in):32

Type of Well Opening: Not Reported Casing Material: Not Reported Opening Material: Not Reported Opening Method: Opening Method: Opening Method: Not Reported Open

Geologic Information:

Record #: 1 Top Geo Unit Below Surface (ft): 0
Bottom Geo Unit Below Surface (ft): 61 Geo Unit Thickness (ft): 61

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 2 Top Geo Unit Below Surface (ft): 61
Bottom Geo Unit Below Surface (ft): 68 Geo Unit Thickness (ft): 7

Geo Unit Description: SANDY CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 3 Top Geo Unit Below Surface (ft): 68
Bottom Geo Unit Below Surface (ft): 90 Geo Unit Thickness (ft): 22

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 4 Top Geo Unit Below Surface (ft): 90
Bottom Geo Unit Below Surface (ft): 120 Geo Unit Thickness (ft): 30

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 5 Top Geo Unit Below Surface (ft): 120 Bottom Geo Unit Below Surface (ft): 132 Geo Unit Thickness (ft): 12

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Geologic Information:

Record #: 6 Top Geo Unit Below Surface (ft): 132
Bottom Geo Unit Below Surface (ft): 229 Geo Unit Thickness (ft): 97

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 7 Top Geo Unit Below Surface (ft): 229
Bottom Geo Unit Below Surface (ft): 37
Geo Unit Thickness (ft): 37

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 8 Top Geo Unit Below Surface (ft): 266
Bottom Geo Unit Below Surface (ft): 324 Geo Unit Thickness (ft): 58

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 9 Top Geo Unit Below Surface (ft): 324
Bottom Geo Unit Below Surface (ft): 351 Geo Unit Thickness (ft): 27

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 10 Top Geo Unit Below Surface (ft): 351
Bottom Geo Unit Below Surface (ft): 403 Geo Unit Thickness (ft): 52

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 11 Top Geo Unit Below Surface (ft): 403
Bottom Geo Unit Below Surface (ft): 421 Geo Unit Thickness (ft): 18

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 12 Top Geo Unit Below Surface (ft): 421
Bottom Geo Unit Below Surface (ft): 427 Geo Unit Thickness (ft): 6

Geo Unit Description: SAND, CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Geologic Information:

Record #: 13 Top Geo Unit Below Surface (ft): 427
Bottom Geo Unit Below Surface (ft): 440 Geo Unit Thickness (ft): 13

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 14 Top Geo Unit Below Surface (ft): 440 Bottom Geo Unit Below Surface (ft): 505 Geo Unit Thickness (ft): 65

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 15 Top Geo Unit Below Surface (ft): 505 Bottom Geo Unit Below Surface (ft): 513 Geo Unit Thickness (ft): 8

Geo Unit Description: SAND, CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 16 Top Geo Unit Below Surface (ft): 513
Bottom Geo Unit Below Surface (ft): 560 Geo Unit Thickness (ft): 47

Geo Unit Description: HARD SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 17 Top Geo Unit Below Surface (ft): 560
Bottom Geo Unit Below Surface (ft): 609 Geo Unit Thickness (ft): 49

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 18 Top Geo Unit Below Surface (ft): 609
Bottom Geo Unit Below Surface (ft): 627 Geo Unit Thickness (ft): 18

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 19 Top Geo Unit Below Surface (ft): 627 Bottom Geo Unit Below Surface (ft): 666 Geo Unit Thickness (ft): 39

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Geologic Information:

Record #: 20 Top Geo Unit Below Surface (ft): 666
Bottom Geo Unit Below Surface (ft): 695 Geo Unit Thickness (ft): 29

Geo Unit Description: HARD SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 21 Top Geo Unit Below Surface (ft): 695 Bottom Geo Unit Below Surface (ft): 696 Geo Unit Thickness (ft): 1

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 22 Top Geo Unit Below Surface (ft): 696
Bottom Geo Unit Below Surface (ft): 711 Geo Unit Thickness (ft): 15

Geo Unit Description: SANDY SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 23 Top Geo Unit Below Surface (ft): 711
Bottom Geo Unit Below Surface (ft): 722 Geo Unit Thickness (ft): 11

Geo Unit Description: SAND, GRAVEL

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 24 Top Geo Unit Below Surface (ft): 722 Bottom Geo Unit Below Surface (ft): 747 Geo Unit Thickness (ft): 25

Geo Unit Description: HARD SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 25 Top Geo Unit Below Surface (ft): 747
Bottom Geo Unit Below Surface (ft): 748 Geo Unit Thickness (ft): 1

Geo Unit Description: SAND W/ SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 26 Top Geo Unit Below Surface (ft): 748
Bottom Geo Unit Below Surface (ft): 763 Geo Unit Thickness (ft): 15

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Geologic Information:

Record #: 27 Top Geo Unit Below Surface (ft): 763

Bottom Geo Unit Below Surface (ft): 5

Geo Unit Thickness (ft): 5

Geo Unit Description: SANDY CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 28 Top Geo Unit Below Surface (ft): 768
Bottom Geo Unit Below Surface (ft): 769
Geo Unit Thickness (ft): 16

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 29 Top Geo Unit Below Surface (ft): 784
Bottom Geo Unit Below Surface (ft): 786 Geo Unit Thickness (ft): 2

Geo Unit Description: SAND, GRAVEL

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 30 Top Geo Unit Below Surface (ft): 786
Bottom Geo Unit Below Surface (ft): 913 Geo Unit Thickness (ft): 127

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 31 Top Geo Unit Below Surface (ft): 913 Bottom Geo Unit Below Surface (ft): 925 Geo Unit Thickness (ft): 12

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 32 Top Geo Unit Below Surface (ft): 925 Bottom Geo Unit Below Surface (ft): 955 Geo Unit Thickness (ft): 30

Geo Unit Description: SANDY SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 33 Top Geo Unit Below Surface (ft): 955
Bottom Geo Unit Below Surface (ft): 961 Geo Unit Thickness (ft): 6

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Geologic Information:

Record #: Top Geo Unit Below Surface (ft): 961 Bottom Geo Unit Below Surface (ft): 974 Geo Unit Thickness (ft): 13

Geo Unit Description: SHALE

DRILLERS DESCRIPTION OF FORMATION GEOLOGY Source of Geo Data:

Remarks: Not Reported

Geologic Information:

Record #: 35 Top Geo Unit Below Surface (ft): 974 Bottom Geo Unit Below Surface (ft): 1006 Geo Unit Thickness (ft): 32

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: Top Geo Unit Below Surface (ft): 1006 36 6

Bottom Geo Unit Below Surface (ft): 1012 Geo Unit Thickness (ft):

Geo Unit Description: SHALE

DRILLERS DESCRIPTION OF FORMATION GEOLOGY Source of Geo Data:

Remarks: Not Reported

Geologic Information:

Record #: 37 Top Geo Unit Below Surface (ft): 1012 Bottom Geo Unit Below Surface (ft): 1061 Geo Unit Thickness (ft): 49

Geo Unit Description: SAND

DRILLERS DESCRIPTION OF FORMATION GEOLOGY Source of Geo Data:

Remarks: Not Reported

Geologic Information:

Record #: 38 Top Geo Unit Below Surface (ft): 1061 Bottom Geo Unit Below Surface (ft): 1075 Geo Unit Thickness (ft): 14

Geo Unit Description: SHALE

DRILLERS DESCRIPTION OF FORMATION GEOLOGY Source of Geo Data:

Remarks: Not Reported

Geologic Information:

39 1075 Record #: Top Geo Unit Below Surface (ft): Bottom Geo Unit Below Surface (ft): 1082 Geo Unit Thickness (ft): 7

Geo Unit Description: SAND

DRILLERS DESCRIPTION OF FORMATION GEOLOGY Source of Geo Data:

Remarks: Not Reported

Geologic Information:

1082 Record #: 40 Top Geo Unit Below Surface (ft): Bottom Geo Unit Below Surface (ft): 1119 Geo Unit Thickness (ft): 37

Geo Unit Description: SHALE

DRILLERS DESCRIPTION OF FORMATION GEOLOGY Source of Geo Data:

Geologic Information:

Record #: 41 Top Geo Unit Below Surface (ft): 1119
Bottom Geo Unit Below Surface (ft): 90
Geo Unit Thickness (ft): 90

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 42 Top Geo Unit Below Surface (ft): 1209 Bottom Geo Unit Below Surface (ft): 1219 Geo Unit Thickness (ft): 10

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 43 Top Geo Unit Below Surface (ft): 1219 Bottom Geo Unit Below Surface (ft): 1232 Geo Unit Thickness (ft): 13

Geo Unit Description: SAND W/ SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 44 Top Geo Unit Below Surface (ft): 1232 Bottom Geo Unit Below Surface (ft): 1284 Geo Unit Thickness (ft): 52

Geo Unit Description: SANDY SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 45 Top Geo Unit Below Surface (ft): 1284
Bottom Geo Unit Below Surface (ft): 7
Geo Unit Thickness (ft): 7

Geo Unit Description: HARD SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 46 Top Geo Unit Below Surface (ft): 1291 Bottom Geo Unit Below Surface (ft): 1299 Geo Unit Thickness (ft): 8

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 47 Top Geo Unit Below Surface (ft): 1299
Bottom Geo Unit Below Surface (ft): 1327 Geo Unit Thickness (ft): 28

Geo Unit Description: SAND (CUT GOOD)

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Geologic Information:

Record #: 48 Top Geo Unit Below Surface (ft): 1327 Bottom Geo Unit Below Surface (ft): 1399 Geo Unit Thickness (ft): 72

Geo Unit Description: CLAY

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 49 Top Geo Unit Below Surface (ft): 1399 Bottom Geo Unit Below Surface (ft): 1411 Geo Unit Thickness (ft): 12

Geo Unit Description: SANDY SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 50 Top Geo Unit Below Surface (ft): 1411 Bottom Geo Unit Below Surface (ft): 1423 Geo Unit Thickness (ft): 12

Geo Unit Description: HARD SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 51 Top Geo Unit Below Surface (ft): 1423

Bottom Geo Unit Below Surface (ft): 5

Geo Unit Thickness (ft): 5

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 52 Top Geo Unit Below Surface (ft): 1428 Bottom Geo Unit Below Surface (ft): 52 Geo Unit Thickness (ft): 74

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 53 Top Geo Unit Below Surface (ft): 1502 Bottom Geo Unit Below Surface (ft): 1528 Geo Unit Thickness (ft): 26

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 54 Top Geo Unit Below Surface (ft): 1528 Bottom Geo Unit Below Surface (ft): 1534 Geo Unit Thickness (ft): 6

Geo Unit Description: HARD SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Geologic Information:

Record #: 55 Top Geo Unit Below Surface (ft): 1534

Bottom Geo Unit Below Surface (ft): 1535 Geo Unit Thickness (ft): 1

Geo Unit Description: SANDY SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 56 Top Geo Unit Below Surface (ft): 1535 Bottom Geo Unit Below Surface (ft): 1553 Geo Unit Thickness (ft): 18

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 57 Top Geo Unit Below Surface (ft): 1553 Bottom Geo Unit Below Surface (ft): 1595 Geo Unit Thickness (ft): 42

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 58 Top Geo Unit Below Surface (ft): 1595 Bottom Geo Unit Below Surface (ft): 1612 Geo Unit Thickness (ft): 17

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 59 Top Geo Unit Below Surface (ft): 1612 Bottom Geo Unit Below Surface (ft): 1628 Geo Unit Thickness (ft): 16

Geo Unit Description: SANDY SHALE, SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 60 Top Geo Unit Below Surface (ft): 1628 Bottom Geo Unit Below Surface (ft): 1723 Geo Unit Thickness (ft): 95

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 61 Top Geo Unit Below Surface (ft): 1723 Bottom Geo Unit Below Surface (ft): 1729 Geo Unit Thickness (ft): 6

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Geologic Information:

Record #: 62 Top Geo Unit Below Surface (ft): 1729 Bottom Geo Unit Below Surface (ft): 1745 Geo Unit Thickness (ft): 16

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 63 Top Geo Unit Below Surface (ft): 1745 Bottom Geo Unit Below Surface (ft): 1754 Geo Unit Thickness (ft): 9

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 64 Top Geo Unit Below Surface (ft): 1754 Bottom Geo Unit Below Surface (ft): 1783 Geo Unit Thickness (ft): 29

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 65 Top Geo Unit Below Surface (ft): 1783

Bottom Geo Unit Below Surface (ft): 1801 Geo Unit Thickness (ft): 18

Geo Unit Description: HARD SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 66 Top Geo Unit Below Surface (ft): 1801 Bottom Geo Unit Below Surface (ft): 1804 Geo Unit Thickness (ft): 3

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 67 Top Geo Unit Below Surface (ft): 1804 Bottom Geo Unit Below Surface (ft): 1845 Geo Unit Thickness (ft): 41

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 68 Top Geo Unit Below Surface (ft): 1845 Bottom Geo Unit Below Surface (ft): 15

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Geologic Information:

Record #: 69 Top Geo Unit Below Surface (ft): 1860 Bottom Geo Unit Below Surface (ft): 5

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 70 Top Geo Unit Below Surface (ft): 1865 Bottom Geo Unit Below Surface (ft): 5

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 71 Top Geo Unit Below Surface (ft): 1870 Bottom Geo Unit Below Surface (ft): 1888 Geo Unit Thickness (ft): 18

Geo Unit Description: SHALE

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 72 Top Geo Unit Below Surface (ft): 1888 Bottom Geo Unit Below Surface (ft): 5

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 73 Top Geo Unit Below Surface (ft): 1893 Bottom Geo Unit Below Surface (ft): 1919 Geo Unit Thickness (ft): 26

Geo Unit Description: ROCK

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Geologic Information:

Record #: 74 Top Geo Unit Below Surface (ft): 1919
Bottom Geo Unit Below Surface (ft): 6 Geo Unit Thickness (ft): 8

Geo Unit Description: SAND

Source of Geo Data: DRILLERS DESCRIPTION OF FORMATION GEOLOGY

Remarks: Not Reported

Water Level Information:

Date Water Level Measure: 19730425 Feet below Ground Surface: -287

Collecting Agency: DRILL

Collection Method: REPORTED - METHOD NOT KNOWN

Remarks: FORMERLY G1011591A

Water Level Information:

Date Water Level Measure: 19940105 Feet below Ground Surface: -335.0 Collecting Agency: USGS Collection Method: AIR LINE

Remarks: FORMERLY G1011591A

Water Level Information:

Date Water Level Measure: 19860116 Feet below Ground Surface: -336

Collecting Agency: DRILL

Collection Method: REPORTED - METHOD NOT KNOWN

Remarks: FORMERLY G1011591A

Water Level Information:

Date Water Level Measure:19910126Feet below Ground Surface:-354.0Collecting Agency:USGSCollection Method:STEEL TAPE

Remarks: FORMERLY G1011591A

Water Level Information:

Date Water Level Measure: 19920115 Feet below Ground Surface: -340.0 Collecting Agency: USGS Collection Method: STEEL TAPE

Remarks: FORMERLY G1011591A

Water Level Information:

Date Water Level Measure: 19930106 Feet below Ground Surface: -367.0 Collecting Agency: USGS Collection Method: AIR LINE

Remarks: FORMERLY G1011591A

Water Level Information:

Date Water Level Measure: 19950111 Feet below Ground Surface: -336.0

Collecting Agency: USGS Collection Method:

Remarks: FORMERLY G1011591A

Water Level Information:

Date Water Level Measure: 19960110 Feet below Ground Surface: -339.0

Collecting Agency: USGS Collection Method: ELECTRIC TAPE

Remarks: FORMERLY G1011591A

Water Level Information:

Date Water Level Measure: 19960925 Feet below Ground Surface: -388.0

Collecting Agency: USGS Collection Method: ELECTRIC TAPE

Remarks: FORMERLY G1011591A

Water Level Information:

Date Water Level Measure: 19970107 Feet below Ground Surface: -342.0 Collecting Agency: USGS Collection Method: AIR LINE

Collecting Agency: USGS Collection Method: AIR LINE Remarks: FORMERLY G1011591A

ANALOG\GRAPHIC RECORDER

Map ID Direction Distance

Elevation EDR ID Number Database Q116 WNW 1/2 - 1 Mile TX WELLS TXHG60000005041

Higher

Database: Water Well Database Well #: 6075 215024 Permittee: Houston, City of Permit #: Start Date of Permit: 2/1/2021 Exp Date of Permit: 1/31/2022 **Public Supply** Active: Active Usage: Year Drilled: 1997 Diameter: 14 Depth to 1st Screen (ft): Depth (ft): 1620 1080

1G SE Site ID: 108667 Groundwater Flow: **VARIES** 1/4 - 1/2 Mile

Shallowest Water Table Depth: 6.8 Lower Deepest Water Table Depth: 9.05

Average Water Table Depth: Not Reported Date: 2-28-98

AQUIFLOW

58921

Map ID Direction Distance

Distance Database EDR ID Number

1 NNW OIL_GAS TXOG90001088944 1/2 - 1 Mile

Surface ID:176755Well Number:Not ReportedBottom ID:176755API #:42201Current Wells #:1Well Type:Dry HoleRadioactive:Not ReportedSide Track:Not Reported

APPENDIX 5 CIVIL DRAWING SET

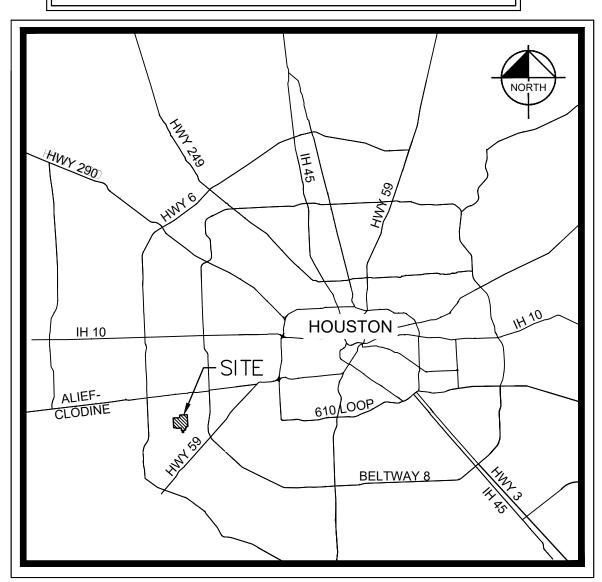
THE SUBJECT PROPERTY IS ADDRESSED AT 12000 BISSONNET STREET, HOUSTON TEXAS 77099. THE SUBJECT PROPERTY IS PART OF AND SURROUNDED BY THE +/-118.778-ACRE DOTY SAND PIT VENTURE (DSPV) LANDFILL. THE DSPV LANDFIL BEGAN AS A SAND MINING OPERATION IN ABOUT 1960 AND TRANSITIONED TO LANDFILL BEFORE 1978 AND CONTINUED TO OPERATE AS A LANDFILL UNTIL ITS CLOSURE IN 1999. IN 1981 THE DSPV LANDFILL RECEIVED A PERMIT FROM THI ENVIRONMENTAL QUALITY (TCEQ)I TO OPERATE THE SITE AS A TYPE IV LANDFIL FOR CONSTRUCTION AND DEMOLITION DEBRIS DISPOSAL. THE SITE WAS SUBSEQUENTLY ISSUED MUNICIPAL SOLID WASTE (MSW) PERMIT NO. 1247 BY TCEO IN 1985. MSW PERMIT NO. 1247 IS ACTIVE AND THE SITE HAS BEEN IN POST CLOSURE CARE SINCE 1999. THE CURRENT TCEQ MSW PERMIT NO. 1247 PERMITTEE IS NORTHWEST METRO HOLDINGS, CS 34, LLC OF BURLINGAME, CALIFORNIA.

LOCATED ADJACENTLY NORTH AND EAST OF THE DSPV LANDFILL IS THE +/-18.11-ACRE OLSHAN DEMOLISHING LANDFILL (FORMERLY MSW PERMIT NO. 1259) ALSO A CLOSED TYPE IV LANDFILL THAT REPORTEDLY RECEIVED CONSTRUCTION DEBRIS WASTE FROM SEPTEMBER 1976 UNTIL JULY 1987. IN 2002. THE OLSHAN LANDFILL ENDED POST CLOSURE CARE, AND THE MSW PERMIT WAS REVOKED BY

THE SUGAR HILLS GOLF COURSE WAS DEVELOPED ABOVE THE DSPV LANDFILL AND OLSHAN DEMOLISHING LANDFILL AND OPERATED FROM APPROXIMATELY 2000 TO 2005 WITH AN ADDRESS OF 12000 BISSONNET STREET. SINCE THE SUGAR HILLS GOLF COURSE CLOSED, BOTH LANDFILLS HAVE REMAINED DEVELOPED AS A GOLF COURSE, THOUGH ONLY SPARINGLY MAINTAINED.

IN APRIL 2016, ECO 1 DEVELOPMENT, LLC (ECO 1), A PRIOR MSW PERMITTEE RECEIVED A TYPE IX REGISTRATION NO. 40286 FROM TCEQ FOR MINING OF THE OLSHAN DEMOLISHING LANDFILL UNDER 30 TEXAS ADMINISTRATIVE CODE (TAC) CHAPTER 330, SUBCHAPTER N. ECO 1 REMOVED SOME GOLF COURSE SOIL FROM THE OLSHAN DEMOLISHING LANDFILL. BUT NEVER ACTIVELY MINED WASTE MATERIAL UNDER THE TYPE IX REGISTRATION. TCEQ REVOKED THE TYPE IX REGISTRATION NO. 40286 APPLICATION. ECO 1 PERFORMED 6 TEST PITS ON THE OLSHAN DEMOLISHING LANDFILL FOR WASTE CHARACTERIZATION. SOIL AND LEACHATE TESTING AND WASTE DEPTH DETERMINATION. FROM THE 6 TEST P ECO 1 EXCAVATED ABOUT 1.700 CUBIC YARDS OF MATERIAL WHICH SKA CATEGORIZED AS 74% SOIL, 10% WOOD, 10% CONCRETE, 3% METAL, AND 3% O (PLASTIC RUBBER TEXTILES ETC) THE MAXIMUM DEPTH OF THE WASTE MATERIAL WAS REACHED IN TEST PIT 1 AT 26 FEFT BELOW GROUND SURFACE (FT-BGS). THI AERIAL EXTENT OF WASTE DEPOSITION WAS NOT EVALUATED BY THE TEST PIT EXCAVATIONS. ALL WASTE OBSERVED WAS CONSISTENT WITH A TYPE IV LANDFILI

THE CURRENT PROPERTY OWNER, BISSONNET 136, LLC, ACQUIRED THE PROPERTY IN JUNE 2019. A RELATED ENTITY, NORTHWEST METRO HOLDINGS, CS 34, LLC BECAME THE MSW NO. 1247 PERMITTEE AFTER A TRANSFER PERMIT MODIFICATION. WAS APPROVED BY TCEO ON JUNE 4 2020



LOCATION MAP

NO WATER AND SANITARY SEWER LINE IS PROPOSED IN THIS PROJECT

NOTE: PROPOSED DRIVEWAY & SIDEWALKS ARE PART OF OCE & PW PLANS. SIDEWALKS

ENGINEER

HOUSTON, TEXAS 77079

REGISTRATION NO. F-928

TEL: (281) 597-9300 CONTACT: ROSIE KAETZER, P.E.

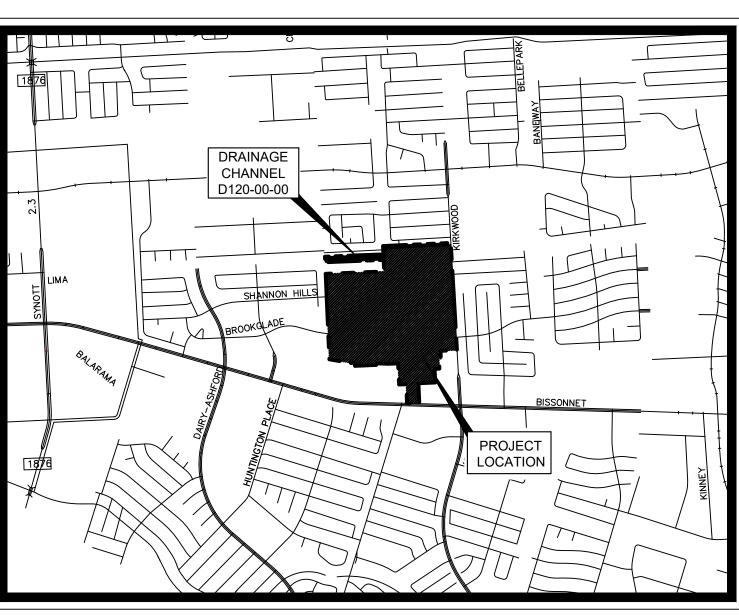
OWNER/DEVELOPER

BISSONNET 136, LLC 855 AUGUSTA DRIVE #3 HOUSTON, TEXAS 77057 TEL: (650) 638-0900 CONTACT: MARK LESTER



CIVIL CONSTRUCTION PLANS MASS GRADING AND DETENTION KIRKWOOD CROSSING PHASE 1

CITY OF HOUSTON HARRIS COUNTY, TEXAS CITY PROJECT NO. 22082076



VICINITY MAP KEY MAP NO 529N

DECEMBER 2023

SHEET NO.	DESCRIPTION
C-01	COVER SHEET
C-02	HARRIS COUNTY ENGINEERING REVIEW SHEET
C-03	HCFCD REVIEW SHEET
C-04	GENERAL CONSTRUCTION NOTES (1 OF 2)
C-04.1	GENERAL CONSTRUCTION NOTES (2 OF 2)
C-05	DEMOLITION PLAN
C-05.1	OVERALL DEVELOPMENT PLAN
C-05.2	EXISTING DRAINAGE AREA MAP
C05.3	PHASE 1 DETENTION SERVICE AREA MAP
C-06	DETENTION SERVICE AREA MAP
C-07	BASIN 1 LAYOUT
C-08	BASIN 2 LAYOUT
C-09	BASIN 3 LAYOUT
C-10	BASIN CROSS SECTION
C-11	DRAINAGE CHANNEL 2 P&P (STA 8+50 TO 17+50)
C-12	DRAINAGE CHANNEL 2 P&P (STA 17+50 TO 26+50)
C-13	DRAINAGE CHANNEL 2 P&P (STA 26+50 TO END)
C-14	DRAINAGE CHANNEL 3 P&P (START TO 9+50)
C-15	DRAINAGE CHANNEL 3 P&P (STA 9+50 TO 18+50)
C-16	DRAINAGE CHANNEL 3 P&P (STA 18+50 TO END)
C-17	CULVERT B P&P
C-17.1	OUTFALL P&P
C-18	CHANNEL CROSS SECTIONS
C-19	STORMWATER POLLUTION PREVENTION PLAN
C-20	MASS GRADING OVERALL
C-20.1	MASS GRADING LAYOUT (SHEET 1 OF 2)
C-20.2	MASS GRADING LAYOUT (SHEET 2 OF 2)
C-21	CLAY CAP EXCAVATION
C-22	SWPPP DETAILS
C-23	STORM SEWER DETAILS (SHEET 1 OF 3)
C-24	STORM SEWER DETAILS (SHEET 2 OF 3)
C-25	STORM SEWER DETAILS (SHEET 3 OF 3)
C-26	HCFCD STORM SEWER AND RIPRAP DETAILS
C-27	HCFCD INTERCEPTOR STRUCTURE DETAILS
C-28	CONCRETE HEADWALLS DETAIL

48-HOUR NOTICE: CONTRACTOR SHALL NOTIFY HARRIS COUNTY PRIOR TO COMMENCING CONSTRUCTION AND/OR BACKFILLING ANY UTILITIES. CONTRACTOR(S) TO CONTACT PUBLIC REVIEW DEPARTMENT @ (713-274-3931) OR PUBLIC.REVIEW@HCPID.ORG.

HARRIS COUNTY MAY HAVE EXISTING UNDERGROUND/OVERHEAD UTILITIES WITHIN THE PROPOSED PROJECT LIMITS. PLEASE CONTACT THE CALL CENTER AT 713-881-3210, OR SUBMIT A WORK ORDER REQUEST THROUGH HTTP://WWW.ENG.HCTX.NET/SIGNALOUT TO OBTAIN FIELD LOCATES.

*CONSTRUCTION IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY REQUIRES

SITE PLANS MUST BE APPROVED PRIOR TO OBTAINING THE REQUIRED HCFCD RIGHT-OF-WAY NOTIFICATION. BE ADVISED THAT THE HCFCD RIGHT-OF-WAY NOTIFICATION IS SEPARATE FROM THE SITE DEVELOPMENT PERMIT PACKAGE.

.) HCFCD RIGHT-OF-WAY NOTIFICATION (PERMIT)

2.) HCFCD 48-HR PRE-CONSTRUCTION NOTICE

ITH ARE REQUIRED PRIOR TO ENTERING OR WORKING WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. THE HCFCD RIGHT-OF-WAY NOTIFICATION AND 48-HR NOTICE MUST BE PROVIDED TO HCFCD AT DCID@HCFCD.HCTX.NET.

TO APPLY FOR THE HCFCD RIGHT-OF-WAY NOTIFICATION PLEASE GO TO http://apps.harriscountytx.gov/EPermits AND APPLY FOR THE HCFCD ROW UNDER ROW NOTFICATION

ILMS No. 22082076 | FAILURE TO PROVIDE BOTH ITEMS COULD RESULT IN PROJECT DELAYS

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

VERIFICATION OF PRIVATE UTILITY LINES

CenterPoint Energy natural gas utilities shown. (Gas service lines are no shown). This signature not be used for conflict verification.

CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY (This signature verifies existing underground facilities — not to be used for conflict verification)

Approved for AT&T underground conduit facilities only. Signature valid for one year.

11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Tel. No. (281) 597-9300

FOR REVIEW ONLY **Kimley** Whorn P.E. No. 141883 Date DECEMBER 202

KIRKWOOD CROSSING

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

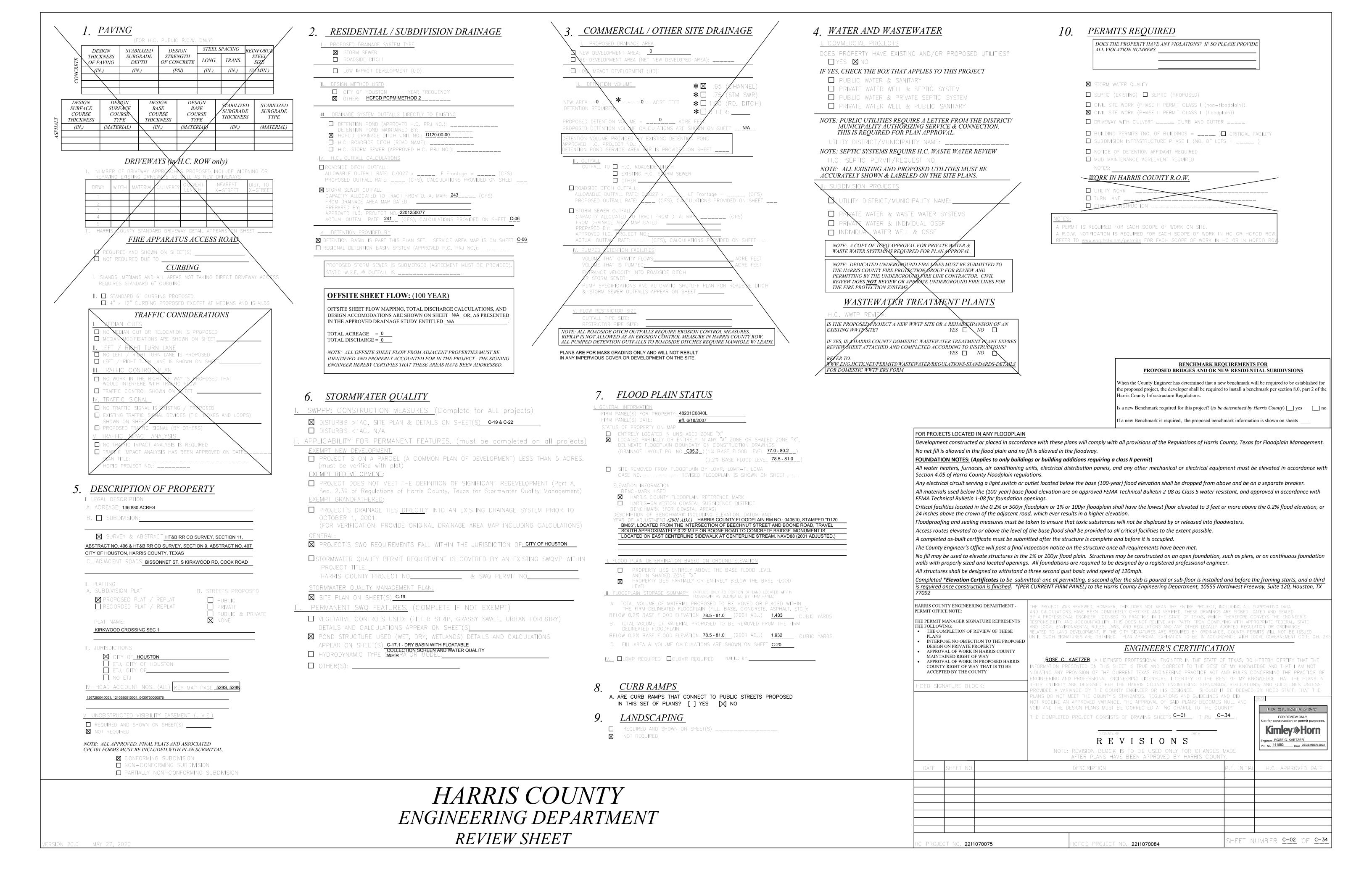
WATER STORM WATER QUALITY

WASTE WATER **FACILITIES**

STORM WATER TRAFFIC & TRANSPORTATION STREET & BRIDGE

FILE NO.

DRAWING SCALE SHEET NO. C-01 OF C-28 FOR CITY OF HOUSTON USE ONLY



□ 1 B. KEY	RIS COUNTY COMMISSIONER'S PRECINCT: 2 3 3 4 MAP: 5298, 529N	
C. ADDI LEGAL DES	RESS: 12000 BISSONNET STREET, HOUSTON, TX 77099 CRIPTION	
	EAGE: 136.880 ACRES SUBDIVISION: KIRKWOOD CROSSING	
ABST	SURVEY & AB STRACT: HT&B RR CO SURVEY, SECTION 11, RACT NO. 406 & HT&B RR CO SURVEY, SECTION 9, ABSTRACT NO. 407 DF HOUSTON, HARRIS COUNTY, TEXAS	
C. ADJA	ACENT ROADS: <u>bissonnet st, s kirkwood rd, cook road</u>	
⊠ PF □ RE PLAT	B. STREETS PROPOSED ROPOSED PLAT / REPLAT CORDED PLAT / REPLAT PRIVATE PUBLIC & PRIVATE NAME: NONE	
 JURISDICT		
⊠ CITY □ ETJ,	OF HOUSTON CITY OF HOUSTON CITY OF	
□ NO		
	01, 1210580010001, 0430730000076	
12072900100	01, 1210300010001, 0430730000070	
5. <i>WO</i> F	RK IN HCFCD RIGHT-OF-WAY	
I. TYPE OF	WORK TO BE PERFORMED IN HCFCD HCFCD ROW OTIFICATION INFORMATION	
I. TYPE OF	WORK TO BE PERFORMED IN HCFCD HCFCD ROW OTIFICATION INFORMATION HCFCD WATERSHED HCFCD UNIT No. D120-00-00 NUMBER OF OUTFALLS 1 UTILITY CROSSING	
I. TYPE OF	WORK TO BE PERFORMED IN HCFCD HCFCD ROW OTIFICATION INFORMATION HCFCD WATERSHED HCFCD UNIT No. D120-00-00 NUMBER OF OUTFALLS 1 UTILITY CROSSING ROADWAY BRIDGE/CULVERT CROSSING FILL ACTIVITY REHABILITATION OF CHANNEL	
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II. USACE III. REFERE V. HOFOD STA VI. HOFOD AC VII. REFER TO	WORK TO BE PERFORMED IN HCFCD HCFCD ROW OTHECATION INFORMATION HCFCD WATERSHED WHCFCD UNIT NO. D120-00-00 NUMBER OF OUTFALLS 1 UTILITY CROSSING ROADWAY BRIDGE/CULVERT CROSSING FILL ACTIVITY REHABILITATION OF CHANNEL MAINTENANCE TRAIL (LENGTH) OTHER COST OF WORK IN HCFCD ROW APPROX.\$115,000 ENVIRONMENTAL PERMIT US ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NUMBER(S) US ARMY CORPS OF ENGINEERS INDIVIDUAL PERMITS OTHER NO PERMITS REQUIRED EXPLAIN: D120-00-00 IS NON-JURISDICTIONAL ENCE / BASIS OF DETERMINATION ENVIRONMENTAL CONSULTANT REPORT BY REPORT TITLE REPORT TITLE REPORT TITLE REPORT DATE OTHER NOTES: - II. REQUIRED ON PROJECTS WITH WORK IN A HCFCD CHANNEL PLASE REFERENCE SECTION 17 OF THE FLOOD CONTROL DISTRICT POLICY, CRITERIA, AND PROCEDURE MANUAL FOR MORE INFORMATION	

ERSION 1.0 OCTOBER 2019

	NEW DEVELOPMENT AREA: RE-DEVELOPMENT AREA (AMOUNT INCR LOW IMPACT DEVELOPMENT (LID) METHOD/DESCRIPTION	EASED IMPERVIOU	
HC M	ETHODOLOGY FOD POPM DETENTION METHOD USE METHOD 1 (LESS THAN 20 ACRES) METHOD 2 (20 ACRES TO 640 ACRES) METHOD 3 (GREATER THAN 640 ACRES OTHER)	
01	TENTION VOLUME & OUTFALL JTFALL TO: .65, H.C.F.C.D. CHANNEL, (H.C.F.C. .75, EXISTING STORM SEWER (OWNER		
	1.00, ROADSIDE DITCH, (OWNER & ROOTHER (OWNER & OPERATOR)		
A. H	STORMWATER DETENTION BASIN OFCO POPM SUMMARY TABLE SEE S DETENTION BASIN SERVICE AREA		_

DETENTION BASIN SERVICE AREA	136	acres				
STORM EVENT	50% EXCEEDANCE (2-YEAR)	10% EXCEEDANCE (10-YEAR)	1% EXCEEDANCE (100-YEAR)			
MAXIMUM ALLOWABLE OUTFLOW (PRE— DEVELOPMENT PEAK FLOW)	77	130	243			
MAXIMUM OUTFLOW PROVIDED (PEAK FLOW FROM BASIN)	76	120	243 241 VARIES 88.4 110.2 0.81 6.03			
LOWEST NATURAL/FINISHED GROUND OR FINISHED FLOOR ELEVATION ESTIMATE		83				
DESIGN WATER SURFACE ELEVATION	VARIES	VARIES	VARIES			
MINIMUM STORAGE REQUIRED (ac-ft)	N/A	N/A	243 241 VARIES 88.4 110.2 0.81 6.03			
DETENTION STORAGE PROVIDED (ac-ft)	34.8	60.10	110.2			
STORAGE RATE PROVIDED (ac-ft/ac)	0.26	0.44	0.81			
OUTFLOW VELOCITY INTO CHANNEL (ft/sec)	3.95	3.15	6.03			
DRAIN TIME - 1% ONLY (hours)		8.89				
EMERGENCY OVERFLOW (TYPE, SIZE, ELEVATION, ETC.)	175	175' OVERFLOW WEIR, 1' DEEP				

. DETENTION BASIN TO BE MAINTAINED BY HOA DETENTION SERVICE AREA MAP ON SHEET <u>C-06</u>____ ADDITIONAL CRITERIA FOR PUMPED DETENTION BASINS VOLUME OF PUMPED 1% EXCEEDANCE STORAGE VOLUME = _____ ACFT ____ % OF TOTAL VOLUME MAXIMUM DESIGN OUTFLOW VELOCITY INTO HCFCD CHANNEL = _____ FT/SEC DRAIN TIME FOR BASIN = _____ HOURS BASED ON ______I DETENTION PROVIDED IN OTHER PLANS: HCFCD PROJECT No._____ DATE SIGNED BY HCFCD:____ DETENTION POND SERVICE AREA MAP IS PROVIDED ON SHEET _____ ENGINEERING FIRM _____ DETENTION BASIN MAINTAINED BY: ______ FLOW RESTRICTOR SIZE OUTFALL PIPE SIZE: 8'x5' RCB RESTRICTOR PIPE SIZE: 1 - 5'x1.25' & 1 - 6'x1.25' OPENING RESTRICTOR PLATE DIMENSION: 11.4' X 8' DETENTION PROVIDED BY ☐ REGIONAL DETENTION BASIN SYSTEM (APPROVED H.C. PRJ NO.): _____

> FOR PROJECTS LOCATED IN ANY FLOODPLAIN Development constructed or placed in accordance with these plans will comply with all provisions of the designated Floodplain Administrator. No net fill is allowed in the flood plain and no fill is allowed in the floodway.

OFFSITE SHEET FLOW: (100 YEAR)

OFFSITE SHEET FLOW MAPPING, TOTAL DISCHARGE CALCULATIONS, AND DESIGN ACCOMODATIONS ARE SHOWN ON SHEET N/A OR, AS PRESENTED IN THE APPROVED DRAINAGE STUDY ENTITLED N/A

TOTAL ACREAGE = 0TOTAL DISCHARGE = 0

NOTE: ALL OFFSITE SHEET FLOW FROM ADJACENT PROPERTIES MUST BE IDENTIFIED AND PROPERLY ACCOUNTED FOR IN THE PROJECT. THE SIGNING ENGINEER HEREBY CERTIFIES THAT THESE AREAS HAVE BEEN ADDRESSED.

ILITY

•	SWQ DISCHARGE INTO FCD FACI
	I. SWPPP: CONSTRUCTION MEASURES. (Must complete)
	🛛 DISTURBS >1AC. SITE PLAN & DETAILS ON SHEET(S)
	C-19 & C-21
	DISTURBS <1AC. N/A
	*II. APPLICABILITY FOR PERMANENT FEATURES. (Must comple
	EXEMPT NEW DEVELOPMENT:
	PROJECT IS ON A PARCEL (A COMMON PLAN OF DEVELOPMENT) LESS THAN 5 ACRES. (Must be verified with plot)
	EXEMPT REDEVELOPMENT:
	□ PROJECT DOES NOT MEET THE DEFINITION OF SIGNIFICANT REDEVELOPMENT (Part A,Sec. 2.39 of Regulations of Harris Cour Texas for Stormwater Quality Management)
	EXEMPT GRANDEATHERED.

PROJECT'S DRAINAGE TIES <u>DIRECTL</u>Y INTO AN EXISTING DRAINAGE SYSTEM PRIOR TO OCTOBER 1, 2001. (FOR VERIFICATION: PROVIDE ORIGINAL DRAINAGE AREA MAP INCLUDING CALCULATIONS)

GENERAL.

PROJECT'S SWQ REQUIREMENTS FALL WITHIN THE JURISDICTION OF:

STORMWATER QUALITY PERMIT REQUIREMENT IS COVERED BY AN EXISTING SWQMP WITHIN PROJECT TITLE:

HARRIS COUNTY PROJECT No_____ & SWQ PERMIT No.

STORMWATER QUALITY MANAGEMENT PLAN:

SITE PLAN ON SHEET(S) C05.3 & C-17.1

	III.	PERMANENT	SWQ	FEATURES.	(COMPLETE	IF	NOT	EXEMPT)	
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- U VEGETATIVE CONTROLS USED: (FILTER STRIP, GRASSY SWALE, URBAN FORESTRY DETAILS AND CALCULATIONS APPEAR ON
- POND STRUCTURE USED (WET, DRY, WETLANDS) DETAILS AND CALCULATIONSAPPEAR ON SHEET(S) C-09 - C-21
- ☐ HYDRODYNAMIC TYPE SEPARATOR MODEL:
- OTHER(S):

6. REPORTS/AGREEMENTS

HC FC D	ACCEPTED	REPORTS	(ALL)

	HUFUD AUGEPTED REPORTS (ALL)
	STORMWATER DRAINAGE DESIGN REPORT REPORT TITLE 12000 BISSONNET MASTER DRAINAGE PLAN
	HCFCD PROJECT # 2201250077 ENGINEERING FIRM KIMLEY-HORN AND ASSOCIATES, INC.
	REPORT ACCEPTANCE DATE 5/17/2022 GEOTECHNICAL INVESTIGATION REPORT REPORT TITLE
	HCFCD PROJECT # ENGINEERING FIRM REPORT ACCEPTANCE DATE
	HCFCD APPROVED VARIANCE DESCRIPTION OF VARIANCE
	DOCUMENT ID #
1	ACDEEMENT TYPE % No.

INTERLOCAL (ILA):
HCFCD MAINTENANCE
TURF ESTABLISHMENT

I. GENEF

NERAL INFORMATION	
FIRM PANEL(S) FOR PROPERTY:	48201C0840L

4. FLOOD PLAIN STATUS

FIRM PANEL(S) DATE: eff. 6/18/2007 STATUS OF PROPERTY ON MAP ☐ ENTIRELY LOCATED IN UNSHADED ZONE "X"
☑ LOCATED PARTIALLY OR ENTIRELY IN ANY "A" ZONE OR SHADED ZONE "X",
☐ DELINEATE FLOODPLAIN BOUNDARY ON CONSTRUCTION DRAWINGS (DRAINAGE LAYOUT PG. NO. CO5.3 __) (1% BASE FLOOD LEVEL 77.0-80.2 __)

☐ SITE REMOVED FROM FLOODPLAIN BY LOMR, LOMR-F, LOMA CASE NO._____ REVISED FLOODPLAIN IS SHOWN ON SHEET____

BENCHMARK USED

MARRIS COUNTY FLOODPLAIN REFERENCE MARK ☐ HARRIS-GALVESTON COASTAL SUBSIDENCE DISTRICT

BENCHMARK (FOR COASTAL AREAS)

DESCRIPTION OF BENCHMARK INCLUDING ELEVATION, DATUM AND EAR OF ADJUSTMENT (2001 ADJ.) HARRIS COUNTY FLOODPLAIN REFERENCE MARK, RM 040510, BM05", LOCATED FROM THE INTERSECTION OF BEECHNUT STREET AND BOONE ROAD, TRAVEL SOUTH APPROXIMATELY 0.22 MILE ON BOONE ROAD TO CONCRETE BRIDGE. MONUMENT IS LOCATED ON EAST CENTERLINE SIDEWALK AT CENTERLINE STREAM. NAVD88 (2001 ADJUSTED.)

(0.2% BASE FLOOD LEVEL **78.5-81.0**

IL FLOOD PLAIN DETERMINATION BASED ON GROUND ELEVATION

- PROPERTY LIES ENTIRELY ABOVE THE BASE FLOOD LEVEL
 AND IN SHADED ZONE "X"
 PROPERTY LIES PARTIALLY OR ENTIRELY BELOW THE BASE FLOOD

III. FLOODPLAIN STORAGE SUMMARY

- (APPLIES ONLY TO PORTION OF LAND LOCATED WITHIN FEMA REGULATORY FLOODPLAIN). A. TOTAL VOLUME OF MATERIAL PROPOSED TO BE MOVED OR PLACED WITHIN THE FIRM DELINEATED FLOODPLAIN (FILL, BASE, CONCRETE, ASPHALT, ETC.): BELOW 0.2% BASE FLOOD ELEVATION (2001 ADJ.) 78.5-81.0 CUBIC YARDS 1,433
- B. TOTAL VOLUME OF MATERIAL PROPOSED TO BE REMOVED FROM THE FIRM DELINEATED FLOODPLAIN:
- BELOW 0.2% BASE FLOOD ELEVATION (2001 ADJ.) 78.5-81.0 CUBIC YARDS 1,932
- INCLUDING CALCULATIONS) C. FILL AREA & VOLUME CALCULATIONS ARE SHOWN ON SHEET <u>C-20</u>

HCFCD SIGNATURE BLOCK

PROJECT NAME: MASS GRADING AND DETENTION FOR KIRKWOOD CROSSING, PHASE 1

ADDRESS: **12000 BISSONNET, HOUSTON, TX 77099**

WAS ACCEPTED BY HARRIS COUNTY FLOOD CONTROL DISTRICT FOR THE PURPOSES LISTED BELOW:

HARRIS COUNTY FLOOD CONTROL DISTRICT

INTERPOSE NO OBJECTION

FOR	ITEMS	LOCATED	OUTSIDE	OF	HCFCD	RIGHT-OF-WAY	
			APPRO	VED			

R ITEMS LOCATED WITHIN PROPOSED HCFCD RIGHT-OF-

NO REVIEW REQUIRED

FINAL PERMITTING BY OTHERS

ADDITIONAL COMMENTS:

PROJECT WAS REVIEWED, HOWEVER, THIS DOES NOT MEAN THE ENTIRE PROJECT, INCLUDING ALL SUPPORTING DATA CALCULATIONS HAVE BEEN COMPLETELY CHECKED AND VERIFIED. THESE DRAWINGS ARE SIGNED, DATED AND SEALED A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS, WHICH THEREFORE CONVEYS THE ENGINEER'S SPONSIBILITY AND ACCOUNTABILITY. THIS DOES NOT RELIEVE ANY PARTY FROM COMPLYING WITH APPROPRIATE FEDERAL, STATE ID LOCAL ENVIRONMENTAL RULES, LAWS, AND REGULATIONS AND ANY OTHER LEGALLY ADOPTED REGULATION OR ORDINANCE LATED TO LAND DEVELOPMENT. IF THE CITY SIGNATURES ARE REQUIRED BY ORDINANCE, COUNTY PERMITS WILL NOT BE ISSUED.

ENGINEER'S CERTIFICATION

NTIL SUCH SIGNATURES ARE OBTAINED. PLAN APPROVAL EXPIRATION TO BE IN ACCORDANCE WITH LOCAL GOVERNEMENT CODE CH. 2

I, <u>rose C. Kaetzer</u>, a licensed professional engineer in the state of texas, do hereby certify HAT THE INFORMATION PRESENTED ON THIS SHEET IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE ND THAT I AM NOT VIOLATING ANY PROVISION OF THE CURRENT TEXAS ENGINEERING PRACTICE ACT AND RULES CONCERNING THE PRACTICE OF ENGINEERING AND PROFESSIONAL ENGINEERING LICENSURE.

ANY VIOLATIONS WILL BE FORWARDED TO THE HARRIS COUNTY DISTRICT ATTORNEY'S OFFICE FOR PROSECUTION.

THE COMPLETED PROJECT CONSISTS OF DRAWING SHEETS<u>C-01</u> Thru<u>C-34</u>

PRELIMINARY FOR REVIEW ONLY

NOTE: REVISION BLOCK IS TO BE USED ONLY FOR CHANGES MADE AFTER

P.E. No. <u>141883</u> Date <u>DECEMBER 20</u>

Kimley »Horn

		PLANS HAVE BEEN APPROVED BY HARRIS COUNTY FLOOD CONTR	UL.	
TE	SHEET NO.	DESCRIPTION	p.e. initial	H.C.F.C.D APPROVED DATE
RIS C	OUNTY FLO	OD CONTROL PROJECT NO. 2201250077	SHEET N	IUMBER <u>C-03</u> OF <u>C-34</u>

HARRIS COUNTY FLOOD CONTROL DISTRICT REVIEW SHEET

GENERAL NOTES (INSIDE CITY LIMITS):

. CONSTRUCT WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING IN ACCORDANCE WITH THE LATEST EDITION OF THE PUBLICATIONS STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS <u> VATER LINES, STORM DRAINAGE AND STREET PAVING</u> AND <u>STANDARD CONSTRUC</u> DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATERLINES, STORM DRAINAGE, AND STREET PAVING PUBLISHED BY THE CITY OF HOUSTON, HOUSTON PUBLIC WORKS.

2. THE GEOTECHNICAL INVESTIGATION FOR THIS PROJECT WAS CONDUCTED IN ACCORDANCE WITH CHAPTER 11 OF THE LATEST EDITION OF THE PUBLICATION INFRASTRUCTURE DESIGN MANUAL, PUBLISHED BY THE CITY OF HOUSTON, HOUSTON PUBLIC WORKS. SOILS REPORT WAS PREPARED BY GOODHEART & ASSOCIATES, LLC DATED FEBRUARY 19, 2020.

3. UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 713-223-4567/811 OR 800-344-8377 AND LONE STAR NOTIFICATION CENTER AT 800-669-8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION. UTILITIES MARKED WITHIN THE PUBLIC RIGHT OF WAY OR IN EASEMENTS SHALL COMPLY WITH TAC TITLE 16, PART 1, CHAPTER 18, RULE 18.6 AND THE AMERICAN PUBLIC WORKS ADMINISTRATION (APWA) UNIFORM COLOR CODE.

4. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATER LINES AND TRAFFIC CONTROL DEVICES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE CITY OF HOUSTON, HOUSTON PUBLIC WORKS'S STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS.
WATER LINES, STORM DRAINAGE, AND STREET PAVING AND STANDARD CONSTRUCTION
DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND
STREET PAVING, REFERENCED ABOVE, AT NO ADDITIONAL COST.

5. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, HOUSTON PUBLIC WORKS AT 713-394-9098 OR VIA FAX AT 832-395-4424 FOR INSPECTION AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.

6. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.

7. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.

8. CONTRACTOR SHALL COMPLY WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.

9. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS RECORDING AS-BUILT CONDITIONS DURING CONSTRUCTION. THESE REDLINE MARKED UP DRAWINGS WILL BE SUBMITTED TO THE DESIGN CONSULTANT WHO WILL MAKE THE CHANGES ON THE ORIGINAL TRACINGS, LABEL EACH SHEET IN THE SET AS "RECORD DRAWINGS", AND RETURN IT TO THE OFFICE OF THE CITY ENGINEER.

STORM SEWER CONSTRUCTION NOTES (CITY OF HOUSTON):

- STORM SEWER SHALL BE REINFORCED CONCRETE PIPE (C-76, CLASS III), AND SHALL BE INSTALLED, BEDDED, AND BACK FILLED IN ACCORDANCE WITH THE CITY OF HOUSTON STANDARD DETAILS DRAWING NOS. 02317-02, 02317-3, 02317-05, 02317-06, AND 02317-07 (OCT. 2002) AS APPLICABLE UNLESS OTHERWISE SHOWN
- 2. ALL STORM SEWER CONSTRUCTED IN SIDE LOT EASEMENT SHALL BE R.C.P (C-76, CLASS III) AND SHALL BE EMBEDDED IN ACCORDANCE WITH THE CITY OF HOUSTON STANDARD DETAILS DRAWING NOS. 02317-02, 02317-03, 02317-05, 02317-06, AND 02317-07 AS APPLICABLE.
- 3. ALL SEWER UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE BACKFILLED WITH 1-1/2 SACK CEMENT/C.Y. STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE. THE REMAINING DEPTH OF TRENCH SHALL BE BACKFILLED WITH SUITABLE EARTH MATERIAL
- 4. ALL TRENCH BACKFILL SHALL BE IN 8" LIFTS, WITH TESTS TAKEN AT 100 FOOT INTERVALS IN EACH LIFT, AND MECHANICALLY COMPACTED TO A DENSITY OF NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR COMPACTION TEST (ASTM D-698/AASHTO T99).
- CIRCULAR AND ELLIPTICAL REINFORCED CONCRETE PIPE SHALL BE INSTALLED USING RUBBER GASKET JOINT CONFORMING TO ASTM C443 AND ASTM C877 RESPECTIVELY.
- 6. ALL STORM SEWER PIPES AND INLET LEADS SHALL BE 24" AND LARGER R.C.P. (C-76, CLASS III).
- 7. ALL PROPOSED PIPE STUB-OUTS FROM MANHOLES AND INLET LEADS ARE TO BE PLUGGED WITH 8" BRICK WALLS UNLESS OTHERWISE NOTED.
- 8. CONTRACTOR SHALL PROVIDE 18" MINIMUM VERTICAL CLEARANCE AT STORM SEWER AND WATER LINE CROSSINGS
- 9. ADJUST MANHOLE COVERS TO GRADE CONFORMING TO REQUIREMENTS OF SECTION 02086-ADJUSTING MANHOLES, INLETS, AND VALVE BOXES TO GRADE.
- 10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING, AND RESTORING ANY BACK SLOPE DRAINAGE SYSTEM DISTURBED AS A RESULT OF THIS
- 11. ALL DITCHES SHALL BE GRADED TO PROPOSED ELEVATIONS TO ENSURE PROPER DRAINAGE. ALL OUTFALLS SHALL BE PROPERLY BACKFILLED AND COMPACTED. ALL DISTURBED AREA SHALL BE REGRADED, SEEDED, AND FERTILIZED.
- 12. ALL DRIVEWAYS SHALL BE LOCATED TO AVOID EXISTING CURB INLET STRUCTURE.

GRADING NOTES (CITY OF HOUSTON):

- GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE STARTING CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
- 2. BEFORE STARTING CONSTRUCTION, CONTRACTOR SHALL VERIFY BENCHMARK ELEVATION AND NOTIFY ENGINEER IF ANY DISCREPANCY AND OR CONFLICT IS
- 3. CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS AND NO PONDING IN PAVED AREAS, AND SHALL NOTIFY ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.
- 4. CONTRACTOR SHALL PROTECT ALL MANHOLE COVERS, VALVE COVERS, VAULT LIDS, FIRE HYDRANTS, POWER POLES, GUY WIRES, AND TELEPHONE BOXES THAT ARE TO REMAIN IN PLACE AND UNDISTURBED DURING CONSTRUCTION.
- REMOVED AND DISPOSED OF BY CONTRACTOR. DISPOSAL SHALL BE AT AN APPROVED OFF-SITE, LAWFUL LOCATION, UNLESS DIRECTED OTHERWISE BY THE 6. FILL SHALL BE PLACED IN LOOSE LIFTS OF MAXIMUM EIGHT INCHES (8") OR LESS

5. ALL EXISTING CONCRETE PAVING, SIDEWALK, AND CURB DEMOLITION SHALL BE

- AND COMPACTED AT OPTIMUM TP +5% MOISTURE CONTENT AS DETERMINED BY AASHTO TEST METHOD T-99.
- . ANY PLACEMENT OF FILL SHALL NOT CREATE PONDING ON ADJACENT PROPERTY.

TRAFFIC NOTES:

- 1. THE CONTRACTOR SHALL PROVIDE AND INSTALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH PART VI OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) LATEST EDITION WITH REVISIONS DURING THE ENTIRE CONSTRUCTION PERIOD.
- 2. NO WORK SHALL BE PERFORMED IN RESIDENTIAL AREAS FROM 7:00PM TO 7:00AM.
- 3. CONTRACTOR SHALL MAINTAIN APPROVED NUMBER OF LANES OF TRAFFIC IN EACH DIRECTION DURING CONSTRUCTION WORKING HOURS. TRAFFIC CONTROL PLANS SHALL INCLUDE ONE-WAY AND/OR DETOUR PLANS. CONTRACTOR SHALL MAINTAIN ADA COMPLAINT PEDESTRIAN ÁCCESS TO BUS STOPS AND ADEQUATE BUS ACCESS TO THE BUS STOP.
- 4. CONTRACTOR SHALL COVER OPEN PAVEMENT EXCAVATIONS FOR MINOR UTILITY WORK WITH ANCHORED STEEL PLATES DURING NON-WORKING HOURS, OPEN LANES FOR NORMAL TRAFFIC FLOW WHEN FEASIBLE.
- 5. CONTRACTOR SHALL SECURE LANE/SIDEWALK/BICYCLE FACILITY CLOSURE PERMITS FROM TRANSPORTATION & DRAINAGE OPERATIONS (MOBILITY PERMIT SECTION AT WWW.GIMS.HOUSTONTX.GOV) BEFORE IMPLEMENTING THE TRAFFIC CONTROL PLAN. THE APPLICATION MUST BE SUBMITTED AT LEAST TEN BUSINESS DAYS PRIOR TO THE IMPLEMENTATION OF THE TRAFFIC CONTROL PLAN AND/OR BEGINNING CONSTRUCTION WORK. THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLANS, CONSTRUCTION SEQUENCING, AND CONSTRUCTION SCHEDULE WITH THE APPLICATION.
- 6. CONTRACTOR SHALL HAVE APPROVED TRAFFIC CONTROL PLAN AND PERMIT AT THE JOB SITE FOR INSPECTION AT ALL TIMES
- 7. ACCESS TO DRIVEWAYS ADJACENT TO THE CONSTRUCTION WORK ZONE SHALL BE MAINTAINED AT ALL TIMES AS MUCH AS POSSIBLE. ADDITIONAL CONES AND/OR DELINEATORS MAY BE REQUIRED TO DELINEATE THE DRIVEWAY ACCESS ROUTE THROUGH THE CONSTRUCTION WORK ZONE. A MINIMUM OF ONE TRAVEL LANE SHALL BE MAINTAINED ACROSS THE DRIVEWAY, UNLESS PRIOR WRITTEN APPROVAL IS OBTAINED FROM THE CITY OF HOUSTON.
- ADDITIONAL OFF DUTY POLICE OFFICERS/FLAGGERS MAY BE REQUESTED TO DIRECT TRAFFIC WHEN LANES ARE BLOCKED AT THE DIRECTION OF THE CITY EVEN IF THEY ARE NOT SPECIFICALLY IDENTIFIED ON THE PROJECT PLANS.

CAUTION: CENTERPOINT ENERGY UNDERGROUND GAS FACILITIES

THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

- WHEN CENTERPOINT ENERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL (713) 207-5463 OR (713) 945-8037 (7:00 AM to 4:30 PM) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
- . WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.
- . WHEN CENTERPOINT FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
- FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659 3552 OR (713)

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

CAUTION: CENTERPOINT ENERGY UNDERGROUND ELECTRICAL LINES

OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW. SECTION 752, HEALTH AND SAFETY CODE, FORBIDS ALL ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:

- . ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE
- OVERHEAD HIGH VOLTAGE LINES; AND • OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER.

PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL CENTERPOINT ENERGY AT 713-207-2222.

HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD

ACTIVITIES ON/OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY NO APPROVAL TO USE. CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713) 207-6348 OR (713) 207-5769

CAUTION: AT&T TEXAS/SWBT FACILITIES

THE LOCATIONS OF AT&T TEXAS/SWBT FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK, HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.

THE CONTRACTOR SHALL CALL 1-800-344-8377 (TEXAS 811) A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.

WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF AT&T TEXAS/SWBT FACILITIES. ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.

WHEN AT&T TEXAS/SWBT FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR

THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN CONDUIT IN THE AREA.

PLEASE CONTACT THE AT&T TEXAS DAMAGE PREVENTION MANAGER MR. KEVIN RAY AT (713) 614-1983 OR E-MAIL HIM AT KR7896@ATT.COM IF CABLE LOCATE REQUESTS ARE NOT COMPLETED FOR OUR AT&T TEXAS/SWBT FACILITIES.

SWPPP CONSTRUCTION NOTES (CITY OF HOUSTON):

1. CONTRACTOR SHALL IMPLEMENT INLET PROTECTION DEVICES AND REINFORCED FILTER FABRIC BARRIER ALONG ROAD AND SIDE DITCHES AT LOCATIONS SHOWN ON THE TYPICAL STORM WATER POLLUTION PREVENTION (SWPP) PLANS TO KEEP SILT AND OR EXCAVATED MATERIALS FROM ENTERING INTO THE STORM WATER INLETS AND DITCHES EVENTUALLY POLLUTING THE RECEIVING STORM.

- 2. DURING THE EXCAVATION PHASE OF THE PROJECT, CONTRACTOR SHALL SCHEDULE THE WORK IN SHORT SEGMENTS SO THAT EXCAVATION MATERIAL CAN BE QUICKLY HAULED AWAY FROM THE SITE AND TO PREVENT IT FROM STAYING UNCOLLECTED ON THE EXISTING PAVEMENT. ANY LOOSE EXCAVATED MATERIAL WHICH FALLS ON PAVEMENTS OR DRIVEWAYS SHALL BE SWEPT BACK INTO THE EXCAVATED AREA.
- 3. CONTRACTOR SHALL CLEAN UP THE EXISTING STREET INTERSECTIONS AND DRIVEWAYS DAILY, AS NECESSARY, TO REMOVE ANY EXCESS MUD, SILT OR ROCK TRACKED FORM THE EXCAVATED AREA.
- 4. CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT AND LOOSE MATERIAL AS CONSTRUCTION PROGRESSES.
- 5. CONTRACTOR TO INSPECT AND MAINTAIN THE AREAS LISTED BELOW AT LEAST ONCE EVERY FOURTEEN(14) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER.
- DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED.
- AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION.
- STRUCTURAL CONTROL MEASURES. LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE.

CONTRACT IS COMPLETE.

6. CONTRACTOR TO BE RESPONSIBLE TO MAINTAIN EXISTING DITCHES AND OR CULVERTS FOR UNOBSTRUCTED DRAINAGE AT ALL TIMES. WHERE SODDING IS DISTURBED BY EXCAVATION ON BACKFILLING OPERATIONS, SUCH AREAS SHALL BE REPLACED BY SEEDING OR SODDING. SLOPES 4:1 OR STEEPER SHALL BE REPLACED BY BLOCK SODDING.

STREET & BRIDGE CONSTRUCTION NOTES (CITY OF HOUSTON):

- 1. HOUSTON PUBLIC WORKS'S "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING"UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN IS CONSISTENT WITH THE MINIMUM STANDARDS ESTABLISHED IN THE "INFRASTRUCTURE DESIGN MANUAL"
- 2. FILL AREAS ON PLANS SHALL BE FILLED IN LAYERS NOT EXCEEDING 8"IN DEPTH AND EACH COMPACTED TO NOT LESS THAN 95% STANDARD PROCTOR DENSITY PRIOR TO INSTALLATION OF WATER LINE AND FILL AREA SHALL BE SEEDED AND FERTILIZED WITHIN 10 WORKING DAYS.
- 3. UTILITY CONTRACTOR SHALL PROVIDE TEMPORARY SILT BARRIER FENCE ON ALL NON-CURBED INLETS WHICH WILL REMAIN IN PLACE AFTER UNDERGROUND
- 4. CONTRACTOR SHALL PROVIDE SILT BARRIER FENCE ON ALL STAGE 1 CURB INLETS.
- 5. EXISTING PAVEMENTS, CURBS, DRIVEWAYS, AND SIDEWALKS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO CITY OF HOUSTON STANDARDS, WITH LATEST ADDENDA AND AMENDMENTS THERETO.
- 6. CONDITION OF THE ROAD AND/OR RIGHT-OF-WAY UPON COMPLETION OF JOB SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.
- 7. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO SATISFACTION OF THE OWNING AUTHORITY.
- 8. EXPOSED 15"OF REINFORCING STEEL AT PROPOSED SAWED JOINT IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #6 BARS 24"LONG 24"C-C DRILLED AND EMBEDDED 8"INTO THE CENTER OF THE EXISTING SLAB WITH "PO ROC" OR EQUAL.
- 9. CONTRACTOR TO TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG AREAS OF EXCAVATION.
- 10. CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAWS CONCERNING EXCAVATION, TRENCHING AND SHORING AS SPECIFIED IN CITY OF HOUSTON ORDINANCE #87-1457.
- 11. WHEEL CHAIR RAMPS SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF HOUSTON STANDARDS AT ALL INTERSECTIONS WHERE SIDEWALKS EXIST AND THE EXISTING CURB OR SIDEWALK IS DAMAGED OR REMOVED DURING CONSTRUCTION.
- 12. WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF HOUSTON, HOUSTON PUBLIC WORKS'S "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS. WATER LINES, STORM DRAINAGE AND STREET PAVING"UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN SHOULD BE CONSISTENT WITH THE MINIMUM STANDARD ESTABLISHED IN THE 'DESIGN MANUAL FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORMS DRAINAGE AND STREET PAVING".
- 13. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGES TO EXISTING WATER, WASTEWATER, STORM SEWER AND TRAFFIC SIGNAL CONDUITS. ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE CITY OF HOUSTON, DEPT. OF PUBLIC WORKS AND ENGINEERING "STANDARD CONSTRUCTION SPECIFICATIONS" WITH LATEST ADDENDA AND AMENDMENTS THERETO, AT NO COST TO THE CITY OF
- 14. PRIOR TO STREET CONSTRUCTION, THE CONTRACTOR SHALL CONTACT THE HOUSTON PUBLIC WORKS AT (PHONE) 832-394-9578 AND COMPLY WITH ALL REQUIREMENTS FOR THE ISSUANCE OF NECESSARY PERMITS/WORK ORDERS FOR STREET CONSTRUCTION.
- 15. DOUBLE REFLECTORIZED BLUE TRAFFIC MARKERS SHALL BE PLACED 6-INCHES OFFSET OF THE CENTERLINE OF ALL FIRE HYDRANT LOCATIONS BY THE PAVING CONTRACTOR. HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A BUTTON PLACED ON EACH STREET.

RIGHT-OF-WAY.

- KHA IS NOT RESPONSIBLE FOR THE MEANS AND METHODS EMPLOYED BY THE CONTRACTOR TO IMPLEMENT THIS DEMOLITION PLAN. THIS PRELIMINARY DEMOLITION PLAN SIMPLY INDICATES THE KNOWN OBJECTS ON THE SUBJECT TRACT THAT ARE TO BE DEMOLISHED AND REMOVED FROM
- KHA DOES NOT WARRANT OR REPRESENT THAT THE PLAN, WHICH WAS PREPARED BASED ON SURVEY AND UTILITY INFORMATION PROVIDED BY OTHERS, SHOWS ALL IMPROVEMENTS AND UTILITIES. THAT THE IMPROVEMENTS AND UTILITIES ARE SHOWN ACCURATELY. OR THAT THE UTILITIES SHOWN CAN BE REMOVED. THE CONTRACTOR IS RESPONSIBLE FOR PERFORMING ITS OWN SITE RECONNAISSANCE TO SCOPE ITS WORK AND TO CONFIRM WITH THE OWNERS OF IMPROVEMENTS AND UTILITIES THE ABILITY AND PROCESS FOR THE REMOVAL OF THEIR
- THIS PLAN IS INTENDED TO GIVE A GENERAL GUIDE TO THE CONTRACTOR, NOTHING MORE. THE GOAL OF THE DEMOLITION IS TO LEAVE THE SITE IN A STATE SUITABLE FOR THE CONSTRUCTION OF THE PROPOSED DEVELOPMENT. REMOVAL OR PRESERVATION OF IMPROVEMENTS, UTILITIES, ETC. TO ACCOMPLISH THIS GOAL ARE THE RESPONSIBILITY OF THE
- CONTRACTOR IS STRONGLY CAUTIONED TO REVIEW THE FOLLOWING REPORTS DESCRIBING SITE CONDITIONS PRIOR TO BIDDING AND IMPLEMENTING THE DEMOLITION PLAN: a. ENVIRONMENTAL SITE ASSESSMENT PROVIDED BY THE OWNER,
- b. ASBESTOS BUILDING INSPECTION REPORT(S) PROVIDED BY THE OWNER, c. GEOTECHNICAL ENGINEERING REPORT PROVIDED BY THE OWNER. d. OTHER REPORTS THAT ARE APPLICABLE AND AVAILABLE.
- CONTRACTOR SHALL CONTACT THE OWNER TO VERIFY WHETHER ADDITIONAL REPORTS OR AMENDMENTS TO THE ABOVE CITED REPORTS HAVE BEEN PREPARED AND TO OBTAIN/REVIEW/AND COMPLY WITH THE RECOMMENDATION OF SUCH STUDIES PRIOR TO STARTING ANY WORK ON THE SITE.
- CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS REGARDING THE DEMOLITION OF OBJECTS ON THE SITE AND THE DISPOSAL OF THE DEMOLISHED MATERIALS OFF-SITE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO REVIEW THE SITE, DETERMINE THE APPLICABLE REGULATIONS, RECEIVE THE REQUIRED PERMITS AND AUTHORIZATIONS, AND
- KHA DOES NOT REPRESENT THAT THE REPORTS AND SURVEYS REFERENCED ABOVE ARE ACCURATE, COMPLETE, OR COMPREHENSIVE SHOWING ALL ITEMS THAT WILL NEED TO BE DEMOLISHED AND REMOVED.
- SURFACE PAVEMENT INDICATED MAY OVERLAY OTHER HIDDEN STRUCTURES, SUCH AS ADDITIONAL LAYERS OF PAVEMENT, FOUNDATIONS OR WALLS, THAT ARE ALSO TO BE REMOVED.
- STANDARD HCFCD NOTES FOR CONSTRUCTION DRAWINGS OBTAIN AND COMPLY WITH ALL APPLICABLE CITY, COUNTY, STATE, AND FEDERAL PERMITS AND APPROVALS, WITH ASSISTANCE FROM ENGINEER, IF NECESSARY. OBTAIN PERMIT (CERTIFICATION) FROM HARRIS COUNTY ENGINEER TO ENTER HARRIS COUNTY FLOOD CONTROL DISTRICT
- NOTIFY THE HARRIS COUNTY FLOOD CONTROL DISTRICT'S DEVELOPMENT COORDINATION AND INSPECTION DEPARTMENT IN WRITING AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. SUBMIT THE HCFCD 48 HOUR PRE-CONSTRUCTION NOTIFICATION FORM, A COPY OF THE APPROVED CONSTRUCTION DRAWINGS, AND A COPY OF THE CORPS OF ENGINEERS INDIVIDUAL SECTION 404 PERMIT OR COMPLIANCE WITH NATIONWIDE PERMIT, IF APPLICABLE, TO HCFCD, 9900 NORTHWEST FREEWAY, HOUSTON, TEXAS 77092, ATTN: DEVELOPMENT COORDINATION AND INSPECTION DEPT. BY HAND DELIVERY, BY EMAIL DCID@HCFCD.ORG, OR FAX TO 713-684-4129 (FAX NUMBER).
- ENGINEER SHALL SUBMIT CERTIFICATION LETTER AND RECORD DRAWINGS TO THE HARRIS COUNTY FLOOD CONTROL DISTRICT'S DEVELOPMENT COORDINATION AND INSPECTION SECTION REQUESTING INSPECTION OF ITEMS CONSTRUCTED IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. PRIOR TO REQUESTING INSPECTION, THE DRAINAGE RIGHT-OF-WAY AND/OR EASEMENTS SHALL BE STAKED AND FLAGGED.
- PROTECT, MAINTAIN, AND RESTORE EXISTING BACKSLOPE DRAINAGE SYSTEMS.
- BACKSLOPE SWALE AND INTERCEPTOR STRUCTURE ELEVATIONS AND LOCATIONS SHOWN ON PLANS ARE APPROXIMATE. FINAL ELEVATIONS AND LOCATIONS SHALL BE FIELD VERIFIED BY THE ENGINEER PRIOR TO INSTALLATION.
- ESTABLISH TURF GRASS ON ALL DISTURBED AREAS WITHIN THE CHANNEL OR DETENTION RIGHT-OF-WAY, EXCEPT THE CHANNEL BOTTOM AND WHERE STRUCTURAL EROSION MEASURES ARE USED. MINIMUM ACCEPTANCE CRITERIA ARE 75% COVERAGE OF LIVE BERMUDA GRASS AND NO EROSION OR RILLS DEEPER THAN 4".
- PERFORM ALL ACTIVITIES WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY IN ACCORDANCE WITH THE MOST RECENT HARRIS COUNTY FLOOD CONTROL DISTRICT STANDARD SPECIFICATIONS BOOK.
- EXCAVATE CHANNEL FLOWLINE TO DESIGN ELEVATION AS SHOWN ON PLANS AND DOWNSTREAM. AS NECESSARY, TO ENSURE NO WATER REMAINS IN THE FACILITY (STORM SEWER, LATERAL CHANNEL, OR DRY BOTTOM DETENTION BASIN) DURING NORMAL WATER SURFACE CONDITIONS IN THE CHANNEL, SO THE FACILITY WILL FUNCTION AS INTENDED. FOR WET BOTTOM DETENTION BASINS, ENSURE NO WATER IS ABOVE THE DESIGN LEVEL IN THE WET BOTTOM DURING NORMAL WATER SURFACE CONDITIONS IN THE CHANNEL.
- MAINTAIN FLOW IN CHANNEL DURING CONSTRUCTION AND RESTORE CHANNEL TO ORIGINAL
- 10. REMOVE ALL EXCAVATED MATERIAL FROM THE HARRIS COUNTY FLOOD CONTROL DISTRICT OR DRAINAGE RIGHT-OF-WAY. NO FILL IS TO BE PLACED WITHIN A DESIGNATED FLOOD PLAIN AREA WITHOUT FIRST OBTAINING A FILL PERMIT FROM THE APPROPRIATE JURISDICTIONAL

BENCHMARK PUBLISHED ELEVATION - 72.81' BENCHMARK - HARRIS COUNTY FLOODPLAIN RM NO.: 040510. STAMPED "D120 BMO5", LOCATED FROM THE INTERSECTION OF BEECHNUT STREET AND BOONE ROAD, TRAVEL SOUTH APPROXIMATELY 0.22 MILE ON BOONE ROAD TO CONCRETE BRIDGE.

MONUMENT IS LOCATED ON EAST CENTERLINE SIDEWALK AT CENTERLINE STREAM. NAVD88 (2001 ADJUSTED.) ELEVATION - 79.02' TEMPORARY BENCHMARK "A"

BOX CUT ON THE SOUTH END OF A MEDIAN ON THE NORTH END OF A BULL NOSE. LOCATED ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM THE INTERSECTION OF COOK ROAD AND BROOKGLADE CIRCLE.

TEMPORARY BENCHMARK "B" ELEVATION - 78.95' BOX CUT ON THE SOUTH END OF A MEDIAN ON THE NORTH END OF A BULL NOSE. LOCATED ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM THE INTERSECTION OF COOK ROAD AND MAGNOLIA CANYON.

TEMPORARY BENCHMARK "C" ELEVATION - 81.34' BOX CUT ON STORM INLET LOCATED ON THE NORTH LINE OF BISSONNET STREET, +/- 1,000 FEET WEST FROM THE INTERSECTION OF BISSONNET STREET AND SOUTH KIRKWOOD ROAD.

TEMPORARY BENCHMARK "D" ELEVATION - 76.20' BOX CUT ON STORM INLET LOCATED ON THE WEST LINE OF SOUTH KIRKWOOD ROAD, +/- 200 FEET NORTH FROM THE INTERSECTION OF ZARROLL DRIVE AND SOUTH KIRKWOOD ROAD.

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

VERIFICATION OF PRIVATE UTILITY LINES

CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not be used for conflict verification.

Signature valid for six months.

CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY.

(This signature verifies existing underground facilities — not to be used for conflict verification)

Signature valid for six months.

Approved for AT&T underground conduit facilities only.

Suite 800 Houston, Texas 77079

TBPE Firm Registration F-928

Tel. No. (281) 597-9300

11700 Katy Freeway,

Signature valid for one year.

FOR REVIEW ONLY **Kimley** »Horn ngineer ROSE C. KAETZER P.E. No. 141883 Date DECEMBER 2023

KIRKWOOD CROSSING

HOUSTON, TX 77048

GENERAL CONSTRUCTION NOTES (1 OF 2)

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

HOUSTON PUBLIC WORKS

CITY OF HOUSTON

WATER STORM WATER QUALITY

STORM WATER

WASTE WATER

FILE NO.

STREET & BRIDGE HORIZ:

TRAFFIC & TRANSPORTATION

FACILITIES

VERT: SHEET NO. C-04 OF C-28 | DRAWING SCALE

FOR CITY OF HOUSTON USE ONLY

KIMLEY HORN GENERAL NOTES

- ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THESE PLANS, CITY (OR TOWN) STANDARD DETAILS AND SPECIFICATIONS, THE FINAL GEOTECHNICAL REPORT AND ALL ISSUED ADDENDA, AND COMMONLY ACCEPTED CONSTRUCTION STANDARDS. THE CITY SPECIFICATIONS SHALL GOVERN WHERE OTHER SPECIFICATIONS DO NOT EXIST. IN CASE OF CONFLICTING
- SPECIFICATIONS OR DETAILS, THE MORE RESTRICTIVE SPECIFICATION AND DETAIL SHALL BE FOLLOWED. 2. THE CONTRACTOR SHALL COMPLY WITH CITY (OR TOWN) "GENERAL NOTES" FOR CONSTRUCTION, IF EXISTING AND REQUIRED BY THE CITY. FOR INSTANCES WHERE THEY CONFLICT WITH THESE KIMLEY HORN GENERAL NOTES, THEN THE MORE RESTRICTIVE SHALL
- 3. THE CONTRACTOR SHALL FURNISH ALL MATERIAL AND LABOR TO CONSTRUCT THE FACILITY AS SHOWN AND DESCRIBED IN THE CONSTRUCTION DOCUMENTS IN ACCORDANCE WITH THE APPROPRIATE AUTHORITIES' SPECIFICATIONS AND REQUIREMENTS.
- 4. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING TO DETERMINE EXISTING CONDITIONS
- 5. THE EXISTING CONDITIONS SHOWN ON THESE PLANS WERE PROVIDED BY THE TOPOGRAPHIC SURVEY PREPARED BY THE PROJECT SURVEYOR AND ARE BASED ON THE BENCHMARKS SHOWN. THE CONTRACTOR SHALL REFERENCE THE SAME BENCHMARKS. 6. THE CONTRACTOR SHALL REVIEW AND VERIFY THE EXISTING TOPOGRAPHIC SURVEY SHOWN ON THE PLANS REPRESENTS EXISTING FIELD CONDITIONS PRIOR TO CONSTRUCTION, AND SHALL REPORT ANY DISCREPANCIES FOUND TO THE OWNER AND ENGINEER IMMEDIATELY
- 7. IF THE CONTRACTOR DOES NOT ACCEPT THE EXISTING TOPOGRAPHIC SURVEY AS SHOWN ON THE PLANS, WITHOUT EXCEPTION, THEN THE CONTRACTOR SHALL SUPPLY AT THEIR OWN EXPENSE, A TOPOGRAPHIC SURVEY BY A REGISTERED PROFESSIONAL LAND SURVEYOR TO THE OWNER AND ENGINEER FOR REVIEW.
- CONTRACTOR SHALL PROVIDE ALL CONSTRUCTION SURVEYING AND STAKING 9. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL CONTROL, INCLUDING BENCHMARKS PRIOR TO COMMENCING
- CONSTRUCTION OR STAKING OF IMPROVEMENTS. PROPERTY LINES AND CORNERS SHALL BE HELD AS THE HORIZONTAL CONTROL 10. THE CONTRACTOR SHALL REVIEW AND VERIFY ALL DIMENSIONS, ELEVATIONS, AND FIELD CONDITIONS THAT MAY AFFECT CONSTRUCTION. ANY DISCREPANCIES ON THE DRAWINGS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER BEFORE COMMENCING WORK. NO FIELD CHANGES OR DEVIATIONS FROM DESIGN ARE TO BE MADE WITHOUT PRIOR
- APPROVAL OF THE ARCHITECT, ENGINEER, AND IF APPLICABLE THE CITY AND OWNER. NO CONSIDERATION WILL BE GIVEN TO CHANGE ORDERS FOR WHICH THE CITY, ENGINEER, AND OWNER WERE NOT CONTACTED PRIOR TO CONSTRUCTION OF THE AFFECTED ITEM. 11. CONTRACTOR SHALL THOROUGHLY CHECK COORDINATION OF CIVIL, LANDSCAPE, MEP, ARCHITECTURAL, AND OTHER PLANS PRIOR TO COMMENCING CONSTRUCTION. OWNER/ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCY PRIOR TO COMMENCING WITH
- 12.IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE VARIOUS UTILITY COMPANIES WHICH MAY HAVE BURIED OR AERIAL UTILITIES WITHIN OR NEAR THE CONSTRUCTION AREA BEFORE COMMENCING WORK TO HAVE THEM LOCATE THEIR EXISTING UTILITIES
- PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE AN ADEQUATE MINIMUM NOTICE TO ALL UTILITY COMPANIES PRIOR TO 13. CONTRACTOR SHALL CALL TEXAS 811 AN ADEQUATE AMOUNT OF TIME PRIOR TO COMMENCING CONSTRUCTION OR ANY EXCAVATION.
- 14. CONTRACTOR SHALL USE EXTREME CAUTION AS THE SITE CONTAINS VARIOUS KNOWN AND UNKNOWN PUBLIC AND PRIVATE UTILITIES. 15. THE LOCATIONS, ELEVATIONS, DEPTH, AND DIMENSIONS OF EXISTING UTILITIES SHOWN ON THE PLANS WERE OBTAINED FROM AVAILABLE UTILITY COMPANY MAPS AND PLANS, AND ARE CONSIDERED APPROXIMATE AND INCOMPLETE. IT SHALL BE THE CONTRACTORS' RESPONSIBILITY TO VERIFY THE PRESENCE, LOCATION, ELEVATION, DEPTH, AND DIMENSION OF EXISTING UTILITIES SUFFICIENTLY IN ADVANCE OF CONSTRUCTION SO THAT ADJUSTMENTS CAN BE MADE TO PROVIDE ADEQUATE CLEARANCES. THE
- ENGINEER SHALL BE NOTIFIED WHEN A PROPOSED IMPROVEMENT CONFLICTS WITH AN EXISTING UTILITY 16. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING ANY ADJUSTMENTS AND RELOCATIONS OF EXISTING UTILITIES THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS, INCLUDING BUT NOT LIMITED TO, ADJUSTING EXISTING MANHOLES TO MATCH PROPOSED GRADE, RELOCATING EXISTING POLES AND GUY WIRES THAT ARE LOCATED IN PROPOSED DRIVEWAYS, ADJUSTING THE HORIZONTAL OR VERTICAL ALIGNMENT OF EXISTING UNDERGROUND UTILITIES TO ACCOMMODATE PROPOSED GRADE OR CROSSING
- WITH A PROPOSED UTILITY, AND ANY OTHERS THAT MAY BE ENCOUNTERED THAT ARE UNKNOWN AT THIS TIME AND NOT SHOWN ON 17. CONTRACTOR SHALL ARRANGE FOR OR PROVIDE, AT ITS EXPENSE, ALL GAS, TELECOMMUNICATIONS, CABLE, OVERHEAD AND
- UNDERGROUND POWER LINE, AND UTILITY POLE ADJUSTMENTS NEEDED. 18. CONTRACTOR IS RESPONSIBLE FOR COORDINATING INSTALLATION OF FRANCHISE UTILITIES THAT ARE NECESSARY FOR ON-SITE AND OFF-SITE CONSTRUCTION, AND SERVICE TO THE PROPOSED DEVELOPMENT.
- 19. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ALL DAMAGES DUE TO THE CONTRACTORS' FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UTILITIES. THE OWNER OR ENGINEER WILL ASSUME NO LIABILITY FOR ANY DAMAGES SUSTAINED OR COST INCURRED OR RELOCATE A UTILITY, THE UTILITY COMPANY OR DEPARTMENT AFFECTED SHALL BE CONTACTED BY THE CONTRACTOR AND THEIR PERMISSION OBTAINED REGARDING THE METHOD TO USE FOR SUCH WORK.
- 20.BRACING OF UTILITY POLES MAY BE REQUIRED BY THE UTILITY COMPANIES WHEN TRENCHING OR EXCAVATING IN CLOSE PROXIMITY TO THE POLES. THE COST OF BRACING POLES WILL BE BORNE BY THE CONTRACTOR, WITH NO SEPARATE PAY ITEM FOR THIS WORK. THE COST IS INCIDENTAL TO THE PAY ITEM.
- 21.CONTRACTOR SHALL USE ALL NECESSARY SAFETY PRECAUTIONS TO AVOID CONTACT WITH OVERHEAD AND UNDERGROUND POWER LINES. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE, FEDERAL AND UTILITY OWNER REGULATIONS PERTAINING
- TO WORK SETBACKS FROM POWER LINES 22.THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN ALL REQUIRED CONSTRUCTION PERMITS, APPROVALS, AND BONDS PRIOR TO CONSTRUCTION.
- 23. THE CONTRACTOR SHALL HAVE AVAILABLE AT THE JOB SITE AT ALL TIMES A COPY OF THE CONTRACT DOCUMENTS INCLUDING PLANS, GEOTECHNICAL REPORT AND ADDENDA, PROJECT AND CITY SPECIFICATIONS, AND SPECIAL CONDITIONS, COPIES OF ANY REQUIRED
- CONSTRUCTION PERMITS, EROSION CONTROL PLANS, SWPPP AND INSPECTION REPORTS. 24.ALL SHOP DRAWINGS AND OTHER DOCUMENTS THAT REQUIRE ENGINEER REVIEW SHALL BE SUBMITTED BY THE CONTRACTOR SUFFICIENTLY IN ADVANCE OF CONSTRUCTION OF THAT ITEM, SO THAT NO LESS THAN 10 BUSINESS DAYS FOR REVIEW AND RESPONSE
- 25.ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES, JURISDICTIONAL AGENCIES, AND/OR UTILITY SERVICE COMPANIES SHALL BE PERFORMED PRIOR TO USE OF THE FACILITY AND THE FINAL CONNECTION OF SERVICES.
- 26.CONTRACTOR SHALL ARRANGE FOR REQUIRED CITY INSPECTIONS 27. CONTRACTOR'S BID PRICE SHALL INCLUDE ALL INSPECTION FEES.
- 28.ALL SYMBOLS SHOWN ON THESE PLANS (E.G. FIRE HYDRANT, METERS, VALVES, INLETS, ETC....) ARE FOR PRESENTATION PURPOSES ONLY AND ARE NOT TO SCALE. CONTRACTOR SHALL COORDINATE FINAL SIZES AND LOCATIONS WITH APPROPRIATE CITY INSPECTOR. 29. THE SCOPE OF WORK FOR THE CIVIL IMPROVEMENTS SHOWN ON THESE PLANS TERMINATES 5-FEET FROM THE BUILDING. REFERENCE THE BUILDING PLANS (E.G. ARCHITECTURAL, STRUCTURAL, MEP) FOR AREAS WITHIN 5-FEET OF THE BUILDING AND WITHIN THE
- BUILDING FOOTPRINT 30.REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR ALL FINAL BUILDING DIMENSIONS.
- 31. THE PROPOSED BUILDING FOOTPRINT(S) SHOWN IN THESE PLANS WAS PROVIDED TO KIMLEY-HORN AND ASSOCIATES, INC. (KHA) BY THE PROJECT ARCHITECT AT THE TIME THESE PLANS WERE PREPARED. IT MAY NOT BE THE FINAL CORRECT VERSION BECAUSE THE BUILDING DESIGN WAS ONGOING. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR CONFIRMING THE FINAL CORRECT VERSION OF THE BUILDING FOOTPRINT WITH THE ARCHITECT AND STRUCTURAL ENGINEER PRIOR TO LAYOUT. DIMENSIONS AND/OR COORDINATES SHOWN ON THESE PLANS WERE BASED ON THE ABOVE STATED ARCHITECTURAL FOOTPRINT, AND ARE THEREFORE A PRELIMINARY LOCATION OF THE BUILDING. THE CONTRACTOR IS SOLELY RESPONSIBLE TO VERIFY WHAT PART OF THE BUILDING THE ARCHITECT'S FOOTPRINT REPRESENTS (E.G. SLAB, OUTSIDE WALL, MASONRY LEDGE, ETC) AND TO CONFIRM ITS FINAL POSITION ON THE SITE BASED ON THE FINAL ARCHITECTURAL FOOTPRINT, CIVIL DIMENSION CONTROL PLAN, SURVEY BOUNDARY AND/OR PLAT. ANY
- DIFFERENCES FOUND SHALL BE REPORTED TO KHA IMMEDIATELY. 32.ALL CONSTRUCTION SHALL COMPLY WITH THE PROJECT'S FINAL GEOTECHNICAL REPORT (OR LATEST EDITION), INCLUDING SUBSEQUENT ADDENDA
- 33.CONTRACTOR IS RESPONSIBLE FOR ALL MATERIALS TESTING AND CERTIFICATION, UNLESS SPECIFIED OTHERWISE BY OWNER. ALL MATERIALS TESTING SHALL BE COORDINATED WITH THE APPROPRIATE CITY INSPECTOR AND COMPLY WITH CITY STANDARD SPECIFICATIONS AND GEOTECHNICAL REPORT. TESTING SHALL BE PERFORMED BY AN APPROVED INDEPENDENT AGENCY FOR TESTING MATERIALS. OWNER SHALL APPROVE THE AGENCY NOMINATED BY THE CONTRACTOR FOR MATERIALS TESTING.
- 34.ALL COPIES OF MATERIALS TEST RESULTS SHALL BE SENT TO THE OWNER, ENGINEER AND ARCHITECT DIRECTLY FROM THE TESTING AGENCY. 35.IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO SHOW, BY THE STANDARD TESTING PROCEDURES OF THE MATERIALS, THAT THE WORK CONSTRUCTED MEETS THE PROJECT REQUIREMENTS AND CITY SPECIFICATIONS.
- 36.DUE TO THE POTENTIAL FOR DIFFERENTIAL SOIL MOVEMENT ADJACENT TO THE BUILDING, THE CONTRACTOR SHALL ADHERE TO GEOTECHNICAL REPORT'S RECOMMENDATION FOR SUBGRADE PREPARATION SPECIFIC TO FLATWORK ADJACENT TO THE PROPOSED BUILDING. THE OWNER AND CONTRACTOR ARE ADVISED TO OBTAIN A GEOTECHNICAL ENGINEER RECOMMENDATION SPECIFIC TO
- FLATWORK ADJACENT TO THE BUILDING, IF NONE IS CURRENTLY EXISTING 37.ALL CONTRACTORS MUST CONFINE THEIR ACTIVITIES TO THE WORK AREA. NO ENCROACHMENTS OUTSIDE OF THE WORK AREA WILL BE ALLOWED. ANY DAMAGE RESULTING THEREFROM SHALL BE CONTRACTOR'S SOLE RESPONSIBILITY TO REPAIR.
- 38. THE CONTRACTOR SHALL PROTECT ALL EXISTING STRUCTURES, UTILITIES, MANHOLES, POLES, GUY WIRES, VALVE COVERS, VAULT LIDS. FIRE HYDRANTS. COMMUNICATION BOXES/PEDESTALS. AND OTHER FACILITIES TO REMAIN AND SHALL REPAIR ANY DAMAGES AT
- 39. THE CONTRACTOR SHALL IMMEDIATELY REPAIR OR REPLACE ANY PHYSICAL DAMAGE TO PRIVATE PROPERTY OR PUBLIC IMPROVEMENTS, INCLUDING BUT NOT LIMITED TO: FENCES, WALLS, SIGNS, PAVEMENT, CURBS, UTILITIES, SIDEWALKS, GRASS, TREES, LANDSCAPING, AND IRRIGATION SYSTEMS, ETC.... TO ORIGINAL CONDITION OR BETTER AT NO COST TO THE OWNER.
- 40.ALL AREAS IN EXISTING RIGHT-OF-WAY DISTURBED BY SITE CONSTRUCTION SHALL BE REPAIRED TO ORIGINAL CONDITION OR BETTER. INCLUDING AS NECESSARY GRADING, LANDSCAPING, CULVERTS, AND PAVEMENT, 41.THE CONTRACTOR SHALL SALVAGE ALL EXISTING POWER POLES, SIGNS, WATER VALVES, FIRE HYDRANTS, METERS, ETC... THAT ARE
- TO BE RELOCATED DURING CONSTRUCTION. 42.CONTRACTOR SHALL MAINTAIN ADEQUATE SITE DRAINAGE DURING ALL PHASES OF CONSTRUCTION, INCLUDING MAINTAINING EXISTING DITCHES OR CULVERTS FREE OF OBSTRUCTIONS AT ALL TIMES. 43.THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND SUBMITTING A TRENCH SAFETY PLAN, PREPARED BY A PROFESSIONAL
- ENGINEER IN THE STATE OF TEXAS, TO THE CITY PRIOR TO CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING TRENCH 5. PROPOSED CONTOURS ARE APPROXIMATE. PROPOSED SPOT ELEVATIONS AND DESIGNATED GRADIENT ARE TO BE USED IN CASE OF SAFETY REQUIREMENTS IN ACCORDANCE WITH CITY, STATE, AND FEDERAL REQUIREMENTS, INCLUDING OSHA FOR ALL TRENCHES. NO OPEN TRENCHES SHALL BE ALLOWED OVERNIGHT WITHOUT PRIOR WRITTEN APPROVAL OF THE CITY. 44.THE CONTRACTOR SHALL KEEP TRENCHES FREE FROM WATER.
- 45.SITE SAFETY IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR. 46.THESE PLANS DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONTRACTOR OR ITS
- EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE ENGINEER'S SEAL HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTATION OF ALL REQUIRED SAFETY PROCEDURES AND PROGRAMS
- 47.SIGNS RELATED TO SITE OPERATION OR SAFETY ARE NOT INCLUDED IN THESE PLANS. 48.CONTRACTOR OFFICE AND STAGING AREA SHALL BE AGREED ON BY THE OWNER AND CONTRACTOR PRIOR TO BEGINNING OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR ALL PERMITTING REQUIREMENTS FOR THE CONSTRUCTION OFFICE, TRAILER,
- STORAGE, AND STAGING OPERATIONS AND LOCATIONS. 49.LIGHT POLES, SIGNS, AND OTHER OBSTRUCTIONS SHALL NOT BE PLACED IN ACCESSIBLE ROUTES.
- 50.ALL SIGNS, PAVEMENT MARKINGS, AND OTHER TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
- 51.TOP RIM ELEVATIONS OF ALL EXISTING AND PROPOSED MANHOLES SHALL BE COORDINATED WITH TOP OF PAVEMENT OR FINISHED GRADE AND SHALL BE ADJUSTED TO BE FLUSH WITH THE ACTUAL FINISHED GRADE AT THE TIME OF PAVING. 52.CONTRACTOR SHALL ADJUST ALL EXISTING AND PROPOSED VALVES, FIRE HYDRANTS, AND OTHER UTILITY APPURTENANCES TO MATCH
- ACTUAL FINISHED GRADES AT THE TIME OF PAVING. 53. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION SEQUENCING AND PHASING, AND SHALL CONTACT THE APPROPRIATE CITY OFFICIALS, INCLUDING BUILDING OFFICIAL, ENGINEERING INSPECTOR, AND FIRE MARSHALL TO LEARN OF ANY REQUIREMENTS. 54.CONTRACTOR IS RESPONSIBLE FOR PREPARATION, SUBMITTAL, AND APPROVAL BY THE CITY OF A TRAFFIC CONTROL PLAN PRIOR TO
- THE START OF CONSTRUCTION, AND THEN THE IMPLEMENTATION OF THE PLAN. 55.CONTRACTOR SHALL KEEP A NEAT AND ACCURATE RECORD OF CONSTRUCTION, INCLUDING ANY DEVIATIONS OR VARIANCES FROM THE PLANS
- 56. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AS-BUILT PLANS TO THE ENGINEER AND CITY IDENTIFYING ALL DEVIATIONS AND VARIATIONS FROM THESE PLANS MADE DURING CONSTRUCTION.
- 57.CONTRACTOR SHALL KEEP THE CONSTRUCTION SITE SECURE FROM TRESPASSERS AT ALL TIMES.

. THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL EROSION CONTROL AND WATER QUALITY REQUIREMENTS, LAWS, AND ORDINANCES THAT APPLY TO THE CONSTRUCTION SITE LAND DISTURBANCE. 2. CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE "TCEQ GENERAL PERMIT TO DISCHARGE UNDER THE TEXAS

- POLLUTANT DISCHARGE ELIMINATION SYSTEM TXR 150000". EROSION CONTROL DEVICES SHOWN ON THE EROSION CONTROL PLAN FOR THE PROJECT SHALL BE INSTALLED PRIOR TO THE START
- 4. ALL EROSION CONTROL DEVICES ARE TO BE INSTALLED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS FOR THE
- PROJECT 5. CONTRACTOR IS SOLELY RESPONSIBLE FOR INSTALLATION, IMPLEMENTATION, MAINTENANCE, AND EFFECTIVENESS OF ALL EROSION CONTROL DEVICES, BEST MANAGEMENT PRACTICES (BMPS), AND FOR UPDATING THE EROSION CONTROL PLAN DURING
- CONSTRUCTION AS FIELD CONDITIONS CHANGE. 6. CONTRACTOR SHALL DOCUMENT THE DATES OF INSTALLATION, MAINTENANCE OR MODIFICATION, AND REMOVAL FOR EACH BMP
- EMPLOYED IN THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IF APPLICABLE
- 7. AS STORM SEWER INLETS ARE INSTALLED ON-SITE, TEMPORARY EROSION CONTROL DEVICES SHALL BE INSTALLED AT EACH INLET PER APPROVED DETAILS. 8. THE EROSION CONTROL DEVICES SHALL REMAIN IN PLACE UNTIL THE AREA IT PROTECTS HAS BEEN PERMANENTLY STABILIZED
- 9. CONTRACTOR SHALL PROVIDE ADEQUATE EROSION CONTROL DEVICES NEEDED DUE TO PROJECT PHASING. 10. CONTRACTOR SHALL OBSERVE THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES AND MAKE FIELD ADJUSTMENTS AND MODIFICATIONS AS NEEDED TO PREVENT SEDIMENT FROM LEAVING THE SITE. IF THE EROSION CONTROL DEVICES DO NOT EFFECTIVELY CONTROL EROSION AND PREVENT SEDIMENTATION FROM WASHING OFF THE SITE, THEN THE CONTRACTOR SHALI
- NOTIFY THE ENGINEER 11 OFF-SITE SOIL BORROW SPOIL AND STORAGE AREAS (IF APPLICABLE) ARE CONSIDERED AS PART OF THE PROJECT SITE AND MUST ALSO COMPLY WITH THE EROSION CONTROL REQUIREMENTS FOR THIS PROJECT. THIS INCLUDES THE INSTALLATION OF BMP'S TO CONTROL FROSION AND SEDIMENTATION AND THE ESTABLISHMENT OF PERMANENT GROUND COVER ON DISTURBED AREAS PRIOR TO FINAL APPROVAL OF THE PROJECT. CONTRACTOR IS RESPONSIBLE FOR MODIFYING THE SWPPP AND EROSION CONTROL PLAN TO
- INCLUDE BMPS FOR ANY OFF-SITE THAT ARE NOT ANTICIPATED OR SHOWN ON THE EROSION CONTROL PLAN. 12. ALL STAGING, STOCKPILES, SPOIL, AND STORAGE SHALL BE LOCATED SUCH THAT THEY WILL NOT ADVERSELY AFFECT STORM WATER QUALITY. PROTECTIVE MEASURES SHALL BE PROVIDED IF NEEDED TO ACCOMPLISH THIS REQUIREMENT, SUCH AS COVERING OR ENCIRCLING THE AREA WITH AN APPROPRIATE BARRIER.
- 13. CONTRACTORS SHALL INSPECT ALL EROSION CONTROL DEVICES, BMPS, DISTURBED AREAS, AND VEHICLE ENTRY AND EXIT AREAS WEEKLY AND WITHIN 24 HOURS OF ALL RAINFALL EVENTS OF 0.5 INCHES OR GREATER, AND KEEP A RECORD OF THIS INSPECTION IN THE SWPPP BOOKLET IF APPLICABLE, TO VERIFY THAT THE DEVICES AND EROSION CONTROL PLAN ARE FUNCTIONING PROPERLY. 14. CONTRACTOR SHALL CONSTRUCT A STABILIZED CONSTRUCTION ENTRANCE AT ALL PRIMARY POINTS OF ACCESS IN ACCORDANCE
- WITH CITY SPECIFICATIONS. CONTRACTOR SHALL ENSURE THAT ALL CONSTRUCTION TRAFFIC USES THE STABILIZED ENTRANCE AT ALL TIMES FOR ALL INGRESS/EGRESS. 15. SITE ENTRY AND EXITS SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT THE TRACKING AND FLOWING OF SEDIMENT AND
- DIRT ONTO OFF-SITE ROADWAYS. ALL SEDIMENT AND DIRT FROM THE SITE THAT IS DEPOSITED ONTO AN OFF-SITE ROADWAY SHALL BE REMOVED IMMEDIATELY 16. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL SILT AND DEBRIS FROM THE AFFECTED OFF-SITE ROADWAYS THAT ARE A
- RESULT OF THE CONSTRUCTION, AS REQUESTED BY OWNER AND CITY. AT A MINIMUM, THIS SHOULD OCCUR ONCE PER DAY FOR THE OFF-SITE ROADWAYS 17. WHEN WASHING OF VEHICLES IS REQUIRED TO REMOVE SEDIMENT PRIOR TO EXITING THE SITE, IT SHALL BE DONE IN AN AREA
- STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP BMP 18. CONTRACTOR SHALL INSTALL A TEMPORARY SEDIMENT BASIN FOR ANY ON-SITE DRAINAGE AREAS THAT ARE GREATER THAN 10 ACRES, PER TCEQ AND CITY STANDARDS. IF NO ENGINEERING DESIGN HAS BEEN PROVIDED FOR A SEDIMENTATION BASIN ON THESE PLANS, THEN THE CONTRACTOR SHALL ARRANGE FOR AN APPROPRIATE DESIGN TO BE PROVIDED.
- 19. ALL FINES IMPOSED FOR SEDIMENT OR DIRT DISCHARGED FROM THE SITE SHALL BE PAID BY THE RESPONSIBLE CONTRACTOR. 20. WHEN SEDIMENT OR DIRT HAS CLOGGED THE CONSTRUCTION ENTRANCE VOID SPACES BETWEEN STONES OR DIRT IS BEING TRACKED ONTO A ROADWAY, THE AGGREGATE PAD MUST BE WASHED DOWN OR REPLACED. RUNOFF FROM THE WASH-DOWN OPERATION SHALL NOT BE ALLOWED TO DRAIN DIRECTLY OFF SITE WITHOUT FIRST FLOWING THROUGH ANOTHER BMP TO CONTROL SEDIMENTATION. PERIODIC RE-GRADING OR NEW STONE MAY BE REQUIRED TO MAINTAIN THE EFFECTIVENESS OF THE CONSTRUCTION ENTRANCE. 21.TEMPORARY SEEDING OR OTHER APPROVED STABILIZATION SHALL BE INITIATED WITHIN 14 DAYS OF THE LAST DISTURBANCE OF ANY AREA, UNLESS ADDITIONAL CONSTRUCTION IN THE AREA IS EXPECTED WITHIN 21 DAYS OF THE LAST DISTURBANCE.
- 22.CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING CONSTRUCTION, ALWAYS CLEANING UP DIRT, LOOSE MATERIAL, AND TRASH AS CONSTRUCTION PROGRESSES. 23.UPON COMPLETION OF FINE GRADING, ALL SURFACES OF DISTURBED AREAS SHALL BE PERMANENTLY STABILIZED. STABILIZATION IS ACHIEVED WHEN THE AREA IS EITHER COVERED BY PERMANENT IMPERVIOUS STRUCTURES, SUCH AS BUILDINGS, SIDEWALK,
- PAVEMENT OR A UNIFORM PERENNIAL VEGETATIVE COVER. BECAUSE OF THE OPERATIONS IN THE VICINITY OF EXISTING UTILITIES OR STRUCTURES. IF IT IS NECESSARY TO SHORE, BRACE, SWING 24.AT THE CONCLUSION OF THE PROJECT, ALL INLETS, DRAIN PIPE, CHANNELS, DRAINAGEWAYS AND BORROW DITCHES AFFECTED BY THE CONSTRUCTION SHALL BE DREDGED, AND THE SEDIMENT GENERATED BY THE PROJECT SHALL BE REMOVED AND DISPOSED IN
 - ACCORDANCE WITH APPLICABLE REGULATIONS. 25. CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT, TRASH AND LOOSE MATERIALS AS CONSTRUCTION PROGRESSES.

- CONTRACTOR SHALL COMPLY WITH ALL TCEQ AND EPA STORM WATER POLLUTION PREVENTION REQUIREMENTS. 2. CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE TCEQ GENERAL PERMIT TO DISCHARGE UNDER THE TEXAS
- POLLUTANT DISCHARGE ELIMINATION SYSTEM TXR 150000.
- 3. THE CONTRACTOR SHALL ENSURE THAT ALL PRIMARY OPERATORS SUBMIT A NOI TO TCEQ AT LEAST SEVEN DAYS PRIOR TO COMMENCING CONSTRUCTION (IF APPLICABLE), OR IF UTILIZING ELECTRONIC SUBMITTAL, PRIOR TO COMMENCING CONSTRUCTION. ALL PRIMARY OPERATORS SHALL PROVIDE A COPY OF THE SIGNED NOI TO THE OPERATOR OF ANY MS4 (TYPICALLY THE CITY) RECEIVING DISCHARGE FROM THE SITE.
- 4. CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMPLEMENTATION OF THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IF APPLICABLE, INCLUDING POSTING SITE NOTICE, INSPECTIONS, DOCUMENTATION, AND SUBMISSION OF ANY INFORMATION REQUIRED BY THE TCEQ AND EPA (E.G. NOI).
- 5. ALL CONTRACTORS AND SUBCONTRACTORS PROVIDING SERVICES RELATED TO THE SWPPP SHALL SIGN THE REQUIRED CONTRACTOR CERTIFICATION STATEMENT ACKNOWLEDGING THEIR RESPONSIBILITIES AS SPECIFIED IN THE SWPPP. 6. A COPY OF THE SWPPP, INCLUDING NOI, SITE NOTICE, CONTRACTOR CERTIFICATIONS, AND ANY REVISIONS, SHALL BE SUBMITTED TO
- THE CITY BY THE CONTRACTOR AND SHALL BE RETAINED ON-SITE DURING CONSTRUCTION. 7. A NOTICE OF TERMINATION (NOT) SHALL BE SUBMITTED TO TCEQ BY ANY PRIMARY OPERATOR WITHIN 30 DAYS AFTER ALL SOIL DISTURBING ACTIVITIES AT THE SITE HAVE BEEN COMPLETED AND A UNIFORM VEGETATIVE COVER HAS BEEN ESTABLISHED ON ALL UNPAVED AREAS AND AREAS NOT COVERED BY STRUCTURES, A TRANSFER OF OPERATIONAL CONTROL HAS OCCURRED, OR THE OPERATOR HAS OBTAINED ALTERNATIVE AUTHORIZATION UNDER A DIFFERENT PERMIT. A COPY OF THE NOT SHALL BE PROVIDED TO THE OPERATOR OF ANY MS4 RECEIVING DISCHARGE FROM THE SITE.

- KHA IS NOT RESPONSIBLE FOR THE MEANS AND METHODS EMPLOYED BY THE CONTRACTOR TO IMPLEMENT THIS DEMOLITION PLAN. THIS PRELIMINARY DEMOLITION PLAN SIMPLY INDICATES THE KNOWN OBJECTS ON THE SUBJECT TRACT THAT ARE TO BE DEMOLISHED AND REMOVED FROM THE SITE 2. KHA DOES NOT WARRANT OR REPRESENT THAT THE PLAN, WHICH WAS PREPARED BASED ON SURVEY AND UTILITY INFORMATION
- PROVIDED BY OTHERS. SHOWS ALL IMPROVEMENTS AND LITILITIES. THAT THE IMPROVEMENTS AND LITILITIES ARE SHOWN. ACCURATELY, OR THAT THE UTILITIES SHOWN CAN BE REMOVED. THE CONTRACTOR IS RESPONSIBLE FOR PERFORMING ITS OWN SITE RECONNAISSANCE TO SCOPE ITS WORK AND TO CONFIRM WITH THE OWNERS OF IMPROVEMENTS AND UTILITIES THE ABILITY AND PROCESS FOR THE REMOVAL OF THEIR FACILITIES.
- 3. THIS PLAN IS INTENDED TO GIVE A GENERAL GUIDE TO THE CONTRACTOR, NOTHING MORE. THE GOAL OF THE DEMOLITION IS TO LEAVE THE SITE IN A STATE SUITABLE FOR THE CONSTRUCTION OF THE PROPOSED DEVELOPMENT. REMOVAL OR PRESERVATION OF
- IMPROVEMENTS, UTILITIES, ETC. TO ACCOMPLISH THIS GOAL ARE THE RESPONSIBILITY OF THE CONTRACTOR. 4. CONTRACTOR IS STRONGLY CAUTIONED TO REVIEW THE FOLLOWING REPORTS DESCRIBING SITE CONDITIONS PRIOR TO BIDDING AND IMPLEMENTING THE DEMOLITION PLAN-
- a. ENVIRONMENTAL SITE ASSESSMENT PROVIDED BY THE OWNER, b. ASBESTOS BUILDING INSPECTION REPORT(S) PROVIDED BY THE OWNER,
- c. GEOTECHNICAL REPORT PROVIDED BY THE OWNER. d OTHER REPORTS THAT ARE APPLICABLE AND AVAILABLE

CONTRACTOR AT NO ADDITIONAL EXPENSE.

- 5. CONTRACTOR SHALL CONTACT THE OWNER TO VERIFY WHETHER ADDITIONAL REPORTS OR AMENDMENTS TO THE ABOVE CITED REPORTS HAVE BEEN PREPARED AND TO OBTAIN/REVIEW/AND COMPLY WITH THE RECOMMENDATION OF SUCH STUDIES PRIOR TO STARTING ANY WORK ON THE SITE.
- 6. CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS REGARDING THE DEMOLITION OF OBJECTS ON THE SITE AND THE DISPOSAL OF THE DEMOLISHED MATERIALS OFF-SITE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO REVIEW THE SITE, DETERMINE THE APPLICABLE REGULATIONS, RECEIVE THE REQUIRED PERMITS AND AUTHORIZATIONS, AND COMPLY, 7. KHA DOES NOT REPRESENT THAT THE REPORTS AND SURVEYS REFERENCED ABOVE ARE ACCURATE, COMPLETE, OR COMPREHENSIVE
- SHOWING ALL ITEMS THAT WILL NEED TO BE DEMOLISHED AND REMOVED. 8. SURFACE PAVEMENT INDICATED MAY OVERLAY OTHER HIDDEN STRUCTURES, SUCH AS ADDITIONAL LAYERS OF PAVEMENT, FOUNDATIONS OR WALLS, THAT ARE ALSO TO BE REMOVED.

- . THE CONTRACTOR AND GRADING SUBCONTRACTOR SHALL VERIFY THE SUITABILITY OF EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE START OF CONSTRUCTION. THE CIVIL ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES
- CONTRACTOR SHALL OBTAIN ANY REQUIRED GRADING PERMITS FROM THE CITY. 3. UNLESS OTHERWISE NOTED, PROPOSED CONTOURS AND SPOT ELEVATIONS SHOWN IN PAVED AREA REFLECT TOP OF PAVEMENT SURFACE. IN LOCATIONS ALONG A CURB LINE, ADD 6-INCHES (OR THE HEIGHT OF THE CURB) TO THE PAVING GRADE FOR TOP OF CURB
- ELEVATION. 4. PROPOSED SPOT ELEVATIONS AND CONTOURS OUTSIDE THE PAVEMENT ARE TO TOP OF FINISHED GRADE.
- DISCREPANCY. 6. ALL FINISHED GRADES SHALL TRANSITION UNIFORMLY BETWEEN THE FINISHED ELEVATIONS SHOWN. 7. CONTOURS AND SPOT GRADES SHOWN ARE ELEVATIONS OF TOP OF THE FINISHED SURFACE. WHEN PERFORMING THE GRADING OPERATIONS. THE CONTRACTOR SHALL PROVIDE AN APPROPRIATE ELEVATION HOLD-DOWN ALLOWANCE FOR THE THICKNESS OF PAVEMENT, SIDEWALK, TOPSOIL, MULCH, STONE, LANDSCAPING, RIP-RAP AND ALL OTHER SURFACE MATERIALS THAT WILL

CONTRIBUTE TO THE TOP OF FINISHED GRADE. FOR EXAMPLE, THE LIMITS OF EARTHWORK IN PAVED AREAS IS THE BOTTOM OF THE

- 8. NO REPRESENTATIONS OF EARTHWORK QUANTITIES OR SITE BALANCE ARE MADE BY THESE PLANS. THE CONTRACTOR SHALL PROVIDE THEIR OWN EARTHWORK CALCULATION TO DETERMINE THEIR CONTRACT QUANTITIES AND COST. ANY SIGNIFICANT VARIANCE FROM A BALANCED SITE SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE CIVIL ENGINEER.
- 9. ALL GRADING AND EARTHWORK SHALL COMPLY WITH THE PROJECT'S FINAL GEOTECHNICAL REPORT (OR LATEST EDITION), INCLUDING SUBSEQUENT ADDENDA 10. ALL EXCAVATION IS UNCLASSIFIED AND SHALL INCLUDE ALL MATERIALS ENCOUNTERED. UNUSABLE EXCAVATED MATERIAL AND ALL WASTE RESULTING FROM SITE CLEARING AND GRUBBING SHALL BE REMOVED FROM THE SITE AND APPROPRIATELY DISPOSED BY THE
- 11. EROSION CONTROL DEVICES SHOWN ON THE EROSION CONTROL PLAN FOR THE PROJECT SHALL BE INSTALLED PRIOR TO THE START OF GRADING. REFERENCE EROSION CONTROL PLAN, DETAILS, GENERAL NOTES, AND SWPPP FOR ADDITIONAL INFORMATION AND REQUIREMENTS 12.BEFORE ANY EARTHWORK IS PERFORMED, THE CONTRACTOR SHALL STAKE OUT AND MARK THE LIMITS OF THE PROJECT'S PROPERTY
- LINE AND SITE IMPROVEMENTS. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY ENGINEERING AND SURVEYING FOR LINE AND GRADE CONTROL POINTS RELATED TO EARTHWORK. 13. CONTRACTOR TO DISPOSE OF ALL EXCESS EXCAVATION MATERIALS IN A MANNER THAT ADHERES TO LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS. THE CONTRACTOR SHALL KEEP A RECORD OF WHERE EXCESS EXCAVATION WAS DISPOSED, ALONG WITH
- THE RECEIVING LANDOWNER'S APPROVAL TO DO SO 14. CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND REPLACEMENT OF TOPSOIL AT THE COMPLETION OF FINE GRADING. CONTRACTOR SHALL REFER TO LANDSCAPE ARCHITECTURE PLANS FOR SPECIFICATIONS AND REQUIREMENTS FOR TOPSOIL. 15. CONTRACTOR SHALL MAINTAIN ADEQUATE SITE DRAINAGE DURING ALL PHASES OF CONSTRUCTION, INCLUDING MAINTAINING EXISTING
- DITCHES OR CULVERTS FREE OF OBSTRUCTIONS AT ALL TIMES. 16.NO EARTHWORK FILL SHALL BE PLACED IN ANY EXISTING DRAINAGE WAY, SWALE, CHANNEL, DITCH, CREEK, OR FLOODPLAIN FOR ANY REASON OR ANY LENGTH OF TIME, UNLESS THESE PLANS SPECIFICALLY INDICATE THIS IS REQUIRED. 17. TEMPORARY CULVERTS MAY BE REQUIRED IN SOME LOCATIONS TO CONVEY RUN-OFF.
- 18. REFER TO DIMENSION CONTROL PLAN, AND PLAT FOR HORIZONTAL DIMENSIONS. 19. THE CONTRACTOR SHALL CLEAR AND GRUB THE SITE AND PLACE, COMPACT, AND CONDITION FILL PER THE PROJECT GEOTECHNICAL

- ENGINEER'S SPECIFICATIONS. THE FILL MATERIAL TO BE USED SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO
- 20.CONTRACTOR IS RESPONSIBLE FOR ALL SOILS TESTING AND CERTIFICATION, UNLESS SPECIFIED OTHERWISE BY OWNER. ALL SOILS TESTING SHALL BE COORDINATED WITH THE APPROPRIATE CITY INSPECTOR AND SHALL COMPLY WITH CITY STANDARD SPECIFICATIONS AND THE GEOTECHNICAL REPORT. SOILS TESTING SHALL BE PERFORMED BY AN APPROVED INDEPENDENT AGENCY
- FOR TESTING SOILS. THE OWNER SHALL APPROVE THE AGENCY NOMINATED BY THE CONTRACTOR FOR SOILS TESTING. 21.ALL COPIES OF SOILS TEST RESULTS SHALL BE SENT TO THE OWNER, ENGINEER AND ARCHITECT DIRECTLY FROM THE TESTING
- 22.IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO SHOW, BY THE STANDARD TESTING PROCEDURES OF THE SOILS, THAT THE WORK CONSTRUCTED MEETS THE PROJECT REQUIREMENTS AND CITY SPECIFICATIONS.
- 23.THE SCOPE OF WORK FOR CIVIL IMPROVEMENT SHOWN ON THESE PLANS TERMINATES 5-FEET FROM THE BUILDING. CONTRACTOR SHALL REFER TO THE GEOTECHNICAL REPORT AND STRUCTURAL PLANS AND SPECIFICATIONS FILL, CONDITIONING, AND PREPARATION IN THE BUILDING PAD.
- 24.DUE TO THE POTENTIAL FOR DIFFERENTIAL SOIL MOVEMENT ADJACENT TO THE BUILDING, THE CONTRACTOR SHALL ADHERE TO GEOTECHNICAL REPORT'S RECOMMENDATION FOR SUBGRADE PREPARATION SPECIFIC TO FLATWORK ADJACENT TO THE PROPOSED BUILDING. THE OWNER AND CONTRACTOR ARE ADVISED TO OBTAIN A GEOTECHNICAL ENGINEER RECOMMENDATION SPECIFIC TO
- FLATWORK ADJACENT TO THE BUILDING, IF NONE IS CURRENTLY EXISTING. 25.CONTRACTOR SHALL ENSURE THAT SUFFICIENT POSITIVE SLOPE AWAY FROM THE BUILDING PAD IS ACHIEVED FOR ENTIRE PERIMETER
- OF THE PROPOSED BUILDING(S) DURING GRADING OPERATIONS AND IN THE FINAL CONDITION. IF THE CONTRACTOR OBSERVES THAT
- THIS WILL NOT BE ACHIEVED, THE CONTRACTOR SHALL CONTACT THE ENGINEER TO REVIEW THE LOCATION. 26.THE CONTRACTOR SHALL TAKE ALL AVAILABLE PRECAUTIONS TO CONTROL DUST. CONTRACTOR SHALL CONTROL DUST BY SPRINKLING WATER, OR BY OTHER MEANS APPROVED BY THE CITY, AT NO ADDITIONAL COST TO THE OWNER.
- 7.CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES FOR ANY REQUIRED UTILITY ADJUSTMENTS AND/OR RELOCATIONS NEEDED FOR GRADING OPERATIONS AND TO ACCOMMODATE PROPOSED GRADE, INCLUDING THE UNKNOWN UTILITIES NOT SHOWN ON THESE PLANS. CONTRACTOR SHALL REFER TO THE GENERAL NOTES "OVERALL" SECTION THESE PLANS FOR ADDITIONAL
- INFORMATION 28.EXISTING TREE LOCATIONS SHOWN ON THESE PLANS ARE APPROXIMATE. CONTRACTOR SHALL REPORT ANY DISCREPANCIES FOUND
- IN THE FIELD THAT AFFECT THE GRADING PLAN TO THE CIVIL ENGINEER. 29.CONTRACTOR SHALL FIELD VERIFY ALL PROTECTED TREE LOCATIONS, INDIVIDUAL PROTECTED TREE CRITICAL ROOT ZONES, AND PROPOSED SITE GRADING, AND NOTIFY THE CIVIL ENGINEER AND LANDSCAPE ARCHITECT OF ANY CONFLICTS WITH THE TREE
- PRESERVATION PLAN BY THE LANDSCAPE ARCHITECT PRIOR TO COMMENCING THE WORK. 30.TREE PROTECTION MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH THE CITY STANDARD TREE PROTECTION DETAILS AND THE
- APPROVED TREE PRESERVATION PLANS BY THE LANDSCAPE ARCHITECT. 31. CONTRACTOR SHALL REFER TO THE LANDSCAPING AND TREE PRESERVATIONS PLANS FOR ALL INFORMATION AND DETAILS
- REGARDING EXISTING TREES TO BE REMOVED AND PRESERVED. 32.NO TREE SHALL BE REMOVED UNLESS A TREE REMOVAL PERMIT HAS BEEN ISSUED BY THE CITY, OR CITY HAS OTHERWISE CONFIRMED IN WRITING THAT ONE IS NOT NEEDED FOR THE TREE(S).
- 33.NO TREE SHALL BE REMOVED OR DAMAGED WITHOUT PRIOR AUTHORIZATION OF THE OWNER OR OWNER'S REPRESENTATIVE. EXISTING TREES SHALL BE PRESERVED WHENEVER POSSIBLE AND GRADING IMPACT TO THEM HELD TO A MINIMUM.
- 34.AFTER PLACEMENT OF SUBGRADE AND PRIOR TO PLACEMENT OF PAVEMENT, CONTRACTOR SHALL TEST AND OBSERVE PAVEMENT AREAS FOR EVIDENCE OF PONDING AND INADEQUATE SLOPE FOR DRAINAGE. ALL AREAS SHALL ADEQUATELY DRAIN TOWARDS THE INTENDED STRUCTURE TO CONVEY STORMWATER RUNOFF. CONTRACTOR SHALL IMMEDIATELY NOTIFY OWNER AND ENGINEER IF ANY
- 35.CONTRACTOR FIELD ADJUSTMENT OF PROPOSED SPOT GRADES IS ALLOWED, IF THE APPROVAL OF THE CIVIL ENGINEER IS OBTAINED.

STANDARD HCFCD NOTES FOR CONSTRUCTION DRAWINGS

AREAS OF POOR DRAINAGE ARE DISCOVERED.

- OBTAIN AND COMPLY WITH ALL APPLICABLE CITY, COUNTY, STATE, AND FEDERAL PERMITS AND APPROVALS, WITH ASSISTANCE FROM ENGINEER, IF NECESSARY. OBTAIN PERMIT (CERTIFICATION) FROM HARRIS COUNTY ENGINEER TO ENTER HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY.
- NOTIFY THE HARRIS COUNTY FLOOD CONTROL DISTRICT'S DEVELOPMENT COORDINATION AND INSPECTION DEPARTMENT IN WRITING AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. SUBMIT THE HCFCD 48 HOUR PRE-CONSTRUCTION NOTIFICATION FORM, A COPY OF THE APPROVED CONSTRUCTION DRAWINGS, AND A COPY OF THE CORPS OF ENGINEERS INDIVIDUAL SECTION 404 PERMIT OR COMPLIANCE WITH NATIONWIDE PERMIT, IF APPLICABLE, TO HCFCD, 9900 NORTHWEST FREEWAY, HOUSTON, TEXAS 77092, ATTN: DEVELOPMENT COORDINATION AND
- INSPECTION DEPT. BY HAND DELIVERY, BY EMAIL DCID@HCFCD.ORG, OR FAX TO 713-684-4129 (FAX NUMBER) ENGINEER SHALL SUBMIT CERTIFICATION LETTER AND RECORD DRAWINGS TO THE HARRIS COUNTY FLOOD CONTROL DISTRICT'S DEVELOPMENT COORDINATION AND INSPECTION SECTION REQUESTING INSPECTION OF ITEMS CONSTRUCTED IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. PRIOR TO REQUESTING INSPECTION, THE DRAINAGE RIGHT-OF-WAY AND/OR EASEMENTS SHALL BE STAKED AND FI AGGED
- PROTECT, MAINTAIN, AND RESTORE EXISTING BACKSLOPE DRAINAGE SYSTEMS.
- BACKSLOPE SWALE AND INTERCEPTOR STRUCTURE ELEVATIONS AND LOCATIONS SHOWN ON PLANS ARE APPROXIMATE. FINAL ELEVATIONS AND LOCATIONS SHALL BE FIELD VERIFIED BY THE ENGINEER PRIOR TO INSTALL ATION
- ESTABLISH TURF GRASS ON ALL DISTURBED AREAS WITHIN THE CHANNEL OR DETENTION RIGHT-OF-WAY, EXCEPT THE CHANNEL BOTTOM AND WHERE STRUCTURAL EROSION MEASURES ARE USED. MINIMUM ACCEPTANCE CRITERIA ARE 75% COVERAGE OF LIVE BERMUDA GRASS AND NO EROSION OR RILLS DEEPER
- PERFORM ALL ACTIVITIES WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY IN ACCORDANCE WITH THE MOST RECENT HARRIS COUNTY FLOOD CONTROL DISTRICT STANDARD
- EXCAVATE CHANNEL FLOWLINE TO DESIGN ELEVATION AS SHOWN ON PLANS AND DOWNSTREAM, AS NECESSARY, TO ENSURE NO WATER REMAINS IN THE FACILITY (STORM SEWER, LATERAL CHANNEL, OR DRY BOTTOM DETENTION BASIN) DURING NORMAL WATER SURFACE CONDITIONS IN THE CHANNEL. SO THE FACILITY WILL FUNCTION AS INTENDED. FOR WET BOTTOM DETENTION BASINS, ENSURE NO WATER IS ABOVE
- THE DESIGN LEVEL IN THE WET BOTTOM DURING NORMAL WATER SURFACE CONDITIONS IN THE CHANNEL. MAINTAIN FLOW IN CHANNEL DURING CONSTRUCTION AND RESTORE CHANNEL TO ORIGINAL CONDITION. REMOVE ALL EXCAVATED MATERIAL FROM THE HARRIS COUNTY FLOOD CONTROL DISTRICT OR DRAINAGE RIGHT-OF-WAY. NO FILL IS TO BE PLACED WITHIN A DESIGNATED FLOOD PLAIN AREA WITHOUT FIRST OBTAINING A FILL PERMIT FROM THE APPROPRIATE JURISDICTIONAL AUTHORITY.

ALL CONNECTIONS TO DISTRICT FACILITIES MUST BE COORDINATED THROUGH THE DISTRICTS OPERATOR, INFRAMARK, AT LEAST 48 HOURS PRIOR TO CONSTRUCTION COMMENCING.

THE SUBJECT PROPERTY IS ADDRESSED AT 12000 BISSONNET STREET, HOUSTON, TEXAS 77099. THE SUBJECT PROPERTY IS PART OF AND SURROUNDED BY THE +/-118.778-ACRE DOTY SAND PIT VENTURE (DSPV) LANDFILL. THE DSPV LANDFILL BEGAN AS A SAND MINING OPERATION IN ABOUT 1960 AND TRANSITIONED TO LANDFILL BEFORE 1978 AND CONTINUED TO OPERATE AS A LANDFILL UNTIL ITS CLOSURE IN 1999. IN 1981 THE DSPV LANDFILL RECEIVED A PERMIT FROM THE TEXAS DEPARTMENT OF HEALTH (TDH), [NOW THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ)] TO OPERATE THE SITE AS A TYPE IV LANDFILL FOR CONSTRUCTION AND DEMOLITION DEBRIS DISPOSAL. THE SITE WAS SUBSEQUENTLY ISSUED MUNICIPAL SOLID WASTE (MSW) PERMIT NO. 1247 BY TCEQ IN 1985. MSW PERMIT NO. 1247 IS ACTIVE AND THE SITE HAS BEEN IN POST CLOSURE CARE SINCE 1999. THE CURRENT TCEQ MSW PERMIT NO. 1247 PERMITTEE IS NORTHWEST METRO HOLDINGS, CS 34, LLC OF BURLINGAME, CALIFORNIA.

LOCATED ADJACENTLY NORTH AND EAST OF THE DSPV LANDFILL IS THE +/-18.11-ACRE OLSHAN DEMOLISHING LANDFILL (FORMERLY MSW PERMIT NO. 1259), ALSO A CLOSED TYPE IV LANDFILL THAT REPORTEDLY RECEIVED CONSTRUCTION DEBRIS WASTE FROM SEPTEMBER 1976 UNTIL JULY 1987 IN 2002 THE OLSHAN LANDFILL ENDED POST CLOSURE CARE. AND THE MSW PERMIT WAS REVOKED BY

THE SUGAR HILLS GOLF COURSE WAS DEVELOPED ABOVE THE DSPV LANDFILL AND OLSHAN DEMOLISHING LANDFILL AND OPERATED FROM APPROXIMATELY 2000 TO 2005 WITH AN ADDRESS OF 12000 BISSONNET STREET. SINCE THE SUGAR HILLS GOLF COURSE CLOSED, BOTH LANDFILLS HAVE REMAINED DEVELOPED AS A GOLF COURSE, THOUGH ONLY SPARINGLY MAINTAINED.

IN APRIL 2016, ECO 1 DEVELOPMENT, LLC (ECO 1), A PRIOR MSW PERMITTEE, RECEIVED A TYPE IX REGISTRATION NO. 40286 FROM TCEQ FOR MINING OF THE OLSHAN DEMOLISHING LANDFILL UNDER 30 TEXAS ADMINISTRATIVE CODE (TAC) CHAPTER 330, SUBCHAPTER N. ECO 1 REMOVED SOME GOLF COURSE SOIL FROM THE OLSHAN DEMOLISHING LANDFILL. BUT NEVER ACTIVELY MINED WASTE MATERIAL UNDER THE TYPE IX REGISTRATION. TCEQ REVOKED THE TYPE IX REGISTRATION ON AUGUST 1, 2019 FOR LACK OF ACTIVITY. HOWEVER, FOR THE REGISTRATION NO. 40286 APPLICATION, ECO 1 PERFORMED 6 TEST PITS ON THE OLSHAN DEMOLISHING LANDFILL FOR WASTE CHARACTERIZATION, SOIL AND LEACHATE TESTING AND WASTE DEPTH DETERMINATION. FROM THE 6 TEST PITS, ECO 1 EXCAVATED ABOUT 1,700 CUBIC YARDS OF MATERIAL WHICH SKA CATEGORIZED AS 74% SOIL, 10% WOOD, 10% CONCRETE, 3% METAL, AND 3% OTHER (PLASTIC, RUBBER, TEXTILES, ETC). THE MAXIMUM DEPTH OF THE WASTE MATERIAL WAS REACHED IN TEST PIT 1 AT 26 FEET BELOW GROUND SURFACE (FT-BGS). THE AERIAL EXTENT OF WASTE DEPOSITION WAS NOT EVALUATED BY THE TEST PIT EXCAVATIONS. ALL WASTE OBSERVED WAS CONSISTENT WITH A TYPE IV LANDFILL OPERATION.

THE CURRENT PROPERTY OWNER, BISSONNET 136, LLC, ACQUIRED THE PROPERTY IN JUNE 2019. A RELATED ENTITY, NORTHWEST METRO HOLDINGS, CS 34, LLC BECAME THE MSW NO. 1247 PERMITTEE AFTER A TRANSFER PERMIT MODIFICATION WAS APPROVED BY TCEQ ON JUNE 4 2020

AS PART OF THE BASE BID FOR THIS PROJECT, CONTRACTOR SHALL ADHERE TO THE PROJECT GEOTECHNICAL REPORT FOR ALL RECOMMENDATIONS FOR BOTH MATERIALS AND PRACTICE OF INSTALLATION GIVEN IN THE PROJECT GEOTECHNICAL REPORT FOR EARTHWORK, SITE SUBGRADE PREPARATION, BUILDING PAD SUBGRADE PREPARATION, PAVING, AND WET/SOFT SOILS CONDITIONS ALONG WITH ANY OTHER SECTIONS PROVIDED IN THE REPORT.

TITLE: KIRKWOOD CROSSING 12000 BISSONNET STREET BY: GOODHEART & ASSOCIATES PLLC DATED: <u>10/21/2022</u>

INCLUDING ALL REVISIONS AND ADDENDA TO THIS REPORT THAT MAY HAVE BEEN RELEASED AFTER THE NOTED DATE.

BENCHMARK PUBLISHED ELEVATION - 72.81' BENCHMARK - HARRIS COUNTY FLOODPLAIN RM NO.: 040510. STAMPED "D120 BMOS", LOCATED FROM THE INTERSECTION OF BEECHNUT STREET AND BOONE ROAD, TRAVEL SOUTH APPROXIMATELY 0.22 MILE ON BOONE ROAD TO CONCRETE BRIDGE. MONUMENT IS LOCATED ON EAST CENTERLINE SIDEWALK AT CENTERLINE STREAM.

NAVD88 (2001 ADJUSTED.) TEMPORARY BENCHMARK "A" ELEVATION - 79.02'

BOX CUT ON THE SOUTH END OF A MEDIAN ON THE NORTH END OF A BULL NOSE. LOCATED ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM THE INTERSECTION OF COOK ROAD AND BROOKGLADE CIRCLE.

TEMPORARY BENCHMARK "B" ELEVATION - 78.95' BOX CUT ON THE SOUTH END OF A MEDIAN ON THE NORTH END OF A BULL NOSE. LOCATED ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM THE INTERSECTION OF COOK ROAD AND MAGNOLIA CANYON.

TEMPORARY BENCHMARK "C" ELEVATION - 81.34' BOX CUT ON STORM INLET LOCATED ON THE NORTH LINE OF BISSONNET STREET, +/- 1,000 FEET WEST FROM THE INTERSECTION OF BISSONNET STREET AND SOUTH KIRKWOOD ROAD.

BOX CUT ON STORM INLET LOCATED ON THE WEST LINE OF SOUTH KIRKWOOD ROAD, +/- 200 FEET NORTH FROM THE INTERSECTION OF ZARROLL DRIVE AND SOUTH KIRKWOOD ROAD.

TEMPORARY BENCHMARK "D"

ELEVATION - 76.20'

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

VERIFICATION OF PRIVATE UTILITY LINES

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11700 Katy Freeway,

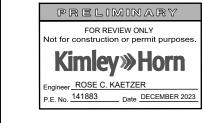
WASTE WATER

FILE NO.

Signature valid for one year.

TBPE Firm Registration F-928 Tel. No. (281) 597-9300

Suite 800 Houston, Texas 77079



KIRKWOOD CROSSING

GENERAL CONSTRUCTION NOTES (2 OF 2)

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON HOUSTON PUBLIC WORKS

STORM WATER QUALITY WATER

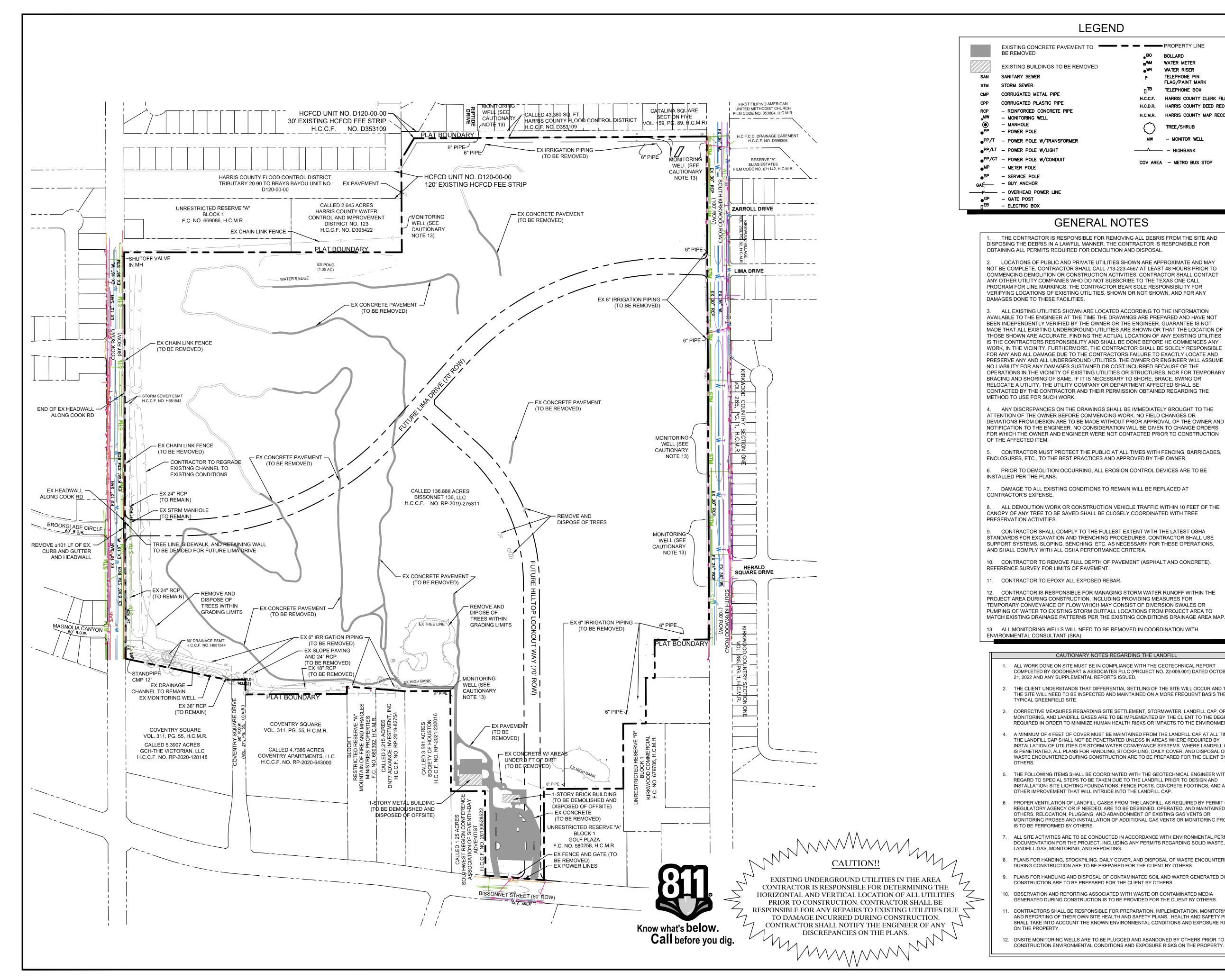
STORM WATER TRAFFIC & TRANSPORTATION STREET & BRIDGE

SHEET NO. C-04.1 OF C-28 DRAWING SCALE

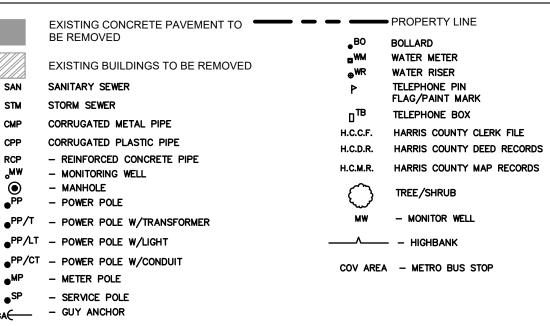
FOR CITY OF HOUSTON USE ONLY

HORIZ:

FACILITIES



- ELECTRIC BOX



GENERAL NOTES

THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL DEBRIS FROM THE SITE AND

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

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Tel. No. (281) 597-9300

FOR REVIEW ONLY **Kimley** »Horn neer ROSE C. KAETZER P.E. No. <u>141883</u> Date <u>DECEMBER 2023</u>

KIRKWOOD CROSSING

DEMOLITION PLAN

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

WASTE WATER **FACILITIES**

TRAFFIC & TRANSPORTATION STREET & BRIDGE

STORM WATER

FILE NO. HORIZ:

SHEET NO. C-05 OF C-28 | DRAWING SCALE FOR CITY OF HOUSTON USE ONLY

DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY OTHERS.). PLANS FOR HANDLING AND DISPOSAL OF CONTAMINATED SOIL AND WATER GENERATED DURING

ALL WORK DONE ON SITE MUST BE IN COMPLIANCE WITH THE GEOTECHNICAL REPORT

21, 2022 AND ANY SUPPLEMENTAL REPORTS ISSUED.

TYPICAL GREENFIELD SITE

COMPLETED BY GOODHEART & ASSOCIATES PLLC (PROJECT NO. 22-009.001) DATED OCTOBER

THE SITE WILL NEED TO BE INSPECTED AND MAINTAINED ON A MORE FREQUENT BASIS THEN A

REQUIRED IN ORDER TO MINIMIZE HUMAN HEALTH RISKS OR IMPACTS TO THE ENVIRONMENT.

INSTALLATION OF UTILITIES OR STORM WATER CONVEYANCE SYSTEMS. WHERE LANDFILL CAP

IS PENETRATED, ALL PLANS FOR HANDLING, STOCKPILING, DAILY COVER, AND DISPOSAL OF

WASTE ENCOUNTERED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY

5. THE FOLLOWING ITEMS SHALL BE COORDINATED WITH THE GEOTECHNICAL ENGINEER WITH REGARD TO SPECIAL STEPS TO BE TAKEN DUE TO THE LANDFILL PRIOR TO DESIGN AND

OTHER IMPROVEMENT THAT WILL INTRUDE INTO THE LANDFILL CAP.

INSTALLATION: SITE LIGHTING FOUNDATIONS, FENCE POSTS, CONCRETE FOOTINGS, AND ANY

PROPER VENTILATION OF LANDFILL GASES FROM THE LANDFILL, AS REQUIRED BY PERMIT OR

OTHERS. RELOCATION, PLUGGING, AND ABANDONMENT OF EXISTING GAS VENTS OR

REGULATORY AGENCY OR IF NEEDED, ARE TO BE DESIGNED, OPERATED, AND MAINTAINED BY

MONITORING PROBES AND INSTALLATION OF ADDITIONAL GAS VENTS OR MONITORING PROBES

ALL SITE ACTIVITIES ARE TO BE CONDUCTED IN ACCORDANCE WITH ENVIRONMENTAL PERMIT

DOCUMENTATION FOR THE PROJECT, INCLUDING ANY PERMITS REGARDING SOLID WASTE,

B. PLANS FOR HANDING, STOCKPILING, DAILY COVER, AND DISPOSAL OF WASTE ENCOUNTERED

4. A MINIMUM OF 4 FEET OF COVER MUST BE MAINTAINED FROM THE LANDFILL CAP AT ALL TIMES.

THE LANDFILL CAP SHALL NOT BE PENETRATED UNLESS IN AREAS WHERE REQUIRED BY

2. THE CLIENT UNDERSTANDS THAT DIFFERENTIAL SETTLING OF THE SITE WILL OCCUR AND THAT

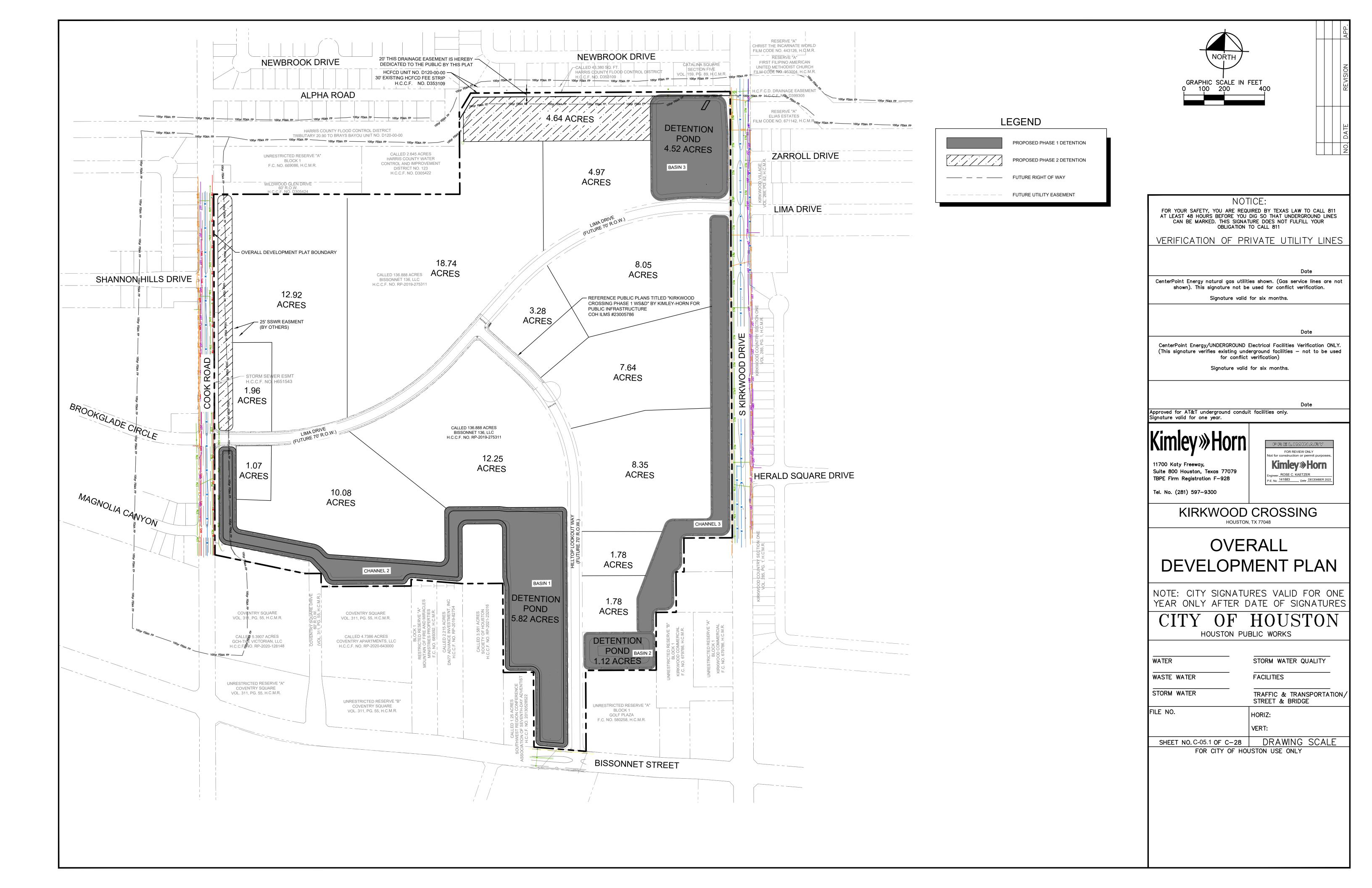
3. CORRECTIVE MEASURES REGARDING SITE SETTLEMENT, STORMWATER, LANDFILL CAP, OR MONITORING, AND LANDFILL GASES ARE TO BE IMPLEMENTED BY THE CLIENT TO THE DEGREE

CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY OTHERS.

10. OBSERVATION AND REPORTING ASSOCIATED WITH WASTE OR CONTAMINATED MEDIA GENERATED DURING CONSTRUCTION IS TO BE PROVIDED FOR THE CLIENT BY OTHERS.

11. CONTRACTORS SHALL BE RESPONSIBLE FOR PREPARATION, IMPLEMENTATION, MONITORING, AND REPORTING OF THEIR OWN SITE HEALTH AND SAFETY PLANS. HEALTH AND SAFETY PLANS SHALL TAKE INTO ACCOUNT THE KNOWN ENVIRONMENTAL CONDITIONS AND EXPOSURE RISKS

12. ONSITE MONITORING WELLS ARE TO BE PLUGGED AND ABANDONED BY OTHERS PRIOR TO CONSTRUCTION.ENVIRONMENTAL CONDITIONS AND EXPOSURE RISKS ON THE PROPERTY.





FLOW ARROWS

PROPERTY BOUNDARY AREA DESIGNATOR 36.84 AREA IN ACRES 193.9 cfs Q100 FLOW IN CFS EXISTING CONTOUR EXISTING DRAINAGE AREAS *CONSTRUCTION IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY REQUIRES:

SITE PLANS MUST BE APPROVED PRIOR TO OBTAINING THE REQUIRED HCFCD RIGHT-OF-WAY NOTIFICATION. BE ADVISED THAT THE HCFCD RIGHT-OF-WAY NOTIFICATION IS SEPARATE FROM THE SITE DEVELOPMENT PERMIT PACKAGE.

.) HCFCD RIGHT-OF-WAY NOTIFICATION (PERMIT) 2.) HCFCD 48-HR PRE-CONSTRUCTION NOTICE

Table 10: 100-Year Peak Flow Comparisor

Table 3: Existing Onsite Condition 100-Year Peak Flows

Overall 136 5.7% 77 130 243

OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

SHEET C-20 FOR FLOODPLAIN CALCULATIONS.

INFORMATION ON STORM DRAIN LINES.

HCFCD # 2201250077.

SEE STORM DRAIN PLAN & PROFILE SHEETS FOR DETAILED

THE APPROVED 12000 BISSONNET MASTER DRAINAGE PLAN,

THERE IS NO FLOODPLAIN FILL MITIGATION IN THIS PROJECT. SEE

DRAINAGE GENERAL NOTES

CONTRACTOR TO FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION

ALL STORM DRAIN LINES SHALL BE RCP, CLASS III UNLESS OTHERWISE

FOR DETAILED HYDRAULICS & HYDROLOGY INFORMATION REFERENCE

Existing Peak

2-Year 10-Year 100-Year

BOTH ARE REQUIRED PRIOR TO ENTERING OR WORKING WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. THE HCFCD RIGHT-OF-WAY NOTIFICATION AND 48-HR NOTICE MUST BE PROVIDED TO HCFCD AT DCID@HCFCD.HCTX.NET.

http://apps.harriscountytx.gov/EPermits AND APPLY FOR THE HCFCD ROW UNDER ROW NOTFICATION.

Fully Developed

Peak Flow (cfs)

TO APPLY FOR THE HCFCD RIGHT-OF-WAY NOTIFICATION PLEASE GO TO

Phase I Peak

FAILURE TO PROVIDE BOTH ITEMS COULD RESULT IN PROJECT DELAYS.

NOTE: PROPOSED DRIVEWAY & SIDEWALKS ARE PART OF OCE & PW PLANS. SIDEWALKS ARE BASED ON PLANNING DEPARTMENT REQUIREMENTS.

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GRAPHIC SCALE IN FEET

100 200

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FOR REVIEW ONLY **Kimley** Whorn ngineer_ROSE C. KAETZER P.E. No. 141883 Date DECEMBER 2023

KIRKWOOD CROSSING

EXISTING DRAINAGE AREA MAP

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY WASTE WATER **FACILITIES**

STORM WATER

TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

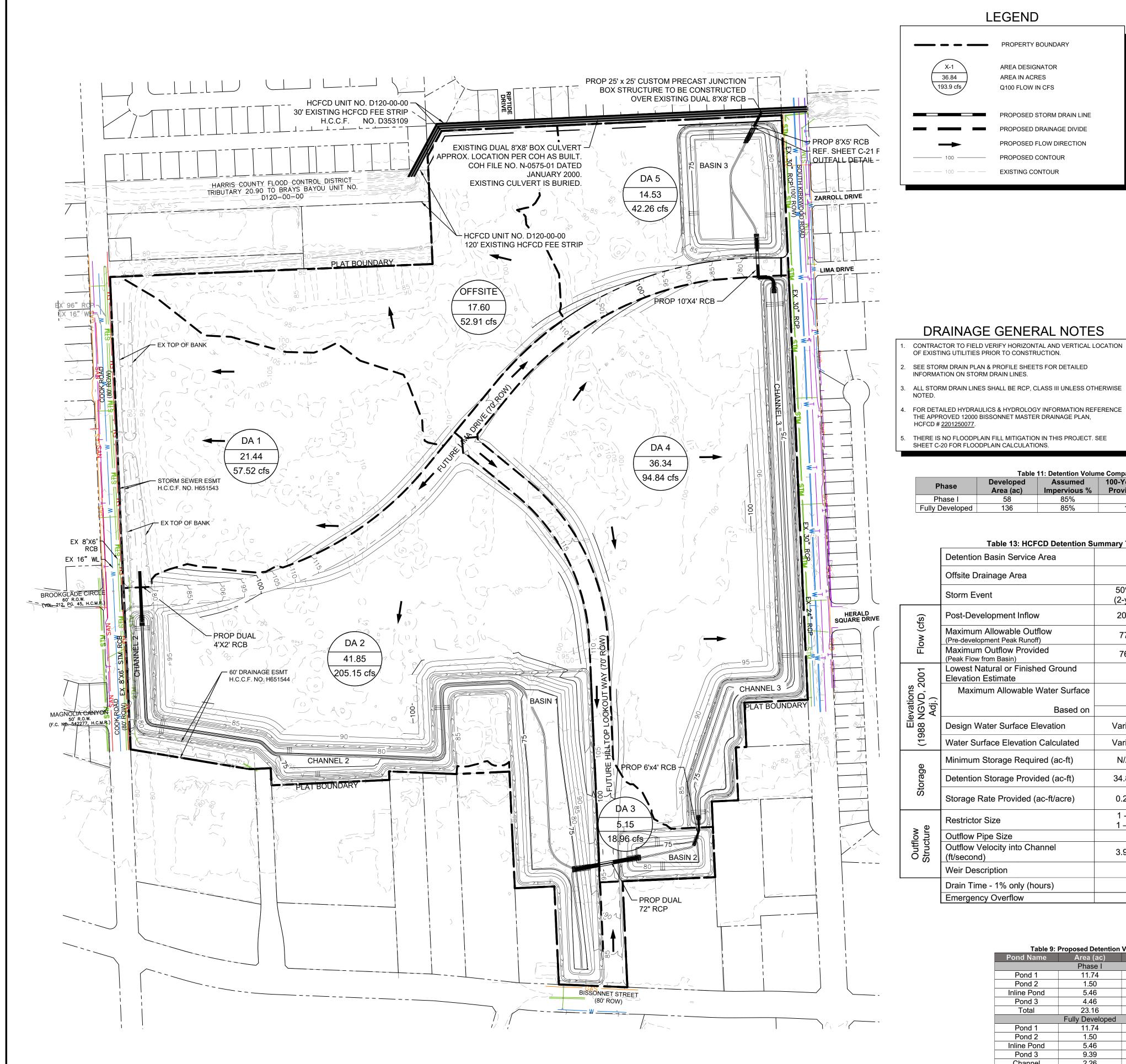
FILE NO. HORIZ:

SHEET NO. C-05.2 OF C-28 DRAWING SCALE

FOR CITY OF HOUSTON USE ONLY

shown). This signature not be used for conflict verification.

Tel. No. (281) 597-9300



PROPERTY BOUNDARY AREA DESIGNATOR 36.84 AREA IN ACRES 193.9 cfs Q100 FLOW IN CFS PROPOSED STORM DRAIN LINE PROPOSED DRAINAGE DIVIDE PROPOSED FLOW DIRECTION PROPOSED CONTOUR EXISTING CONTOUR

Detention Basin Service Area

Offsite Drainage Area

Post-Development Inflow

(Pre-development Peak Runoff)

Peak Flow from Basin)

Elevation Estimate

Restrictor Size

(ft/second)

Outflow Pipe Size

Weir Description

Emergency Overflow

Maximum Outflow Provided

Lowest Natural or Finished Ground

Design Water Surface Elevation

Water Surface Elevation Calculated

Minimum Storage Required (ac-ft)

Detention Storage Provided (ac-ft)

Storage Rate Provided (ac-ft/acre)

Outflow Velocity into Channel

Drain Time - 1% only (hours)

Maximum Allowable Water Surface

Based on

Storm Event

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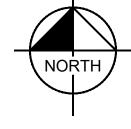
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FAILURE TO PROVIDE BOTH ITEMS COULD RESULT IN PROJECT DELAYS.

BASED ON PLANNING DEPARTMENT REQUIREMENTS. OCE ILMS NO. 23005786



GRAPHIC SCALE IN FEET 100 200

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KIRKWOOD CROSSING

PHASE 1 DETENTION SERVICE AREA MAP

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

WASTE WATER **FACILITIES**

STORM WATER

TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

FILE NO. HORIZ:

SHEET NO. C05.3 OF C-28 DRAWING SCALE FOR CITY OF HOUSTON USE ONLY

Table 9: Proposed Detention Volumes

Table 11: Detention Volume Comparison

Table 13: HCFCD Detention Summary Table (Fully Developed)

100-Year Storage

67.43

203

Varies

Varies

N/A

34.84

0.26

3.95

100-Year Storage

312

130

120

83.0'

82.0'

Reference Marker 040515

Varies

Varies

N/A

60.10

0.44

1 - 5.00' x 1.25' Rectangular Orifice

1 – 6.00' x 1.25' Rectangular Orifice

8' x 5' Box Culvert

8' Weir at Elevation 77.5'

175' Overflow Weir, 1' deep

acres

acres

1%

(100-yr)

515

243

241

Varies

Varies

0.65

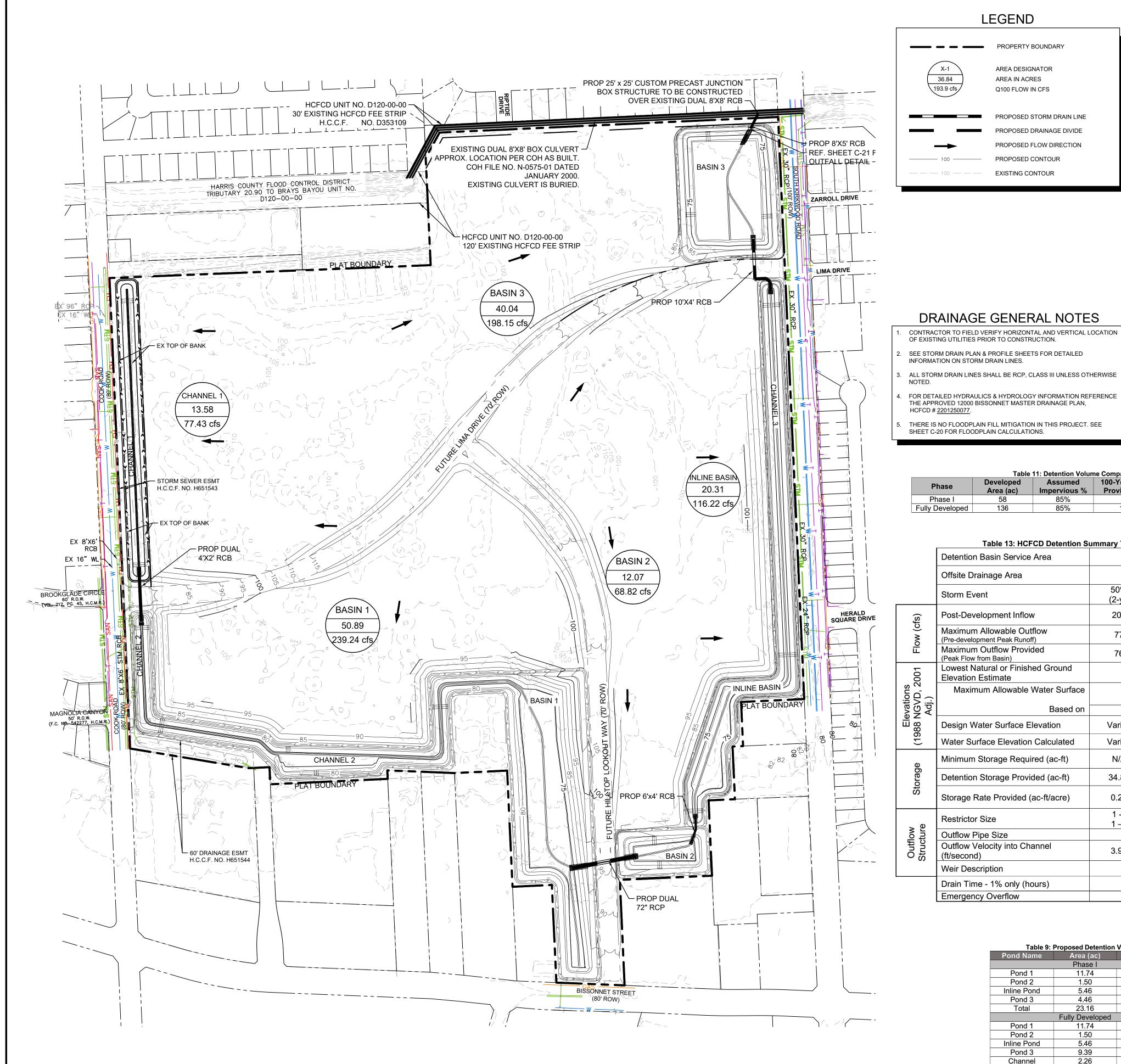
110.21

0.81

6.03

Pond Name	Area (ac)	volume (ac-it)
	Phase I	
Pond 1	11.74	25.00
Pond 2	1.50	2.67
Inline Pond	5.46	10.69
Pond 3	4.46	29.06
Total	23.16	67.43
	Fully Developed	
Pond 1	11.74	32.49
Pond 2	1.50	3.40
Inline Pond	5.46	12.72
Pond 3	9.39	57.66
Channel	2.26	3.94

30.35 110.21



PROPERTY BOUNDARY AREA DESIGNATOR 36.84 AREA IN ACRES 193.9 cfs Q100 FLOW IN CFS PROPOSED STORM DRAIN LINE PROPOSED DRAINAGE DIVIDE PROPOSED FLOW DIRECTION PROPOSED CONTOUR

Phase

Detention Basin Service Area

Offsite Drainage Area

Post-Development Inflow

(Pre-development Peak Runoff) Maximum Outflow Provided

Lowest Natural or Finished Ground

Design Water Surface Elevation

Water Surface Elevation Calculated

Minimum Storage Required (ac-ft)

Detention Storage Provided (ac-ft)

Storage Rate Provided (ac-ft/acre)

Outflow Velocity into Channel

Drain Time - 1% only (hours)

Maximum Allowable Water Surface

Based on

Peak Flow from Basin)

Elevation Estimate

Restrictor Size

(ft/second)

Outflow Pipe Size

Weir Description

Emergency Overflow

Storm Event

EXISTING CONTOUR

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FOR REVIEW ONLY **Kimley** »Horn ngineer_ROSE C. KAETZER P.E. No. 141883 Date DECEMBER 2023

KIRKWOOD CROSSING

DETENTION SERVICE AREA MAP

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY WASTE WATER **FACILITIES**

STORM WATER

TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

FILE NO.

HORIZ:

SHEET NO. C-06 OF C-28 DRAWING SCALE FOR CITY OF HOUSTON USE ONLY

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Table 11: Detention Volume Comparison

Table 13: HCFCD Detention Summary Table (Fully Developed)

67.43

203

Varies

Varies

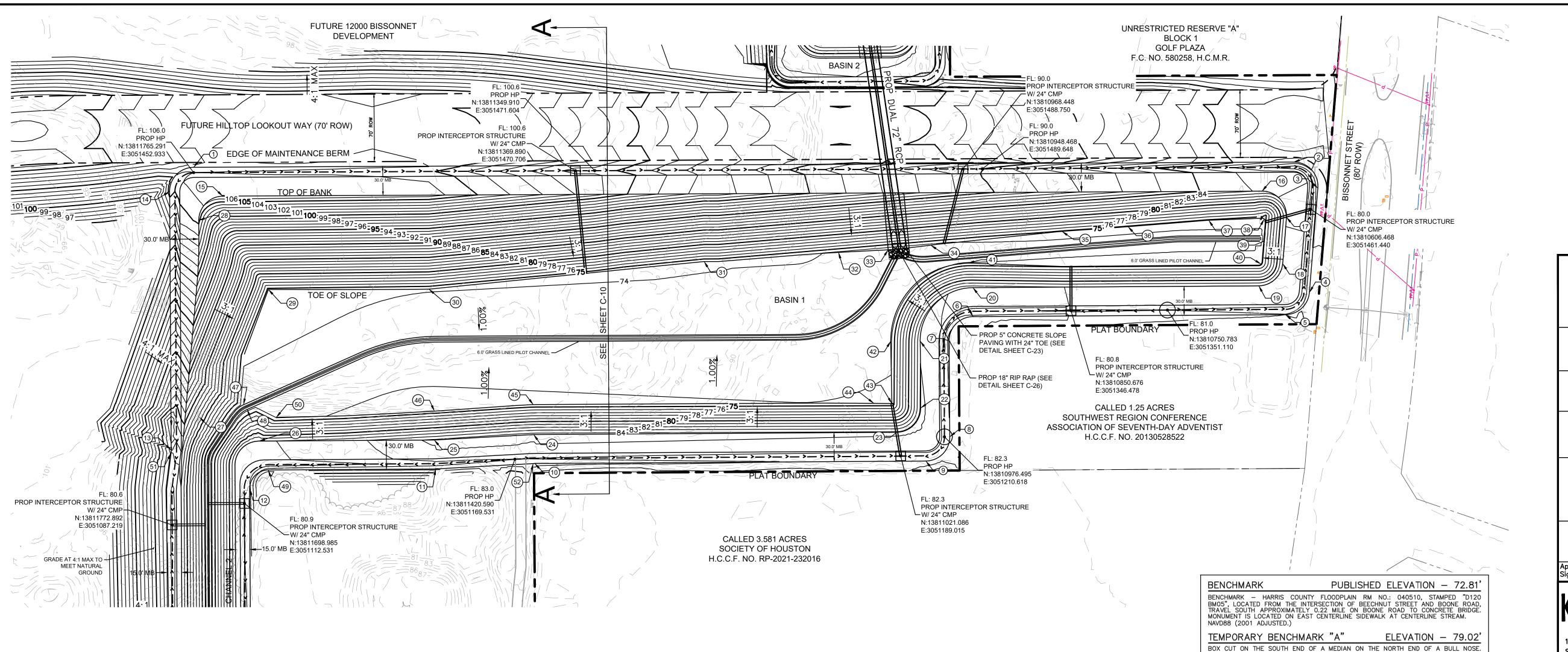
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Channel	2.26	3.94
Total	30.35	110.21



EASTING

3051435.8397

3051445.8432

13811042.6178 | 3051401.8794

13810998.7261 | 3051408.4866

13810863.3104 | 3051428.1861

13810654.2852 | 3051449.3260

13810653.9073 | 3051426.4238

13810655.6917 | 3051402.6861

13810959.1468 | 3051391.4556

13811036.1694 | 3051307.2793

13811032.3424 | 3051242.8917

13811050.9728 | 3051242.3302

13811403.8031 | 3051226.8686

13811505.8948 | 3051215.9705

13811703.8949 | 3051214.7106

13811700.0191 | 3051209.9350

BASIN 1

	POINT TABLE POINT TABLE				F	POINT TAE	;LE							
POINT NO.	DESCRIPTION	ELEVATION	NORTHING	EASTING	POINT NO.	DESCRIPTION	ELEVATION	NORTHING	EASTING	POINT NO	. DESCRIPTION	ELEVATION	NORTHING	
1	EDGE OF MB	106.50	13811765.5383	3051458.4278	17	TOP OF BANK	82.00	13810631.3659	3051452.2078	33	TOE OF SLOPE	73.36	13811042.6178	3
2	EDGE OF MB	83.40	13810626.1579	3051509.6410	18	TOP OF BANK	82.00	13810633.3388	3051403.9307	34	TOE OF SLOPE	73.75	13810998.7261	3
3	EDGE OF MB	82.60	13810600.0561	3051483.6454	19	TOP OF BANK	82.00	13810657.1599	3051379.9784	35	TOE OF SLOPE	74.84	13810863.3104	3
4	EDGE OF MB	81.70	13810604.4864	3051375.2365	20	TOP OF BANK	82.60	13810953.2540	3051366.2475	36	TOE OF SLOPE	74.82	13810795.0961	3
5	EDGE OF MB	81.00	13810628.3075	3051351.2841	21	TOP OF BANK	83.90	13811005.6453	3051308.7177	37	TOE OF SLOPE	74.82	13810711.7689	3
6	EDGE OF MB	82.10	13810951.8643	3051336.2797	22	TOP OF BANK	84.20	13811002.3814	3051239.4543	38	TOE OF SLOPE	74.85	13810654.2852	3
7	EDGE OF MB	82.30	13810975.6785	3051310.1298	23	TOP OF BANK	84.20	13811026.1956	3051213.3044	39	TOE OF SLOPE	74.84	13810653.9073	3
8	EDGE OF MB	82.90	13810971.0016	3051210.8772	24	TOP OF BANK	84.48	13811402.1749	3051195.8689	40	TOE OF SLOPE	74.83	13810655.6917	3
9	EDGE OF MB	82.80	13810994.8158	3051184.7273	25	TOP OF BANK	84.20	13811504.9442	3051186.1052	41	TOE OF SLOPE	74.12	13810959.1468	3
10	EDGE OF MB	83.40	13811399.9208	3051165.9412	26	TOP OF BANK	82.00	13811686.3953	3051177.6644	42	TOE OF SLOPE	73.71	13811036.1694	3
11	EDGE OF MB	83.71	13811502.2169	3051156.2217	27	TOP OF BANK	81.69	13811749.1320	3051199.9219	43	TOE OF SLOPE	74.26	13811032.3424	3
12	EDGE OF MB	81.71	13811694.1852	3051127.7691	28	TOP OF BANK	105.30	13811758.0300	3051403.6746	44	TOE OF SLOPE	74.17	13811050.9728	3
13	EDGE OF MB	81.40	13811776.9839	3051164.6941	29	TOE OF SLOPE	74.60	13811683.0006	3051335.0510	45	TOE OF SLOPE	74.14	13811403.8031	3
14	EDGE OF MB	105.50	13811789.3890	3051432.2953	30	TOE OF SLOPE	74.03	13811516.7543	3051342.0739	46	TOE OF SLOPE	74.26	13811505.8948	3
15	TOP OF BANK	107.03	13811734.1794	3051429.8070	31	TOE OF SLOPE	74.11	13811232.8404	3051382.1007	47	TOE OF SLOPE	73.65	13811703.8949	3
16	TOP OF BANK	83.83	13810657.7423	3051478.1910	32	TOE OF SLOPE	73.87	13811094.0053	3051397.1580	48	TOE OF SLOPE	73.64	13811700.0191	3
		•	•											

POINT TABLE							
POINT NO.	DESCRIPTION	ELEVATION	NORTHING	EASTING			
49	EDGE OF MB	83.47	13811675.6094	3051148.1512			
50	TOE OF SLOPE	73.91	13811669.4887	3051203.0105			
51	EDGE OF MB	81.80	13811777.0422	3051161.4752			
52	EDGE OF MB	83.40	13811401.4036	3051165.8362			

LEGEND PROPERTY LINE PROPOSED STORM DRAIN LINE PROPOSED CONTOUR EXISTING CONTOUR —< —< —< — INTERCEPTOR SWALE

TCEQ DETENTION POND CONSTRUCTION NOTES

GEOMEMBRANE LINER.

- 1. STORMWATER DETENTION FOR NEW DEVELOPMENTS IS REQUIRED BY CITY OF HOUSTON CODE (CITATION). THE CITY OF HOUSTON DOES NOT PROVIDE REGIONAL STORMWATER DETENTION.
- CONSISTING OF 2 FEET OF COMPACTED CLAY OVERLAIN BY A GEOMEMBRANE LINER OF A MINIMUM OF 30 MILS THICK. B. PROTECTIVE COVER CONSISTING OF 2 FEET OF LOAMY MATERIAL

SUITABLE FOR REVEGETATION SHALL BE PLACED OVER THE

2. DETENTION PONDS WILL BE DESIGNED WITH A LINER SYSTEM

- 4. THE COMPACTED CLAY LINER, GEOMEMBRANE LINER, AND PROTECTIVE LAYER WILL EXTEND 2 FEET IN ELEVATION ABOVE THE 100-YEAR/24-HOUR DESIGN STORM WATER SURFACE ELEVATION. 5. THE DETENTION PONDS ARE DESIGNED TO PASS THE RUNOFF FROM
- THE 100-YEAR/24-HOUR DESIGN STORM EVENT IN LESS THAN 24 HOURS. NO RUNOFF WILL BE PERMANENTLY RETAINED IN THE DETENTION POND. 6. POND HYDRAULIC ANALYSES ARE INCLUDED AS AN APPENDIX TO THE
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*CONSTRUCTION IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY REQUIRES:

SITE PLANS MUST BE APPROVED PRIOR TO OBTAINING THE REQUIRED HCFCD RIGHT-OF-WAY NOTIFICATION. BE ADVISED THAT THE HCFCD RIGHT-OF-WAY NOTIFICATION IS SEPARATE FROM THE SITE DEVELOPMENT PERMIT PACKAGE.

LOCATED ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM THE INTERSECTION OF COOK ROAD AND BROOKGLADE CIRCLE.

BOX CUT ON THE SOUTH END OF A MEDIAN ON THE NORTH END OF A BULL NOSE. LOCATED ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM THE INTERSECTION OF COOK ROAD AND MAGNOLIA CANYON.

BOX CUT ON STORM INLET LOCATED ON THE NORTH LINE OF BISSONNET STREET,

+/- 1,000 FEET WEST FROM THE INTERSECTION OF BISSONNET STREET AND SOUTH KIRKWOOD ROAD.

BOX CUT ON STORM INLET LOCATED ON THE WEST LINE OF SOUTH KIRKWOOD ROAD, +/- 200 FEET NORTH FROM THE INTERSECTION OF ZARROLL DRIVE AND SOUTH KIRKWOOD ROAD.

ELEVATION - 78.95'

ELEVATION - 81.34'

ELEVATION - 76.20'

TEMPORARY BENCHMARK "B"

TEMPORARY BENCHMARK "C"

TEMPORARY BENCHMARK "D"

.) HCFCD RIGHT-OF-WAY NOTIFICATION (PERMIT) 2.) HCFCD 48-HR PRE-CONSTRUCTION NOTICE

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FAILURE TO PROVIDE BOTH ITEMS COULD RESULT IN PROJECT DELAYS.

Know what's below.

Call before you dig.

EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

VERIFICATION OF PRIVATE UTILITY LINES

CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not be used for conflict verification.

Signature valid for six months.

CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY. (This signature verifies existing underground facilities — not to be used for conflict verification)

Signature valid for six months.

Date

Approved for AT&T underground conduit facilities only. Signature valid for one year.

11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Tel. No. (281) 597-9300

FOR REVIEW ONLY **Kimley** Whorn nineer ROSE C. KAETZER P.E. No. 141883 Date DECEMBER 2023

KIRKWOOD CROSSING

BASIN 1 LAYOUT

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON HOUSTON PUBLIC WORKS

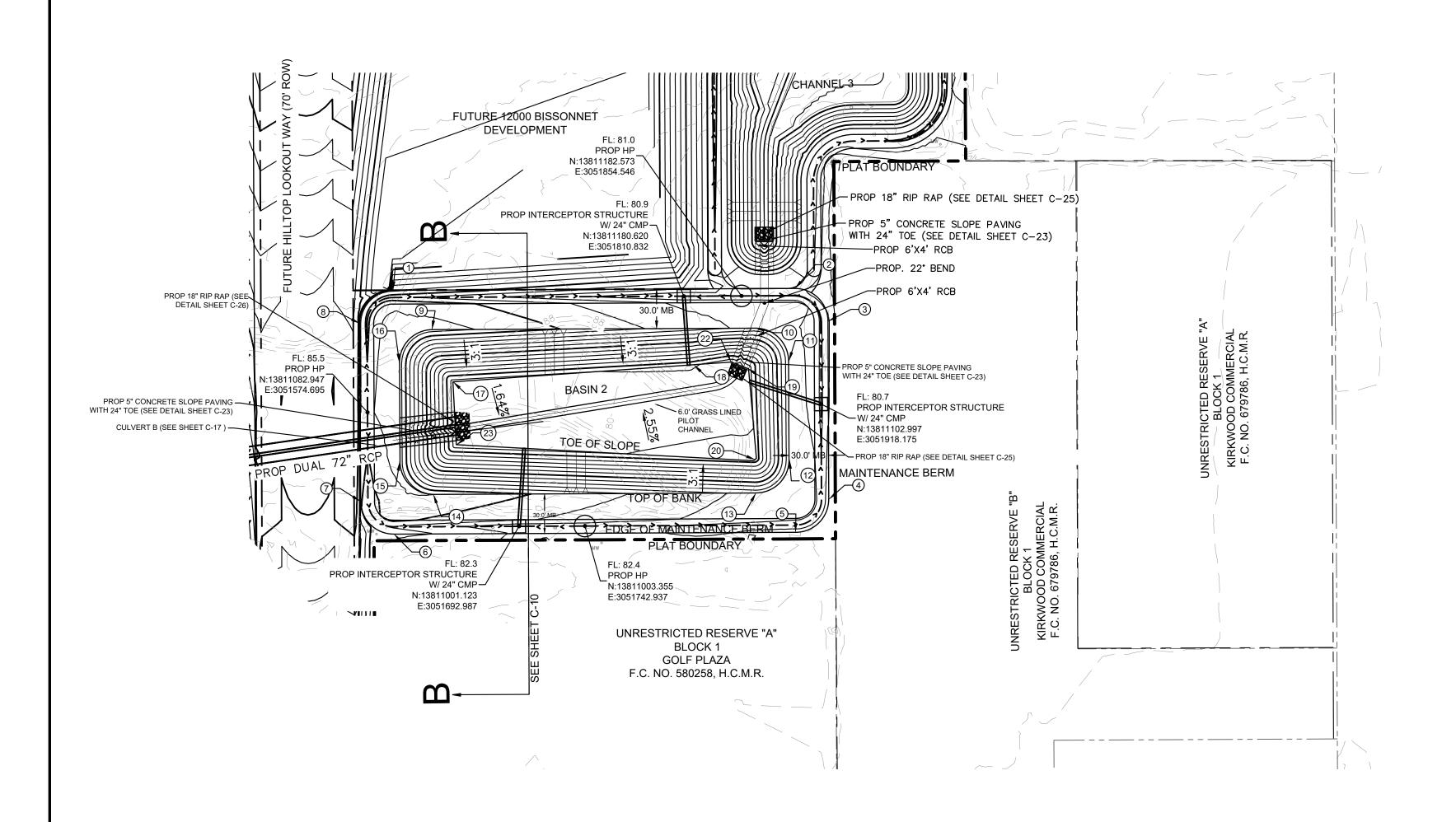
WATER

STORM WATER QUALITY WASTE WATER **FACILITIES**

STORM WATER TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

FILE NO. HORIZ:

SHEET NO. C-07 OF C-28 DRAWING SCALE FOR CITY OF HOUSTON USE ONLY



BASIN 2

	POINT TABLE						Р	OINT TAB	LE	
f	POINT NO.	DESCRIPTION	ELEVATION	NORTHING	EASTING	POINT NO.	DESCRIPTION	ELEVATION	NORTHING	EASTING
ľ	1	EDGE OF MB	86.08	13811176.2581	3051590.0275	13	TOP OF BANK	82.70	13811033.6350	3051871.7249
Ī	2	EDGE OF MB	81.57	13811189.8761	3051894.7728	14	TOP OF BANK	86.00	13811022.6964	3051626.9470
Ī	3	EDGE OF MB	81.75	13811166.0171	3051920.8639	15	TOP OF BANK	86.50	13811046.5489	3051600.8562
Ī	4	EDGE OF MB	82.51	13811031.0954	3051926.8933	16	TOP OF BANK	86.50	13811121.5300	3051597.4859
Ī	5	EDGE OF MB	82.40	13811005.0042	3051903.0343	17	TOE OF SLOPE	73.50	13811108.6394	3051638.4770
Ī	6	EDGE OF MB	84.50	13810991.3874	3051598.3240	18	TOE OF SLOPE	74.14	13811128.6294	3051820.5367
Ī	7	EDGE OF MB	85.05	13811015.2399	3051572.2332	19	TOE OF SLOPE	73.19	13811127.8505	3051861.1562
Ī	8	EDGE OF MB	86.05	13811150.1605	3051566.1687	20	TOE OF SLOPE	74.48	13811058.9253	3051870.0213
Ī	9	TOP OF BANK	86.50	13811147.6276	3051621.3446	22	TOE OF SLOPE	73.20	13811132.1284	3051848.8922
ſ	10	TOP OF BANK	82.70	13811158.5668	3051866.1420	23	TOE OF SLOPE	73.20	13811061.1004	3051642.9993
Ī	11	TOP OF BANK	82.70	13811134.7078	3051892.2331					
Ī	12	TOP OF BANK	82.70	13811059.7262	3051895.5839					

TCEQ DETENTION POND CONSTRUCTION NOTES

- STORMWATER DETENTION FOR NEW DEVELOPMENTS IS REQUIRED BY
 CITY OF HOUSTON CODE (CITATION). THE CITY OF HOUSTON DOES NOT
 PROVIDE REGIONAL STORMWATER DETENTION.
- CONSISTING OF 2 FEET OF COMPACTED CLAY OVERLAIN BY A GEOMEMBRANE LINER OF A MINIMUM OF 30 MILS THICK.

 3. PROTECTIVE COVER CONSISTING OF 2 FEET OF LOAMY MATERIAL

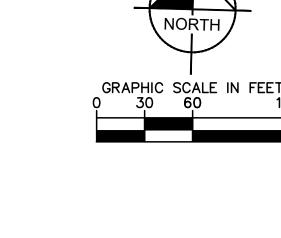
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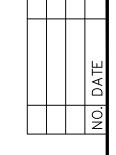
SUITABLE FOR REVEGETATION SHALL BE PLACED OVER THE GEOMEMBRANE LINER.

4. THE COMPACTED CLAY LINER, GEOMEMBRANE LINER, AND PROTECTIVE LAYER WILL EXTEND 2 FEET IN ELEVATION ABOVE THE

100-YEAR/24-HOUR DESIGN STORM WATER SURFACE ELEVATION.

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- 8. DETENTION PONDS MAY BE USED FOR RECREATIONAL ACTIVITIES BETWEEN STORM EVENTS.





LEGEND

PROPERTY LINE
PROPOSED STORM DRAIN LINE
PROPOSED CONTOUR
PROPOSED CONTOUR
STING CONTOUR
INTERCEPTOR SWALE

BENCHMARK PUBLISHED ELEVATION — 72.81'

BENCHMARK — HARRIS COUNTY FLOODPLAIN RM NO.: 040510, STAMPED "D120 BM05", LOCATED FROM THE INTERSECTION OF BEECHNUT STREET AND BOONE ROAD, TRAVEL SOUTH APPROXIMATELY 0.22 MILE ON BOONE ROAD TO CONCRETE BRIDGE. MONUMENT IS LOCATED ON EAST CENTERLINE SIDEWALK AT CENTERLINE STREAM. NAVD88 (2001 ADJUSTED.)

TEMPORARY BENCHMARK "A" ELEVATION — 79.02'

BOX CUT ON THE SOUTH END OF A MEDIAN ON THE NORTH END OF A BULL NOSE. LOCATED ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM THE INTERSECTION OF COOK ROAD AND BROOKGLADE CIRCLE.

TEMPORARY BENCHMARK "B" ELEVATION — 78.95'

BOX CUT ON THE SOUTH END OF A MEDIAN ON THE NORTH END OF A BULL NOSE. LOCATED ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM THE INTERSECTION OF COOK ROAD AND MAGNOLIA CANYON.

TEMPORARY BENCHMARK "C" ELEVATION — 81.34'
BOX CUT ON STORM INLET LOCATED ON THE NORTH LINE OF BISSONNET STREET,
+/- 1,000 FEET WEST FROM THE INTERSECTION OF BISSONNET STREET AND SOUTH
KIRKWOOD ROAD.

TEMPORARY BENCHMARK "D" ELEVATION - 76.20'

BOX CUT ON STORM INLET LOCATED ON THE WEST LINE OF SOUTH KIRKWOOD ROAD, +/- 200 FEET NORTH FROM THE INTERSECTION OF ZARROLL DRIVE AND SOUTH KIRKWOOD ROAD.

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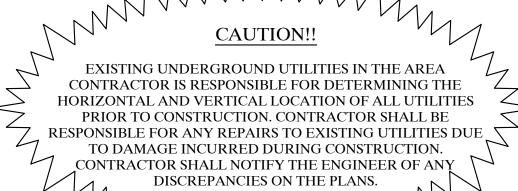
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CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not be used for conflict verification.

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Kimley»Hor

11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F—928

Tel. No. (281) 597–9300

FOR REVIEW ONLY
Not for construction or permit purposes.

Kimley Horn

Engineer_ROSE C. KAETZER
P.E. No. 141883 Date DECEMBER 2023

KIRKWOOD CROSSING

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

BASIN 2 LAYOUT

CITY OF HOUSTON

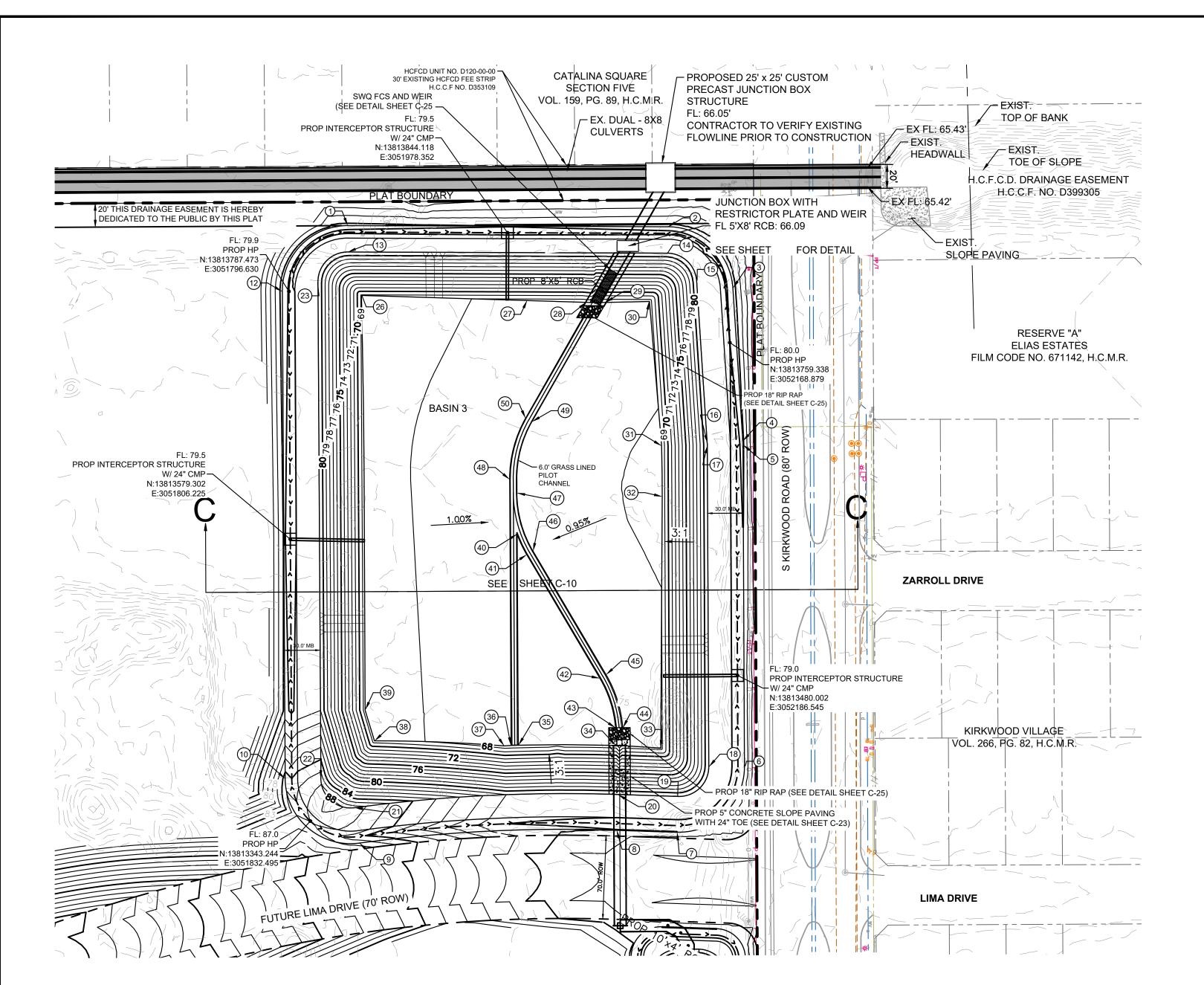
HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY
WASTE WATER FACILITIES

STORM WATER TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

FILE NO. HORIZ:

SHEET NO. C-08 OF C-28 DRAWING SCALE
FOR CITY OF HOUSTON USE ONLY



BASIN 3

POINT TABLE								
POINT NO.	NORTHING	EASTING						
1	EDGE OF MB	80.30	13813844.7159	3051844.0691				
2	EDGE OF MB	80.30	13813854.5361	3052112.8463				
3	EDGE OF MB	80.50	13813805.3497	3052169.5502				
4	EDGE OF MB	80.23	13813677.1819	3052183.0872				
5	EDGE OF MB	80.22	13813673.8747	3052183.3359				
6	EDGE OF MB	79.80	13813403.7869	3052195.4760				
7	EDGE OF MB	80.00	13813346.3184	3052140.8942				
8	EDGE OF MB	80.00	13813345.9830	3052090.0358				
9	EDGE OF MB	86.50	13813326.4048	3051874.4905				
10	EDGE OF MB	85.50	13813378.0364	3051809.9962				
12	TOP OF BANK	80.50	13813787.2202	3051791.1356				
13	TOP OF BANK	81.00	13813822.5633	3051844.8036				
14	TOP OF BANK	81.00	13813832.3665	3052113.1167				
15	TOP OF BANK	81.00	13813810.0090	3052138.8912				
16	TOP OF BANK	81.00	13813674.0309	3052153.2531				
17	TOP OF BANK	81.00	13813672.5276	3052153.3662				
18	TOP OF BANK	81.00	13813402.4398	3052165.5063				
19	TOP OF BANK	81.00	13813376.3177	3052140.6964				
20	TOP OF BANK	81.00	13813375.9823	3052089.8380				
21	TOP OF BANK	87.50	13813355.9488	3051869.2800				

POINT TABLE							
POINT NO.	DESCRIPTION	ELEVATION	NORTHING	EASTING			
22	TOP OF BANK	86.53	13813379.4177	3051839.9644			
23	TOP OF BANK	81.00	13813796.4288	3051820.7429			
26	TOE OF SLOPE	68.84	13813786.5333	3051857.7151			
27	TOE OF SLOPE	67.57	13813787.8318	3051997.3289			
28	TOE OF SLOPE	67.23	13813788.2934	3052046.9612			
29	TOE OF SLOPE	67.12	13813788.8807	3052063.0401			
30	TOE OF SLOPE	67.44	13813791.1632	3052099.9599			
31	TOE OF SLOPE	68.20	13813670.3991	3052115.0179			
32	TOE OF SLOPE	68.31	13813627.7398	3052117.2625			
33	TOE OF SLOPE	67.61	13813416.3861	3052124.6656			
34	TOE OF SLOPE	67.29	13813417.0930	3052086.7579			
35	TOE OF SLOPE	67.28	13813413.9363	3052004.6890			
36	TOE OF SLOPE	67.28	13813413.5873	3051998.6986			
37	TOE OF SLOPE	67.33	13813412.9170	3051993.1123			
38	TOE OF SLOPE	68.43	13813412.8004	3051883.7163			
39	TOE OF SLOPE	68.49	13813438.6509	3051874.8060			
40	PILOT CHANNEL	67.19	13813591.2109	3051996.6192			
41	PILOT CHANNEL	67.28	13813574.2888	3052005.4571			
42	PILOT CHANNEL	67.94	13813473.0053	3052070.9659			
43	PILOT CHANNEL	68.09	13813431.9452	3052085.8190			

POINT TABLE POINT NO. DESCRIPTION | ELEVATION | NORTHING 13813432.2188 | 3052091.8285 13813476.2638 | 3052076.0040 PILOT CHANNEL 67.33 13813577.5474 | 3052010.4952 67.17 13813625.8161 3051995.0440 PILOT CHANNEL 67.17 | 13813637.0585 | 3051988.5260 PILOT CHANNEL 67.14 13813686.3224 | 3052005.2706 PILOT CHANNEL

PILOT CHANNEL

67.14 | 13813689.0799 | 3051999.9419

TCEQ DETENTION POND CONSTRUCTION NOTES

- PROVIDE REGIONAL STORMWATER DETENTION.
- GEOMEMBRANE LINER OF A MINIMUM OF 30 MILS THICK.
- 100-YEAR/24-HOUR DESIGN STORM WATER SURFACE ELEVATION. 5. THE DETENTION PONDS ARE DESIGNED TO PASS THE RUNOFF FROM
- DETENTION POND. 6. POND HYDRAULIC ANALYSES ARE INCLUDED AS AN APPENDIX TO THE DEVELOPMENT PERMIT NARRATIVE.
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B. PROTECTIVE COVER CONSISTING OF 2 FEET OF LOAMY MATERIAL SUITABLE FOR REVEGETATION SHALL BE PLACED OVER THE GEOMEMBRANE LINER.

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BETWEEN STORM EVENTS.

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LEGEND

BENCHMARK — HARRIS COUNTY FLOODPLAIN RM NO.: 040510, STAMPED "D120 BM05", LOCATED FROM THE INTERSECTION OF BEECHNUT STREET AND BOONE ROAD, TRAVEL SOUTH APPROXIMATELY 0.22 MILE ON BOONE ROAD TO CONCRETE BRIDGE. MONUMENT IS LOCATED ON EAST CENTERLINE SIDEWALK AT CENTERLINE STREAM.

BOX CUT ON THE SOUTH END OF A MEDIAN ON THE NORTH END OF A BULL NOSE.

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PROPOSED STORM DRAIN LINE

PUBLISHED ELEVATION - 72.81'

ELEVATION - 79.02'

ELEVATION - 81.34'

ELEVATION - 76.20'

PROPERTY LINE

PROPOSED CONTOUR

— — — 555 — — — **EXISTING CONTOUR**

—< —< —< — INTERCEPTOR SWALE

) HCFCD RIGHT-OF-WAY NOTIFICATION (PERMIT) 2.) HCFCD 48-HR PRE-CONSTRUCTION NOTICE

BENCHMARK

NAVD88 (2001 ADJUSTED.)

TEMPORARY BENCHMARK "A"

TEMPORARY BENCHMARK "B"

TEMPORARY BENCHMARK "C"

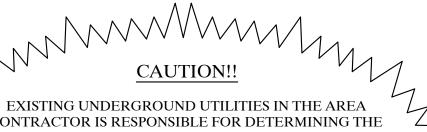
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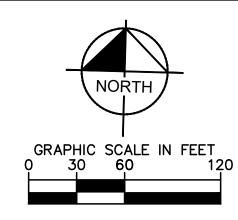
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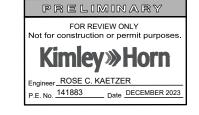
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Tel. No. (281) 597-9300



KIRKWOOD CROSSING

BASIN 3 LAYOUT

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY WASTE WATER **FACILITIES**

STORM WATER

TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

FILE NO. HORIZ:

SHEET NO. C-09 OF C-28 DRAWING SCALE FOR CITY OF HOUSTON USE ONLY

CROSS SECTION A-A BASIN 1

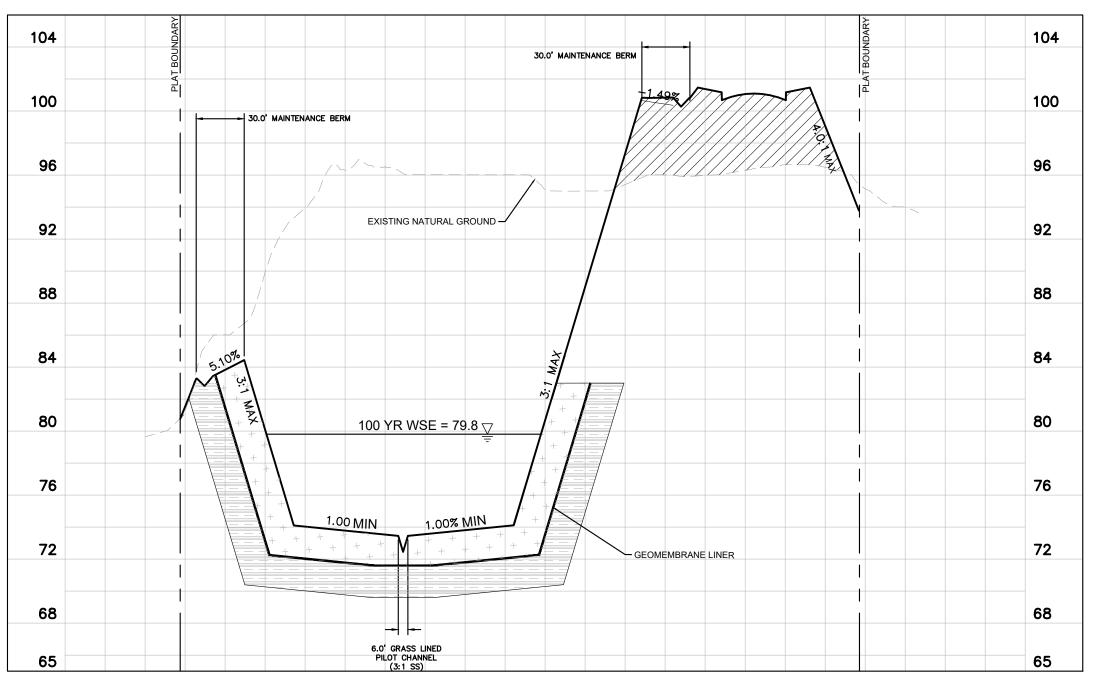


Table 12: Detention Pond 100-Year WSE WSE (ft) **Pond** Phase I 79.8 Pond 1 79.8 Pond 2 Pond 3 79.0 Fully Developed Pond 1 81.0 81.0 Pond 2 Pond 3

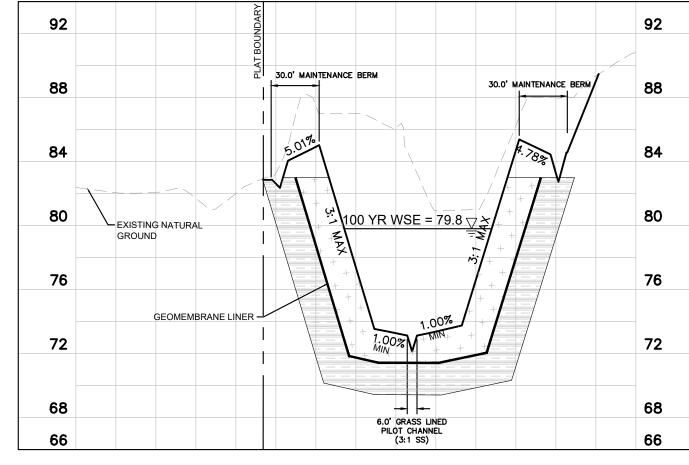
CROSS SECTION B-B BASIN 2

84

64

62

EXISTING NATURAL -

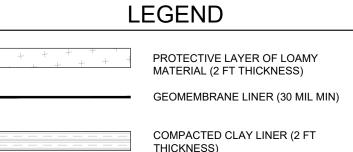


CROSS SECTION C-C BASIN 3

100 YR WSE = 79.0 ▽

1.00%MIN

GEOMEMBRANE LINER -



BOX CUT ON STORM INLET LOCATED ON THE WEST LINE OF SOUTH KIRKWOOD ROAD, +/- 200 FEET NORTH FROM THE INTERSECTION OF ZARROLL DRIVE AND SOUTH KIRKWOOD ROAD.

TCEQ DETENTION POND CONSTRUCTION NOTES

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GEOMEMBRANE LINER.

DETENTION POND.

BETWEEN STORM EVENTS.

TEMPORARY BENCHMARK "A"

TEMPORARY BENCHMARK "B"

TEMPORARY BENCHMARK "C"

TEMPORARY BENCHMARK "D"

BENCHMARK

NAVD88 (2001 ADJUSTED.)

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6. POND HYDRAULIC ANALYSES ARE INCLUDED AS AN APPENDIX TO THE

7. THE DETENTION PONDS WILL BE INSPECTED ANNUALLY FOR SIGNS OF EROSION OR EXPOSURE OF THE GEOMEMBRANE LINER. ANY REPAIRS

BENCHMARK — HARRIS COUNTY FLOODPLAIN RM NO.: 040510, STAMPED "D120 BM05", LOCATED FROM THE INTERSECTION OF BEECHNUT STREET AND BOONE ROAD, TRAVEL SOUTH APPROXIMATELY 0.22 MILE ON BOONE ROAD TO CONCRETE BRIDGE. MONUMENT IS LOCATED ON EAST CENTERLINE SIDEWALK AT CENTERLINE STREAM.

BOX CUT ON THE SOUTH END OF A MEDIAN ON THE NORTH END OF A BULL NOSE.

LOCATED ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM THE INTERSECTION OF COOK ROAD AND BROOKGLADE CIRCLE.

BOX CUT ON THE SOUTH END OF A MEDIAN ON THE NORTH END OF A BULL NOSE.

LOCATED ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM THE INTERSECTION OF COOK ROAD AND MAGNOLIA CANYON.

BOX CUT ON STORM INLET LOCATED ON THE NORTH LINE OF BISSONNET STREET,

PUBLISHED ELEVATION - 72.81'

NEEDED WILL BE INITIATED PROMPTLY UPON DISCOVERY. 8. DETENTION PONDS MAY BE USED FOR RECREATIONAL ACTIVITIES

THE 100-YEAR/24-HOUR DESIGN STORM EVENT IN LESS THAN 24 HOURS. NO RUNOFF WILL BE PERMANENTLY RETAINED IN THE

SITE PLANS MUST BE APPROVED PRIOR TO OBTAINING THE REQUIRED HCFCD RIGHT-OF-WAY NOTIFICATION. BE ADVISED THAT THE HCFCD RIGHT-OF-WAY NOTIFICATION IS SEPARATE FROM THE SITE DEVELOPMENT PERMIT PACKAGE.

CONSTRUCTION IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY REQUIRES:

1.) HCFCD RIGHT-OF-WAY NOTIFICATION (PERMIT) 2.) HCFCD 48-HR PRE-CONSTRUCTION NOTICE

BOTH ARE REQUIRED PRIOR TO ENTERING OR WORKING WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. THE HCFCD RIGHT-OF-WAY NOTIFICATION AND 48-HR NOTICE MUST BE PROVIDED TO HCFCD AT DCID@HCFCD.HCTX.NET.

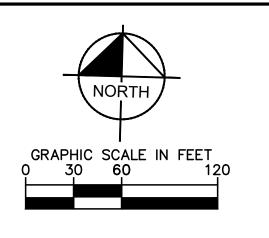
TO APPLY FOR THE HCFCD RIGHT-OF-WAY NOTIFICATION PLEASE GO TO http://apps.harriscountytx.gov/EPermits AND APPLY FOR THE HCFCD ROW UNDER ROW NOTFICATION.

FAILURE TO PROVIDE BOTH ITEMS COULD RESULT IN PROJECT DELAYS.

Know what's below.

Call before you dig.





FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

VERIFICATION OF PRIVATE UTILITY LINES

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Signature valid for six months.

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11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Tel. No. (281) 597-9300

STORM WATER



KIRKWOOD CROSSING

BASIN CROSS SECTION

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

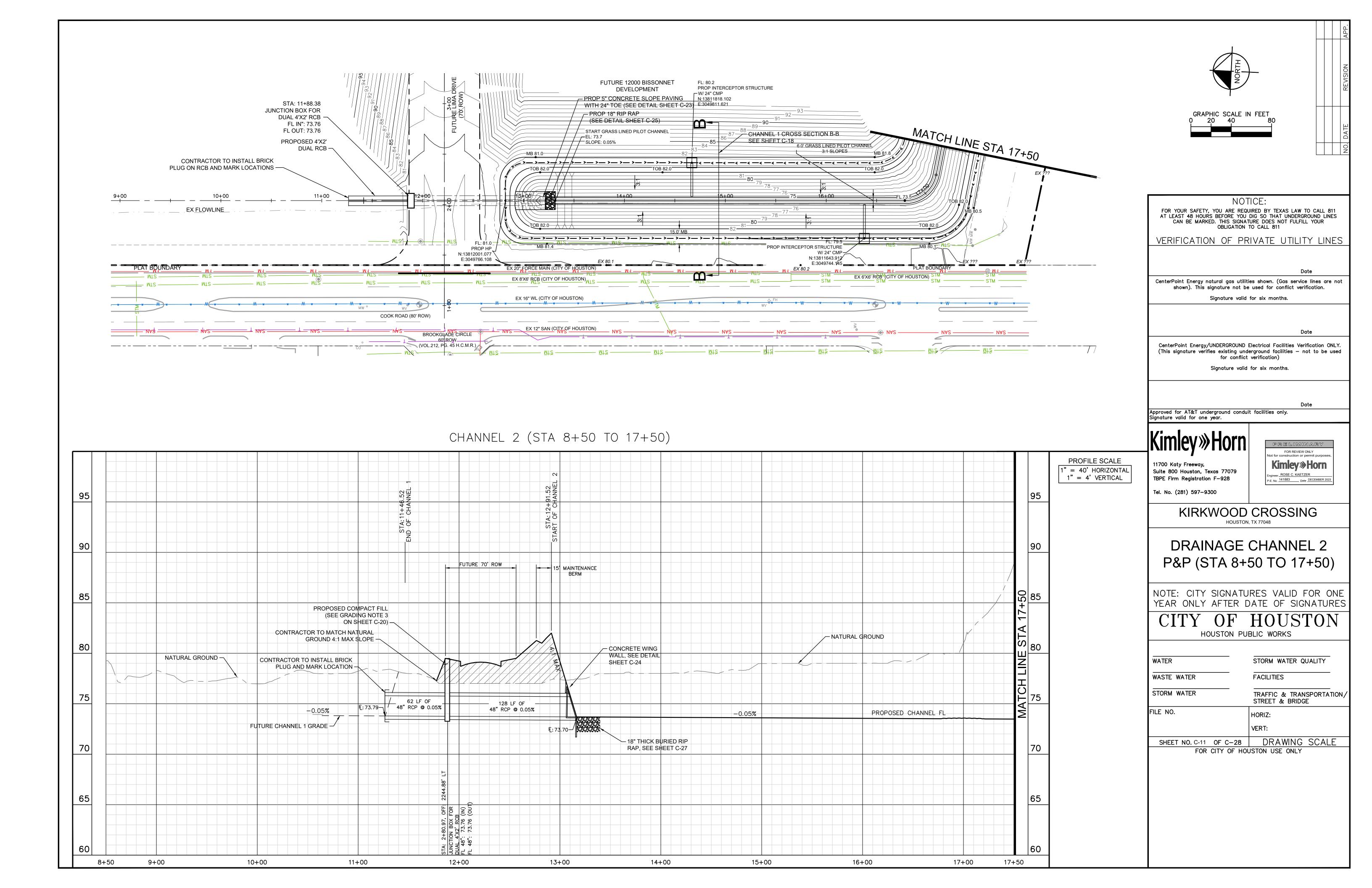
WATER STORM WATER QUALITY

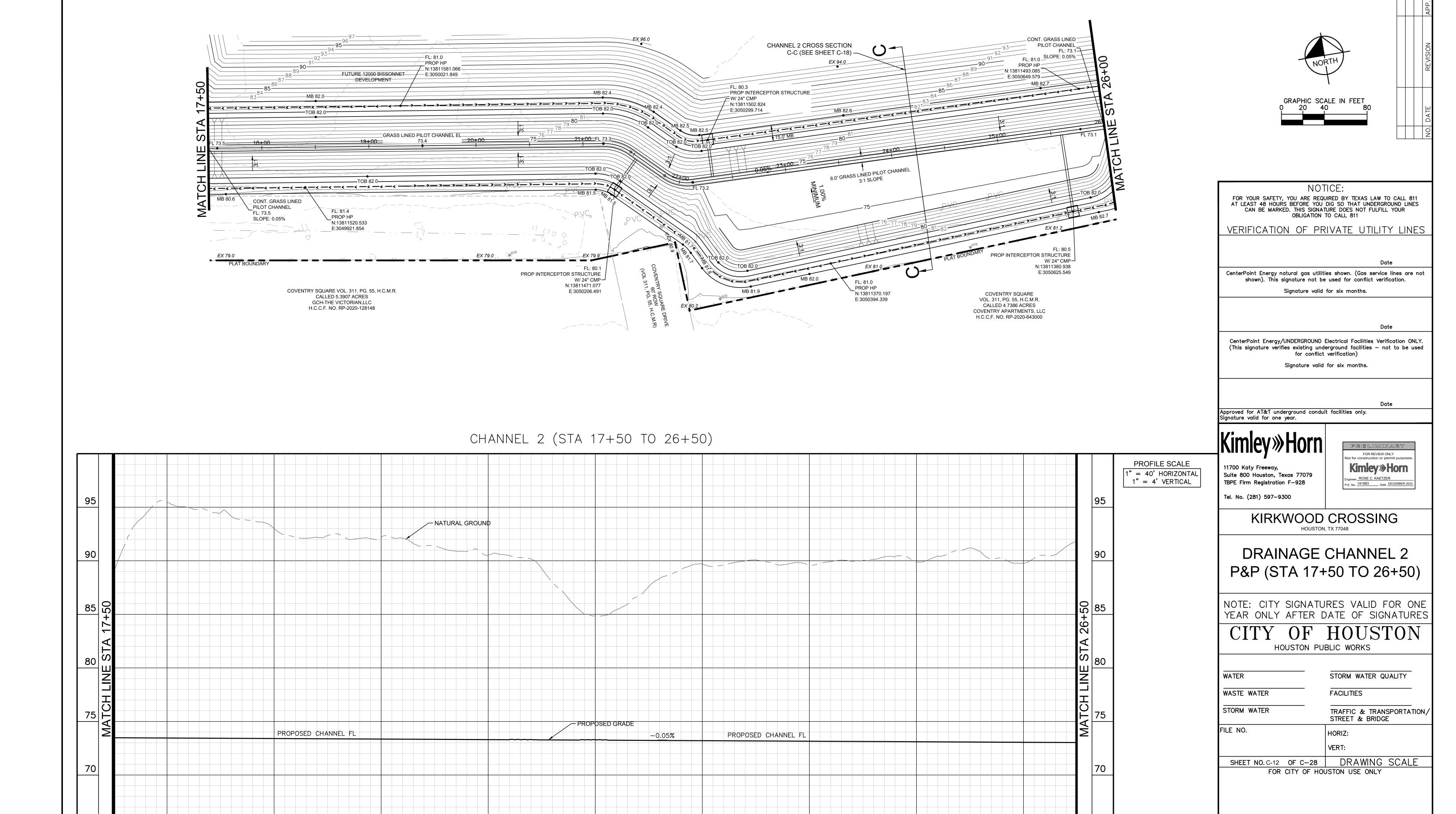
WASTE WATER **FACILITIES**

> TRAFFIC & TRANSPORTATION STREET & BRIDGE

FILE NO.

DRAWING SCALE SHEET NO. C-10 OF C-28 FOR CITY OF HOUSTON USE ONLY





65

17+50

18+00

20+00

19+00

21+00

22+00

23+00

65

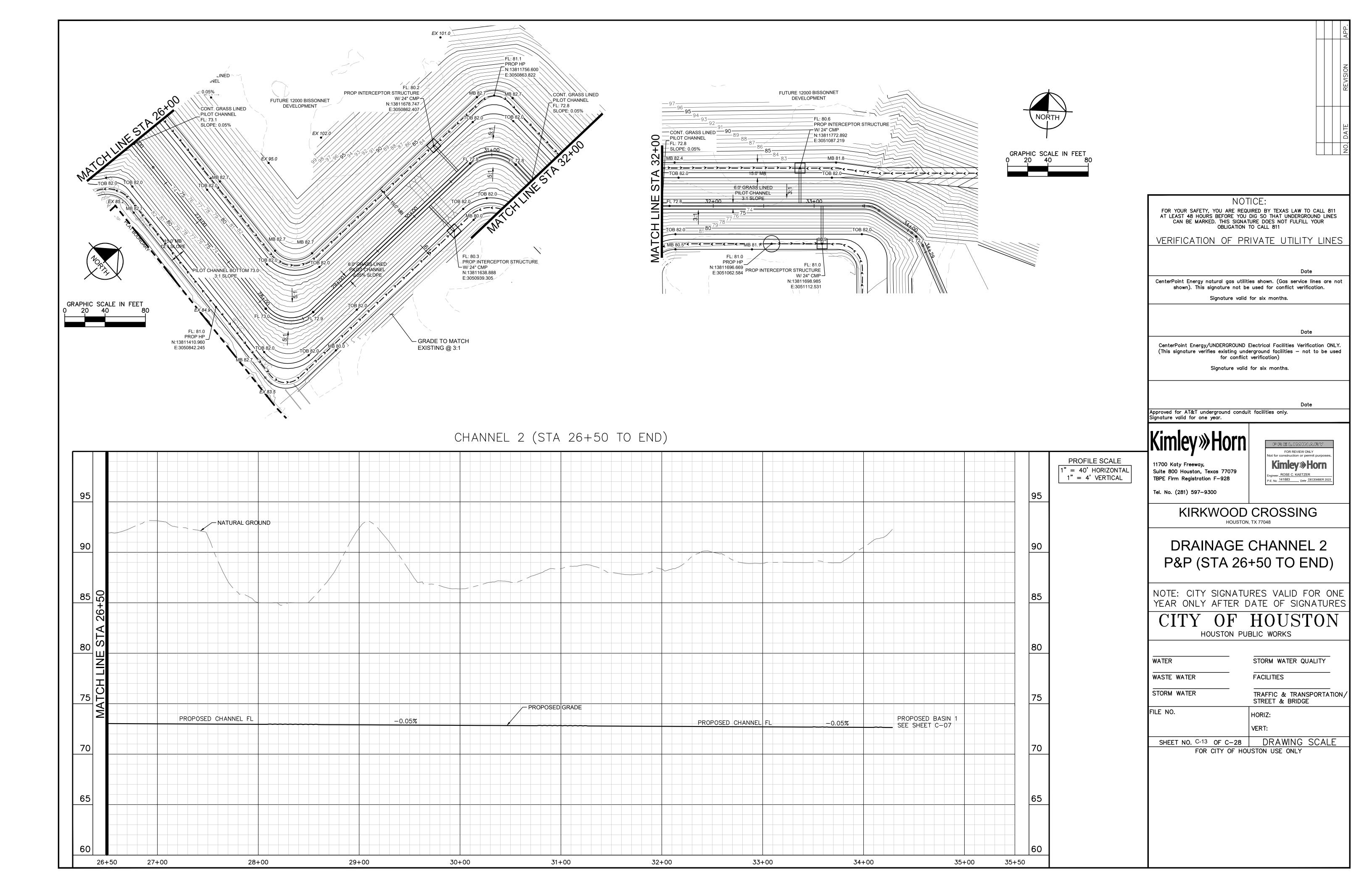
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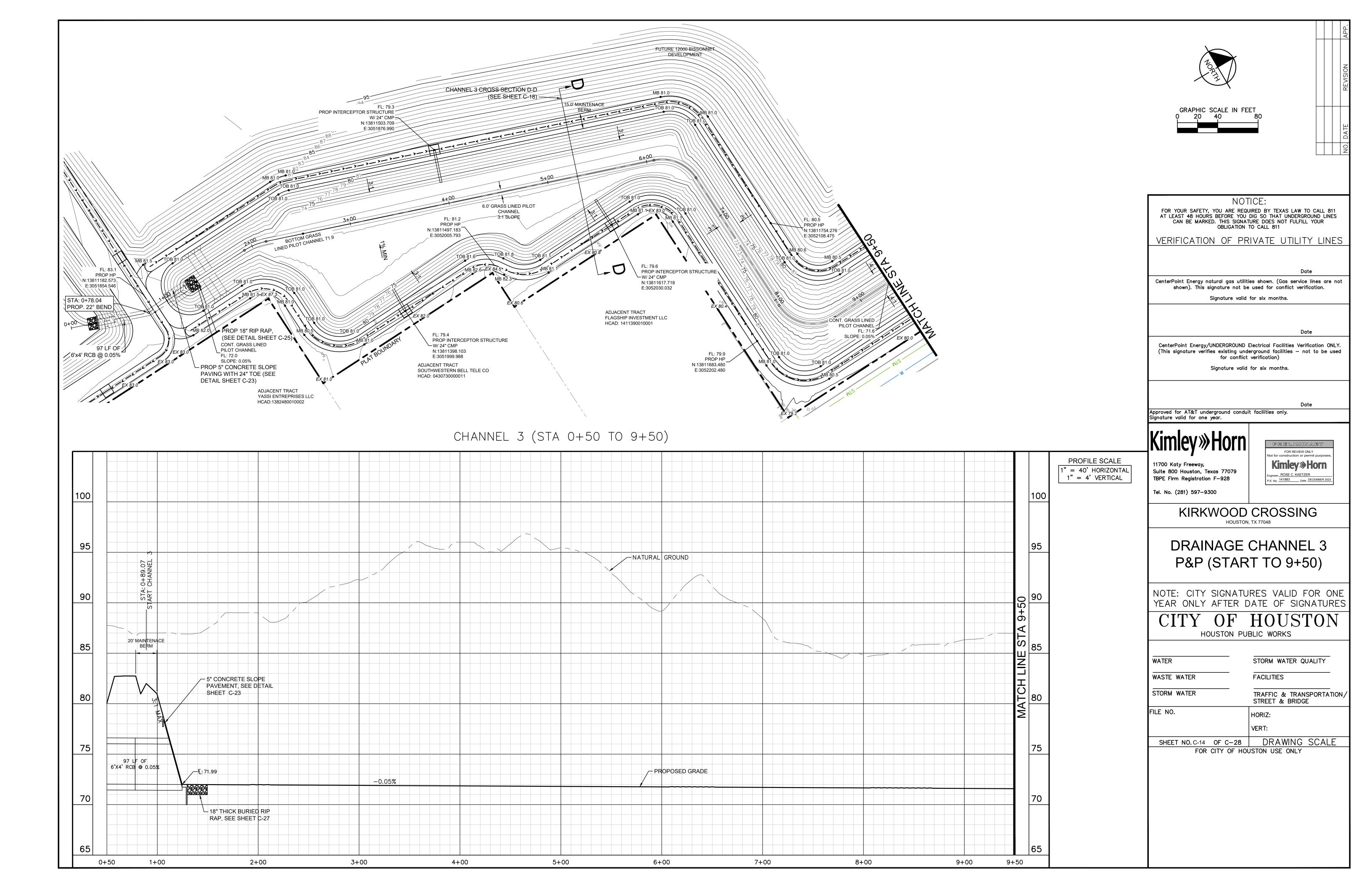
26+50

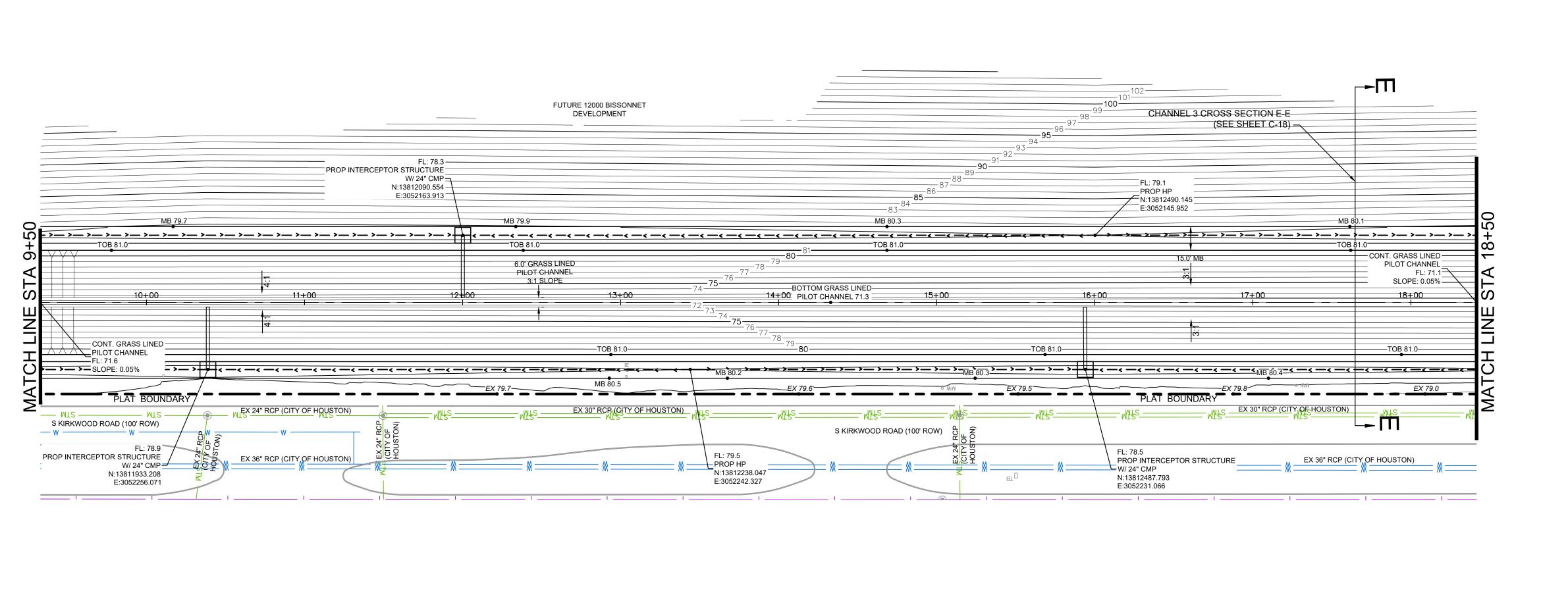
26+00

25+00

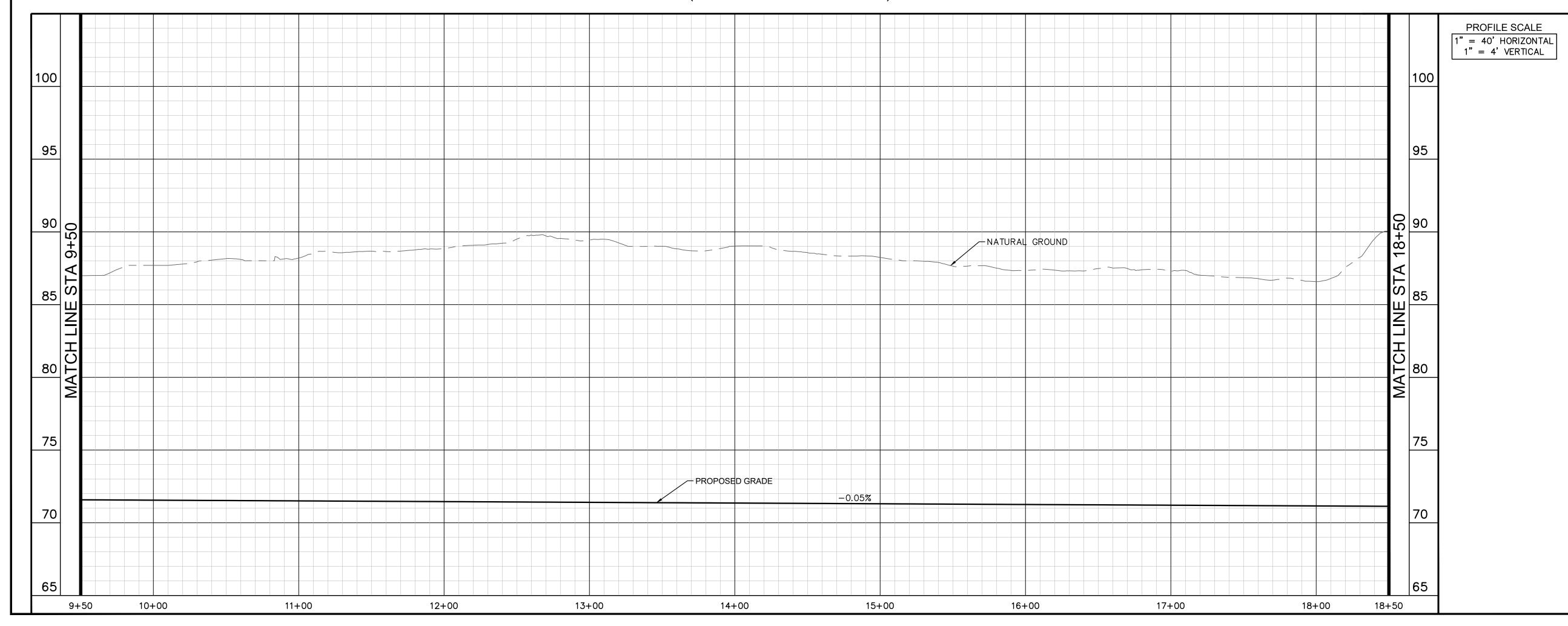
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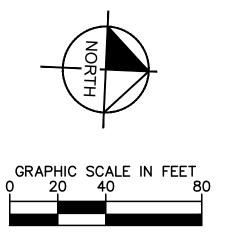


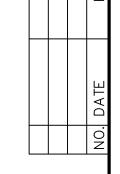












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Tel. No. (281) 597-9300

FOR REVIEW ONLY **Kimley** Whorn Engineer_ROSE C. KAETZER
P.E. No. 141883 Date DECEMBER 2023

KIRKWOOD CROSSING HOUSTON, TX 77048

DRAINAGE CHANNEL 3 P&P (STA 9+50 TO 18+50)

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON HOUSTON PUBLIC WORKS

STORM WATER QUALITY

WASTE WATER

WATER

FILE NO.

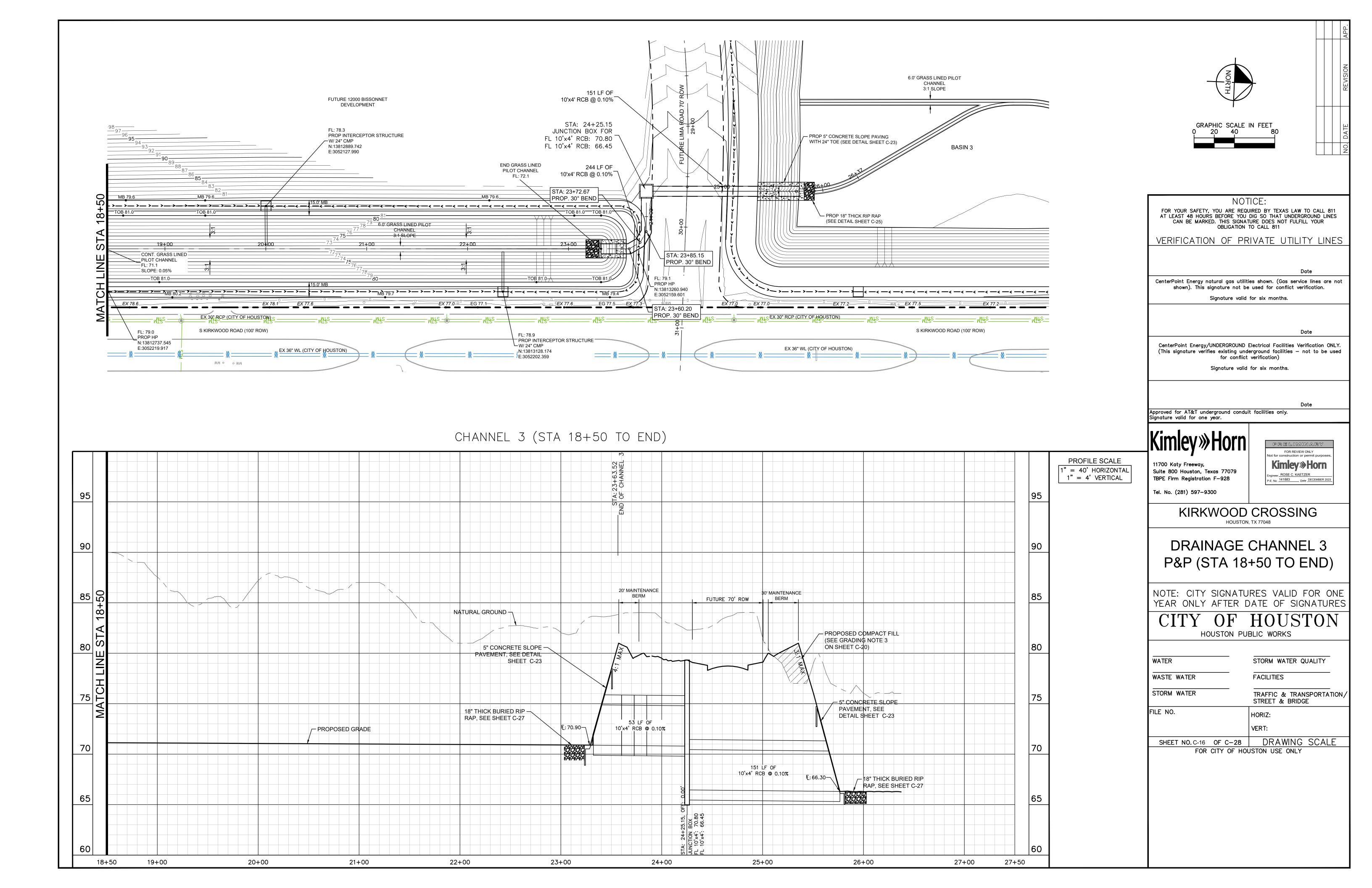
STORM WATER

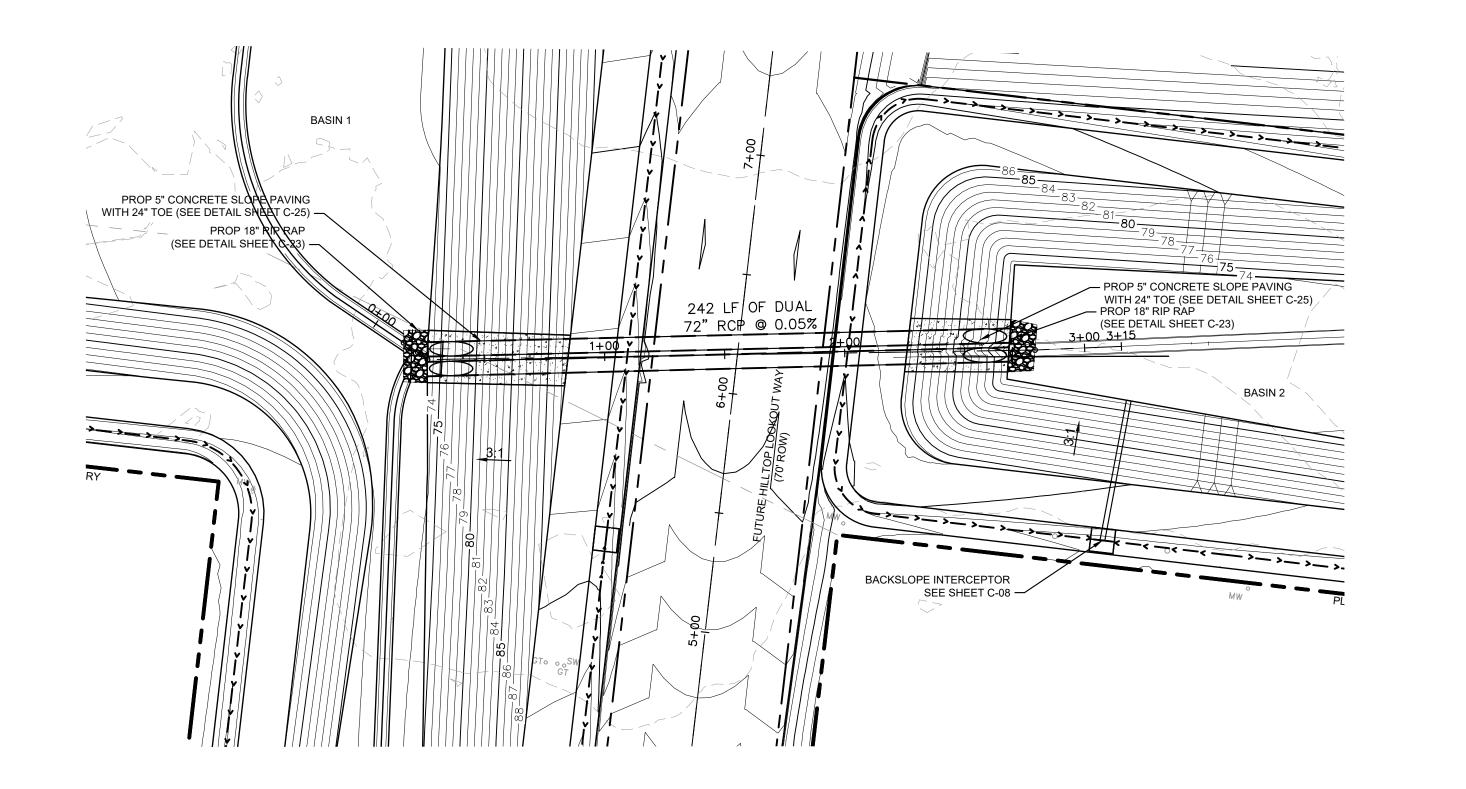
FACILITIES

TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

HORIZ:

SHEET NO. C-15 OF C-28 DRAWING SCALE





11700 Katy Freeway,

Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Signature valid for one year.



KIRKWOOD CROSSING

CULVERT B P&P

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

WASTE WATER **FACILITIES**

FILE NO.

STORM WATER TRAFFIC & TRANSPORTATION/

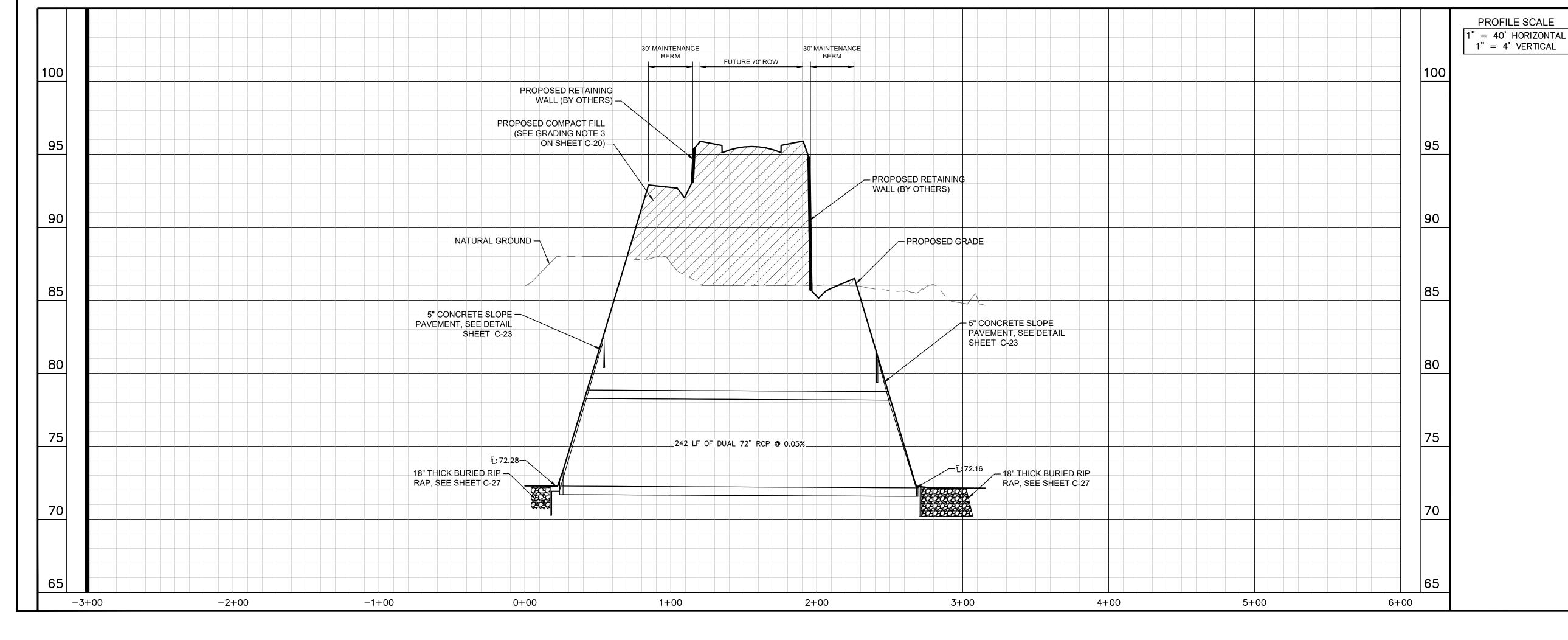
STREET & BRIDGE

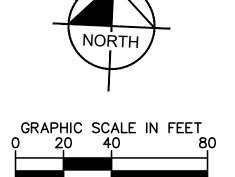
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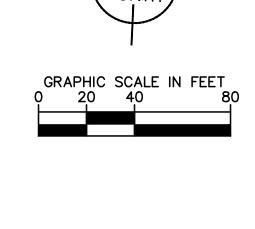
SHEET NO. C-17 OF C-28 DRAWING SCALE

FOR CITY OF HOUSTON USE ONLY

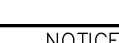












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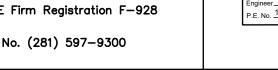
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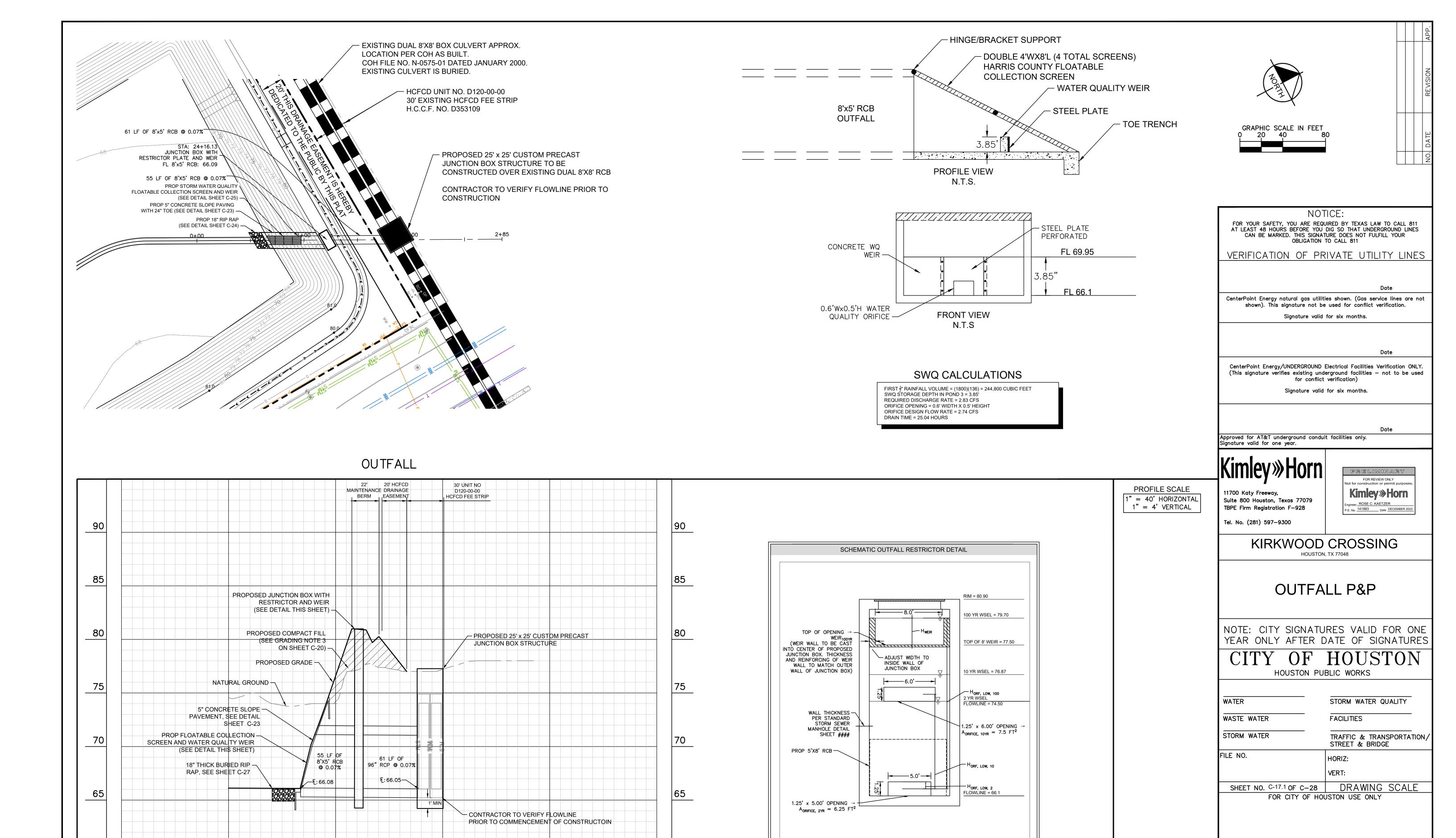
Signature valid for six months.

Date

			•
Tel.	No.	(281)	597-93



Approved for AT&T underground conduit facilities only.



-1+00

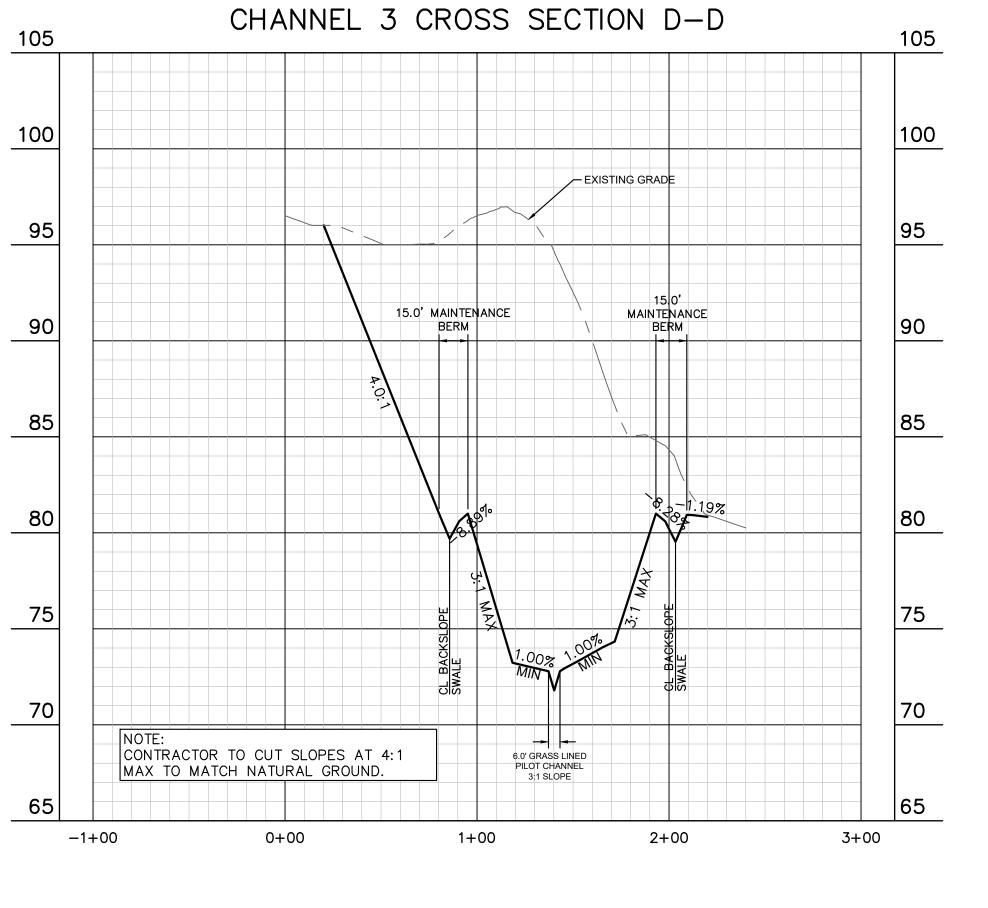
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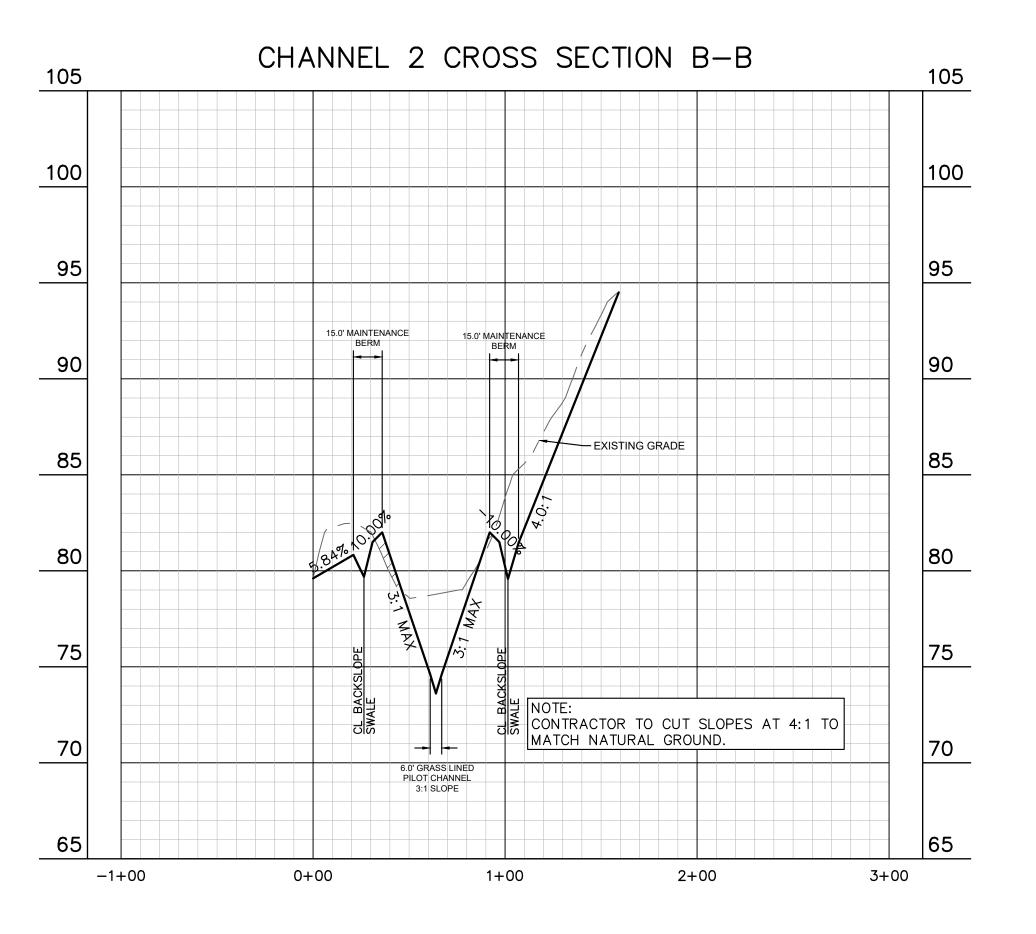
1+00

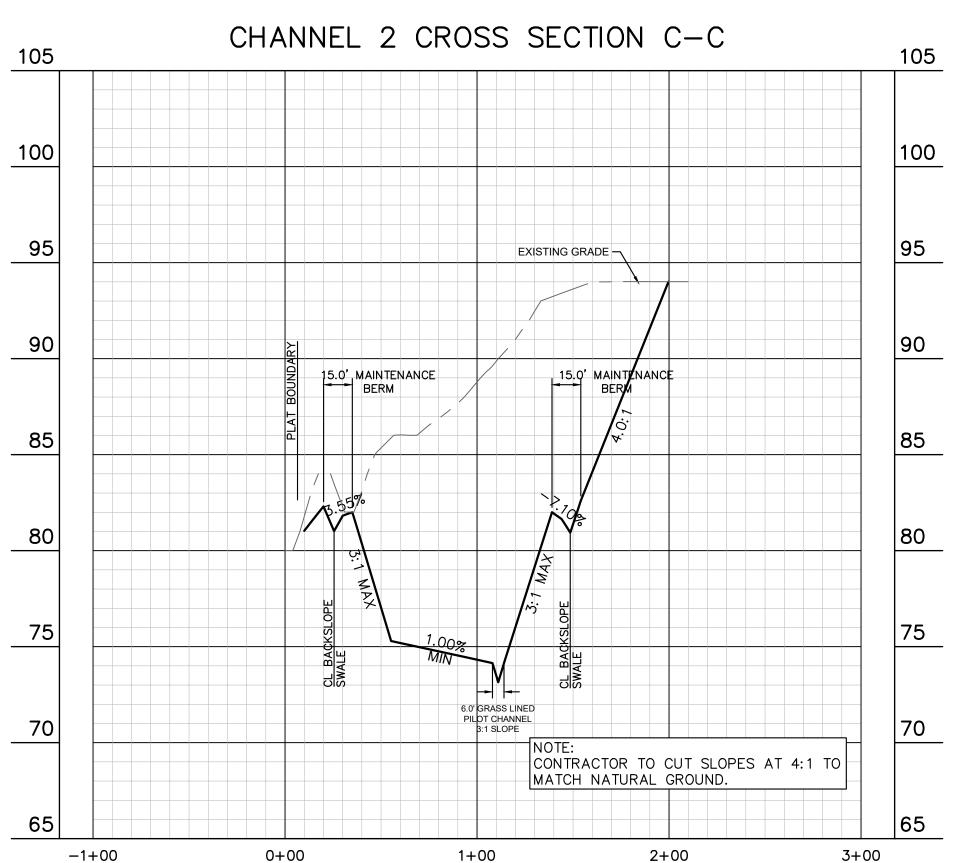
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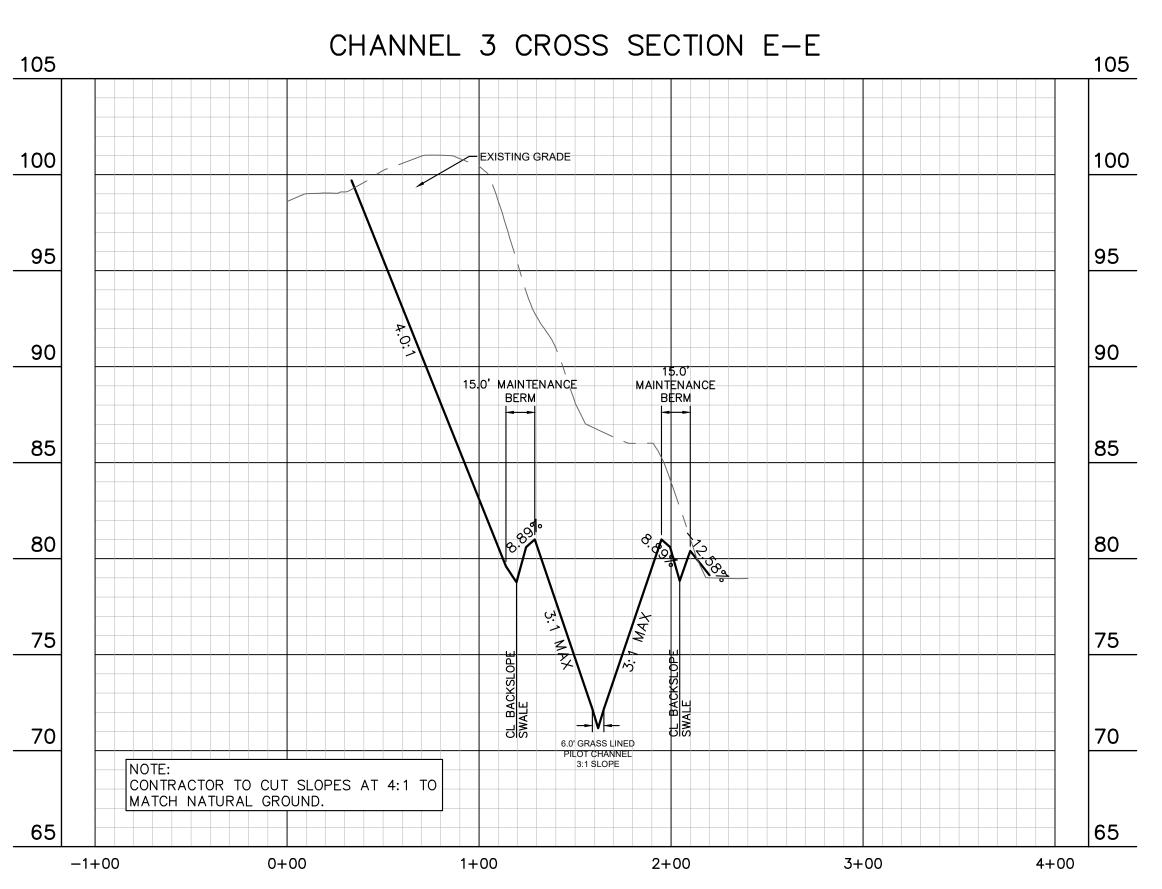
3+00

4+00









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FOR REVIEW ONLY
Not for construction or permit purposes.

Kimley > Horn

Engineer_ROSE C. KAETZER
P.E. No. 141883 Date DECEMBER 2023

KIRKWOOD CROSSING

HOUSTON, TX 77

CHANNEL CROSS SECTIONS

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON PUBLIC WORKS

WATER

WASTE WATER

STORM WATER

FILE NO.

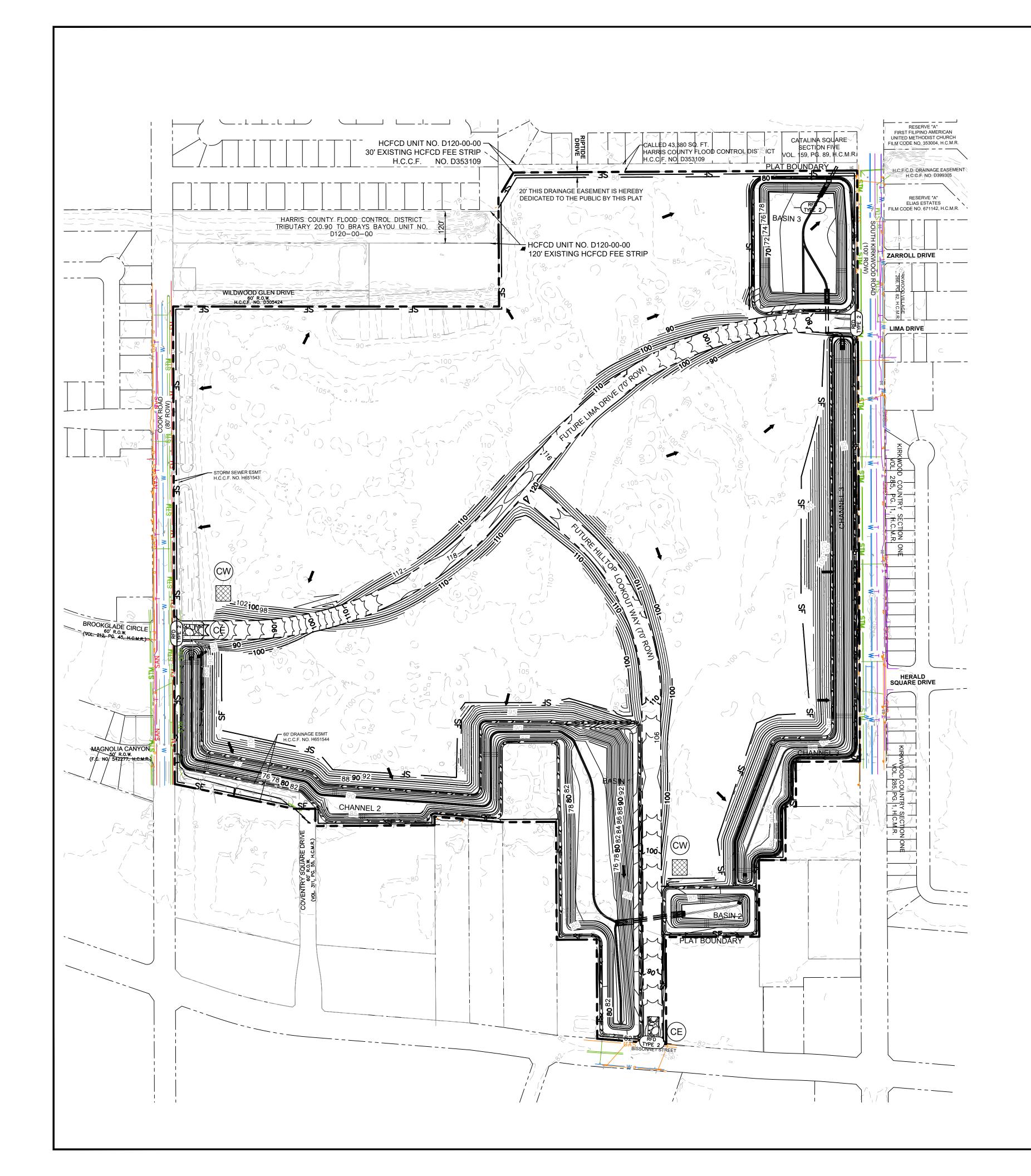
TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

FACILITIES

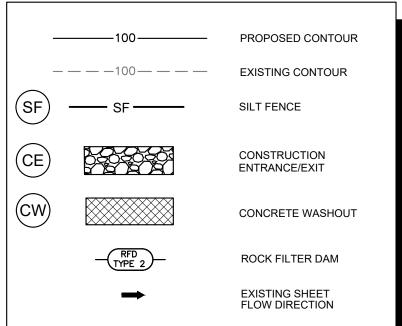
STORM WATER QUALITY

HORIZ:

SHEET NO. C-18 OF C-28 DRAWING SCALE

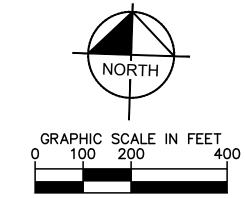


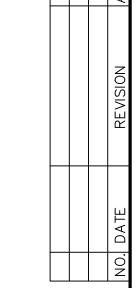




EROSION CONTROL NOTES

- 1. EROSION CONTROL DEVICES SHOWN ON THIS PLAN SHALL BE INSTALLED PRIOR TO THE START OF LAND DISTURBING ACTIVITIES ON THE PROJECT.
- 2. ALL EROSION CONTROL DEVICES ARE TO BE INSTALLED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS FOR THIS PROJECT. CHANGES ARE TO BE APPROVED BEFORE CONSTRUCTION BY THE DESIGN ENGINEER AND THE CITY ENGINEERING DIVISION.
- 3. IF THE EROSION CONTROL PLAN AS APPROVED CANNOT CONTROL EROSION AND OFF-SITE SEDIMENTATION FROM THE PROJECT, THE EROSION CONTROL PLAN WILL BE REQUIRED TO BE REVISED AND/OR ADDITIONAL EROSION CONTROL DEVICES WILL BE REQUIRED ON SITE.
- 4. INSPECTIONS SHALL BE MADE WEEKLY AND AFTER RAIN STORM EVENTS TO INSURE THAT THE DEVICES ARE FUNCTIONING PROPERLY. WHEN SEDIMENT OR MUD HAS CLOGGED THE VOID SPACES BETWEEN STONES OR MUD IS BEING TRACKED ONTO A PUBLIC ROADWAY THE AGGREGATE PAD MUST BE WASHED DOWN OR REPLACED. RUNOFF FROM THE WASHDOWN OPERATION SHALL NOT BE ALLOWED TO DRAIN DIRECTLY OFF SITE WITHOUT FIRST FLOWING THROUGH ANOTHER BMP TO CONTROL OFF SITE SEDIMENTATION. PERIODIC RE-GRADING OR THE ADDITION OF NEW STONE MAY BE REQUIRED TO MAINTAIN THE EFFICIENCY OF THE INSTALLATION.
- 5. CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTAL OF N.O.I., N.O.T. AND ANY ADDITIONAL INFORMATION REQUIRED BY THE TCEQ CONTRACTOR SHALL COMPLY WITH ALL TCEQ STORM WATER POLLUTION PREVENTION REQUIREMENTS.
- 6. SILT FENCE SHOWN OFFSET FROM PROPERTY LINE FOR CLARITY PURPOSED ONLY. ALL SILT FENCE ALONG THE EDGE OF THE PROPERTY SHALL BE SET ON OR INSIDE THE PROPERTY LIMITS.
- 7. CONTRACTOR TO PROVIDE INLET PROTECTION IN PUBLIC ROW ONLY DURING EARTH MOVING ACTIVITIES. CONTRACTOR TO ENSURE PONDING DOES NOT OCCUR IN PUBLIC ROW OR ON ADJACENT PROPERTIES AT ANY TIME DURING CONSTRUCTION.
- 8. DISTURBED PORTIONS OF SITE MUST BE STABILIZED. STABILIZATION PRACTICES MUST BE INITIATED WITHIN 14 DAYS IN PORTIONS OF THE SITE WHERE CONSTRUCTION HAS BEEN EITHER TEMPORARILY OR PERMANENTLY CEASED. UNLESS EXCEPTED WITHIN THE OPDES PERMIT. CONTRACTOR SHALL REMOVE TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF STABILIZATION.
- 9. SITE ENTRY AND EXIT LOCATIONS SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT THE TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAYS. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ON A PUBLIC ROADWAY MUST BE REMOVED IMMEDIATELY. WHEN WASHING IS REQUIRED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO A PUBLIC ROADWAY, IT SHALL BE DONE IN AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT BASIN. ALL FINES IMPOSED FOR DISCHARGING SEDIMENT ONTO PUBLIC AREAS SHALL BE PAID BY THE CONTRACTOR.
- 10. ALL STAGING AREAS, STOCKPILES, SPOILS, ETC. SHALL BE LOCATED SUCH THAT THEY WILL NOT ADVERSELY AFFECT STORM WATER QUALITY. OTHERWISE, COVERING OR ENCIRCLING THESE AREAS WITH SOME PROTECTIVE MEASURE WILL BE NECESSARY.
- 11. UPON COMPLETION OF FINE GRADING, ALL SURFACE AREAS DISTURBED WITHIN OR ADJACENT TO THE CONSTRUCTION LIMITS SHALL BE PERMANENTLY STABILIZED. STABILIZATION IS OBTAINED WHEN THE SITE IS COVERED WITH IMPERVIOUS STRUCTURES AND PAVING AND/OR A UNIFORM PERENNIAL VEGETATIVE COVER. THE PERENNIAL VEGETATIVE COVER MUST HAVE A COVERAGE OF AT LEAST 70%, AS DETERMINED BY OWNER'S REPRESENTATIVE.
- 12. CONTRACTOR SHALL BE RESPONSIBLE FOR REESTABLISHING ANY EROSION CONTROL DEVICE WHICH HE DISTURBS. EACH CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE OF ANY DEFICIENCIES IN THE ESTABLISHED EROSION CONTROL MEASURES THAT MAY LEAD TO UNAUTHORIZED DISCHARGE OR STORM WATER POLLUTION, SEDIMENTATION, OR OTHER POLLUTANTS. UNAUTHORIZED POLLUTANTS INCLUDE (BUT ARE NOT LIMITED TO) EXCESS CONCRETE DUMPING OR CONCRETE RESIDUE, PAINTS, SOLVENTS, GREASES, FUEL AND LUBRICANT OIL, PESTICIDES, AND ANY SOLID WASTE MATERIALS.





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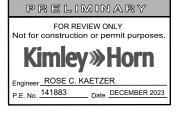
Kimley»Hor

11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Tel. No. (281) 597-9300

STORM WATER

FILE NO.



KIRKWOOD CROSSING

HOUSTON, TX 7704

STORMWATER POLLUTION PREVENTION PLAN

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

WASTE WATER FACILITIES

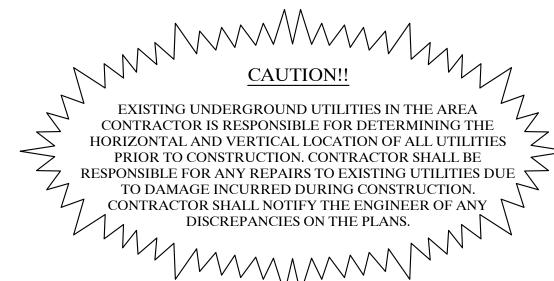
TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

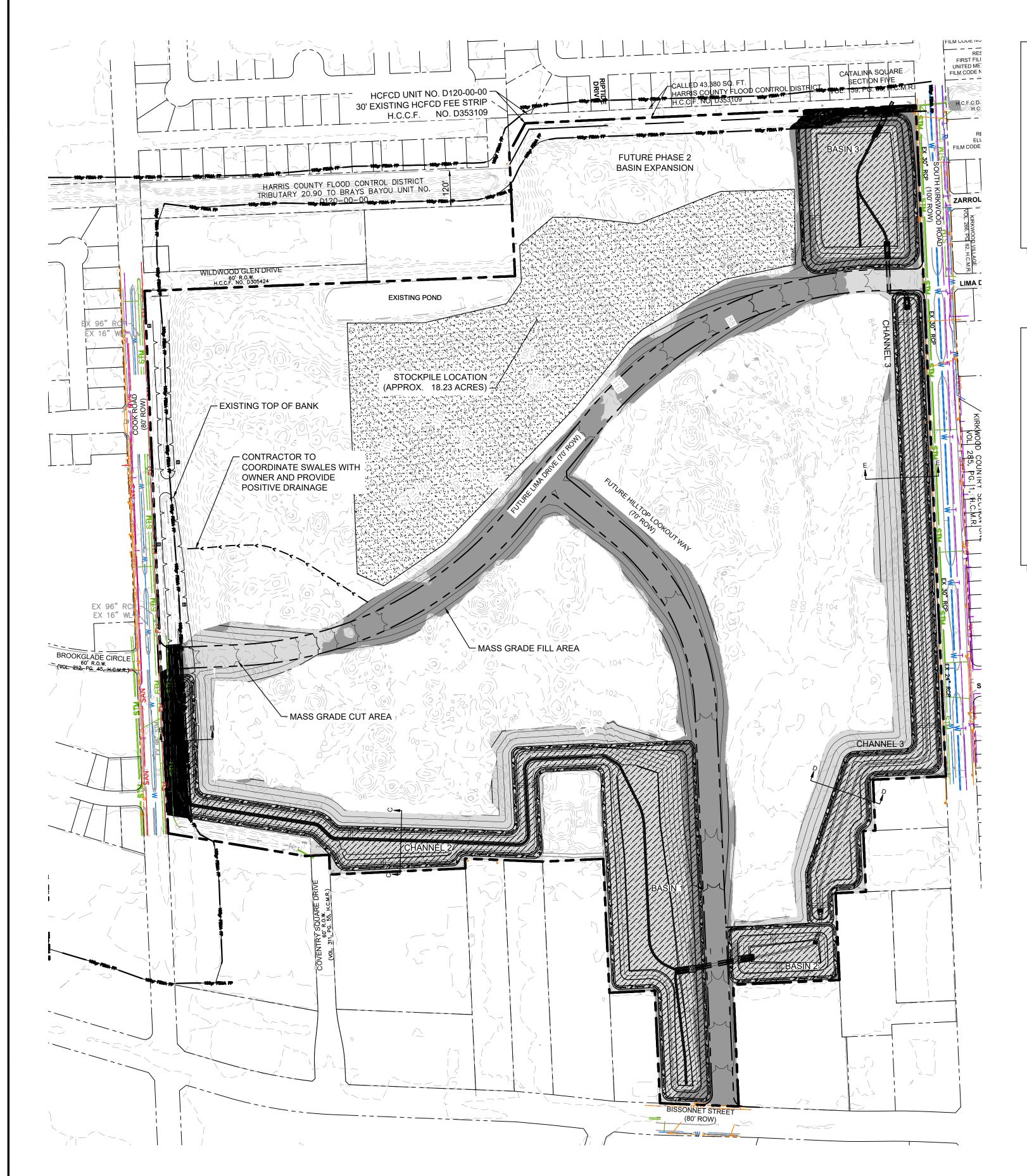
HORIZ:

MEDT.

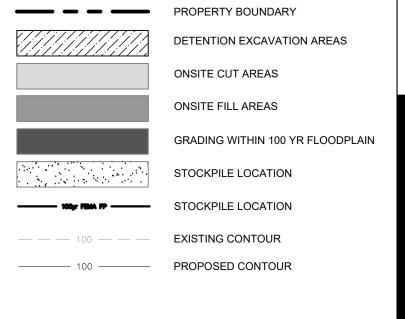
SHEET NO. C-19 OF C-28 DRAWING SCALE







LEGEND



NOTES

CONTRACTOR TO OBTAIN ALL PERMITS REQUIRED BY

CULVERTS WITHIN THE DEVELOPMENT.

TO RECEIVING FILL. PROOF-ROLLING

SITES, UNLESS OTHERWISE NOTED.

GRADING CONSTRUCTION.

TCEQ, HARRIS COUNTY, CITY OF HOUSTON, AND HCFCD PRIOR TO STARTING CONSTRUCTION OF UTILITIES AND/OR

CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING

TEMPORARY SITE DRAINAGE AND CONTROLLING RUNOFF

SWALES OR PROVIDING PORTABLE PUMPS, IF REQUIRED,

CONTRACTOR TO PLACE FILL MATERIAL IN 8" LOOSE LIFTS AND COMPACT TO 95% STANDARD PROCTOR DENSITY.

ALL AREAS TO RECEIVE FILL SHALL BE PROOF-ROLLED TO

DETECT ANY SOFT OR POORLY COMPACTED AREAS PRIOR

THE CONTRACTOR SHALL GRADE FROM GIVEN ELEVATIONS

AT 4:1 MAX BACK TO NATURAL GROUND FROM CUT OR FILL

PROPOSED CONTOURS SHOWN ARE FOR REFERENCE

ONLY. CONTRACTOR TO USE SPOT ELEVATIONS FOR

. CONTRACTOR TO PLACE FILL IN STOCKPILE AREA NO HIGHER THAN 4 FT ABOVE NATURAL GROUND.

SO THAT CONSTRUCTION PROGRESS MAY CONTINUE.

FOR THE DURATION OF THE CONSTRUCTION CONTRACT.

CUT/FILL SUMMARY

CUT: 200,333 CY BASIN 2: 12,862 CY INLINE BASIN: 103,406 CY BASIN 3 PH 1: 37,421 CY CHANNEL 1: 18,292 CY PAVEMENT: 8,809 CY TOTAL 381,123 CY FILL: BASIN 1: 9,940 CY BASIN 2: 100 CY INLINE BASIN 100 CY BASIN 3 PH1: 9,400 CY CHANNEL 1 PAVEMENT: 2,643 CY 23,650 CY TOTAL 45,833 CY **UP TO 335,290 CY** STOCKPILE:

FLOODPLAIN EARTHWORK CALCS

- 1. CUT WITHIN FLOODPLAIN: 1932 CY
- 2. FILL WITHIN FLOODPLAIN: 1433 CY
- 3. TOTAL EXISTING FLOODPLAIN STORAGE BELOW 500 YR BFE: .0464 AC-FT
- 4. TOTAL PROPOSED FLOODPLAIN STORAGE BELOW 500 YR BFE: .0573 AC-FT

500-BASE FLOOD ELEVATIONS

BASE FLOOD ELEVATION = 78.50 - 81.0' FIRM PANEL # 48201C0840L



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Tel. No. (281) 597-9300

FOR REVIEW ONLY **Kimley** »Horn Engineer ROSE C. KAETZER
P.E. No. 141883 Date DECEMBER 2023

KIRKWOOD CROSSING

MASS GRADING OVERALL

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

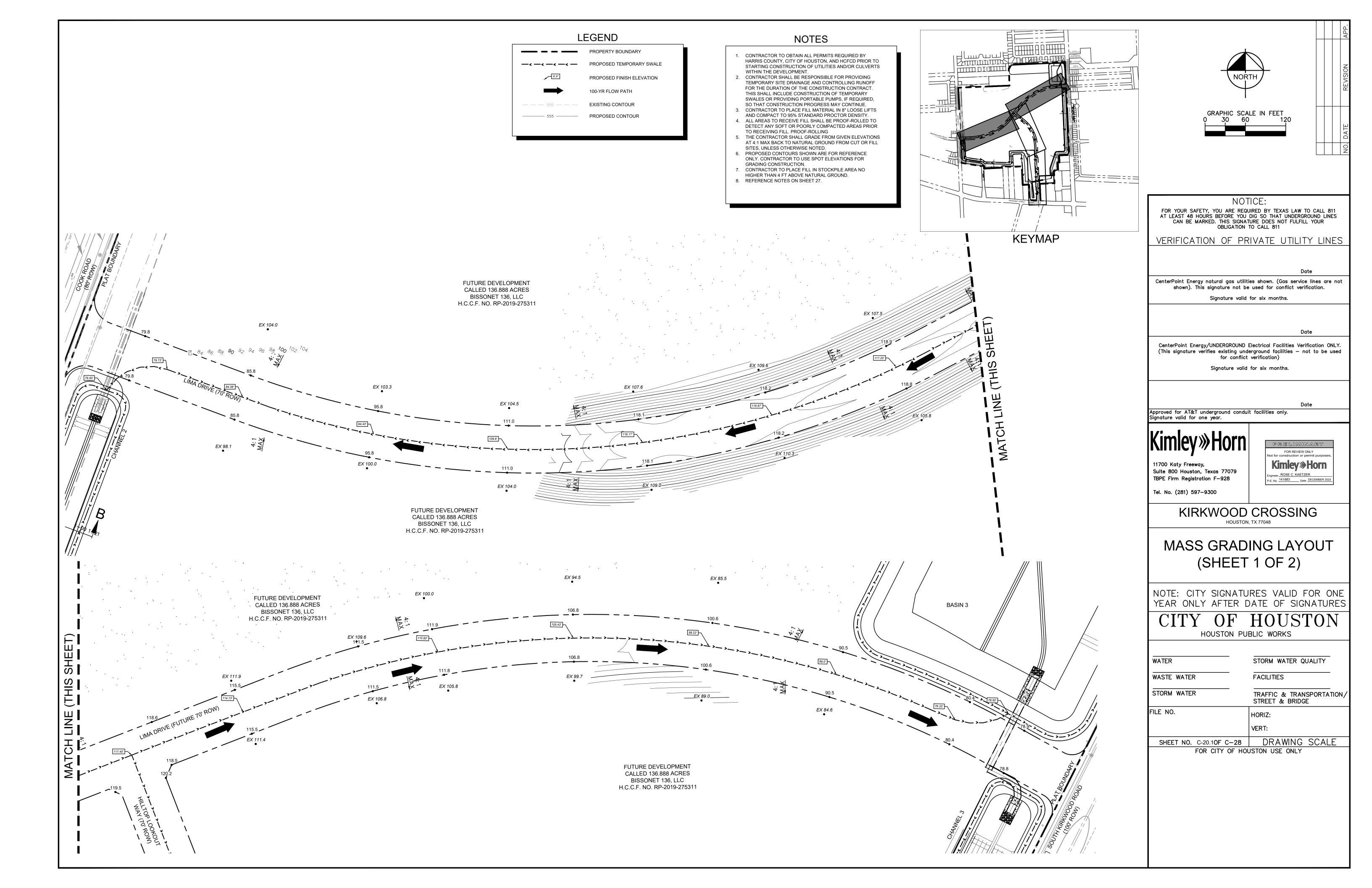
WASTE WATER **FACILITIES**

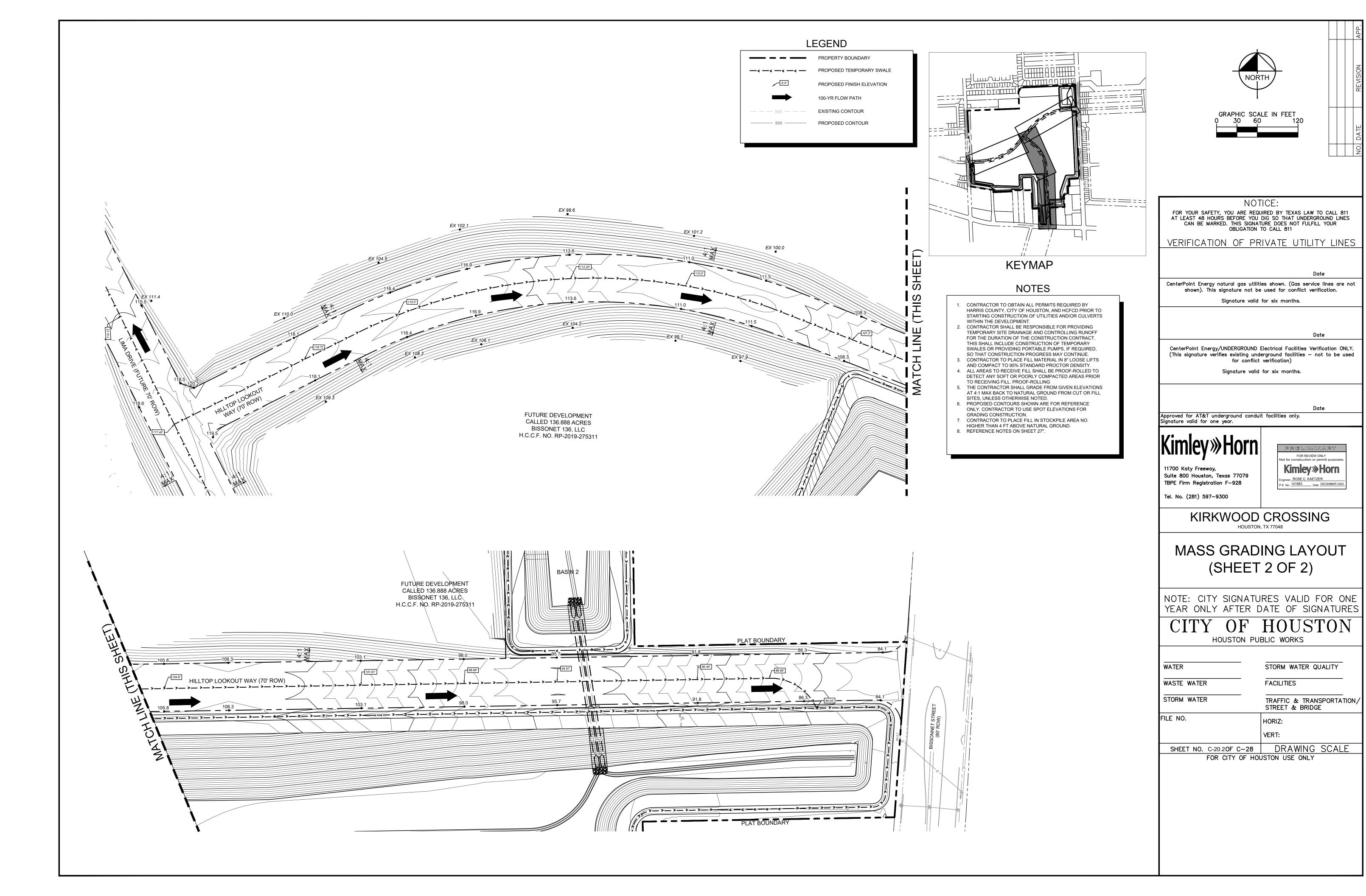
STORM WATER

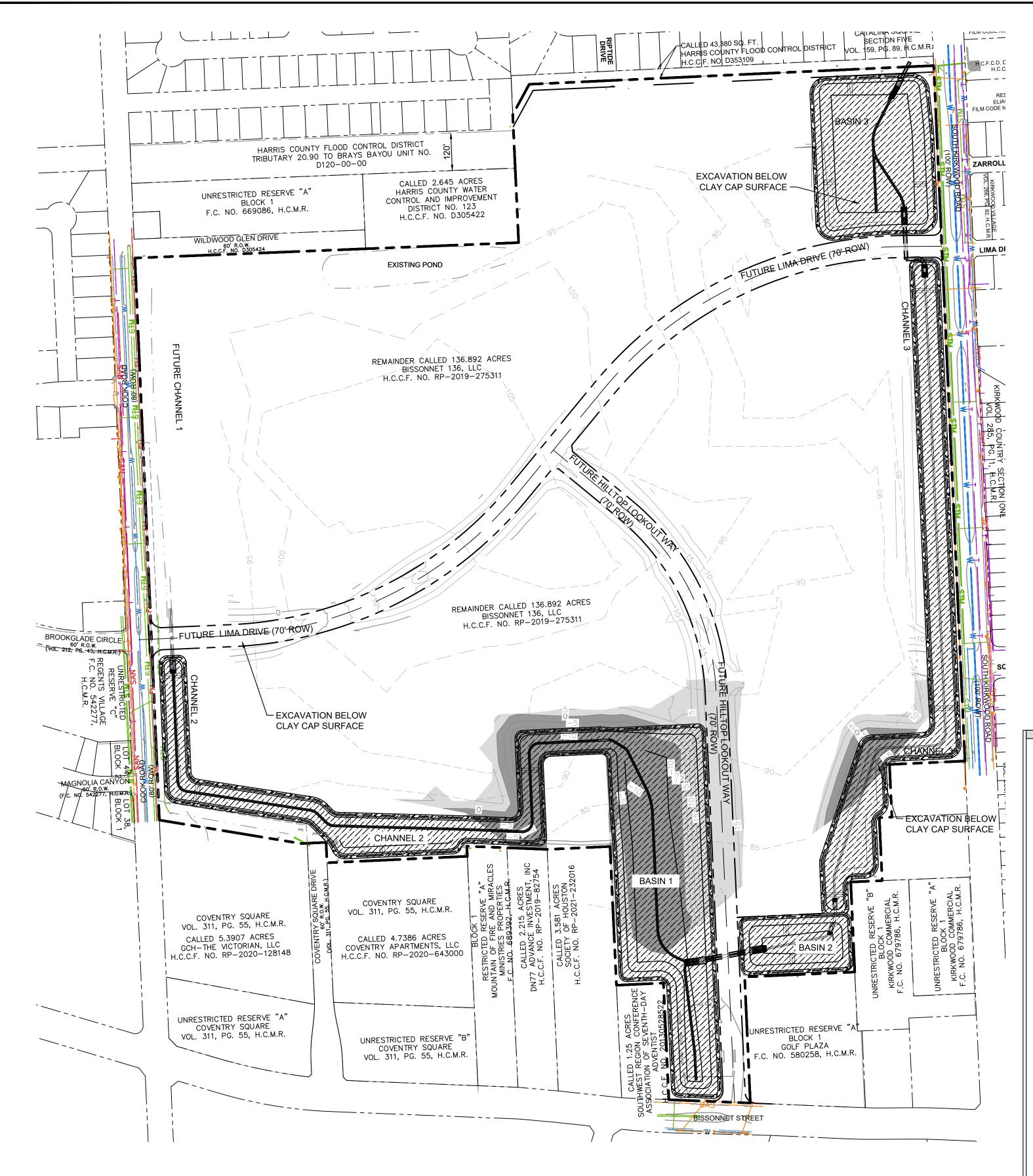
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TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

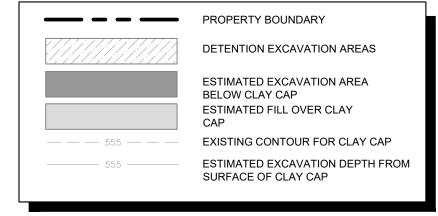
SHEET NO. C-20 OF C-28 DRAWING SCALE FOR CITY OF HOUSTON USE ONLY







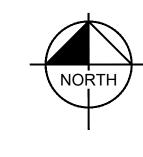
LEGEND

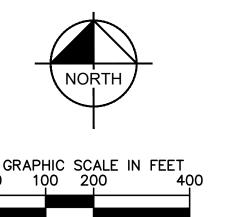


NOTES

- . THE 12000 BISSONNET PROPERTY WAS FORMERLY DEVELOPED AS THE SUGAR HILLS GOLF COURSE. THE GOLF COURSE, WHICH REMAINS LARGELY IN TACT TODAY, WAS DEVELOPED OVER THE DOTY SAND PIT VENTURE (DSPV) LANDFILL. THE DSPV OPERATED AS A TYPE IV LANDFILL FOR CONSTRUCTION AND DEMOLITION DEBRIS DISPOSAL. THE SITE WAS ISSUED A MUNICIPAL SOLID WASTE (MSW) PERMIT NO. 1247 BY TCEQ IN 1985. MSW PERMIT NO. 1247 IS ACTIVE AND THE SITE HAS BEEN IN
- POST CLOSURE CARE SINCE 1999. SKA CONSULTING, L.P. IS SUBMITTING THE TCEQ PERMIT REQUIRED UNDER 30 TAC CHAPTER 330 SUBCHAPTER T. THIS PERMIT IS REQUIRED PRIOR TO THE START OF ANY CONSTRUCTION.
- ACCORDING TO THE SITE INVESTIGATION REPORT PREPARED BY SKA CONSULTING AND BASED ON 6 TEST PITS IN 2019, THE WASTE BELOW THE CLAY CAP CONSISTS OF 74% SOIL, 10% WOOD, 10% CONCRETE, 3% METAL, AND 3% MISCELLANEOUS MATERIALS SUCH AS RUBBER, PLASTIC AND TEXTILES. ALL WASTE OBSERVED WAS CONSISTENT WITH A TYPE IV LANDFILL OPERATION. PLEASE REFER TO THE SITE INVESTIGATION REPORT PREPARED BY SKA CONSULTING, L.P FOR MORE DETAILED INFORMATION ON THE LANDFILL WASTE.
- 4. LANDFILL WASTE IS COVERED BY A CLAY CAP APPROXIMATELY 2-3' DEEP. THE LIMITS OF THE CLAY CAP SURFACE SHOWN ARE APPROXIMATED BASED ON SOIL BORINGS PERFORMED ONSITE AND ARE SHOWN FOR REFERENCE ONLY. ACTUAL LIMITS MAY VARY.
- DUE TO THE AGE OF THE LANDFILL, ALL WASTE EXCAVATED BELOW THE CLAY CAP MUST BE TRANSPORTED TO CLASS 2 INDUSTRIAL WASTE LANDFILL SITES AND DISPOSED OF IN ACCORDANCE WITH TCEQ REGULATIONS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY SITE DRAINAGE AND CONTROLLING RUNOFF FOR THE DURATION OF THE CONSTRUCTION CONTRACT. THIS SHALL INCLUDE CONSTRUCTION OF TEMPORARY SWALES OR PROVIDING PORTABLE PUMPS, IF REQUIRED, SO THAT CONSTRUCTION PROGRESS MAY CONTINUE.

- CAUTIONARY NOTES REGARDING THE LANDFILL ALL WORK DONE ON SITE MUST BE IN COMPLIANCE WITH THE GEOTECHNICAL DATED OCTOBER 21, 2022 AND ANY SUPPLEMENTAL REPORTS ISSUED.
- THE CLIENT UNDERSTANDS THAT DIFFERENTIAL SETTLING OF THE SITE WILL OCCUR AND THAT THE SITE WILL NEED TO BE INSPECTED AND MAINTAINED ON A MORE FREQUENT BASIS THEN A TYPICAL GREENFIELD SITE.
- CORRECTIVE MEASURES REGARDING SITE SETTLEMENT, STORMWATER, LANDFILL CAP. OR MONITORING. AND LANDFILL GASES ARE TO BE IMPLEMENTED BY THE CLIENT TO THE DEGREE REQUIRED IN ORDER TO MINIMIZE HUMAN HEALTH RISKS OR IMPACTS TO THE ENVIRONMENT.
- 4. A MINIMUM OF 4 FEET OF COVER MUST BE MAINTAINED FROM THE LANDFILL CAP AT ALL TIMES. THE LANDFILL CAP SHALL NOT BE PENETRATED UNLESS IN AREAS WHERE REQUIRED BY INSTALLATION OF UTILITIES OR STORM WATER CONVEYANCE SYSTEMS. WHERE LANDFILL CAP IS PENETRATED, ALL PLANS FOR HANDLING, STOCKPILING, DAILY COVER, AND DISPOSAL OF WASTE ENCOUNTERED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY OTHERS.
- THE FOLLOWING ITEMS SHALL BE COORDINATED WITH THE GEOTECHNICAL ENGINEER WITH REGARD TO SPECIAL STEPS TO BE TAKEN DUE TO THE LANDFILL PRIOR TO DESIGN AND INSTALLATION: SITE LIGHTING FOUNDATIONS, FENCE POSTS, CONCRETE FOOTINGS, AND ANY OTHER IMPROVEMENT THAT WILL INTRUDE INTO THE LANDFILL CAP.
- PROPER VENTILATION OF LANDFILL GASES FROM THE LANDFILL, AS REQUIRED BY PERMIT OR REGULATORY AGENCY OR IF NEEDED, ARE TO BE DESIGNED, OPERATED, AND MAINTAINED BY OTHERS RELOCATION PLUGGING AND ABANDONMENT OF EXISTING GAS VENTS OR MONITORING PROBES AND INSTALLATION OF ADDITIONAL GAS VENTS OR MONITORING PROBES IS TO BE PERFORMED BY OTHERS.
- ALL SITE ACTIVITIES ARE TO BE CONDUCTED IN ACCORDANCE WITH ENVIRONMENTAL PERMIT DOCUMENTATION FOR THE PROJECT, INCLUDING ANY PERMITS REGARDING SOLID WASTE, LANDFILL GAS, MONITORING, AND REPORTING.
- 8. PLANS FOR HANDING, STOCKPILING, DAILY COVER, AND DISPOSAL OF WASTE ENCOUNTERED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY
- 9. PLANS FOR HANDLING AND DISPOSAL OF CONTAMINATED SOIL AND WATER GENERATED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY
- 10. OBSERVATION AND REPORTING ASSOCIATED WITH WASTE OR CONTAMINATED MEDIA GENERATED DURING CONSTRUCTION IS TO BE PROVIDED FOR THE CLIENT BY
- 11. CONTRACTORS SHALL BE RESPONSIBLE FOR PREPARATION, IMPLEMENTATION, MONITORING, AND REPORTING OF THEIR OWN SITE HEALTH AND SAFETY PLANS. HEALTH AND SAFETY PLANS SHALL TAKE INTO ACCOUNT THE KNOWN ENVIRONMENTAL CONDITIONS AND EXPOSURE RISKS ON THE PROPERTY.
- 12. ONSITE MONITORING WELLS ARE TO BE PLUGGED AND ABANDONED BY OTHERS PRIOR TO CONSTRUCTION.





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Date

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11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Tel. No. (281) 597-9300

FOR REVIEW ONLY **Kimley** Whorn gineer ROSE C. KAETZER P.E. No. 141883 Date DECEMBER 2023

KIRKWOOD CROSSING

CLAY CAP EXCAVATION

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

WASTE WATER **FACILITIES**

STORM WATER

TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

FILE NO. HORIZ:

SHEET NO. C-21 OF C-28 DRAWING SCALE FOR CITY OF HOUSTON USE ONLY

EROSION CONTROL	L SCHEDULING AND SEQUENCING
I. ROUGH GRADING	1. CONSTRUCT TEMPORARY CONSTRUCTION ENTRANCE, SILT FENCE, DIKE, AND TREE PROTECTION FENCE ACCORDING TO THE APPROXIMATE LOCATION AND SHOWN ON GRADING AND EROSION CONTROL PLAN NOTES AND DETAIL SHEET. 2. BEGIN CLEARING AND GRADING SITE. 3. SEED AND REVEGETATE SLOPES WHERE SHOWN.
II. UTILITY INSTALLATION	1. KEEP ALL STORM WATER POLLUTION PREVENTION MEASURES IN PLACE. 2. INSTALL STORM DRAINS, SANITARY SEWER, AND WATER AS SPECIFIED ON PLAN SHEETS.
III. PAVING	1. KEEP ALL STORM WATER POLLUTION MEASURES IN PLACE. REMOVE AS NEEDED TO PAVE. 2. STABILIZE SUBGRADE. 3. PAVE STREETS AND SIDEWALKS AS SPECIFIED ON PLAN SHEETS. 4. RE-INSTALL ANY STORM WATER POLLUTION PREVENTION MEASURES REMOVED FOR PAVING OPERATIONS.
IV. FINAL GRADING/SOIL STABILIZATION/LANDSCAPING	1. REVEGETATE LOT AND PARKWAYS. 2. LANDSCAPE CONTRACTOR SHALL REVEGETATE ALL AREAS RESERVED FOR LANDSCAPE VEGETATIVE COVERS. 3. REMOVE EROSION CONTROL DEVICES WHEN MINIMUM 70% GROUND COVER IS ESTABLISHED. VEGETATION MUST BE ESTABLISHED BEFORE STRUCTURAL CONTROLS REMOVED.

NOTE: THE SEQUENCE OF CONSTRUCTION SHOWN ABOVE IS A GENERAL OVERVIEW AND IS INTENDED TO CONVEY THE GENERAL CONCEPTS OF THE EROSION CONTROL DESIGN AND SHOULD NOT BE RELIED UPON FOR CONSTRUCTION PURPOSES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETAILED PHASING AND CONSTRUCTION SEQUENCING NECESSARY TO CONSTRUCT THE PROPOSED IMPROVEMENTS INCLUDED IN THESE PLANS. THE CONTRACTOR SHALL NOTIFY ENGINEER IN WRITING IMMEDIATELY, PRIOR TO AND/OR DURING CONSTRUCTION IF ANY ADDITIONAL INFORMATION ON THE CONSTRUCTION SEQUENCE IS NECESSARY. CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION AND ALL OTHER APPLICABLE LAWS.

B.M.P. MAINTENANCE SCHEDULE

TEMPORARY STONE CONSTRUCTION ENTRANCE/EXIT:

INSPECTIONS SHALL BE MADE WEEKLY AND AFTER RAIN STORM EVENTS TO ENSURE THAT THE FACILITY IS FUNCTIONING PROPERLY. AGGREGATE PAD SHALL BE WASHED DOWN OR REPLACED WHEN SEDIMENT OR MUD HAS CLOGGED THE VOID SPACES BETWEEN THE STONES OR MUD IS BEING TRACKED ONTO THE PUBLIC ROADWAY. RUNOFF FROM WASH DOWN OPERATION SHALL BE FILTERED THROUGH ANOTHER B.M.P. PRIOR TO DRAINING OFF—SITE.

SILT FEN

INSPECTIONS SHALL BE MADE WEEKLY AND AFTER RAIN STORM EVENTS. SEDIMENT SHALL BE REMOVED FROM BEHIND THE FENCE WHEN THE DEPTH OF SEDIMENT HAS BUILT UP TO ONE—THIRD THE HEIGHT OF THE FENCE ABOVE GRADE. FENCE SHALL BE INSPECTED FOR GAPS AT BASE. INSPECT SUPPORTING POSTS AND FILTER FABRIC. REPLACE IF REQUIRED.

PIPE INLET PROTECTION:

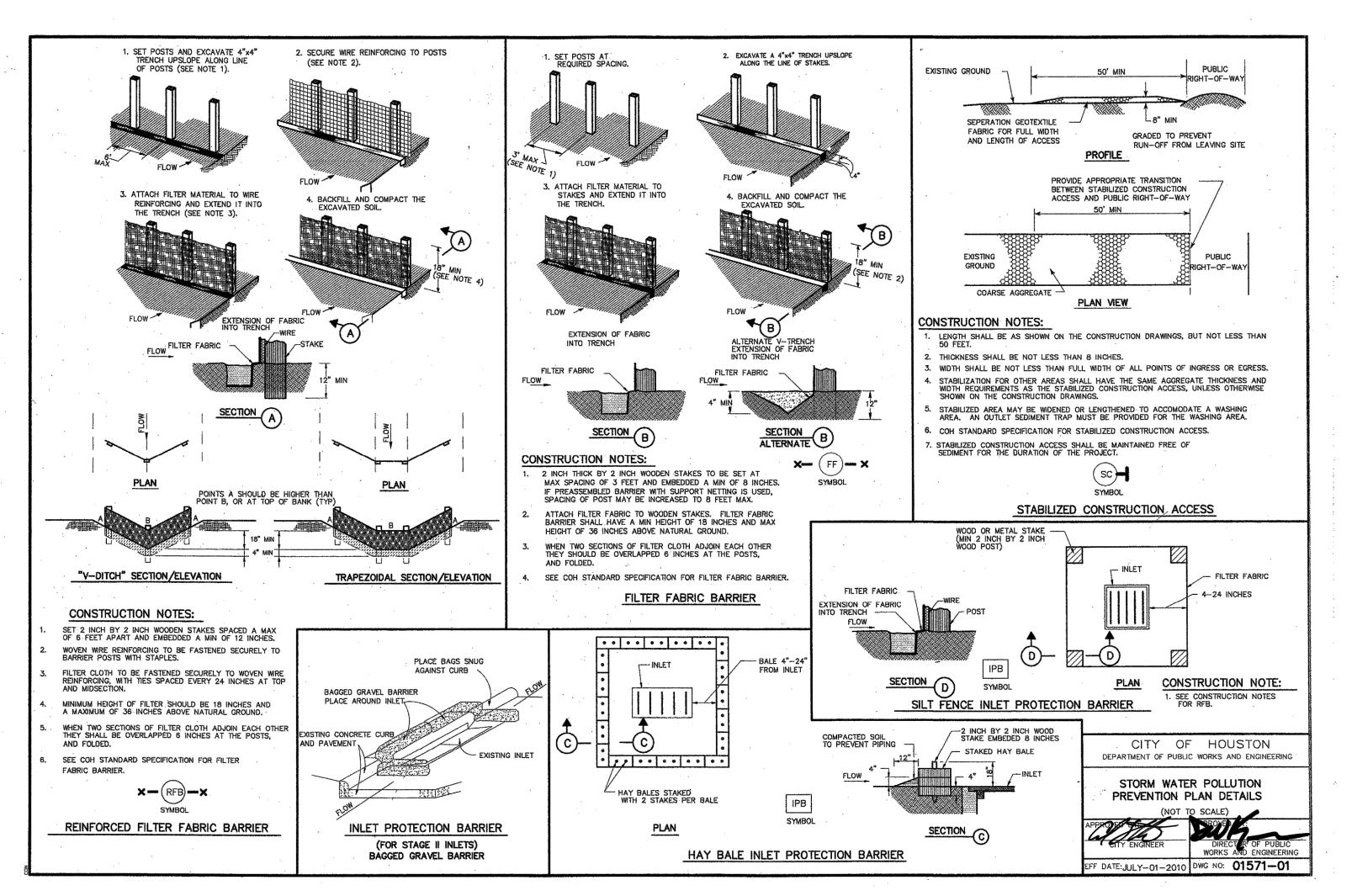
INSPECTIONS SHALL BE MADE WEEKLY AND AFTER RAIN STORM EVENTS TO ENSURE THAT THE DEVICE IS FUNCTIONING PROPERLY. SEDIMENT SHALL BE REMOVED FROM THE STORAGE AREA WHEN SEDIMENT DEPTH HAS BUILT UP TO ONE—HALF THE DESIGN DEPTH. IF DE—WATERING OF THE STORAGE VOLUME IS NOT OCCURRING, CLEAN OR REPLACE THE FILTER STONE SURROUNDING THE PIPE INLET. CLEAN THE STONE SURFACE THE FIRST FEW TIMES BY RAKING. REPEATED SEDIMENT BUILD—UP WILL REQUIRE FILTER STONE REPLACEMENT.

ROCK CHECK DAM:

INSPECTIONS SHALL BE MADE WEEKLY AND AFTER ALL RAIN EVENTS TO ENSURE THAT THE DEVICE IS FUNCTIONING PROPERLY. REMOVE SEDIMENT FROM THE STORAGE AREA UPSTREAM OF THE DAM WHEN THE DEPTH OF SEDIMENT HAS BUILT UP TO ONE—HALF OF THE DAM HEIGHT. REPAIR DAMAGE TO THE CHANNEL IN THE VICINITY OF THE CHECK DAMS IMMEDIATELY TO PREVENT ADDITIONAL DAMAGE. REPLACE MISSING OR DISLODGED ROCK AS NEEDED TO MAINTAIN THE DESIGN HEIGHT AND CROSS SECTION OF THE CHECK DAM.

CURB INLET/GRATE INLET/WYE INLET:

INSPECTIONS SHALL BE MADE WEEKLY AND AFTER ALL RAIN EVENTS TO ENSURE THAT THE DEVICE IS FUNCTIONING PROPERLY. REMOVE SEDIMENT FROM THE STORAGE AREA SURROUNDING THE INLET/GRATE WHEN THE DEPTH OF SEDIMENT HAS BUILT UP TO ONE—HALF OF THE PROTECTION HEIGHT. DEVICE SHALL BE INSPECTED FOR GAPS AT BASE, AND SHALL BE REPLACED AS NEEDED.



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Date

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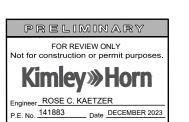
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Kimley » Horr

11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F—928

Tel. No. (281) 597-9300



KIRKWOOD CROSSING

HOUSTON, TX 77048

SWPPP DETAILS

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

WASTE WATER

STORM WATER

FILE NO.

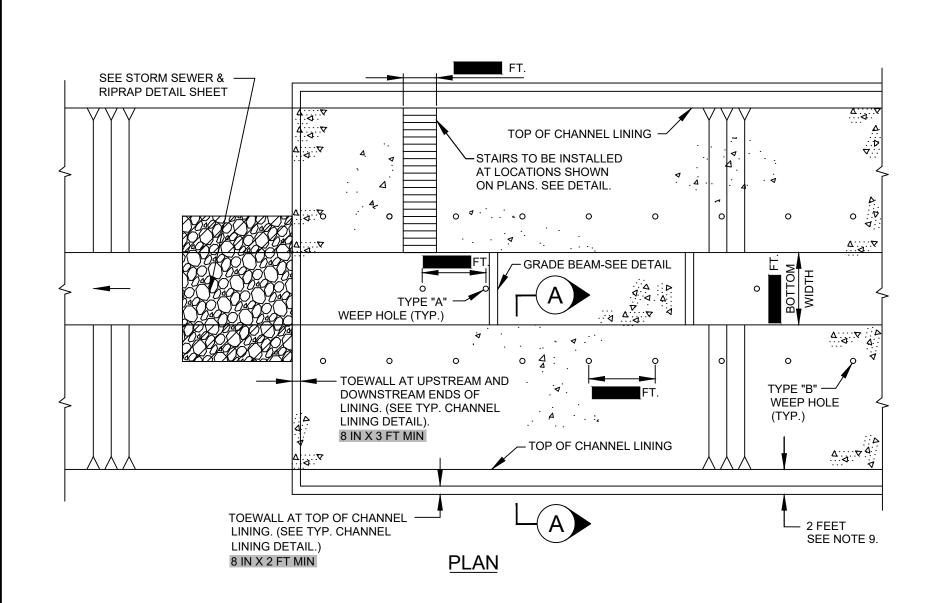
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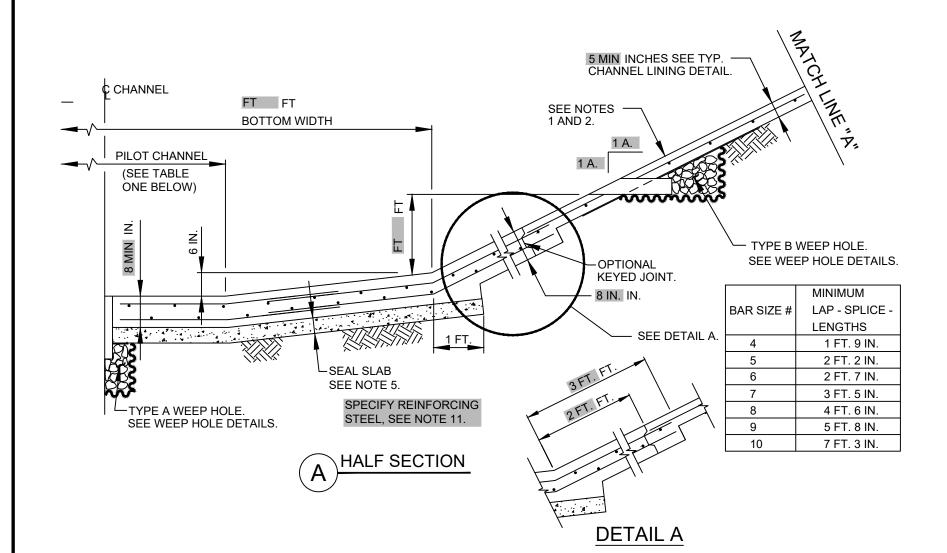
TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

FACILITIES

HORIZ:

SHEET NO. C-22 OF C-28 DRAWING SCALE





TYPICAL TRAPEZOIDAL CHANNEL LINING

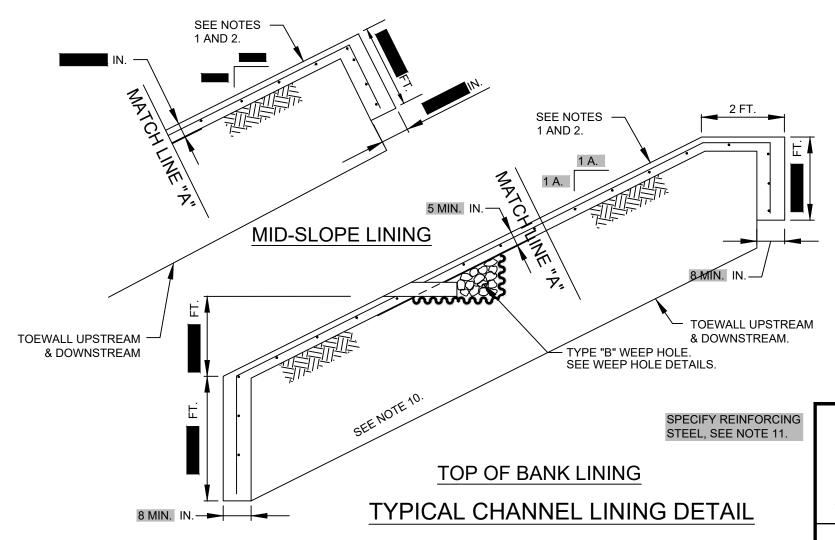
5 MIN IN. SEE TYP. —— CHANNEL LINING DETAIL. PILOT CHANNEL WIDTH FLAT BOTTOM VARI FT. TYPE B WEEP HOLE AT 3 IN. FT. O.C. SEE WEEP HOLE DETAILS. PILOT CHANNEL (SEE TABLE ABOVE) DETAIL B TYPE C WEEP HOLE AT 8 M FEET O.C. SEE WEEP HOLE DETAILS. 6 INCH KEYED JOINT. SEE NOTE 14. 6 INCH -SEAL SLAB SEE NOTE 5. TYPE A WEEP HOLE AT 8 M FEET O.C. SEE WEEP HOLE DETAILS. - SEE NOTE 8.

TYPICAL RECTANGULAR CONCRETE

CHANNEL LINING HALF SECTION

SPECIFY REINFORCING STEEL, SEE NOTE 11.

PIPE OUTFALL DETAIL



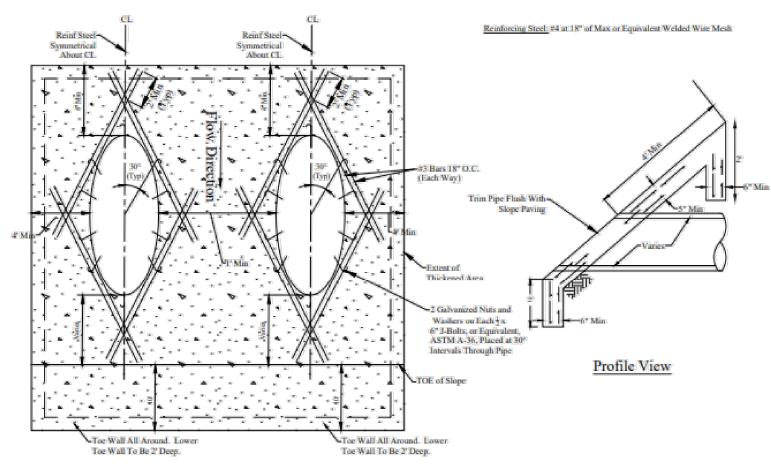
Continuous

#4 Bars @ 18" C-C _ 6",

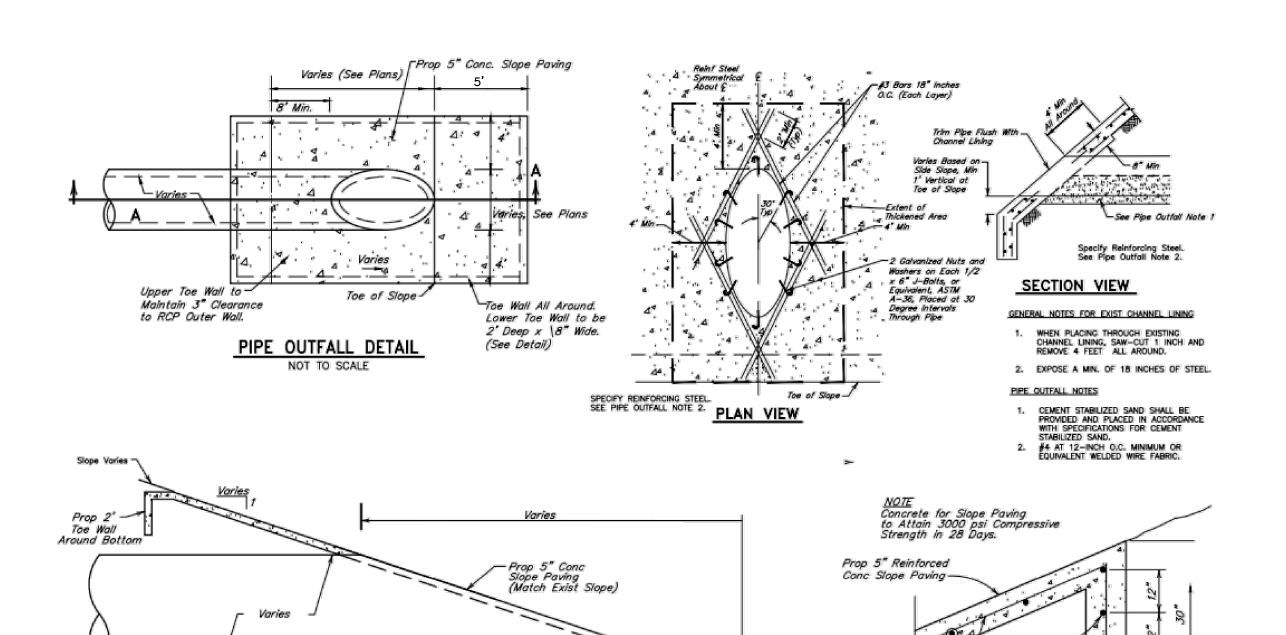
SLOPE PAVING

TOE WALL DETAIL

Backslope Outfall/Slope Paving Detail Reinf Steel Symmetrical About CL #5 Bars 18° O.C. (Each Way) Fig. Bars 18° O.C. (Each Way)



Dual Pipe Outfall/Slope Paving Detail



1'-2" To Expose Steel. Bend Break End of RCP Back Steel Out and Tie to Slope Paving Steel with 10" Laps.

SECTION "A-A"

Plan View

TYPICAL BASIN OUTFALL DETAILS

L Channel

└ Prop 2' Toe Wall Around Bottom NOTICE:

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Suite 800 Houston, Texas 77079
TBPE Firm Registration F—928

Tel. No. (281) 597–9300

FOR REVIEW ONLY
Not for construction or permit purposes.

Kimley >>> Horn

Engineer_ROSE C. KAETZER
P.E. No. 141883 Date DECEMBER 2023

KIRKWOOD CROSSING

STORM SEWER DETAILS

(SHEET 1 OF 3)

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

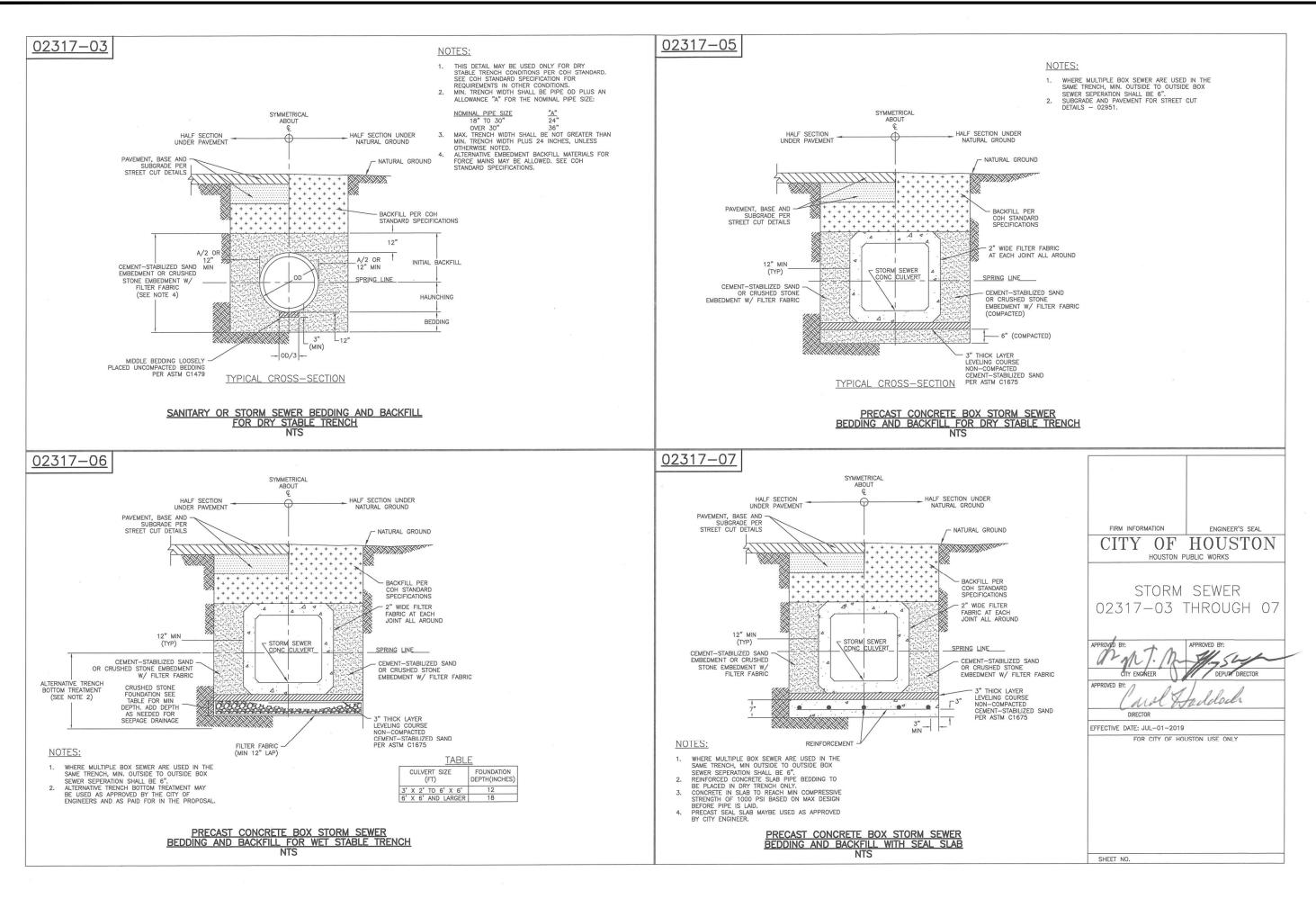
WASTE WATER FACILITIES

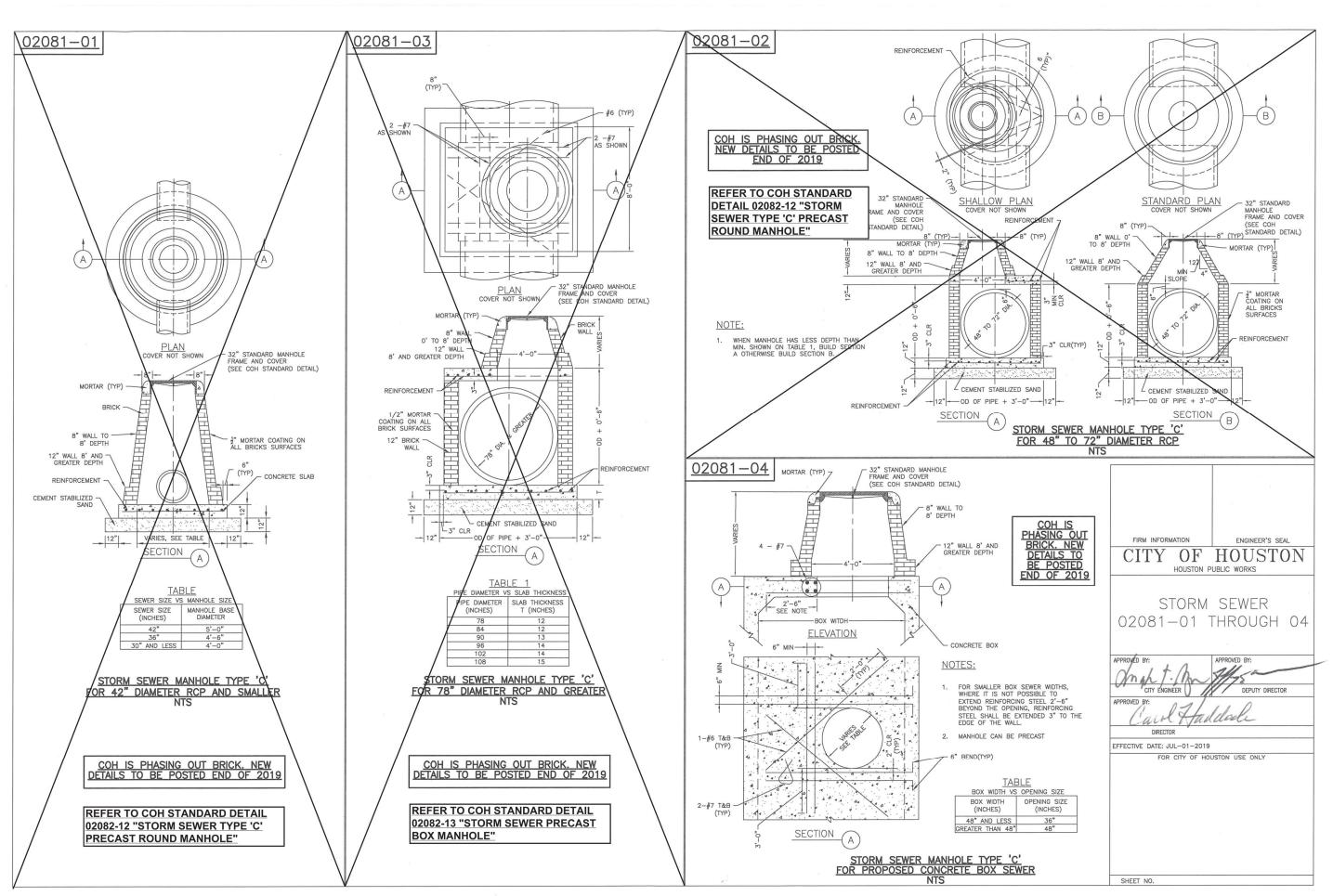
STORM WATER TRAFFIC & TRANSPORTATION / STREET & BRIDGE

FILE NO. HORIZ:

VERT:

SHEET NO. C-23 OF C-28 DRAWING SCALE
FOR CITY OF HOUSTON USE ONLY







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PRELIMINARY FOR REVIEW ONLY **Kimley** Whorn ngineer_ROSE C. KAETZER P.E. No. 141883 Date DECEMBER 2023

KIRKWOOD CROSSING

STORM SEWER DETAILS

(SHEET 2 OF 3)

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY WASTE WATER **FACILITIES**

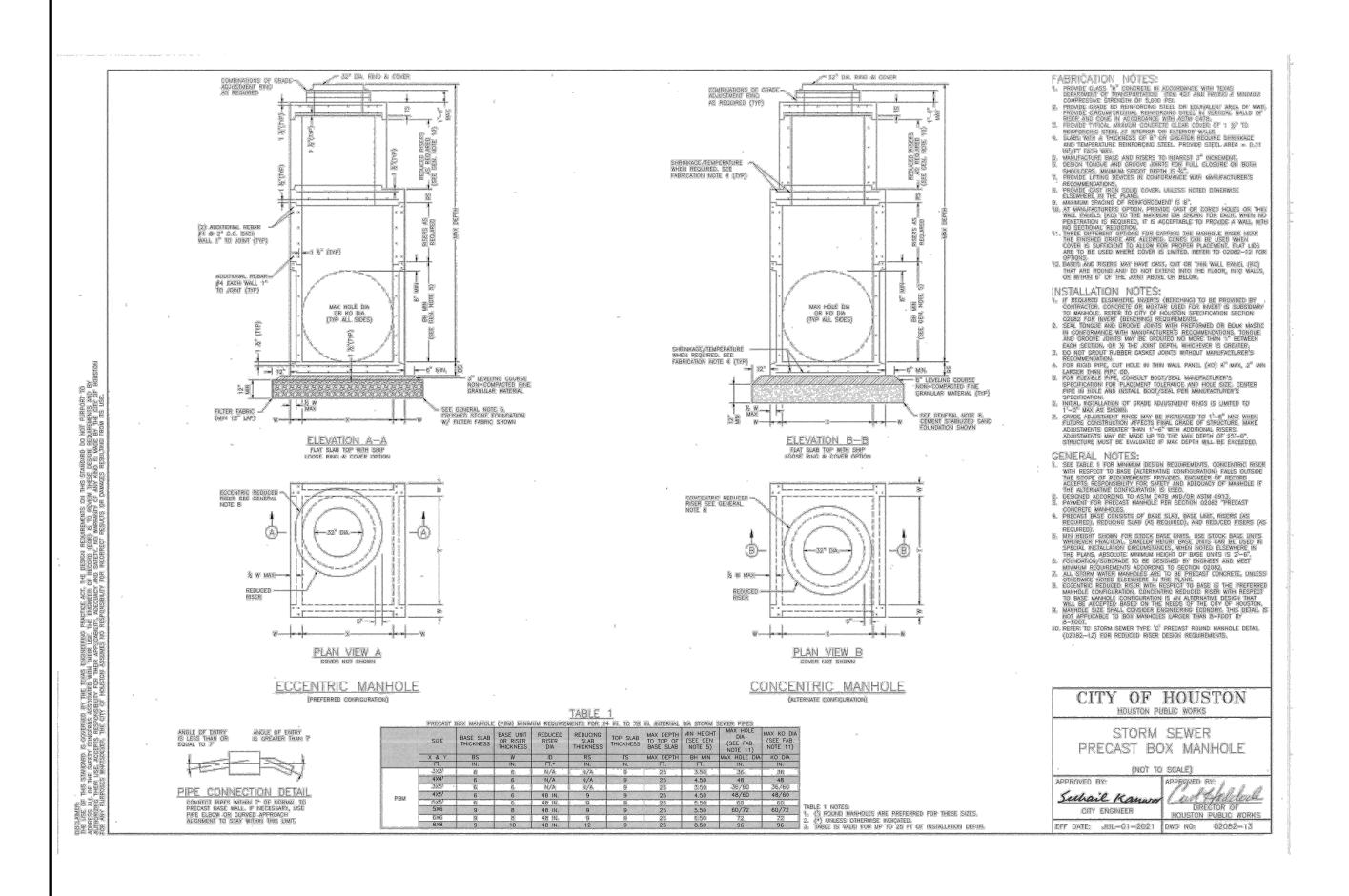
STORM WATER

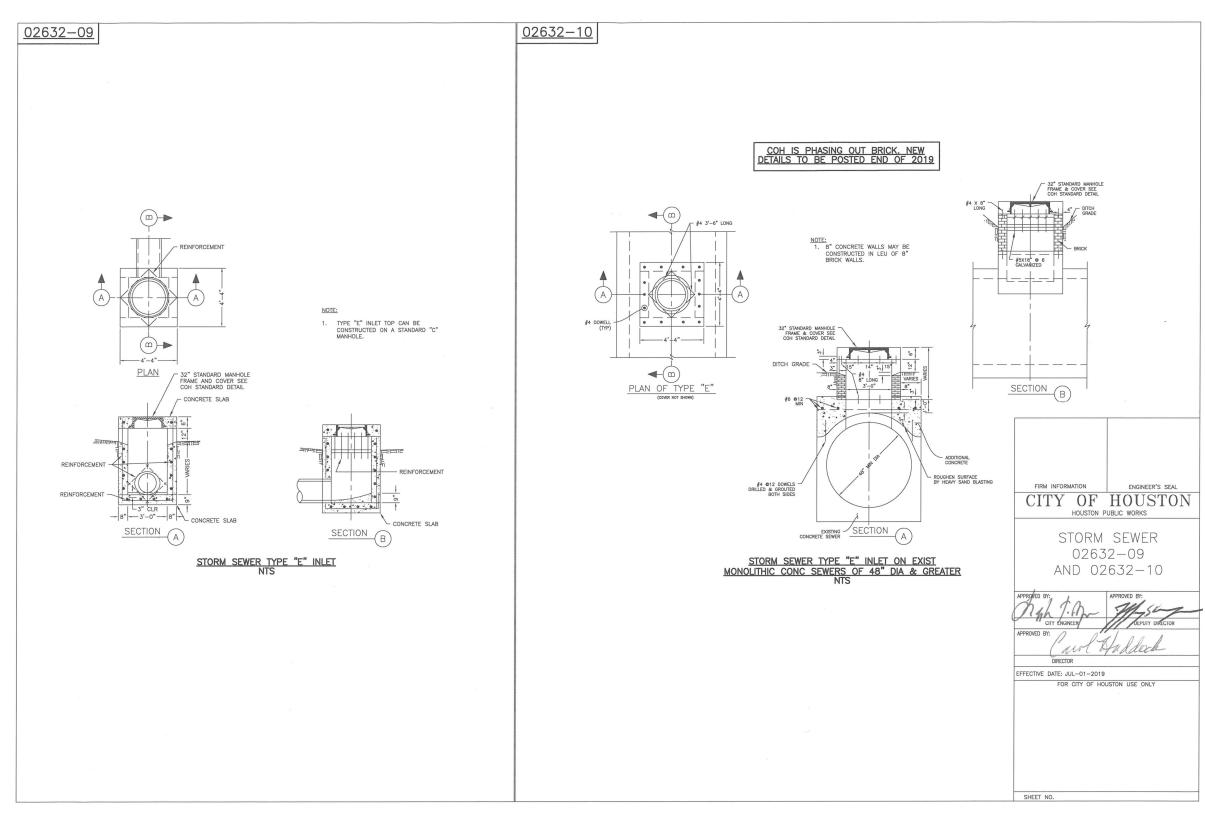
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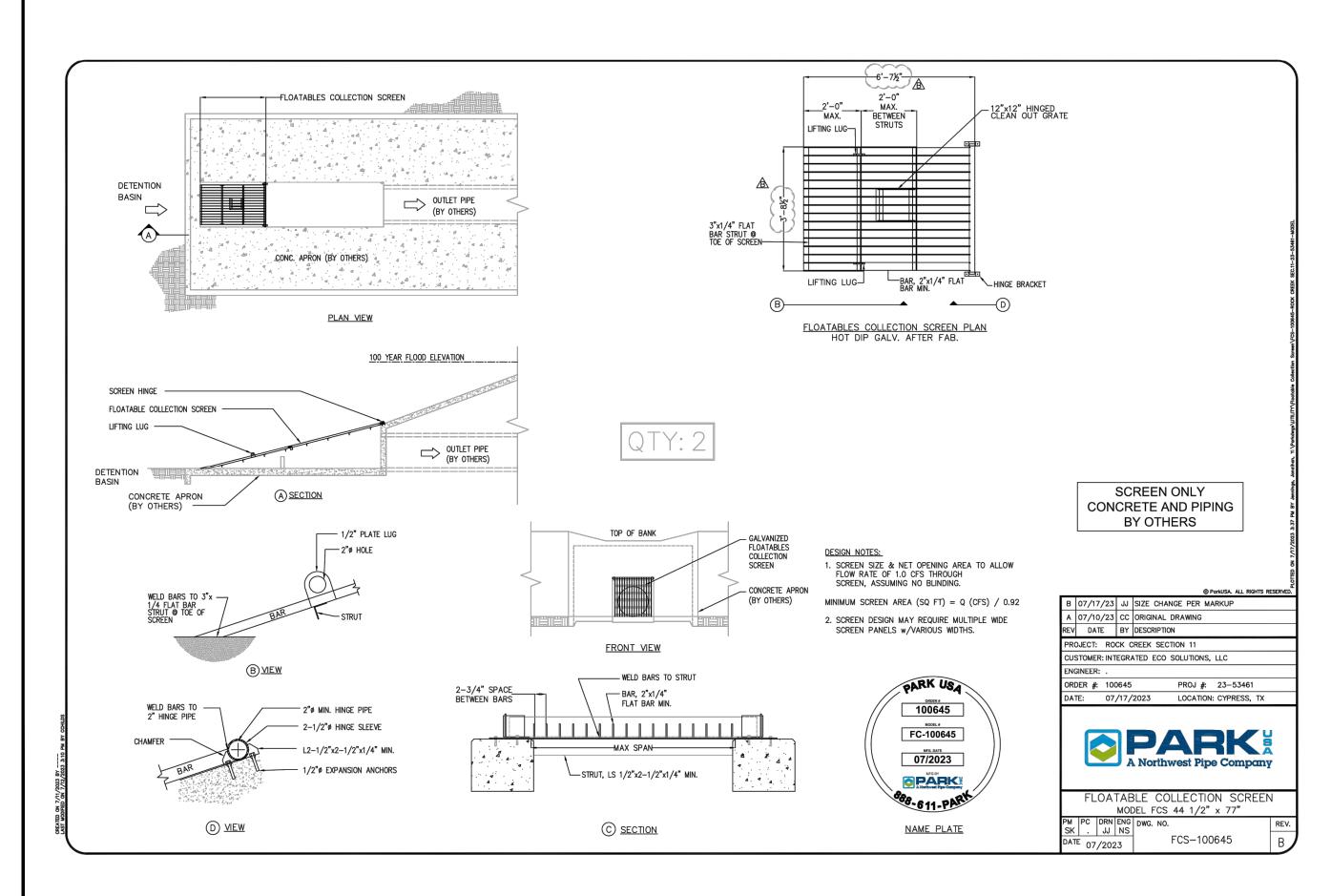
TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

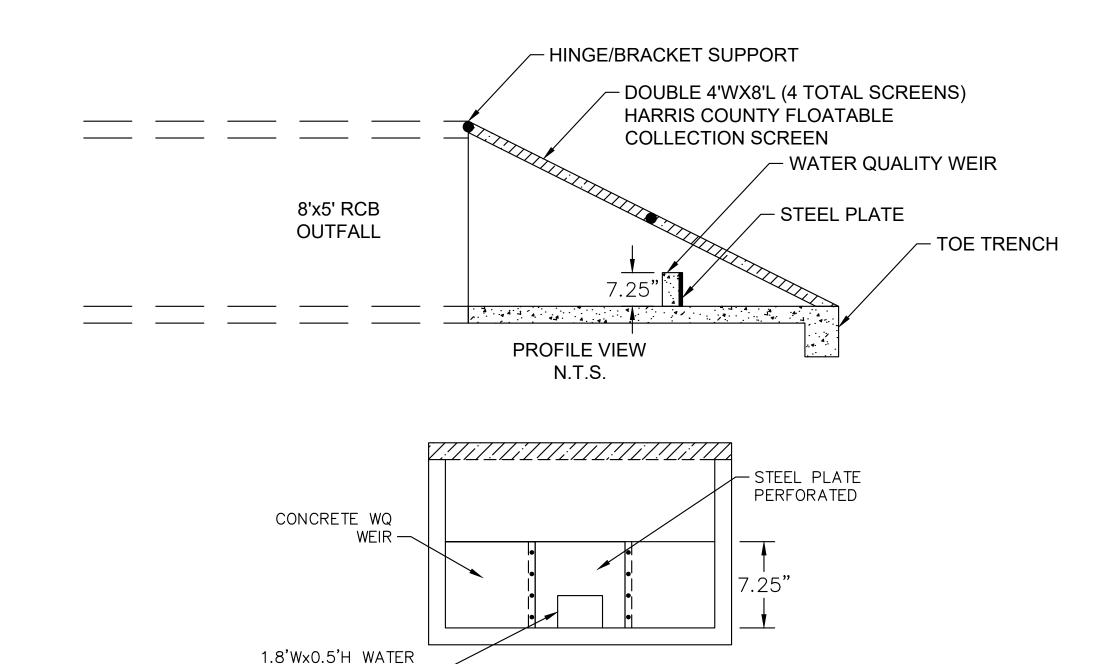
HORIZ:

SHEET NO. C-24 OF C-28 DRAWING SCALE FOR CITY OF HOUSTON USE ONLY









FRONT VIEW

N.T.S

QUALITY ORIFICE -

NOTICE

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KIRKWOOD CROSSING

STORM SEWER DETAILS

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

(SHEET 3 OF 3)

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY
WASTE WATER FACILITIES

STORM WATER TRAFFIC & TRANSPORTATION /

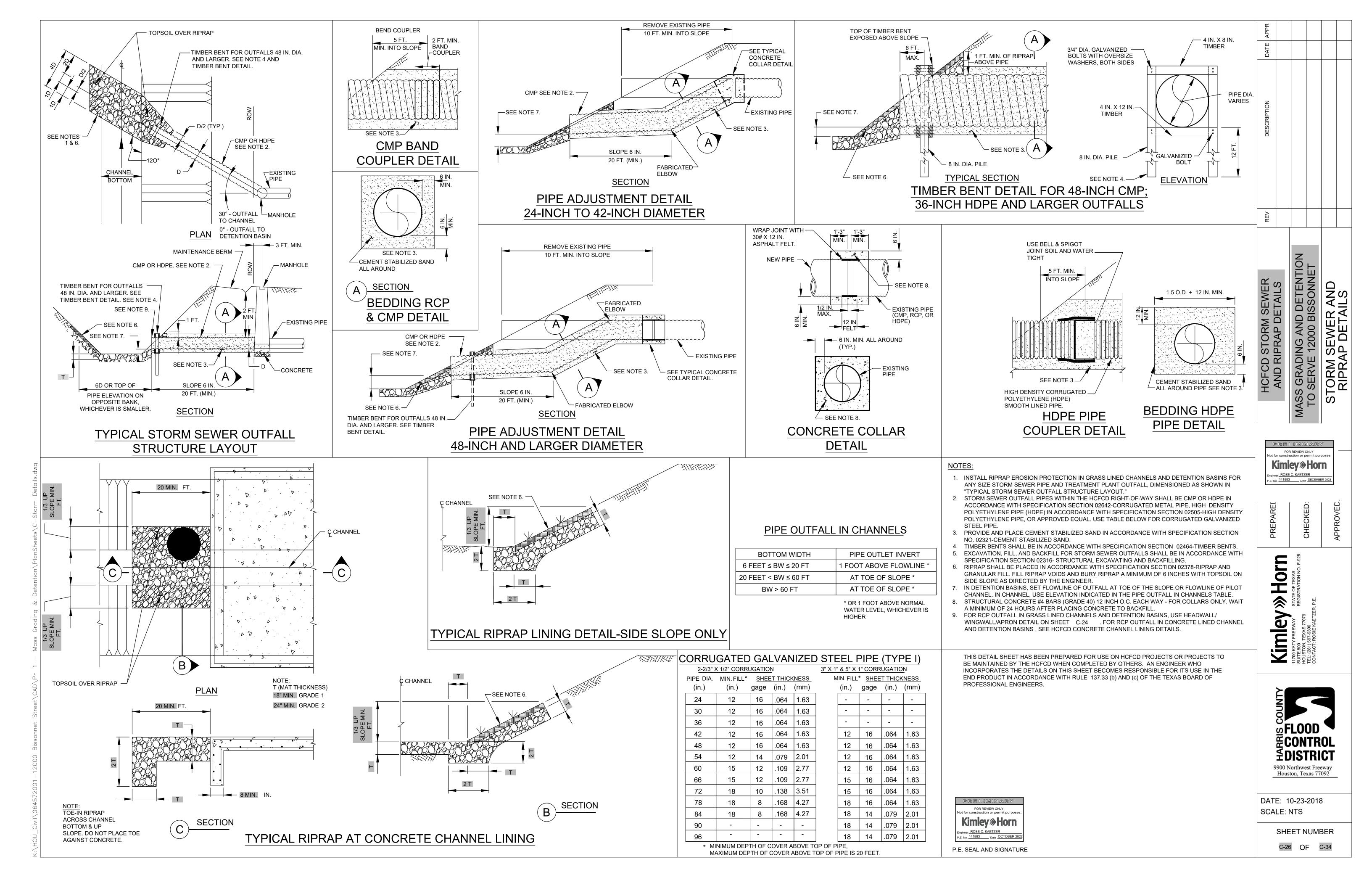
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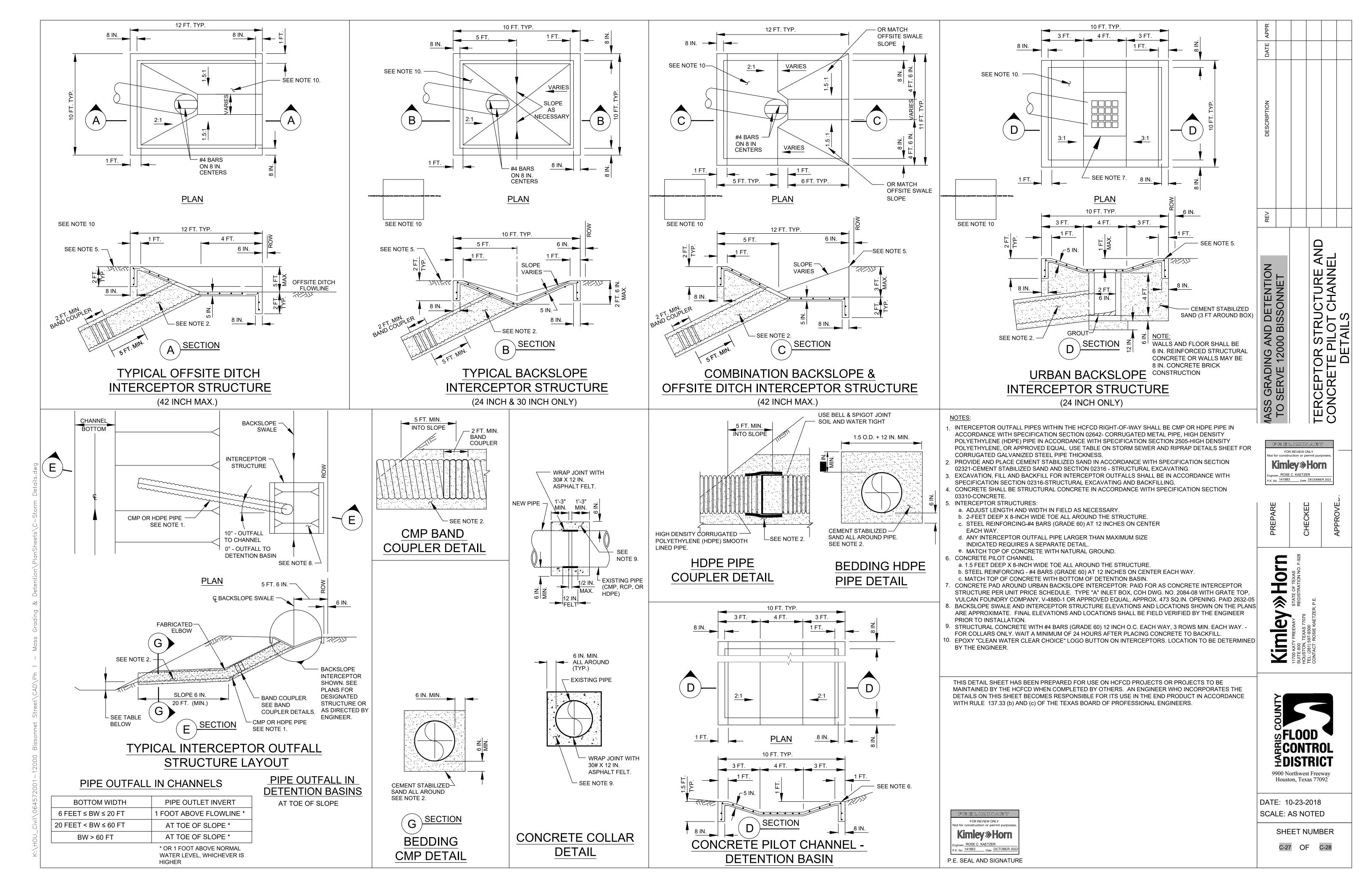
STREET & BRIDGE

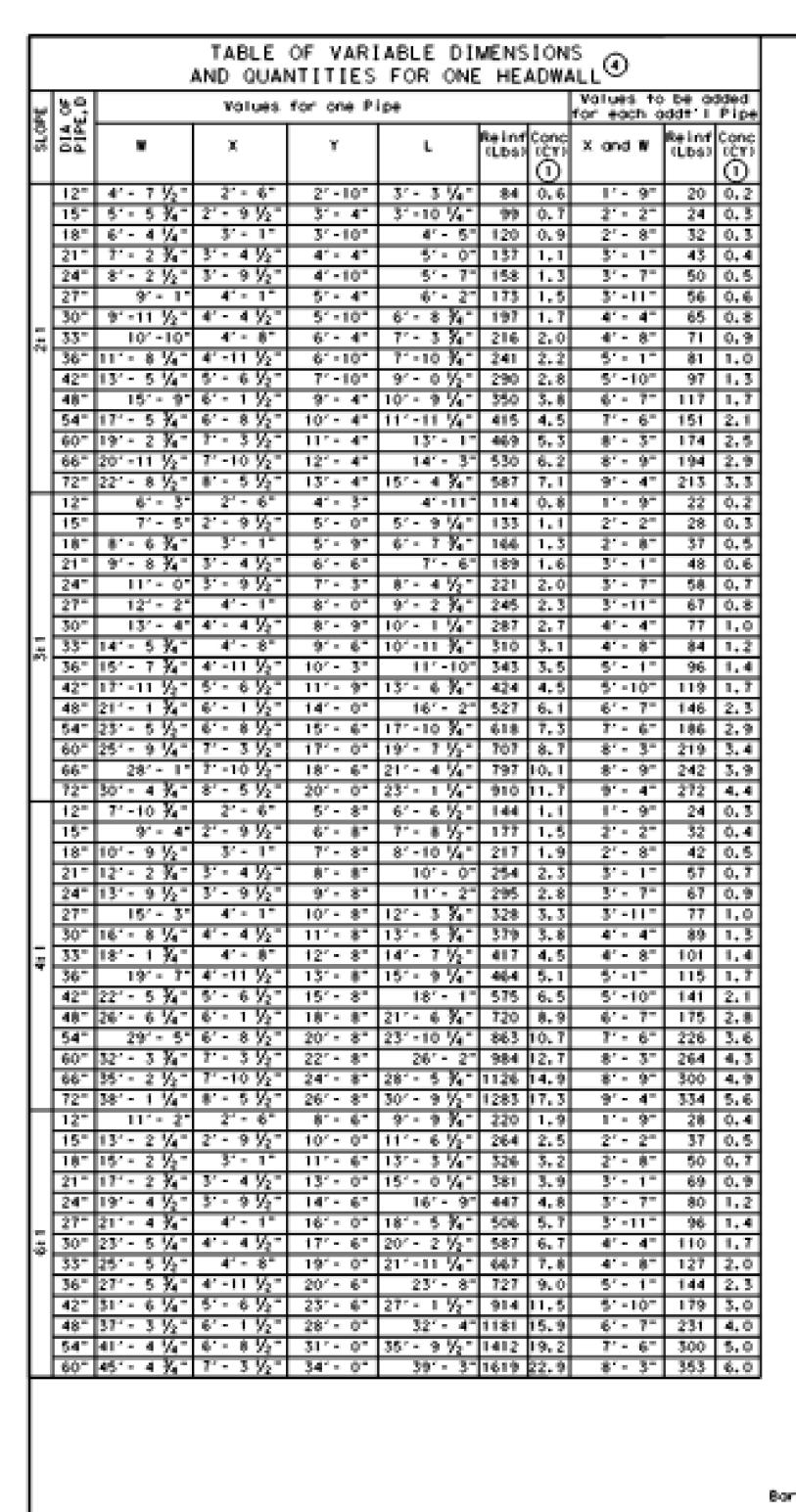
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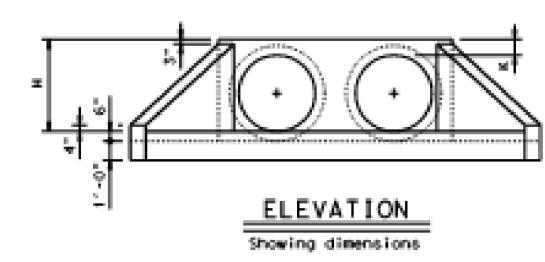
VERT:

SHEET NO. C-25 OF C-28 DRAWING SCALE









% Pipe or Pipes-

Bons F —

Bors C-

Bors B—

— Bors V₁ ·V_x

Conforms to SL:1 slope

perpendicular to Rawy —

Bons VI - Vx ----

Bors 5-3

Bons Dr - 0x -

TYPICAL WING ELEVATION

Bons 5 —

3/2

— Bors A₁-A× j

Bons 0-

Contractor shall

Bor W on Inside

face of wall. —

needed to support ritio

SECTION A-A

provide bors as

Finished Grade

(Roadway Slope)

- Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.
- ② For vehicle safety, ourbs shall project no more than 3" above finished grade. Curb heights shall be reduced, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- (3) Provide a 1'-0" footing as shown where required to maintain 4" Min cover for pipes.
- (a) Quantities shown are for one structure end only (one headwall).
- (5) Min Length 6° 3° × $\left(\frac{12 \times H 7}{12 \times L}\right)$ Max Length 12 × H 3° × $\left(\frac{12 \times H 7}{12 \times L}\right)$ 1°

-Bors E

Bors $B_1 \cdot B_{\times}$

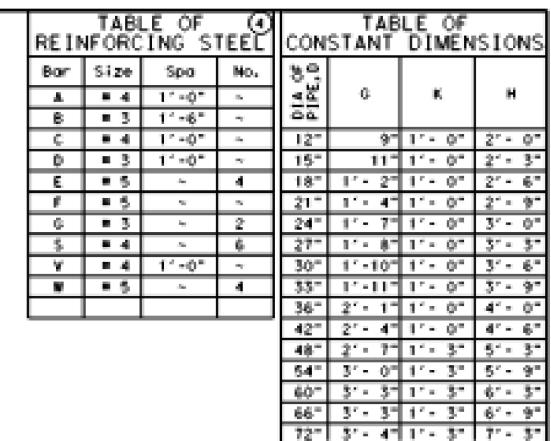
Toe of

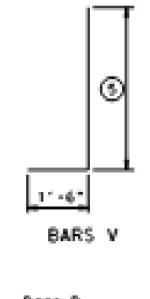
>= Bors D

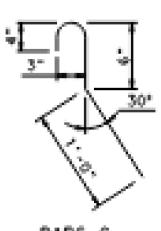
-Const Jt

Slope --

6 Lengths of wings based on SL:1 Slope along this







BARS C 12" -0" Tongs

9" Min Bors Bx. BARS B & B1-Bx

Tel. No. (281) 597-9300

GENERAL NOTES: Designed according to AASHTO LRFD

Specifications. Reinforcing steel shall be placed with

the center of the outside layer of bars 2"
from the surface of the concrete.
All reinforcing steel shall be Grade 60.
All concrete shall be Class "C" and shall
have a minimum compressive strength of 3600 psi.

No bridge rails of any type may be mounted directly to these culvert headwalls.

Texas Department of Transportation

CONCRETE HEADWALLS WITH FLARED WINGS FOR 0° SKEW PIPE CULVERTS

CH-FW-0

Bridge Division Standard

nuc diffinitiese.dign	dis Th	50T	or represent	DARGE	621 (MP
Onidon February 2019	1997	SECT	.000		CHOOKE
RDV96089					
	2006		500MT		20037-00.

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Kimley »Horn gineer ROSE C. KAETZER P.E. No. <u>141883</u> Date <u>DECEMBER 2023</u>

KIRKWOOD CROSSING

HOUSTON, TX 77048

CONCRETE HEADWALLS DETAIL

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CITY OF HOUSTON HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

WASTE WATER **FACILITIES**

STORM WATER

TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

FILE NO. HORIZ:

SHEET NO. C-28 OF C-28 DRAWING SCALE

FOR CITY OF HOUSTON USE ONLY

Date FOR REVIEW ONLY

APPENDIX 6 WATER, SEWER, DRAINAGE, AND PAVING PLANS

CIVIL SITEWORK PLANS PAVING, GRADING & UTILITIES FOR KIRKWOOD CROSSING PHASE 1 WS&D

PLANS SUBMITTAL/REVIEW LOG

FIRST SUBMITTAL JANUARY 18, 2023
 SECOND SUBMITTAL AUGUST XX, 2023

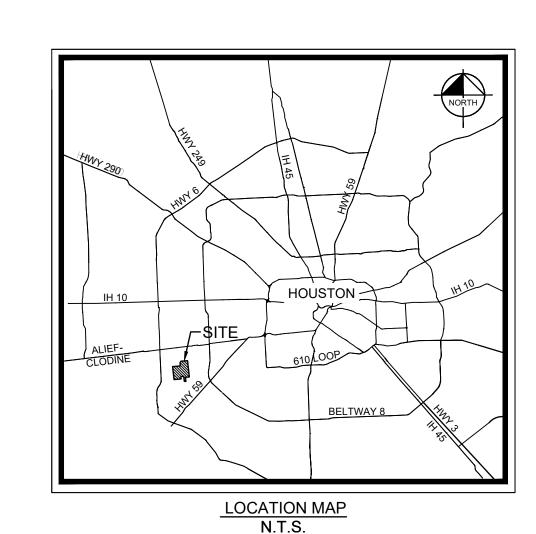
THE SUBJECT PROPERTY IS ADDRESSED AT 12000 BISSONNET STREET, HOUSTON, TEXAS 77099. THE SUBJECT PROPERTY IS PART OF AND SURROUNDED BY THE +/-118.778-ACRE DOTY SAND PIT VENTURE (DSPV) LANDFILL. THE DSPV LANDFILL BEGAN AS A SAND MINING OPERATION IN ABOUT 1960 AND TRANSITIONED TO LANDFILL BEFORE 1978 AND CONTINUED TO OPERATE AS A LANDFILL UNTIL ITS CLOSURE IN 1999. IN 1981 THE DSPV LANDFILL RECEIVED A PERMIT FROM THE TEXAS DEPARTMENT OF HEALTH (TDH), [NOW THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ)] TO OPERATE THE SITE AS A TYPE IV LANDFILL FOR CONSTRUCTION AND DEMOLITION DEBRIS DISPOSAL. THE SITE WAS SUBSEQUENTLY ISSUED MUNICIPAL SOLID WASTE (MSW) PERMIT NO. 1247 BY TCEC IN 1985. MSW PERMIT NO. 1247 IS ACTIVE AND THE SITE HAS BEEN IN POST CLOSURE CARE SINCE 1999. THE CURRENT TCEQ MSW PERMIT NO. 1247 PERMITTE IS NORTHWEST METRO HOLDINGS. CS 34. LLC OF BURLINGAME. CALIFORNIA.

LOCATED ADJACENTLY NORTH AND EAST OF THE DSPV LANDFILL IS THE +/18.11-ACRE OLSHAN DEMOLISHING LANDFILL (FORMERLY MSW PERMIT NO. 1259),
ALSO A CLOSED TYPE IV LANDFILL THAT REPORTEDLY RECEIVED CONSTRUCTION
DEBRIS WASTE FROM SEPTEMBER 1976 UNTIL JULY 1987. IN 2002, THE OLSHAN
LANDFILL ENDED POST CLOSURE CARE, AND THE MSW PERMIT WAS REVOKED BY
TCFO

THE SUGAR HILLS GOLF COURSE WAS DEVELOPED ABOVE THE DSPV LANDFILL AND OLSHAN DEMOLISHING LANDFILL AND OPERATED FROM APPROXIMATELY 2000 TO 2005 WITH AN ADDRESS OF 12000 BISSONNET STREET. SINCE THE SUGAR HILLS GOLF COURSE CLOSED, BOTH LANDFILLS HAVE REMAINED DEVELOPED AS A GOLF COURSE, THOUGH ONLY SPARINGLY MAINTAINED.

IN APRIL 2016, ECO 1 DEVELOPMENT, LLC (ECO 1), A PRIOR MSW PERMITTE RECEIVED A TYPE IX REGISTRATION NO. 40286 FROM TCEQ FOR MINING OF THE OI SHAN DEMOLISHING LANDEILL UNDER 30 TEXAS ADMINISTRATIVE CODE (TAC HAPTER 330, SUBCHAPTER N. ECO 1 REMOVED SOME GOLF COURSE SOIL FROM THE OLSHAN DEMOLISHING LANDFILL, BUT NEVER ACTIVELY MINED WASTE MATERIAL UNDER THE TYPE IX REGISTRATION. TCEQ REVOKED THE TYPE IX REGISTRATION ON AUGUST 1 2019 FOR LACK OF ACTIVITY. HOWEVER, FOR THE REGISTRATION NO. 40286 APPLICATION, ECO 1 PERFORMED 6 TEST PITS ON THE OLSHAN DEMOLISHING LANDFILL FOR WASTE CHARACTERIZATION, SOIL AND LEACHATE TESTING AND WASTE DEPTH DETERMINATION. FROM THE 6 TEST PITS, ECO 1 EXCAVATED ABOUT 1.700 CUBIC YARDS OF MATERIAL WHICH SKA CATEGORIZED AS 74% SOIL, 10% WOOD, 10% CONCRETE, 3% METAL, AND 3% OTHER (PLASTIC, RUBBER, TEXTILES, ETC). THE MAXIMUM DEPTH OF THE WASTE MATERIAL WAS REACHED IN TEST PIT 1 AT 26 FEET BELOW GROUND SURFACE (FT-BGS). THE AERIAL EXTENT OF WASTE DEPOSITION WAS NOT EVALUATED BY THE TEST PIT EXCAVATIONS. ALL WASTE OBSERVED WAS CONSISTENT WITH A TYPE IV LANDFILL

THE CURRENT PROPERTY OWNER, BISSONNET 136, LLC, ACQUIRED THE PROPERTY IN JUNE 2019. A RELATED ENTITY, NORTHWEST METRO HOLDINGS, CS 34, LLC BECAME THE MSW NO. 1247 PERMITTEE AFTER A TRANSFER PERMIT MODIFICATION WAS APPROVED BY TCEQ ON JUNE 4 2020.



CONTRACTOR SHALL NOTIFY THE CITY OF HOUSTON, HOUSTON PUBLIC WORKS, OFFICE OF THE CITY

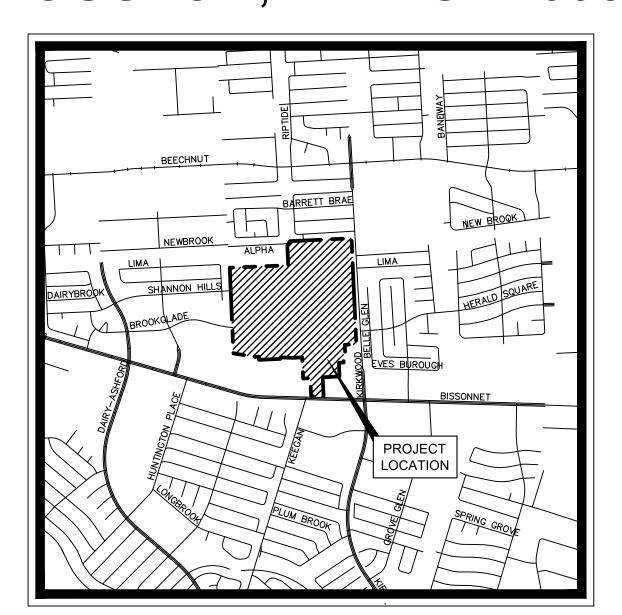
ACCORDING TO MAP NO. (48201C0840L) OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S FLOOD

ENGINEER, 48 HOURS BEFORE STARTING WORK ON THIS PROJECT, TELEPHONE NO. 832-394-9098

INSURANCE RATE MAPS FOR HARRIS COUNTY AND INCORPORATED AREAS, DATED 06/18/2007, THE

SUBJECT TRACT IS SITUATED WITHIN ZONE X UNSHADED.

12000 BISSONNET STREET HOUSTON, TEXAS 77099



VICINITY MAP

AUGUST 2023

REFERENCE BENCHMARKS BENCHMARK - HARRIS COUNTY FLOODPLAIN RM NO.: 040510, STAMPED "D120 BM05", LOCATED FROM THE INTERSECTION OF BEECHNUT STREET AND BOONE ROAD, TRAVEL SOUTH APPROXIMATELY 0.22 MILE ON BOONE ROAD TO CONCRETE BRIDGE. MONUMENT IS LOCATED ON EAST CENTERLINE SIDEWALK AT CENTERLINE STREAM NAVD88 (2001 ADJUSTED TEMPORARY BENCHMARK "A" - Elevation = 79.02' BOX CUT ON THE SOUTH END OF A MEDIAN ON THE NORTH END OF A BULL NOSE. LOCATED ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM THE INTERSECTION OF COOK ROAD AND BROOKGLADE CIRCLE. TEMPORARY BENCHMARK "B" - Elevation = 78.95" BOX CUT ON THE SOUTH END OF A MEDIAN ON THE NORTH END OF A BULL NOSE. LOCATED ON THE CENTER LINE OF COOK ROAD, APPROXIMATELY 30.0' NORTH FROM THE INTERSECTION OF COOK ROAD AND MAGNOLIA FEMPORARY BENCHMARK "C" - Elevation = 81.34 BOX CUT ON STORM INLET LOCATED ON THE NORTH LINE OF BISSONNET STREET, +/- 1,000 FEET WEST FROM THE INTERSECTION OF BISSONNET STREET AND SOUTH KIRKWOOD ROAD. TEMPORARY BENCHMARK "D" - Elevation = 76.20' BOX CUT ON STORM INLET LOCATED ON THE WEST LINE OF SOUTH KIRKWOOD ROAD, +/- 200 FEET NORTH FROM THE INTERSECTION OF ZARROLL DRIVE AND SOUTH KIRKWOOD ROAD.

Know what's below.
Call before you dig.

EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE PLANS.

SHEET INDEX

Sheet Number	Sheet Title
C1.0	COVER SHEET
C2.0	HARRIS COUNTY EXPRESS REVIEW SHEET
C3.0	HCFCD EXPRESS REVIEW SHEET
C4.0	GENERAL NOTES
C5.0	OVERALL DEVELOPMENT PLAN
C6.0	PAVING AND SIGNAGE PLAN
C7.0	OVERALL WATER PLAN
C8.0	OVERALL SEWER PLAN
C9.0	OVERALL STORM PLAN
C10.0	PROPOSED DRAINAGE AREA MAP & CALCS
C11.0	STORM & INLET CALCULATIONS
C12.0	GRADING PLAN
C13.0	PLAN & PROFILE - LIMA DRIVE (START TO 8+30)
C14.0	PLAN & PROFILE - LIMA DRIVE (8+30 TO 17+30)
C15.0	PLAN & PROFILE - LIMA DRIVE (17+30 TO 26+30)
C16.0	PLAN & PROFILE - LIMA DRIVE (26+30 TO 35+30)
C17.0	PLAN & PROFILE - HILLTOP LOOKOUT WAY
C18.0	PLAN & PROFILE - OFFSITE SSWR (0+00 TO 3+00)
C19.0	PLAN & PROFILE - OFFSITE SSWR (3+00 TO 10+75)
C20.0	STORM PROFILES - LATERALS (1 OF 2)
C21.0	STORM PROFILES - LATERALS (2 OF 2)
C22.0	EROSION CONTROL PLAN
C23.0	EROSION CONTROL DETAILS
C24.0	CONSTRUCTION DETAILS (1 OF 6)
C25.0	CONSTRUCTION DETAILS (2 OF 6)
C26.0	CONSTRUCTION DETAILS (3 OF 6)
C27.0	CONSTRUCTION DETAILS (4 OF 6)
C28.0	CONSTRUCTION DETAILS (5 OF 6)
C29.0	CONSTRUCTION DETAILS (6 OF 6)

NO. DATE REVISION APP.

Kimley» Horn

11700 Katy Freeway,
Suite 800 Houston, Texas 7707
TBPE Firm Registration F—928

TBPE Firm Registration F-Tel. No. (281) 597-9300

TRAFFIC SIGNAL

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

P.E. No. <u>141883</u> Date <u>January 2023</u>

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY
WASTE WATER FACILITIES

STORM WATER TRAFFIC & TRANSPORTATION/

STREET & BRIDGE

CITY ENGINEER DATE

DIRECTOR OF DATE
HOUSTON PUBLIC WORKS

SHEET NO C1.0 OF C29.0 SHEETS

FOR CITY OF HOUSTON USE ONLY

OWNER: BISSONNET 136, LLC 22310 GRAND CORNER DRIVE, SUITE 140 HOUSTON, TEXAS 77057

22310 GRAND CORNER DRIVE, SUITE OF HOUSTON, TEXAS 77057 CONTACT: MARK LESTER (650) 638-0900

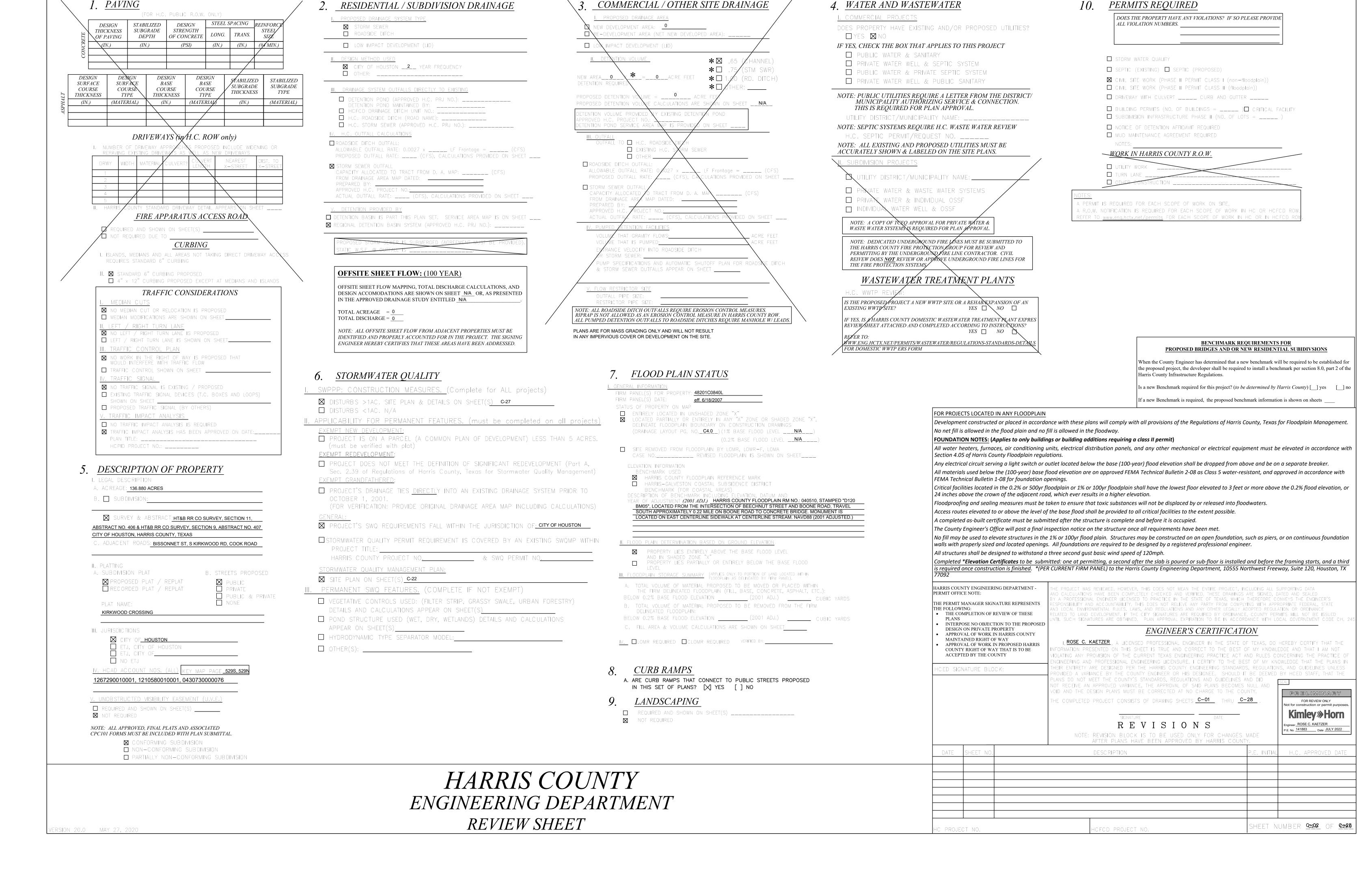
SURVEYOR: WINDROSE 11111 RICHMOND AVE, STE 150 HOUSTON, TEXAS 77082 (713) 458-2281

PREPARED BY:

Kimley»Horn

11700 Katy Freeway, Suite 800 Houston, Texas 77079 Certificate of Authorization F-928 Contact: Rosie Kaetzer, PE

Tel. No. (281) 597-9300



1. PROPERTY DESCRIPTION	2. SITE DE	TENTION	DRAI	<u>INA</u>
LOCATION INFORMATION A. HARRIS COUNTY COMMISSIONER'S PRECINCT:	I. PROPOSED DRAINAGE AREA NEW DEVELOPMENT AREA:		100150	O oaft
☐ 1 ☐ 2 ☐ 3 🔀 4 B. KEY MAP: 529S, 529N	RE-DEVELOPMENT AREA (AMOUNT INCF			J sqπ
C. ADDRESS: 12000 BISSONNET STREET, HOUSTON, TX 77099	METHOD/DESCRIPTION			
LEGAL DESCRIPTION				
A. ACREAGE: 136.880 ACRES B. SUBDIVISION: KIRKWOOD CROSSING	II. METHODOLOGY hofod popm detention method us	ED:		
SURVEY & ABSTRACT: ht&b rr co survey, section 11,	☐ METHOD 1 (LESS THAN 20 ACRES)			
ABSTRACT NO. 406 & HT&B RR CO SURVEY, SECTION 9, ABSTRACT NO. 407 CITY OF HOUSTON, HARRIS COUNTY, TEXAS				
C. ADJACENT ROADS: <u>BISSONNET ST, S KIRKWOOD RD, COOK ROAD</u>	OTHER			
PLATTING	III. DETENTION VOLUME & OUTFALL OUTFALL TO:			
A. SUBDIVISION PLAT B. STREETS PROPOSED PROPOSED PLAT / REPLAT PRIVATE PRIVATE	☒ .65, H.C.F.C.D. CHANNEL, (H.C.F.C.	d. unit no.)	D120-00-00	
PLAT NAME:	☐ .75, EXISTING STORM SEWER (OWNE	R & OPERATOR)		
KIRKWOOD CROSSING	☐ 1.00, ROADSIDE DITCH, (OWNER & R	OAD NAME)		
JURISDIC TIONS	OTHER (OWNER & OPERATOR)	_		
<pre> CITY OF HOUSTON ETJ, CITY OF HOUSTON ETJ, CITY OF</pre>	IV. STORMWATER DETENTION BASIN	INFORMATION		
NO ETJ UTILITY DISTRICT (NAME)	A. HCFCD PCPM SUMMARY TABLE SEE	 Sheet (DF THESE PL	_ANS.
HCAD ACCOUNT NOS. (ALL)	DETENTION BASIN SERVICE AREA		ores 10% EXCEEDANCE	- 1 % G
<u>1267290010001, 1210580010001, 0430730000076</u>	STORM EVENT MAXIMUM ALLOWABLE OUTFLOW (PRE- DEVELOPMENT PEAK FLOW)	(2-YEAR)	(10-YEAR)	(10
	MAXIMUM OUTFLOW PROVIDED (PEAK FLOW FROM BASIN)	76	107	
	LOWEST NATURAL/FINISHED GROUND OR FINISHED FLOOR ELEVATION ESTIMATE		81	
	DESIGN WATER SURFACE ELEVATION MINIMUM STORAGE REQUIRED (ac-ft)	VARIES N/A	VARIES N/A	
	DETENTION STORAGE PROVIDED (ac-ft)	35.9	64.6	
WORK IN HCFCD RIGHT-OF-WAY	STORAGE RATE PROVIDED (ac-ft/ac) OUTFLOW VELOCITY INTO CHANNEL	0.27 5.04	5.32	
TYPE OF WORK TO BE PERFORMED IN HCFCD HCFCD ROW	(ft/sec) DRAIN TIME - 1% ONLY (hours)	0.01	8.5	
A. BOND/NOTIFICATION INFORMATION — HCFCD WATERSHED	EMERGENCY OVERFLOW (TYPE, SIZE, ELEVATION, ETC.)	175' O\	/ERFLOW WEIR,	1' DEEP
M HCFCD UNIT No. <u>D120-00-00</u> Number of outfalls <u>1</u>	B. DETENTION BASIN TO BE MAINTAINED C. DETENTION SERVICE AREA MAP ON S			
□ UTILITY CROSSING□ ROADWAY BRIDGE/CULVERT CROSSING	D. ADDITIONAL CRITERIA FOR PUMPED DI	ETENTION BASINS		
☐ FILL ACTIVITY ☐ REHABILITATION OF CHANNEL	VOLUME OF PUMPED 1% EXCEEDANCE S MAXIMUM DESIGN OUTFLOW VELOCITY IN	TO HOFOD CHANNEL	_ =	
☐ MAINTENANCE ☐ TEMPORARY CROSSING	DRAIN TIME FOR BASIN = F	ionk2 razed ov =		
TRAIL (LENGTH)OTHER	V. DETENTION PROVIDED IN OTHER			
COST OF WORK IN HCFCD ROW	PLAN TITLE): <u>APRI</u>
USACE ENVIRONMENTAL PERMIT US ARMY CORPS OF ENGINEERS NATIONWIDE	DETENTION POND SERVICE AREA MAP IS ENGINEERING FIRM KIMLEY-HORN AND A	SSOCIATES, INC.	C10.0	
PERMIT NUMBER(S) US ARMY CORPS OF ENGINEERS INDIVIDUAL PERMITS	DETENTION BASIN MAINTAINED BY: HARRIS (
□ OTHER NO PERMITS REQUIRED EXPLAIN:	VI. FLOW RESTRICTOR SIZE OUTFALL PIPE SIZE: RESTRICTOR PIPE SIZE:			
D120-00-00 IS NON-JURISDICTIONAL	RESTRICTOR PLATE DIMENSION:			
	VII. DETENTION PROVIDED BY ☐ REGIONAL DETENTION BASIN SYSTEM (APPR	OVED H.C. PRJ NO.):		
. REFERENCE / BASIS OF DETERMINATION				
BYREPORT TITLE	FOR PROJECTS LOCATED IN ANY F Development constructed or place		lans will comply wish	h all
REPORT DATE	Development constructed or place provisions of the designated Flood No net fill is allowed in the flood p	lplain Administrator.		, uii
NOTES:	TO LET JII IS GROWED III THE JIOUU P	jii is anowed iii li	- , 	
I. — III. REQUIRED ON PROJECTS WITH WORK IN A HOFOD CHANNEL. PLEASE REFERENCE SECTION 17 OF THE FLOOD CONTROL DISTRICT POLICY, CRITERIA, AND PROCEDURE MANUAL FOR MORE INFORMATION.	OFFSITE SHEET FLO	W: (100 YEAR)		
v. hcfcd standard notes: see sheet <u>C4.0</u> of these plans.	OFFSITE SHEET FLOW MAPPING DESIGN ACCOMODATIONS ARE	E SHOWN ON SHEET N	/A OR, AS PRES	
A. ANGROD STATEMENT INSTES, SEE SHEET <u></u> - OF HILDE F L ANS.	IN THE APPROVED DRAINAGES TOTAL ACREAGE = 0			·
C24.0 - C29.0 /. hcfcd standard details: see sheet of these plans.	1 11 11 11 11 11 11 11 11 11 11 11 11 1			
C24.0 - C29.0 '. hcfcd standard details: see sheet of these plans.	TOTAL DISCHARGE = $\overline{0}$			
C24.0 - C29.0		COUNTED FOR IN THE I	PROJECT. THE S	SIGNING

ERSION 1.0 OCTOBER 2019

	2. SITE DETENTION DRAINAGE
<u> .</u>	PROPOSED DRAINAGE AREA
	<pre>NEW DEVELOPMENT AREA:</pre>
.	METHODOLOGY
	HCFCD PCPM DETENTION METHOD USED:
	☐ METHOD 1 (LESS THAN 20 ACRES)
	METHOD 2 (20 ACRES TO 640 ACRES)
	☐ METHOD 3 (GREATER THAN 640 ACRES)
	OTHER
.	DETENTION VOLUME & OUTFALL OUTFALL TO:

STORMWATER DETENTION BASIN INFORMATION

DETENTION BASIN SERVICE AREA	135	acres	
STORM EVENT	50% EXCEEDANCE (2-YEAR)	10% EXCEEDANCE (10-YEAR)	1% EXCEEDANCE (100-YEAR)
MAXIMUM ALLOWABLE OUTFLOW (PRE- DEVELOPMENT PEAK FLOW)	77	130	243
MAXIMUM OUTFLOW PROVIDED (PEAK FLOW FROM BASIN)	76	107	237
LOWEST NATURAL/FINISHED GROUND OR FINISHED FLOOR ELEVATION ESTIMATE		81	
DESIGN WATER SURFACE ELEVATION	VARIES	VARIES	VARIES
MINIMUM STORAGE REQUIRED (ac-ft)	N/A	N/A	101.3
DETENTION STORAGE PROVIDED (ac-ft)	35.9	64.6	104.6
STORAGE RATE PROVIDED (ac-ft/oc)	0.27	0.48	0.91
OUTFLOW VELOCITY INTO CHANNEL (ft/sec)	5.04	5.32	6.06
DRAIN TIME - 1% ONLY (hours)		8.5	
EMERGENCY OVERFLOW	175	'OVERFLOW WEIR, 1'	DEEP

ADDITIONAL CRITERIA FOR PUMPED DETENTION BASINS VOLUME OF PUMPED 1% EXCEEDANCE STORAGE VOLUME = _____ ACFT ____ % OF TOTAL VOLUME MAXIMUM DESIGN OUTFLOW VELOCITY INTO HCFCD CHANNEL = _____ FT/SEC DRAIN TIME FOR BASIN = _____ HOURS BASED ON ______HEAD CONDITIONS

HCFCD PROJECT No.1908070047 DATE SIGNED BY HCFCD: APRIL 16, 2020 DETENTION POND SERVICE AREA MAP IS PROVIDED ON SHEET C10.0 ENGINEERING FIRM KIMLEY-HORN AND ASSOCIATES, INC. DETENTION BASIN MAINTAINED BY: HARRIS COUNTY MUD 421

OFFSITE SHEET FLOW: (100 YEAR)

3. SWQ DISCHARGE INTO FCD FACILITY

I. SWPPP: CONSTRUCTION MEASURES. (Must complete)

- ☐ DISTURBS >1AC. SITE PLAN & DETAILS ON SHEET(S)
- DISTURBS < 1AC. N/A

*II. APPLICABILITY FOR PERMANENT FEATURES. (Must complete) EXEMPT NEW DEVELOPMENT:

PROJECT IS ON A PARCEL (A COMMON PLAN OF DEVELOPMENT)

LESS THAN 5 ACRES. (Must be verified with plat) EXEMPT REDEVELOPMENT:

- PROJECT DOES NOT MEET THE DEFINITION OF SIGNIFICANT REDEVELOPMENT (Part A,Sec. 2.39 of Regulations of Harris County, Texas for Stormwater Quality Management)
- EXEMPT GRANDFATHERED: ☐ PROJECT'S DRAINAGE TIES DIRECTLY INTO AN EXISTING DRAINAGE SYSTEM PRIOR TO OCTOBER 1, 2001. (FOR VERIFICATION: PROVIDE ORIGINAL DRAINAGE AREA MAP

- PROJECT'S SWQ REQUIREMENTS FALL WITHIN THE JURISDICTION OF:
- ☐ STORMWATER QUALITY PERMIT REQUIREMENT IS COVERED BY AN FXISTING SWOMP WITHIN PROJECT TITLE:

HARRIS COUNTY PROJECT No______ & SWQ PERMIT No.

STORMWATER QUALITY MANAGEMENT PLAN: ☐ SITE PLAN ON SHEET(S)

INCLUDING CALCULATIONS)

- III. PERMANENT SWQ FEATURES. (COMPLETE IF NOT EXEMPT)
- U VEGETATIVE CONTROLS USED: (FILTER STRIP, GRASSY SWALE, URBAN FORESTRY DETAILS AND CALCULATIONS APPEAR ON
- ☐ POND STRUCTURE USED (WET, DRY, WETLANDS) DETAILS AND
- CALCULATIONSAPPEAR ON SHEET(S) C-09 C-21
- ☐ HYDRODYNAMIC TYPE SEPARATOR MODEL:_____ OTHER(S):

6. REPORTS/AGREEMENTS

I. HOFOD ACCEPTED REPORTS (ALL

STORMWATER DRAINAGE DESIGN REPORT

REPORT TITLE 12000 BISSONNET MASTER DRAINAGE PLAN HCFCD PROJECT #_**2201250077**

ENGINEERING FIRM KIMLEY-HORN AND ASSOCIATES, INC. REPORT ACCEPTANCE DATE <u>5/17/2022</u>

GEOTECHNICAL INVESTIGATION REPORT

REPORT TITLE _____

ENGINEERING FIRM ______

REPORT ACCEPTANCE DATE ______

HCFCD APPROVED VARIANCE

DESCRIPTION OF VARIANCE ______ _____ DOCUMENT ID #_____

VARIANCE ACCEPTANCE DATE ______

II. AGREEMENT TYPE & No.:

☐ INTERLOCAL (ILA): _____ HCFCD MAINTENANCE_____ TURF ESTABLISHMENT _____

4. FLOOD PLAIN STATUS

I. GENERAL INFORMATION

FIRM PANEL(S) FOR PROPERTY: _____ FIRM PANEL(S) DATE: _____

STATUS OF PROPERTY ON MAP

ENTIRELY LOCATED IN UNSHADED ZONE "X"

LOCATED PARTIALLY OR ENTIRELY IN ANY "A" ZONE OR SHADED ZONE "X",
DELINEATE FLOODPLAIN BOUNDARY ON CONSTRUCTION DRAWINGS (DRAINAGE LAYOUT PG. NO.____) (1% BASE FLOOD LEVEL _____)

☐ SITE REMOVED FROM FLOODPLAIN BY LOMR, LOMR-F, LOMA CASE NO._____ REVISED FLOODPLAIN IS SHOWN ON SHEET____

FLEVATION INFORMATION

- M HARRIS COUNTY FLOODPLAIN REFERENCE MARK
- ☐ HARRIS—GALVESTON COASTAL SUBSIDENCE DISTRICT BENCHMARK (FOR COASTAL AREAS)

DESCRIPTION OF BENCHMARK INCLUDING ELEVATION. DATUM AND AR OF ADJUSTMENT (2001 ADJ.) HARRIS COUNTY FLOODPLAIN REFERENCE MARK, RM 040510, BM05", LOCATED FROM THE INTERSECTION OF BEECHNUT STREET AND BOONE ROAD, TRAVEL SOUTH APPROXIMATELY 0.22 MILE ON BOONE ROAD TO CONCRETE BRIDGE. MONUMENT IS LOCATED ON EAST CENTERLINE SIDEWALK AT CENTERLINE STREAM. NAVD88 (2001 ADJUSTED.)

(0.2% BASE FLOOD LEVEL _____)

II. FLOOD PLAIN DETERMINATION BASED ON GROUND ELEVATION

- PROPERTY LIES ENTIRELY ABOVE THE BASE FLOOD LEVEL
- AND IN SHADED ZONE "X"

 PROPERTY LIES PARTIALLY OR ENTIRELY BELOW THE BASE FLOOD

III FLOODPLAIN STORAGE SUMMARY

- (APPLIES ONLY TO PORTION OF LAND LOCATED WITHIN FEMA REGULATORY FLOODPLAIN). A. TOTAL VOLUME OF MATERIAL PROPOSED TO BE MOVED OR PLACED WITHIN THE FIRM DELINEATED FLOODPLAIN (FILL, BASE, CONCRETE, ASPHALT, ETC.):
- BELOW 0.2% BASE FLOOD ELEVATION (2001 ADJ.) _____ CUBIC YARDS _____ B. TOTAL VOLUME OF MATERIAL PROPOSED TO BE REMOVED FROM THE FIRM
- DELINEATED FLOODPLAIN: BELOW 0.2% BASE FLOOD ELEVATION (2001 ADJ.) ______ CUBIC YARDS _____
- INCLUDING CALCULATIONS)
- C. FILL AREA & VOLUME CALCULATIONS ARE SHOWN ON SHEET_____

HCFCD SIGNATURE BLOCK

PROJECT NAME: MASS GRADING AND DETENTION FOR KIRKWOOD CROSSING, PHASE 1

ADDRESS: 12000 BISSONNET, HOUSTON, TX 77099

WAS ACCEPTED BY HARRIS COUNTY FLOOD CONTROL DISTRICT FOR THE PURPOSES LISTED BELOW:

HARRIS COUNTY FLOOD CONTROL DISTRICT

FOR ITEMS LOCATED OUTSIDE OF HCFCD RIGHT-OF-WA

FOR ITEMS LOCATED WITHIN EXISTING HOFOD RIGHT-OF-WA

OR ITEMS LOCATED WITHIN PROPOSED HOFOD RIGHT-OF-WAY NO REVIEW REQUIRED:

FINAL PERMITTING BY OTHERS

ADDITIONAL COMMENTS:

PROJECT WAS REVIEWED, HOWEVER, THIS DOES NOT MEAN THE ENTIRE PROJECT, INCLUDING ALL SUPPORTING DATA D CALCULATIONS HAVE BEEN COMPLETELY CHECKED AND VERIFIED. THESE DRAWINGS ARE SIGNED, DATED AND SEALED Y A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS, WHICH THEREFORE CONVEYS THE ENGINEER'S SPONSIBILITY AND ACCOUNTABILITY. THIS DOES NOT RELIEVE ANY PARTY FROM COMPLYING WITH APPROPRIATE FEDERAL, STATE D LOCAL ENVIRONMENTAL RULES, LAWS, AND REGULATIONS AND ANY OTHER LEGALLY ADOPTED REGULATION OR ORDINANCE

ATED TO LAND DEVELOPMENT, IF THE CITY SIGNATURES ARE REQUIRED BY ORDINANCE, COUNTY PERMITS WILL NOT BE ISSUED

TIL SUCH SIGNATURES ARE OBTAINED. PLAN APPROVAL EXPIRATION TO BE IN ACCORDANCE WITH LOCAL GOVERNEMENT CODE CH. ENGINEER'S CERTIFICATION

ROSE C. KAETZER A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS, DO HEREBY CERTIFY HAT THE INFORMATION PRESENTED ON THIS SHEET IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND THAT I AM NOT VIOLATING ANY PROVISION OF THE CURRENT TEXAS ENGINEERING PRACTICE ACT AND RULES CONCERNING THE PRACTICE OF ENGINEERING AND PROFESSIONAL ENGINEERING LICENSURE.

ANY VIOLATIONS WILL BE FORWARDED TO THE HARRIS COUNTY DISTRICT ATTORNEY'S OFFICE FOR PROSECUTION.

THE COMPLETED PROJECT CONSISTS OF DRAWING SHEETS<u>C1.0</u> THRU<u>C29.0</u>. PRELIMINARY 8/16/2023 FOR REVIEW ONLY

SIGNATURE							DATE			
D	F	1 7	т	C	т	\circ	ът	C		

K E V I S I U N S NOTE: REVISION BLOCK IS TO BE USED ONLY FOR CHANGES MADE AFTER PLANS HAVE BEEN APPROVED BY HARRIS COUNTY FLOOD CONTROL.

Kimley »Horn ngineer_ROSE C. KAETZER P.E. No. <u>141883</u> Date <u>JULY 2022</u>

.E. INITIAL H.C.F.C.D APPROVED DA DESCRIPTION SHEET NUMBER <u>C3.0</u> OF HARRIS COUNTY FLOOD CONTROL PROJECT NO.

HARRIS COUNTY FLOOD CONTROL DISTRICT REVIEW SHEET

GENERAL NOTES (INSIDE CITY LIMITS):

- . CONSTRUCT WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING IN ACCORDANCE WITH THE LATEST EDITION OF THE PUBLICATIONS STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATERLINES, STORM DRAINAGE, AND STREET PAVING PUBLISHED BY THE CITY OF HOUSTON, HOUSTON PUBLIC WORKS.
- 2. THE GEOTECHNICAL INVESTIGATION FOR THIS PROJECT WAS CONDUCTED IN ACCORDANCE WITH CHAPTER 11 OF THE LATEST EDITION OF THE PUBLICATION INFRASTRUCTURE DESIGN MANUAL, PUBLISHED BY THE CITY OF HOUSTON, HOUSTON PUBLIC WORKS. SOILS REPORT WAS PREPARED BY GOODHEART & ASSOCIATES LLC, PROJECT NO. 19-001.001, DATED FEBRUARY 19, 2020.
- 3. UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 713-223-4567/811 OR 800-344-8377 AND LONE STAR NOTIFICATION CENTER AT 800-669-8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION, UTILITIES MARKED. WITHIN THE PUBLIC RIGHT OF WAY OR IN EASEMENTS SHALL COMPLY WITH TAC TITLE 16, PART 1, CHAPTER 18, RULE 18.6 AND THE AMERICAN PUBLIC WORKS ADMINISTRATION (APWA) UNIFORM COLOR CODE.
- 4. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATER LINES AND TRAFFIC CONTROL DEVICES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE CITY OF HOUSTON, HOUSTON PUBLIC WORKS' STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS. WATER LINES, STORM DRAINAGE, AND STREET PAVING AND STANDARD CONSTRUCTION DETAILS FOR VASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING, REFERENCED
- 5. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, HOUSTON PUBLIC WORKS AT 832-394-9098 FOR INSPECTION AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
- 6. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.
- 7. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.
- 8. CONTRACTOR SHALL COMPLY WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.
- 9. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS RECORDING AS-BUILT CONDITIONS DURING CONSTRUCTION. THESE REDLINE MARKED UP DRAWINGS WILL BE SUBMITTED TO THE DESIGN CONSULTANT. WHO WILL MAKE THE CHANGES ON THE ORIGINAL TRACINGS, LABEL EACH SHEET IN THE SET AS "RECORD DRAWINGS", AND RETURN IT TO THE OFFICE OF THE CITY ENGINEER.

STORM SEWER CONSTRUCTION NOTES (CITY OF HOUSTON)

- STORM SEWER SHALL BE REINFORCED CONCRETE PIPE (C-76, CLASS III), AND SHALL BE INSTALLED, BEDDED, AND BACK FILLED IN ACCORDANCE WITH THE CITY OF HOUSTON STANDARD DETAILS DRAWING NOS. 02317-02, 02317-3, 02317-05, 02317-06, AND 02317-07 (OCT. 2002) AS APPLICABLE UNLESS OTHERWISE SHOWN ON THE
- ALL STORM SEWER CONSTRUCTED IN SIDE LOT EASEMENT SHALL BE R.C.P (C-76, CLASS III) AND SHALL BE EMBEDDED IN ACCORDANCE WITH THE CITY OF HOUSTON STANDARD DETAILS DRAWING NOS. 02317-02, 02317-03, 02317-05, 02317-06, AND 02317-07 AS APPLICABLE.
- ALL SEWER UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE BACKFILLED WITH 1-1/2 SACK CEMENT/C.Y. STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE. THE REMAINING DEPTH OF TRENCH SHALL BE BACKFILLED WITH SUITABLE EARTH
- ALL TRENCH BACKFILL SHALL BE IN 8" LIFTS, WITH TESTS TAKEN AT 100 FOOT INTERVALS IN EACH LIFT, AND MECHANICALLY COMPACTED TO A DENSITY OF NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR COMPACTION TEST (ASTM D-698/AASHTO T99)
- CIRCULAR AND ELLIPTICAL REINFORCED CONCRETE PIPE SHALL BE INSTALLED USING RUBBER GASKET JOINT CONFORMING TO ASTM C443 AND ASTM C877 RESPECTIVELY.
- ALL STORM SEWER PIPES AND INLET LEADS SHALL BE 24" AND LARGER R.C.P. (C-76, CLASS III).
- ALL PROPOSED PIPE STUB-OUTS FROM MANHOLES AND INLET LEADS ARE TO BE PLUGGED WITH 8" BRICK WALLS UNLESS OTHERWISE NOTED.
- MINIMUM HORIZONTAL CLEARANCE BETWEEN ANY STORM PIPE AND BOX SHALL BE AT LEAST 48-INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES. MINIMUM VERTICAL CLEARANCE BETWEEN ANY STORM PIPE AND BOX SHALL BE AT LEAST 24-INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES.
- ADJUST MANHOLE COVERS TO GRADE CONFORMING TO REQUIREMENTS OF SECTION 02086-ADJUSTING MANHOLES, INLETS, AND VALVE BOXES TO GRADE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING, AND RESTORING ANY BACK SLOPE DRAINAGE SYSTEM DISTURBED AS A RESULT OF THIS WORK.
- ALL DITCHES SHALL BE GRADED TO PROPOSED ELEVATIONS TO ENSURE PROPER DRAINAGE. ALL OUTFALLS SHALL BE PROPERLY BACKFILLED AND COMPACTED. ALL DISTURBED AREA SHALL BE REGRADED, SEEDED, AND
- 12. ALL DRIVEWAYS SHALL BE LOCATED TO AVOID EXISTING CURB INLET STRUCTURE.

WATER LINE CONSTRUCTION NOTES (CITY OF HOUSTON):

- WATER LINES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON INFRASTRUCTURE DESIGN MANUAL, STANDARD SPECIFICATION, AND CONSTRUCTION DETAILS.
- ALL 4" THROUGH 12" WATER LINE TO BE AWWA C-900 PVC DR-18 BLUE PRESSURE RATED WATER MAIN WITH 2" AND SMALLER WATER SERVICE LINE TO BE CONTINUOUS TYPE K COPPER TUBING PER COH STANDARD SPECIFICATION SECTION 02503. ALL 4" THRU 54" DI PIPE WATER LINES SHALL BE AWWA C151 WITH INSIDE LINING WITH AWWA C104 AND DOUBLE WRAPPED WITH 8-MIL POLYETHYLENE SHEETS.
- CONCRETE THRUST BLOCKS SHALL BE PROVIDED AS NECESSARY TO PREVENT PIPE MOVEMENT. USE RESTRAINED JOINTS WHERE PREVENTING MOVEMENT OF 16" OR GREATER PIPE IS NECESSARY DUE TO
- ALL WATER LINES UNDER PROPOSED OR FUTURE PAVING AND TO A POINT OF ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE ENCASED IN BANK SAND TO 12" OVER PIPE AND BACKFILLED WITH CEMENT STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE.
- ALL WATER LINE AND SEWER LINE CROSSINGS SHALL BE CONSTRUCTED PER CITY OF HOUSTON AND TCEQ REGULATIONS
- ALL WATER VALVES SHALL BE SUPPLIED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF AWWA C-500 AND SHALL BE OF THE RESILIENT SEAT TYPE.
- ALL WATER LINES TO BE DISINFECTED IN CONFORMANCE WITH AWWA C-651 AND THE TEXAS STATE DEPARTMENT OF HEALTH. AT LEAST ONE BACTERIOLOGICAL SAMPLE SHALL BE COLLECTED FOR EVERY 1,000 LINEAR FEET OF WATER LINE AND SHALL BE REPEATED IF CONTAMINATION PERSISTS.
- ALL BELOW GRADE VALVES SHALL BE GASKETED, HUB-END GATE VALVES WITH A CAST IRON BOX, EXCEPT WHERE FLANGES ARE CALLED OUT ON THE PLANS
- 9) 4" THRU 12" FIT TINGS SHALL BE CEMENT MORTAR LINED COMPACT DUCTILE IRON PRESSURE FITTINGS PER ANSI A21.53, OR PUSH ON FITTINGS PER ANSI A21.10 PRESSURE RATED AT 250 PSIG.
- 0) HYDROSTATIC TESTING: ALL WATER PIPE SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON STANDARD CONSTRUCTION SPECIFICATIONS. TESTS ARE TO BE PERFORMED ON THE ENTIRE FOOTAGE OF WATER PIPE LINE INCLUDED IN THE PROJECT
- ALL WATER LINES TO HAVE 4' MINIMUM COVER TO FINISHED GRADE AND MINIMUM 12" CLEARANCE TO OTHER UTILITIES AT CROSSING UNLESS OTHERWISE NOTED ON PLANS. ALL WATER LINE INSTALLED OVER 8' DEEP SHALL UTILIZE RESTRAINED JOINT FITTINGS.
- CONTRACTOR SHALL KEEP WATER PIPE CLEAN AND CAPPED (OR OTHERWISE EFFECTIVELY COVERED) OPEN PIPE ENDS TO EXCLUDE INSECTS, ANIMALS OR OTHER SOURCES OF CONTAMINATION FROM UNFINISHED PIPE LINES AT TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS.

GRADING NOTES (CITY OF HOUSTON):

- 1. GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE STARTING CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
- 2. BEFORE STARTING CONSTRUCTION, CONTRACTOR SHALL VERIFY BENCHMARK ELEVATION AND NOTIFY ENGINEER IF ANY DISCREPANCY AND/OR CONFLICT IS FOUND.
- 3. CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS AND NO PONDING IN PAVED AREAS, AND SHALL NOTIFY ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.
- 4. CONTRACTOR SHALL PROTECT ALL MANHOLE COVERS, VALVE COVERS, VAULT LIDS, FIRE HYDRANTS, POWER POLES, GUY WIRES, AND TELEPHONE BOXES THAT ARE TO REMAIN IN PLACE AND UNDISTURBED DURING CONSTRUCTION.
- 5. ALL EXISTING CONCRETE PAVING, SIDEWALK, AND CURB DEMOLITION SHALL BE REMOVED AND DISPOSED OF BY CONTRACTOR. DISPOSAL SHALL BE AT AN APPROVED OFF-SITE, LAWFUL LOCATION, UNLESS DIRECTED OTHERWISE BY THE OWNER

SANITARY SEWER CONSTRUCTION NOTES (CITY OF HOUSTON):

- 1. ALL SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF HOUSTON "STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, STREET PAVING, AND TRAFFIC" AND ALL CURRENT AMENDMENTS THERETO AND BE SUBJECT TO A STANDARD EXFILTRATION TEST. TESTS ARE TO BE PERFORMED ON THE TOTAL FOOTAGE OF SEWER LINE INCLUDED IN THE PROJECT. REQUIREMENTS OF TEXAS ADMINISTRATIVE CODE, TITLE 30 CHAPTER 217, "DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEMS" SHALL GOVERN WHERE CONFLICTS EXIST EXCEPT WHERE CITY REQUIREMENTS ARE MORE STRINGENT.
- 2. ALL MANHOLES ARE TO BE PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02082-01, 02082-02, 02082N-02, 02082-03, AND 02082N-03 UNLESS OTHERWISE NOTED. USE 2019 VERSION AS
- 3. SANITARY SEWER MANHOLES WILL HAVE BEDDING AND BACKFILL PER CITY OF HOUSTON STANDARD DETAILS DRAWING NO. 02317-08 UNLESS OTHERWISE NOTED.
- 4. THE SANITARY SEWER PVC PIPE SHALL BE ASTM D 3034 TYPE PSM SDR 26 GRAVITY SEWER PIPE, ASTM D2241 SDR 26 PRESSURE RATED SEWER PIPE OR AWWA C-900 DR-18 GREEN PVC PRESSURE RATED SEWER PIPE BASED ON CONSTRUCTION CONDITION REQUIREMENT AND CONFORMING TO ASTM D1784 AND CITY OF HOUSTON STANDARD SPECIFICATION SECTION 02506 POLYVINYL CHLORIDE PIPE.
- 5. WHEN SS PRESSURE RATED PVC PIPE IS USED ON WATERLINE (WL) CROSSING UNDER CONDITION 1 OF COH IDM TABLE 7.3, THE SAME TYPE OF D2241 SDR 26 PVC PIPE OR C-900 GREEN DR-18 PVC GREEN PRESSURED TO BE UTILIZING IN-BETWEEN TWO SS MH'S. OR TO UTILIZE A DI TRANSITION ADAPTER FOR THE CONNECTING OF ASTM D-3034 PVC GRAVITY PIPE TO DI-OD AWWA C-900 PVC PIPE CENTERED AT WL WHEN CONNECTING TWO DIFFERENT TYPES OF PVC PIPES FOR SEWER CONSTRUCTION.
- 6. AWWA C-900 DR-18 PVC PIPE USES EITHER AWWA C900 DR-18 PVC FITTINGS OR DIP FITTINGS.
- 7. ALL SANITARY SEWER LINES UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL HAVE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02317-01, 02317-02, OR 02317-03 AS APPLICABLE, WITH 1 1/2 SACK CEMENT/CY STABILIZED SAND BACKFILL UP TO THE BOTTOM OF THE PAVEMENT SUBGRADE. 100 PSI PERFORMANCE RESULTS ARE STILL REQUIRED.
- 8. ALL SANITARY SEWERS CROSSING WATER LINES WITH A CLEARANCE BETWEEN 12 INCHES AND 9 FEET SHALL HAVE A MINIMUM OF ONE 18' JOINT OF 150 PSI DUCTILE IRON OR (GREEN) C900 PVC PIPE MEETING ASTM SPECIFICATION D2241 CENTERED ON WATER LINE. WHEN WATER LINE IS BELOW SANITARY SEWER, PROVIDE MINIMUM 2 FOOT SEPARATION.
- 9. CONTRACTOR SHALL PROVIDE A MINIMUM HORIZONTAL CLEARANCE OF 9' FEET BETWEEN WATER LINES AND SANITARY SEWER MANHOLES AND LINES.
- 10. SANITARY SEWER MANHOLE RIMS OUTSIDE OF PROPOSED PAVING WILL BE SET 3" 6" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER PAVING WITH SLOPED BACKFILL ADDED FOR STORM WATER TO DRAIN AWAY FROM MANHOLE RIM.
- 11. IN WET STABLE TRENCH AREAS USE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBER 02317-02
- 12. DEFLECTION TEST: DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE AND SEMI-RIGID SEWER PIPE. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5% IF THE DEFLECTION TEST IS TO BE RUN USING A RIGID MANDREL, IT SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PERFORMED AS PER 30 TAC 217.57 LATEST AMENDMENT AND WITHOUT MECHANICAL PULLING DEVICES. NO BALL-TYPE MANDREL IS ALLOWED.
- 13. INFILTRATION, EXFILTRATION OR LOW-PRESSURE AIR TEST: EITHER OF THE FOLLOWING TESTS SHALL BE PERFORMED AS PER TAC, TITLE 30 217.57 WITHIN THE SPECIFIED TOLERANCES ON ALL GRAVITY
- A.INFILTRATION OR EXFILTRATION TEST: TOTAL LEAKAGE AS DETERMINED BY A HYDROSTATIC HEAD TEST SHALL NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO (2) FEET.
- B. LOW-PRESSURE AIR TEST: PERFORM TEST ACCORDING TO UNI-B-6-90 OR OTHER APPROPRIATE PROCEDURES. FOR SECTIONS OF PIPE LESS THAN 36" (INCH) AVERAGE INSIDE DIAMETER, THE MINIMUM ALLOWABLE TIME FOR PRESSURE DROP FROM 3.5 P.S.I.G. TO 2.5 P.S.I.G. SHALL BE AS FOLLOWS:
- 6" 340 SECONDS OR 0.855(L) FOR TEST LENGTHS GREATER THAN 398' 8" 454 SECONDS OR 1.520(L) FOR TEST LENGTHS GREATER THAN 298' 10" 567 SECONDS OR 2.374(L) FOR TEST LENGTHS GREATER THAN 239' 12" 680 SECONDS OR 3.419(L) FOR TEST LENGTHS GREATER THAN 199' 15" 850 SECONDS OR 5.342(L) FOR TEST LENGTHS GREATER THAN 159' 18" 1020 SECONDS OR 7.693(L) FOR TEST LENGTHS GREATER THAN 133'
- 14. "SAN. S. E." INDICATES "SANITARY SEWER EASEMENT"

WHERE L = LENGTH OF LINE OF SAME PIPE SIZE IN FEET.

15. FOR SANITARY MANHOLE (MH) RIMS SET INSIDE OF OR @ CURB & GUTTER PAVEMENT AND/OR BELOW T.C., MH RIMS WILL BE SET FLUSHED WITH AN ABUTTING PAVED SURFACE. THE (VALCUN, NEENAH OR EQUAL) HEAVY DUTY BOLTED SOLID MH COVER SHALL BE PROPERLY (AND SECURELY) ATTACHED AND SEALED TO ITS COMPATIBLE GASKETED FRAME BY USING BOTH A NEOPRENE GASKET AND (AT LEAST) 4 COUNTER-SUNK HEX-HEAD COARSE THREADED 1/2"-13 UNC STAINLESS STEEL BOLTS. THE HEAVY DUTY FRAME MH COVER SHALL BE SOLID (NO AIR HOLES). SAID FRAME SHALL BE BOTH EMBEDDED INTO THE MH'S TOP ALSO SECURELY ANCHORED TO THE UNDERLYING MH STRUCTURE WITH EITHER SECURELY ATTACHED EMBEDDED ANCHOR BOLTS OR THE CONCRETE MH'S EXPOSED REBARS WELDED TO THE FRAME OR OTHER EQUALLY SECURED METHODS TO PREVENT MH COVER/FRAME BLOW-OFFS/EJECTIONS.

SWPPP CONSTRUCTION NOTES (CITY OF HOUSTON):

- CONTRACTOR SHALL IMPLEMENT INLET PROTECTION DEVICES AND REINFORCED FILTER FABRIC BARRIER ALONG ROAD AND SIDE DITCHES AT LOCATIONS SHOWN ON THE TYPICAL STORM WATER POLLUTION PREVENTION (SWPP) PLANS TO KEEP SILT AND OR EXCAVATED MATERIALS FROM ENTERING INTO THE STORM WATER INLETS AND DITCHES EVENTUALLY POLLUTING THE RECEIVING
- 2. DURING THE EXCAVATION PHASE OF THE PROJECT, CONTRACTOR SHALL SCHEDULE THE WORK IN SHORT SEGMENTS SO THAT EXCAVATION MATERIAL CAN BE QUICKLY HAULED AWAY FROM THE SITE AND TO PREVENT IT FROM STAYING UNCOLLECTED ON THE EXISTING PAVEMENT. ANY LOOSE EXCAVATED MATERIAL WHICH FALLS ON PAVEMENTS OR DRIVEWAYS SHALL BE SWEPT BACK INTO THE EXCAVATED AREA.
- 3. CONTRACTOR SHALL CLEAN UP THE EXISTING STREET INTERSECTIONS AND DRIVEWAYS DAILY, AS NECESSARY, TO REMOVE ANY EXCESS MUD, SILT OR ROCK TRACKED FORM THE EXCAVATED AREA.
- 4. CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT AND LOOSE MATERIAL AS CONSTRUCTION PROGRESSES.
- 5. CONTRACTOR TO INSPECT AND MAINTAIN THE AREAS LISTED BELOW AT LEAST ONCE EVERY FOURTEEN(14) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.5 INCHES
- DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED. AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION.
- STRUCTURAL CONTROL MEASURES.
- LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE.
- 6. CONTRACTOR TO BE RESPONSIBLE TO MAINTAIN EXISTING DITCHES AND OR CULVERTS FOR UNOBSTRUCTED DRAINAGE AT ALL TIMES. WHERE SODDING IS DISTURBED BY EXCAVATION ON BACKFILLING OPERATIONS, SUCH AREAS SHALL BE REPLACED BY SEEDING OR SODDING. SLOPES 4:1 OR STEEPER SHALL BE REPLACED BY BLOCK SODDING.

TRAFFIC NOTES:

CONTRACTOR OR OWNER SHALL SUBMIT TRAFFIC CONTROL PLANS WITH THE MOBILITY PERMIT APPLICATION. THE PLANS SHALL BE DRAWN TO SCALE AND SEALED BY A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS.

THE GENERAL NOTES THAT SHALL BE INCLUDED ON THE TRAFFIC CONTROL PLAN CAN BE FOUND IN CHAPTER 15 (15.12 TRAFFIC CONTROL PLAN) OF THE CITY OF HOUSTON'S (CITY) INFRASTRUCTURE DESIGN MANUAL (IDM). BELOW ARE SEVERAL KEY NOTES FROM THE IDM TO BE AWARE OF:

1. THE CONTRACTOR SHALL PROVIDE AND INSTALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH PART VI OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) LATEST EDITION WITH REVISIONS DURING THE ENTIRE CONSTRUCTION PERIOD.

2. NO WORK SHALL BE PERFORMED IN RESIDENTIAL AREAS FROM 7:00PM TO 7:00AM.

3. CONTRACTOR SHALL MAINTAIN APPROVED NUMBER OF LANES OF TRAFFIC IN EACH DIRECTION DURING CONSTRUCTION WORKING HOURS. TRAFFIC CONTROL PLANS SHALL INCLUDE ONE-WAY AND/OR DETOUR PLANS. CONTRACTOR SHALL MAINTAIN ADA COMPLIANT PEDESTRIAN ACCESS TO BUS STOPS AND ADEQUATE BUS ACCESS TO THE BUS STOP.

4. CONTRACTOR SHALL COVER OPEN PAVEMENT EXCAVATIONS FOR MINOR UTILITY WORK WITH ANCHORED STEEL PLATES DURING NON-WORKING HOURS, OPEN LANES FOR NORMAL TRAFFIC FLOW

5. CONTRACTOR SHALL SECURE LANE/SIDEWALK/BICYCLE FACILITY CLOSURE PERMITS FROM TRANSPORTATION & DRAINAGE OPERATIONS (MOBILITY PERMIT SECTION AT WWW.GIMS.HOUSTONTX.GOV) BEFORE IMPLEMENTING THE TRAFFIC CONTROL PLAN. THE APPLICATION MUST BE SUBMITTED AT LEAST TEN BUSINESS DAYS PRIOR TO THE IMPLEMENTATION OF THE TRAFFIC CONTROL PLAN AND/OR BEGINNING CONSTRUCTION WORK. THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLANS, CONSTRUCTION SEQUENCING, AND CONSTRUCTION SCHEDULE WITH THE APPLICATION.

6. CONTRACTOR SHALL HAVE APPROVED TRAFFIC CONTROL PLAN AND PERMIT AT THE JOB SITE FOR INSPECTION AT ALL TIMES.

7. ACCESS TO DRIVEWAYS ADJACENT TO THE CONSTRUCTION WORK ZONE SHALL BE MAINTAINED AT ALL TIMES AS MUCH AS POSSIBLE, ADDITIONAL CONES AND/OR DELINEATORS MAY BE REQUIRED TO DELINEATE THE DRIVEWAY ACCESS ROUTE THROUGH THE CONSTRUCTION WORK ZONE. A MINIMUM OF ONE TRAVEL LANE SHALL BE MAINTAINED ACROSS THE DRIVEWAY, UNLESS PRIOR WRITTEN APPROVAL IS OBTAINED FROM THE CITY OF HOUSTON.

8. ADDITIONAL OFF DUTY POLICY OFFICERS/FLAGGERS MAY BE REQUESTED TO DIRECT TRAFFIC WHEN LANES ARE BLOCKED AT THE DIRECTION OF THE CITY EVEN IF THEY ARE NOT SPECIFICALLY IDENTIFIED ON

STREET AND BRIDGE NOTES:

REMOVED DURING CONSTRUCTION.

LINES, STORMS DRAINAGE AND STREET PAVING"

 HOUSTON PUBLIC WORKS' "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING" UNI ESS OTHERWISE NOTED, AND APPROVED ON THESE PLANS. THE DESIGN IS CONSISTENT WITH THE MINIMUM STANDARDS ESTABLISHED IN THE "INFRASTRUCTURE DESIGN MANUAL"

http://documents.publicworks.houstontx.gov/document-center/engineering-and-construction/index.htm.

2. FILL AREAS ON PLANS SHALL BE FILLED IN LAYERS NOT EXCEEDING 8" IN DEPTH AND EACH COMPACTED TO NOT LESS THAN 95% STANDARD PROCTOR DENSITY PRIOR TO INSTALLATION OF WATER LINE AND FILL AREA SHALL BE SEEDED AND FERTILIZED WITHIN 10 WORKING DAYS.

3. UTILITY CONTRACTOR SHALL PROVIDE TEMPORARY SILT BARRIER FENCE ON ALL NON-CURB INLETS WHICH WILL REMAIN IN PLACE AFTER UNDERGROUND CONTRACT IS COMPLETE

4. CONTRACTOR SHALL PROVIDE SILT BARRIER FENCE ON ALL STAGE 1 CURB INLETS.

5. EXISTING PAVEMENTS, CURBS, DRIVEWAYS, AND SIDEWALKS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO CITY OF HOUSTON STANDARDS, WITH LATEST ADDENDUM'S AND

6. CONDITION OF THE ROAD AND/OR RIGHT-OF-WAY. UPON COMPLETION OF JOB, SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.

7. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO SATISFACTION OF

USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #6 BARS. 24" LONG. 24" C-C. DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB WITH "PO ROC" OR EQUAL.

8. EXPOSED 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT, IF NO REINFORCING STEEL EXISTS,

9. CONTRACTOR TO TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG AREAS OF EXCAVATION.

11. WHEEL CHAIR RAMPS SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF HOUSTON STANDARDS AT

ALL INTERSECTIONS WHERE SIDEWALKS EXIST AND THE EXISTING CURB OR SIDEWALK IS DAMAGED OR

10. CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAW CONCERNING EXCAVATION, TRENCHING AND SHORING AS SPECIFIED IN CITY OF HOUSTON ORDINANCE #87-1457.

12. WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF HOUSTON, HOUSTON PUBLIC WORKS' "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS. WATER LINES, STORM DRAINAGE AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN SHOULD BE CONSISTENT WITH THE MINIMUM STANDARD ESTABLISHED IN THE "DESIGN MANUAL FOR WASTEWATER COLLECTION SYSTEMS, WATER

13. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGES TO EXISTING WATER, WASTEWATER, STORM SEWER AND TRAFFIC SIGNAL CONDUITS, ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE CITY OF HOUSTON, HOUSTON PUBLIC WORKS' "STANDARD CONSTRUCTION SPECIFICATIONS" WITH LATEST ADDENDA AND AMENDMENTS THERETO, AT NO COST TO THE CITY OF

14. PRIOR TO STREET CONSTRUCTION. THE CONTRACTOR SHALL CONTACT HOUSTON PUBLIC WORKS AT 832-394-9578 AND COMPLY WITH ALL REQUIREMENTS FOR THE ISSUANCE OF NECESSARY PERMITS/WORK ORDERS FOR STREET CONSTRUCTION.

15. DOUBLE REFLECTORIZED BLUE TRAFFIC MARKERS SHALL BE PLACED 6-INCHES OFFSET OF THE CENTERLINE OF ALL FIRE HYDRANT LOCATIONS BY THE PAVING CONTRACTOR. HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A BUTTON PLACED ON EACH STREET.

FRANCHISE UTILITIES

CAUTION: CENTERPOINT ENERGY UNDERGROUND GAS FACILITIES

THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

- WHEN CENTERPOINT ENERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL (713) 207-5463 OR (713) 945-8037 (7:00 AM TO 4:30 PM) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
- WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION
- WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
- FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659-3552 OR (713) 207-4200.

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

CAUTION: CENTERPOINT ENERGY OVERHEAD ELECTRICAL LINES

OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH AND SAFETY CODE FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:

- ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX (6) FEET OF LINE OVERHEAD HIGH VOLTAGE LINES; AND
- OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES.

PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED CALL CENTERPOINT ENERGY AT (713) 207-2222.

NO APPROVAL TO USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713) 207-6348 OR (713) 207-5769.

CAUTION: AT&T TEXAS/SWBT FACILITIES

THE LOCATIONS OF AT&T TEXAS/SWBT FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.

THE CONTRACTOR SHALL CALL 1-800-344-8377 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.

WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF AT&T TEXAS/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.

WHEN AT&T TEXAS/SWBT FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.

THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN CONDUIT IN THE AREA.

PLEASE CONTACT THE AT&T TEXAS DAMAGE PREVENTION MANAGER MR. ROOSEVELT LEE JR. AT

(713)567-4552 OR E-MAIL HIM AT RL7259@ATT.COM, IF THERE ARE QUESTIONS ABOUT BORING OR

EXCAVATING NEAR OUR AT&T TEXAS/SWBT FACILITIES.

AS PART OF THE BASE BID FOR THIS PROJECT, CONTRACTOR SHALL ADHERE TO THE PROJECT GEOTECHNICAL REPORT FOR ALL RECOMMENDATIONS FOR BOTH MATERIALS AND PRACTICE OF INSTALLATION GIVEN IN THE PROJECT GEOTECHNICAL REPORT FOR EARTHWORK. SITE SUBGRADE PREPARATION, BUILDING PAD SUBGRADE PREPARATION, PAVING, AND WET/SOFT SOILS CONDITIONS ALONG WITH ANY OTHER SECTIONS PROVIDED IN THE REPORT.

TITLE: SUPPLEMENTAL GEOTECHNICAL REPORT, 12000 BISSONNET STREET BY: GOODHEART & ASSOCIATES LLC DATED: FEBRUARY 19, 2020

INCLUDING ALL REVISIONS AND ADDENDA TO THIS REPORT THAT MAY HAVE BEEN RELEASED AFTER THE NOTED DATE.

CAUTIONARY NOTES REGARDING THE LANDFILL

- ALL WORK DONE ON SITE MUST BE IN COMPLIANCE WITH THE GEOTECHNICAL REPORT COMPLETED BY GOODHEART & ASSOCIATES PLLC (PROJECT NO. 22-009.001) DATED OCTOBER 21, 2022 AND ANY SUPPLEMENTAL REPORTS ISSUED.
- THE CLIENT UNDERSTANDS THAT DIFFERENTIAL SETTLING OF THE SITE WILL OCCUR AND THAT THE SITE WILL NEED TO BE INSPECTED AND MAINTAINED ON A MORE FREQUENT BASIS THEN A TYPICAL GREENFIELD SITE
- CORRECTIVE MEASURES REGARDING SITE SETTLEMENT, STORMWATER, LANDFILL CAP, OR MONITORING, AND LANDFILL GASES ARE TO BE IMPLEMENTED BY THE CLIENT TO THE DEGREE REQUIRED IN ORDER TO MINIMIZE HUMAN HEALTH RISKS OR IMPACTS TO THE ENVIRONMENT

A MINIMUM OF 4 FEET OF COVER MUST BE MAINTAINED FROM THE LANDFILL CAP AT

ALL TIMES. THE LANDFILL CAP SHALL NOT BE PENETRATED UNLESS IN AREAS WHERE

REQUIRED BY INSTALLATION OF UTILITIES OR STORM WATER CONVEYANCE SYSTEMS. WHERE LANDFILL CAP IS PENETRATED, ALL PLANS FOR HANDLING, STOCKPILING, DAILY COVER, AND DISPOSAL OF WASTE ENCOUNTERED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY OTHERS. THE FOLLOWING ITEMS SHALL BE COORDINATED WITH THE GEOTECHNICAL

ENGINEER WITH REGARD TO SPECIAL STEPS TO BE TAKEN DUE TO THE LANDFILL

PRIOR TO DESIGN AND INSTALLATION: SITE LIGHTING FOUNDATIONS, FENCE POSTS, CONCRETE FOOTINGS, AND ANY OTHER IMPROVEMENT THAT WILL INTRUDE INTO THE LANDFILL CAP. PROPER VENTILATION OF LANDFILL GASES FROM THE LANDFILL, AS REQUIRED BY PERMIT OR REGULATORY AGENCY OR IF NEEDED, ARE TO BE DESIGNED, OPERATED,

AND MAINTAINED BY OTHERS. RELOCATION, PLUGGING, AND ABANDONMENT OF

GAS VENTS OR MONITORING PROBES IS TO BE PERFORMED BY OTHERS ALL SITE ACTIVITIES ARE TO BE CONDUCTED IN ACCORDANCE WITH ENVIRONMENTAL PERMIT DOCUMENTATION FOR THE PROJECT, INCLUDING ANY PERMITS REGARDING

EXISTING GAS VENTS OR MONITORING PROBES AND INSTALLATION OF ADDITIONAL

PLANS FOR HANDING, STOCKPILING, DAILY COVER, AND DISPOSAL OF WASTE ENCOUNTERED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY

SOLID WASTE, LANDFILL GAS, MONITORING, AND REPORTING.

PLANS FOR HANDLING AND DISPOSAL OF CONTAMINATED SOIL AND WATER GENERATED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY

. OBSERVATION AND REPORTING ASSOCIATED WITH WASTE OR CONTAMINATED MEDIA

CONTRACTORS SHALL BE RESPONSIBLE FOR PREPARATION, IMPLEMENTATION, MONITORING AND REPORTING OF THEIR OWN SITE HEALTH AND SAFETY PLANS

GENERATED DURING CONSTRUCTION IS TO BE PROVIDED FOR THE CLIENT BY

ENVIRONMENTAL CONDITIONS AND EXPOSURE RISKS ON THE PROPERTY 12. ONSITE MONITORING WELLS ARE TO BE PLUGGED AND ABANDONED BY OTHERS

HEALTH AND SAFETY PLANS SHALL TAKE INTO ACCOUNT THE KNOWN

PRIOR TO CONSTRUCTION.

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

VERIFICATION OF PRIVATE UTILITY LINES

CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not be used for conflict verification. Signature valid for six months.

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11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Tel. No. (281) 597-9300

WASTE WATER

FILE NO.

KIRKWOOD CROSSING PHASE 1 WS&D

HOUSTON, TX 77048

GENERAL NOTES

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

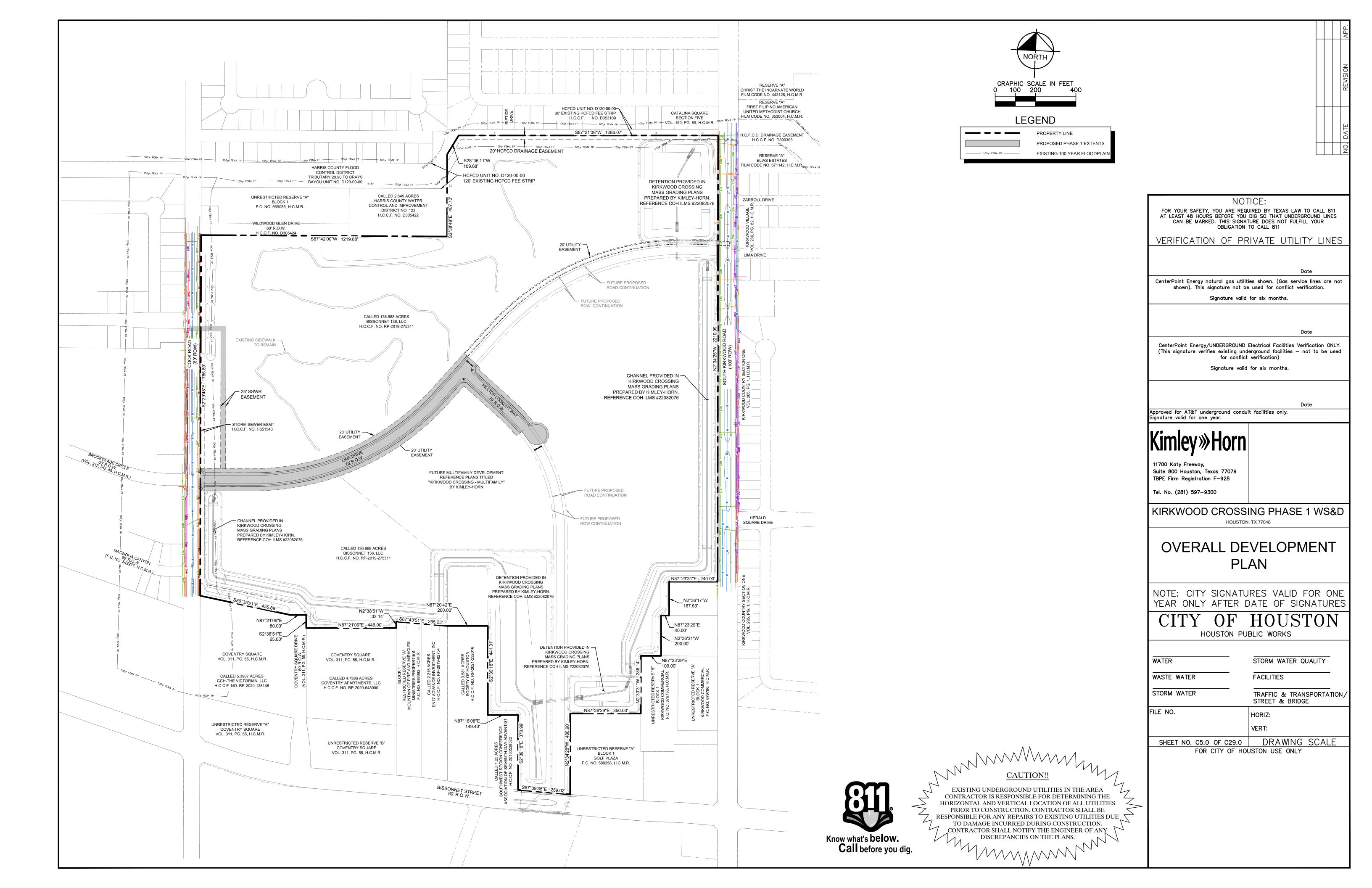
STORM WATER TRAFFIC & TRANSPORTATION STREET & BRIDGE

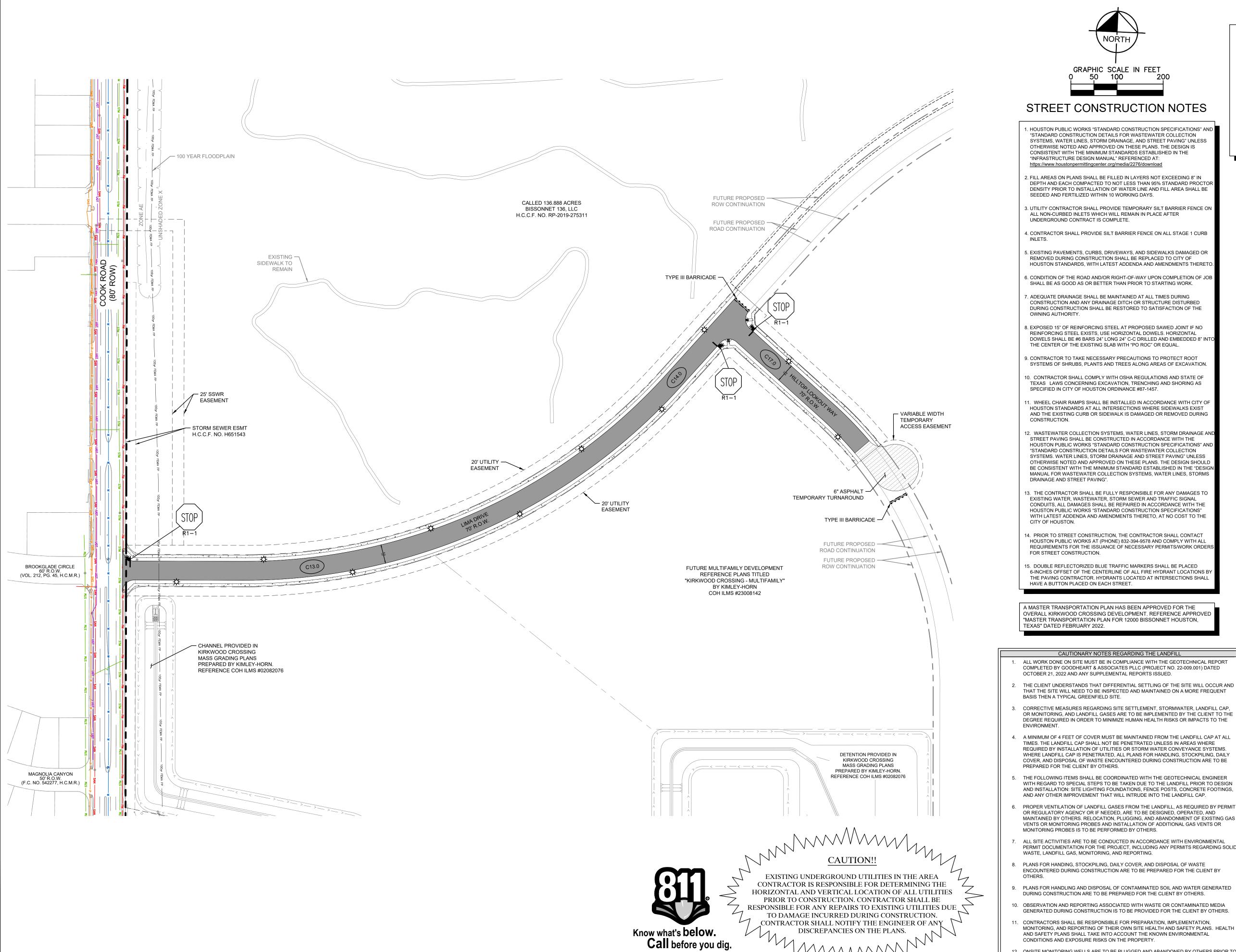
HORIZ:

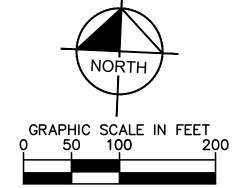
FOR CITY OF HOUSTON USE ONLY

SHEET NO. C4.0 OF C29.0 | DRAWING SCALE

FACILITIES







STREET CONSTRUCTION NOTES

"STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN IS CONSISTENT WITH THE MINIMUM STANDARDS ESTABLISHED IN THE

- DEPTH AND EACH COMPACTED TO NOT LESS THAN 95% STANDARD PROCTO DENSITY PRIOR TO INSTALLATION OF WATER LINE AND FILL AREA SHALL BE
- ALL NON-CURBED INLETS WHICH WILL REMAIN IN PLACE AFTER
- 4. CONTRACTOR SHALL PROVIDE SILT BARRIER FENCE ON ALL STAGE 1 CURB
- 5. EXISTING PAVEMENTS, CURBS, DRIVEWAYS, AND SIDEWALKS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO CITY OF
- SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.
- 7. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO SATISFACTION OF THE
- REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #6 BARS 24" LONG 24" C-C DRILLED AND EMBEDDED 8" INT
- 9. CONTRACTOR TO TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT
- 10. CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAWS CONCERNING EXCAVATION, TRENCHING AND SHORING AS
- 1. WHEEL CHAIR RAMPS SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF HOUSTON STANDARDS AT ALL INTERSECTIONS WHERE SIDEWALKS EXIST AND THE EXISTING CURB OR SIDEWALK IS DAMAGED OR REMOVED DURING
- STREET PAVING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS. WATER LINES, STORM DRAINAGE AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN SHOULD BE CONSISTENT WITH THE MINIMUM STANDARD ESTABLISHED IN THE "DESIGN MANUAL FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORMS
- 13. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGES TO EXISTING WATER, WASTEWATER, STORM SEWER AND TRAFFIC SIGNAL CONDUITS, ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" WITH LATEST ADDENDA AND AMENDMENTS THERETO, AT NO COST TO THE
- 14. PRIOR TO STREET CONSTRUCTION, THE CONTRACTOR SHALL CONTACT HOUSTON PUBLIC WORKS AT (PHONE) 832-394-9578 AND COMPLY WITH ALL REQUIREMENTS FOR THE ISSUANCE OF NECESSARY PERMITS/WORK ORDER
- 15. DOUBLE REFLECTORIZED BLUE TRAFFIC MARKERS SHALL BE PLACED 6-INCHES OFFSET OF THE CENTERLINE OF ALL FIRE HYDRANT LOCATIONS BY THE PAVING CONTRACTOR. HYDRANTS LOCATED AT INTERSECTIONS SHALL

A MASTER TRANSPORTATION PLAN HAS BEEN APPROVED FOR THE OVERALL KIRKWOOD CROSSING DEVELOPMENT. REFERENCE APPROVED "MASTER TRANSPORTATION PLAN FOR 12000 BISSONNET HOUSTON,

- ALL WORK DONE ON SITE MUST BE IN COMPLIANCE WITH THE GEOTECHNICAL REPORT COMPLETED BY GOODHEART & ASSOCIATES PLLC (PROJECT NO. 22-009.001) DATED
- 2. THE CLIENT UNDERSTANDS THAT DIFFERENTIAL SETTLING OF THE SITE WILL OCCUR AND THAT THE SITE WILL NEED TO BE INSPECTED AND MAINTAINED ON A MORE FREQUENT
- 3. CORRECTIVE MEASURES REGARDING SITE SETTLEMENT, STORMWATER, LANDFILL CAP, OR MONITORING, AND LANDFILL GASES ARE TO BE IMPLEMENTED BY THE CLIENT TO THE DEGREE REQUIRED IN ORDER TO MINIMIZE HUMAN HEALTH RISKS OR IMPACTS TO THE
- 4. A MINIMUM OF 4 FEET OF COVER MUST BE MAINTAINED FROM THE LANDFILL CAP AT ALL TIMES. THE LANDFILL CAP SHALL NOT BE PENETRATED UNLESS IN AREAS WHERE REQUIRED BY INSTALLATION OF UTILITIES OR STORM WATER CONVEYANCE SYSTEMS. WHERE LANDFILL CAP IS PENETRATED, ALL PLANS FOR HANDLING, STOCKPILING, DAILY COVER, AND DISPOSAL OF WASTE ENCOUNTERED DURING CONSTRUCTION ARE TO BE
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- OR REGULATORY AGENCY OR IF NEEDED, ARE TO BE DESIGNED, OPERATED, AND MAINTAINED BY OTHERS. RELOCATION, PLUGGING, AND ABANDONMENT OF EXISTING GAS VENTS OR MONITORING PROBES AND INSTALLATION OF ADDITIONAL GAS VENTS OR
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- PLANS FOR HANDING, STOCKPILING, DAILY COVER, AND DISPOSAL OF WASTE ENCOUNTERED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY
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- 12. ONSITE MONITORING WELLS ARE TO BE PLUGGED AND ABANDONED BY OTHERS PRIOR TO

LEGEND

PROPERTY LINE 9" THICK CONCRETE PAVEMENT STREET LIGHT STREET NAME LOCATION STOP SIGN LOCATION SHEET REFERENCE NUMBER 6' CONCRETE SIDEWALK BY DEVELOPER ACCESSIBILITY RAMP BY DEVELOPER TEMPORARY TURN AROUND EXISTING 100 YEAR FLOODPLAIN

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STORM WATER

FILE NO.

KIRKWOOD CROSSING PHASE 1 WS&D

HOUSTON, TX 77048

PAVING AND SIGNAGE PLAN

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

STORM WATER QUALITY WATER

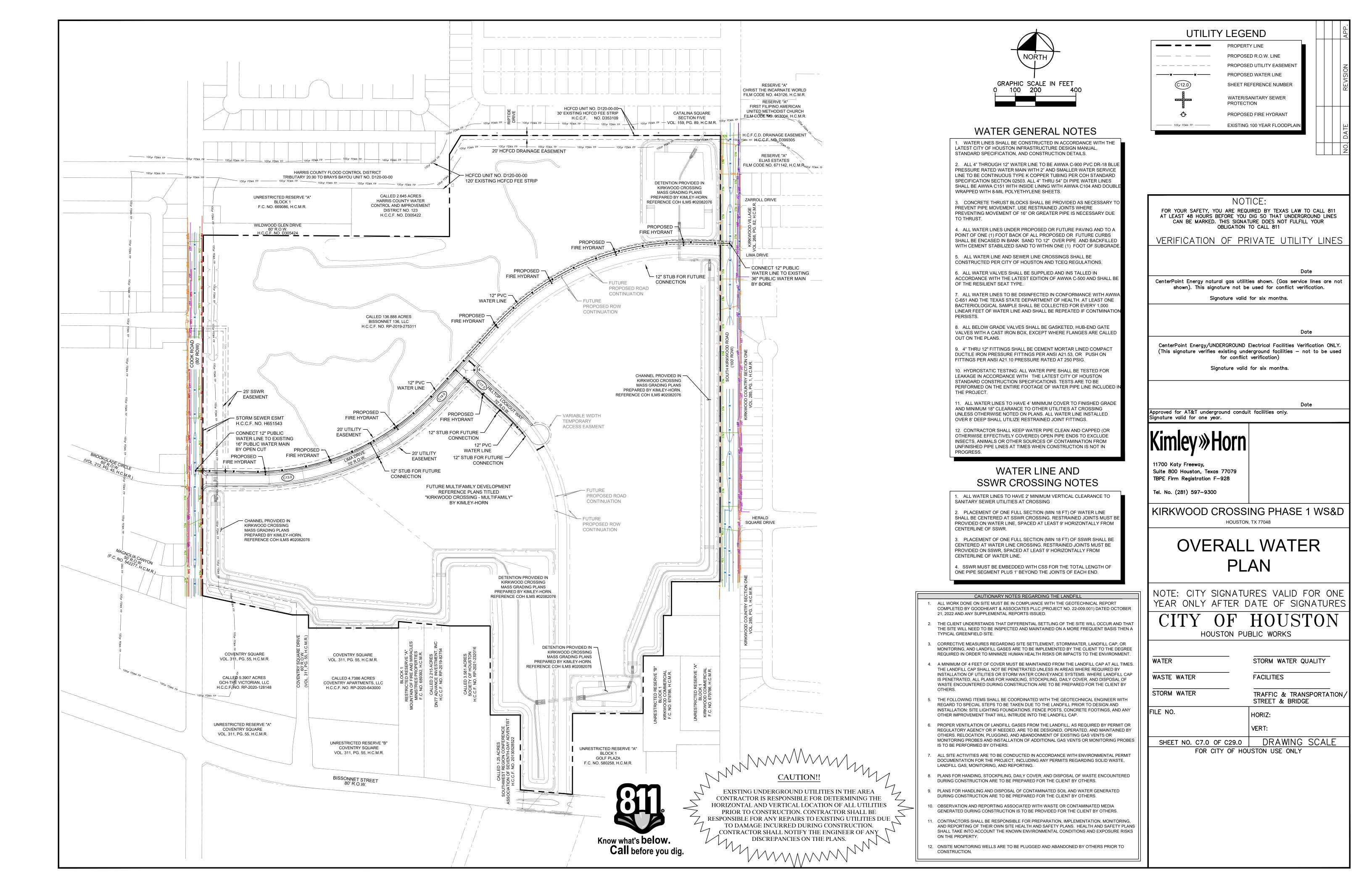
WASTE WATER **FACILITIES**

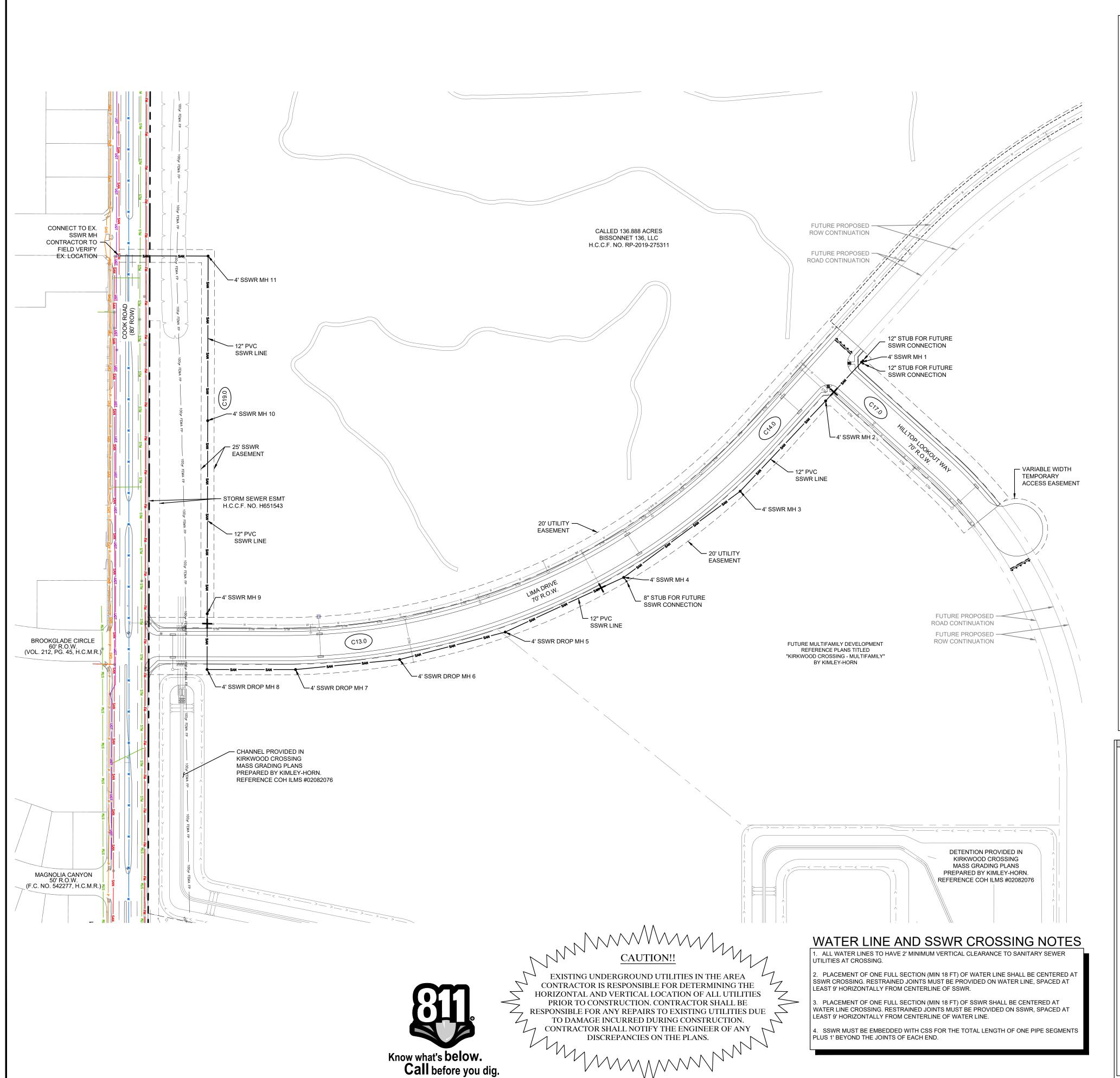
TRAFFIC & TRANSPORTATION

STREET & BRIDGE

HORIZ:

SHEET NO. C6.0 OF C29.0 DRAWING SCALE





SANITARY SEWER NOTES

1. ALL SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF HOUSTON "STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, STREET PAVING, AND TRAFFIC" AND ALL CURRENT AMENDMENTS THERETO AND BE SUBJECT TO A STANDARD EXFILTRATION TEST. TESTS ARE TO BE PERFORMED ON THE TOTAL FOOTAGE OF SEWER LINE INCLUDED IN THE PROJECT. REQUIREMENTS OF TEXAS ADMINISTRATIVE CODE, TITLE 30 CHAPTER 217, "DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEMS" SHALL GOVERN WHERE CONFLICTS EXIST EXCEPT WHERE CITY REQUIREMENTS ARE MORE STRINGENT.

2. ALL MANHOLES ARE TO BE PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02082-01, 02082-02, 02082N-02, 02082-03, AND 02082N-03 UNLESS OTHERWISE NOTED. USE 2019 VERSION AS APPLICABLE.

3. SANITARY SEWER MANHOLES WILL HAVE BEDDING AND BACKFILL PER CITY OF HOUSTON STANDARD DETAILS DRAWING NO. 02317-08 UNLESS OTHERWISE NOTED.

. THE SANITARY SEWER PVC PIPE SHALL BE ASTM D 3034 TYPE PSM SDR 26 GRAVITY SEWER PIPE, ASTM D2241 SDR 26 PRESSURE RATED SEWER PIPE OR AWWA C-900 DR-18 GREEN PVC PRESSURE RATED SEWER PIPE BASED ON CONSTRUCTION CONDITION REQUIREMENT AND CONFORMING TO ASTM D1784 AND CITY OF HOUSTON STANDARD SPECIFICATION SECTION 02506 POLYVINYL CHLORIDE PIPE.

. WHEN SS PRESSURE RATED PVC PIPE IS USED ON WATERLINE (WL) CROSSING UNDER CONDITION 1 OF COH IDM TABLE 7.3, THE SAME TYPE OF D2241 SDR 26 PVC PIPE OR C-900 GREEN DR-18 PVC GREEN PRESSURED TO BE UTILIZING IN-BETWEEN TWO SS MH'S. OR TO UTILIZE A DI TRANSITION ADAPTER FOR THE CONNECTING OF ASTM D-3034 PVC GRAVITY PIPE TO DI-OD AWWA C-900 PVC PIPE CENTERED AT WL WHEN CONNECTING TWO DIFFERENT TYPES OF PVC PIPES FOR SEWER CONSTRUCTION.

6. AWWA C-900 DR-18 PVC PIPE USES EITHER AWWA C900 DR-18 PVC FITTINGS OR DIP

7. ALL SANITARY SEWER LINES UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL HAVE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02317-01, 02317-02, OR 02317-03 AS APPLICABLE, WITH 1 1/2 SACK CEMENT/CY STABILIZED SAND BACKFILL UP TO THE BOTTOM OF THE PAVEMENT SUBGRADE. 100 PSI PERFORMANCE RESULTS ARE STILL REQUIRED.

8. ALL SANITARY SEWERS CROSSING WATER LINES WITH A CLEARANCE BETWEEN 12 INCHES AND 9 FEET SHALL HAVE A MINIMUM OF ONE 18' JOINT OF 150 PSI DUCTILE IRON OR (GREEN) C900 PVC PIPE MEETING ASTM SPECIFICATION D2241 CENTERED ON WATER LINE. WHEN WATER LINE IS BELOW SANITARY SEWER, PROVIDE MINIMUM 2 FOOT SEPARATION.

9. CONTRACTOR SHALL PROVIDE A MINIMUM HORIZONTAL CLEARANCE OF 9' FEET BETWEEN WATER LINES AND SANITARY SEWER MANHOLES AND LINES.

0. SANITARY SEWER MANHOLE RIMS OUTSIDE OF PROPOSED PAVING WILL BE SET 3' - 6" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER PAVING WITH SLOPED BACKFILL ADDED FOR STORM WATER TO DRAIN AWAY FROM MANHOLE RIM.

11. IN WET STABLE TRENCH AREAS USE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBER 02317-02.

12. DEFLECTION TEST: DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE AND SEMI-RIGID SEWER PIPE. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKELL HAS BEEN IN PLACE AT LEAST 30 DAYS NO PIPE SHALL EXCEED A DEFLECTION OF 5% IF THE DEFLECTION TEST IS TO BE RUN USING A RIGID MANDREI IT SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PERFORMED AS PER 30 TAC 217.57 LATEST AMENDMENT AND WITHOUT MECHANICAL PULLING DEVICES. NO BALL-TYPE MANDREL IS ALLOWED.

3. INFILTRATION, EXFILTRATION OR LOW-PRESSURE AIR TEST: EITHER OF THE FOLLOWING TESTS SHALL BE PERFORMED AS PER TAC, TITLE 30 217.57 WITHIN THE SPECIFIED TOLERANCES ON ALL GRAVITY SEWERS.

A. INFILTRATION OR EXFILTRATION TEST: TOTAL LEAKAGE AS DETERMINED BY A HYDROSTATIC HEAD TEST SHALL NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO (2) FEET.

B. LOW-PRESSURE AIR TEST: PERFORM TEST ACCORDING TO UNI-B-6-90 OR OTHER APPROPRIATE PROCEDURES. FOR SECTIONS OF PIPE LESS THAN 36" (INCH) AVERAGE INSIDE DIAMETER, THE MINIMUM ALLOWABLE TIME FOR PRESSURE DROP FROM 3.5 P.S.I.G. TO 2.5 P.S.I.G. SHALL BE AS FOLLOWS:

6" 340 SECONDS OR 0.855(L) FOR TEST LENGTHS GREATER THAN 398' 8" 454 SECONDS OR 1.520(L) FOR TEST LENGTHS GREATER THAN 298' 10" 567 SECONDS OR 2.374(L) FOR TEST LENGTHS GREATER THAN 239' 12" 680 SECONDS OR 3.419(L) FOR TEST LENGTHS GREATER THAN 199' 15" 850 SECONDS OR 5.342(L) FOR TEST LENGTHS GREATER THAN 159' 18" 1020 SECONDS OR 7.693(L) FOR TEST LENGTHS GREATER THAN 133'

WHERE L = LENGTH OF LINE OF SAME PIPE SIZE IN FEET.

14. "SAN. S. E." INDICATES "SANITARY SEWER EASEMENT"

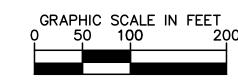
15. FOR SANITARY MANHOLE (MH) RIMS SET INSIDE OF OR @ CURB & GUTTER PAVEMENT AND/OR BELOW T.C., MH RIMS WILL BE SET FLUSHED WITH AN ABUTTING PAVED SURFACE. THE (VALCUN, NEENAH OR EQUAL) HEAVY DUTY BOLTED SOLID MH COVER SHALL BE PROPERLY (AND SECURELY) ATTACHED AND SEALED TO ITS COMPATIBLE GASKETED FRAME BY USING BOTH A NEOPRENE GASKET AND (AT LEAST) 4 COUNTER-SUNK HEX-HEAD COARSE THREADED 1/2"-13 UNC STAINLESS STEEL BOLTS. THE HEAVY DUTY FRAME MH COVER SHALL BE SOLID (NO AIR HOLES). SAID FRAME SHALL BE BOTH EMBEDDED INTO THE MH'S TOP ALSO SECURELY ANCHORED TO THE UNDERLYING MH STRUCTURE WITH EITHER SECURELY ATTACHED EMBEDDED ANCHOR BOLTS OR THE CONCRETE MH'S EXPOSED REBARS WELDED TO THE FRAME OR OTHER EQUALLY SECURED METHODS TO PREVENT MH COVER/FRAME BLOW-OFFS/EJECTIONS

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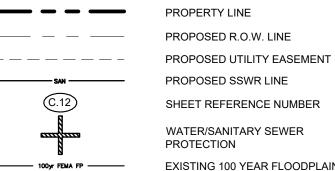
ENCOUNTERED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY OTHERS.

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- ALL SITE ACTIVITIES ARE TO BE CONDUCTED IN ACCORDANCE WITH ENVIRONMENTAL PERMIT DOCUMENTATION FOR THE PROJECT, INCLUDING ANY PERMITS REGARDING SOLID WASTE, LANDFILL GAS, MONITORING, AND REPORTING
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UTILITY LEGEND



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Tel. No. (281) 597-9300

FILE NO.

KIRKWOOD CROSSING PHASE 1 WS&D

HOUSTON, TX 77048

OVERALL SEWER PLAN

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON HOUSTON PUBLIC WORKS

STORM WATER QUALITY

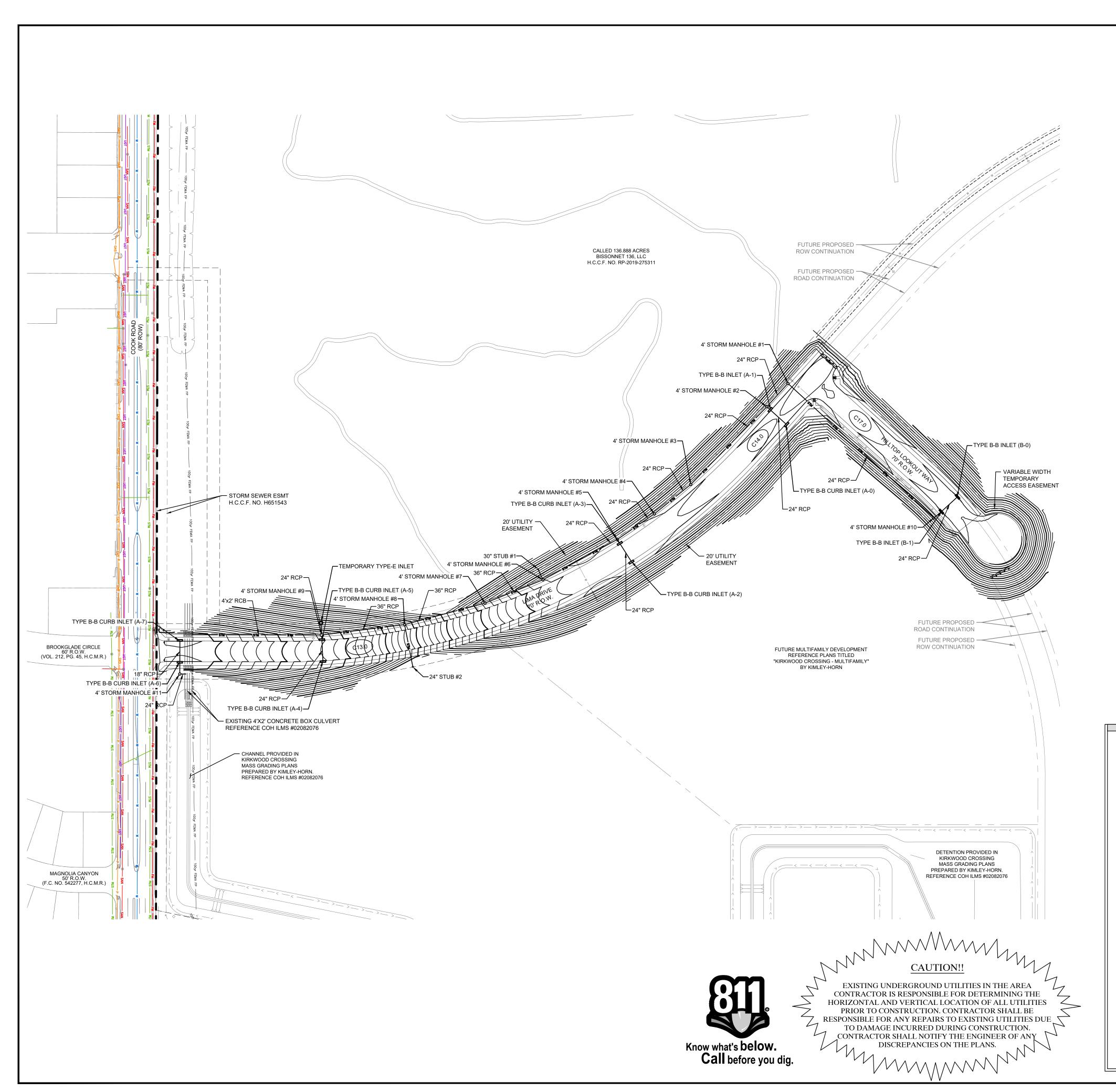
WATER WASTE WATER **FACILITIES**

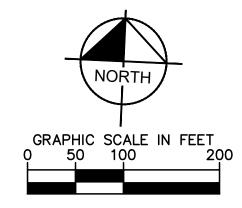
TRAFFIC & TRANSPORTATION

STORM WATER STREET & BRIDGE

HORIZ:

SHEET NO. C8.0 OF C29.0 | DRAWING SCALE





UTILITY LEGEND

PROPOSED R.O.W. LINE PROPOSED UTILITY EASEMENT PROPOSED STORM LINE SHEET REFERENCE NUMBER EXISTING 100 YEAR FLOODPLAIN

STORM SEWER GENERAL NOTES

1. STORM SEWER SHALL BE REINFORCED CONCRETE PIPE (C-76, CLASS III), AND SHALL BE INSTALLED, BEDDED, AND BACK FILLED IN ACCORDANCE WITH THE CITY OF HOUSTON DRAWING NOS. 2317-02. 02317-3. 02317-05. 02317-06. AND 02317-07 (OCT. 2002) AS APPLICABLE UNLESS OTHERWISW SHOWN ON THE

2. ALL STORM SEWER CONSTRUCTED IN SIDELOT EASMENT SHALL BE R.C.P (C-76, CLASSIII) AND SHALL BE EMBEDDED IN ACCORDANCE WITH THE CITY OF HOUSTON DRAWING NOS. 02317-02, 02317-03, 02317-05, 02317-06, AND 02317-07

3. ALL SEWER UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE BACKFILLED WITH 1-1/2 SACK CEMENT/C.Y. STABLIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE. THE REMAINING DEPTH OF TRENCH SHALL BE BACKFILLED WITH SUITABLE EARTH MATERIAL.

4. ALL TRENCH BACKFILL SHALL BE IN 8" LIFTS, WITH TESTS TAKEN AT 100 FOOT INTERVALS IN EACH LIFT, AND MECHNICALLY COMPACTED TO A DENSITY OF NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR COMACTION TEST (ASTM D-698/AASHTO T99).

5. CIRCULAR AND ELLIPTICAL REINFORCED CONCRETE PIPE SHALL BE INSTALLED USING RUBBER GASKET JOINT CONFORMING TO ASTM C443 AND ASTM C877 RESPECTIVELY.

6. ALL STORM SEWER PIPES AND INLET LEADS SHALL BE 24" AND LARGER R.C.F (C-76, CLASSIII).

7. ALL PRPOSED PIPE STUB-OUTS FROM MANHOLES AND INLET LEADS ARE TO BE PLUGGED WITH 8" BRICK WALLS UNLESS OTHERWISE NOTED.

8. MINIMUM HORIZONTAL CLEARANCE BETWEEN ANY STORM PIPE AND BOX SHALL BE AT LEAST 48-INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES. MINIMUM VERTICAL CLEARANCE BETWEEN ANY STORM PIPE AND BOX SHALL BE AT LEAST 18-INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OF PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES.

9. ADJUST MANHOLE COVERS TO GRADE CONFORMING TO REQUIREMENTS OF SECTION 02086-ADJUSTING MANHOLES, INLETS, AND VALAVE BOXES TO GRADE.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING. MAINTAINING, AND RESTORING ANY BACK SLOPE DRAINAGE SYSTEM DISTURBED AS A RESULT OF THIS WORK.

11. ALL DITCHES SHALL BE GRADED TO PROPOSED ELEVATIONS TO INSURE PROPER DRAINAGE. ALL OUTFALLS SHALL BE PROPERLY BACKFILLED AND COMPACTED. ALL DISTURBED AREA SHALL BE REGRADED, SEEDED, AND

12. ALL DRIVEWAYS WILL BE LOCATED TO AVOID EXISTING CURB INLET STRUCTURES.

DRAINAGE NOTE

DETENTION FOR THIS DEVELOPMENT IS PROVIDED IN THE OVERALL KIRKWOOD CROSSING DEVELOPMENT PER THE APPROVED DRAINAGE REPORT. THIS INCLUDES A CHANNELIZED SYSTEM WHICH FLOWS COUNTERCLOCKWISE AROUND THE KIRKWOOD CROSSING DEVELOPMENT TO THE ULTIMATE OUTFALL AT THE NORTHEAST CORNER. REFERENCE APPROVED DRAINAGE REPORT TITLED "12000 BISSONNET (136 ACRES) MASTER DRAINAGE PLAN" DATED JANUARY 2022.

ALL WORK DONE ON SITE MUST BE IN COMPLIANCE WITH THE GEOTECHNICAL REPORT

- COMPLETED BY GOODHEART & ASSOCIATES PLLC (PROJECT NO. 22-009.001) DATED OCTOBER 21, 2022 AND ANY SUPPLEMENTAL REPORTS ISSUED.
- 2. THE CLIENT UNDERSTANDS THAT DIFFERENTIAL SETTLING OF THE SITE WILL OCCUR AND THAT THE SITE WILL NEED TO BE INSPECTED AND MAINTAINED ON A MORE FREQUENT BASIS THEN A TYPICAL GREENFIELD SITE.
- CORRECTIVE MEASURES REGARDING SITE SETTLEMENT, STORMWATER, LANDFILL CAP, OR MONITORING, AND LANDFILL GASES ARE TO BE IMPLEMENTED BY THE CLIENT TO THE DEGREE REQUIRED IN ORDER TO MINIMIZE HUMAN HEALTH RISKS OR IMPACTS TO THE
- . A MINIMUM OF 4 FEET OF COVER MUST BE MAINTAINED FROM THE LANDFILL CAP AT ALL TIMES. THE LANDFILL CAP SHALL NOT BE PENETRATED UNLESS IN AREAS WHERE REQUIRED BY INSTALLATION OF UTILITIES OR STORM WATER CONVEYANCE SYSTEMS. WHERE LANDFILL CAP IS PENETRATED, ALL PLANS FOR HANDLING, STOCKPILING, DAILY COVER, AND DISPOSAL OF WASTE ENCOUNTERED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY OTHERS.
- 5. THE FOLLOWING ITEMS SHALL BE COORDINATED WITH THE GEOTECHNICAL ENGINEER WITH REGARD TO SPECIAL STEPS TO BE TAKEN DUE TO THE LANDFILL PRIOR TO DESIGN AND INSTALLATION: SITE LIGHTING FOUNDATIONS, FENCE POSTS, CONCRETE FOOTINGS, AND ANY OTHER IMPROVEMENT THAT WILL INTRUDE INTO THE LANDFILL CAP.
- PROPER VENTILATION OF LANDFILL GASES FROM THE LANDFILL, AS REQUIRED BY PERMIT OR REGULATORY AGENCY OR IF NEEDED, ARE TO BE DESIGNED, OPERATED, AND MAINTAINED BY OTHERS. RELOCATION, PLUGGING, AND ABANDONMENT OF EXISTING GAS VENTS OR MONITORING PROBES AND INSTALLATION OF ADDITIONAL GAS VENTS OR MONITORING PROBES IS TO BE PERFORMED BY OTHERS.
- ALL SITE ACTIVITIES ARE TO BE CONDUCTED IN ACCORDANCE WITH ENVIRONMENTAL PERMIT DOCUMENTATION FOR THE PROJECT, INCLUDING ANY PERMITS REGARDING SOLID WASTE, LANDFILL GAS, MONITORING, AND REPORTING.
- PLANS FOR HANDING, STOCKPILING, DAILY COVER, AND DISPOSAL OF WASTE ENCOUNTERED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY
- 9. PLANS FOR HANDLING AND DISPOSAL OF CONTAMINATED SOIL AND WATER GENERATED
- DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY OTHERS. 10. OBSERVATION AND REPORTING ASSOCIATED WITH WASTE OR CONTAMINATED MEDIA
- 1. CONTRACTORS SHALL BE RESPONSIBLE FOR PREPARATION, IMPLEMENTATION, MONITORING, AND REPORTING OF THEIR OWN SITE HEALTH AND SAFETY PLANS. HEALTH AND SAFETY PLANS SHALL TAKE INTO ACCOUNT THE KNOWN ENVIRONMENTAL

CONDITIONS AND EXPOSURE RISKS ON THE PROPERTY.

12. ONSITE MONITORING WELLS ARE TO BE PLUGGED AND ABANDONED BY OTHERS PRIOR TO CONSTRUCTION

GENERATED DURING CONSTRUCTION IS TO BE PROVIDED FOR THE CLIENT BY OTHERS.

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

VERIFICATION OF PRIVATE UTILITY LINES

CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not be used for conflict verification.

Signature valid for six months.

CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY. (This signature verifies existing underground facilities — not to be used for conflict verification)

Signature valid for six months.

Approved for AT&T underground conduit facilities only. Signature valid for one year.

11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Tel. No. (281) 597-9300

FILE NO.

KIRKWOOD CROSSING PHASE 1 WS&D

HOUSTON, TX 77048

OVERALL STORM PLAN

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

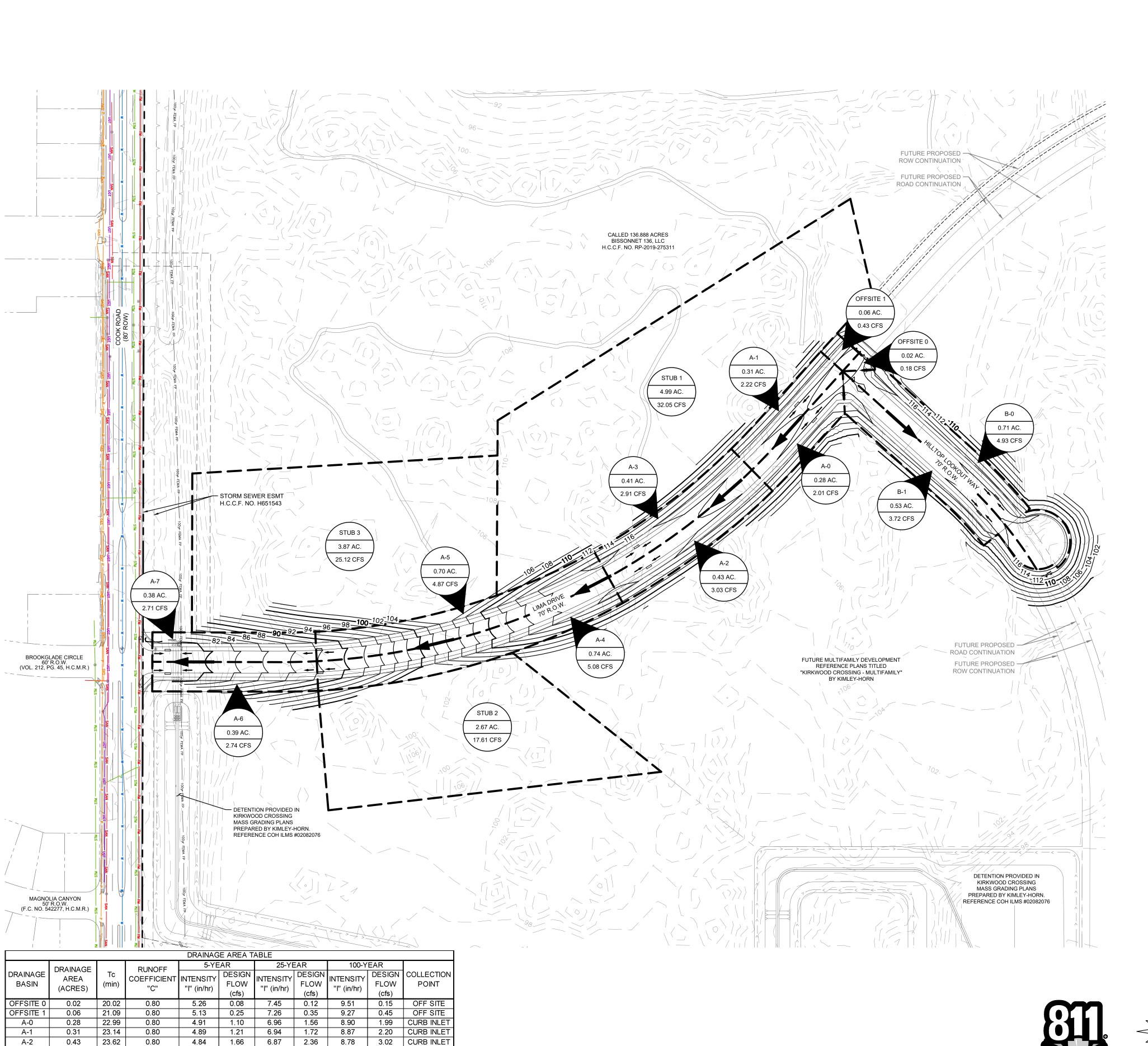
WASTE WATER **FACILITIES**

STORM WATER TRAFFIC & TRANSPORTATION

STREET & BRIDGE

HORIZ:

SHEET NO. C9.0 OF C29.0 DRAWING SCALE



2.26

3.99

3.78

6.89 2.10 8.81

4.81 2.04 6.82 2.89 8.72 3.70 CURB INLET

2.15 8.81

2.70 6.75 3.83 8.64 4.91 CURB INLET

6.75

6.89

8.79

8.63

8.64

4.84 | CURB INLET

2.75 CURB INLET 2.68 CURB INLET

A-3

23.55

24.39

23.47

0.53 23.94

0.80

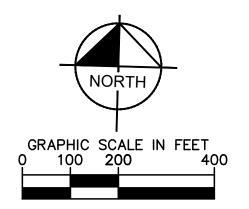
0.80

4.76

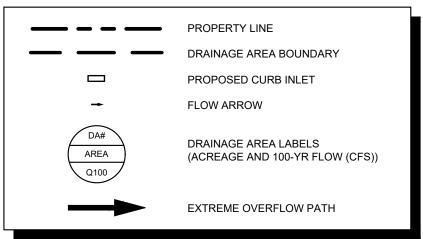
2.67

1.51

1.48



UTILITY LEGEND



DRAINAGE NOTE

DETENTION FOR THIS DEVELOPMENT IS PROVIDED IN THE OVERALL KIRKWOOD CROSSING DEVELOPMENT PER THE APPROVED DRAINAGE REPORT. THIS INCLUDES A CHANNELIZED SYSTEM WHICH FLOWS COUNTERCLOCKWISE AROUND THE KIRKWOOD CROSSING DEVELOPMENT TO THE ULTIMATE OUTFALL AT THE NORTHEAST CORNER. REFERENCE APPROVED DRAINAGE REPORT TITLED "12000 BISSONNET (136 ACRES) MASTER DRAINAGE PLAN" DATED JANUARY 2022.

REFERENCE "MASS GRADING AND DETENTION FOR KIRKWOOD CROSSING PHASE 1 PLANS" (COH ILMS NO. 22082076, HCFCD NO. 2211070084, & HC NO. 2211070075) SHEETS C-07 AND C-08 FOR DETENTION SERVICE AREA MAP AND EXISTING DRAINAGE AREA MAP, RESPECTIVELY

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

VERIFICATION OF PRIVATE UTILITY LINES

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Approved for AT&T underground conduit facilities only. Signature valid for one year.

11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Tel. No. (281) 597-9300

KIRKWOOD CROSSING PHASE 1 WS&D

PROPOSED DRAINAGE AREA MAP & CALCS

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

WASTE WATER **FACILITIES**

STORM WATER

FILE NO.

TRAFFIC & TRANSPORTATION STREET & BRIDGE

HORIZ:

SHEET NO. C10.0 OF C29.0 DRAWING SCALE FOR CITY OF HOUSTON USE ONLY

Know what's **below. Call** before you dig.

EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY

2 YEAR CALCULATIONS

STRU FROM		DRAINAGE AREA (ACRES)	TOTAL AREA (ACRES)	RUNOFF C	TOTAL C*A	1 1	DRAINAGE ARE FLOW 2-YR (CF	FINW 2-VR	REACH R LENGTH (FT)	DIAMETER (IN	SPAN (FT)	DESIGN SLOPE (%)	MANNING'S ROUGHNESS COEFFICIENT "n"	PIPE DESIGN CAPACITY (CFS)	DESIGN VELOCITY (FT/SEC)	AREA (SQ FT)	WETTED PERIMETER (FI	FALL (FT)		FLOWLINE ELEVATION DOWNSTREAM (FT)	2-YR ACTUAL VELOCITY (FT/SEC)	ACTUAL HYDRAULIC GRADIENT (%)	CHANGE IN HEAD (FT)	2-YR Hv (FT)	Kj	, ,	ELEVATION OF 2-YR HYD. RADE LINE UPSTREAM (FT)	ELEVATION OF 2-YR HYD. GRADE LINE DOWNSTREAM (FT)	TOP OF PIPE ELEVATION UPSTREAM (FT)	TOP OF PIPE ELEVATION DOWNSTREAM (FT)	LIDST DE AM (ET)	FINISHED GRADE DOWNSTREAM (FT)	HGL ABOVE GROUND (FT)	COVER (FT)
A0	A1	0.28	0.28	0.8	0.22 22.99	3.92	0.88	0.88	41	24	-	0.73	0.013	19.33	6.2	3.1	6.3	0.30	113.00	112.70	0.28	0.01%	0.00	0.00	1.25	0.00	114.70	114.70	115.00	114.70	118.06	118.06	-3.36	3.06
A1	MH1	0.31	0.59	0.8	0.47 24.07	3.83	0.95	1.81	11	24	-	0.95	0.013	22.05	7.0	3.1	6.3	0.10	112.70	112.60	0.58	0.03%	0.00	0.01	0.50	0.00	114.60	114.60	114.70	114.60	118.06	118.27	-3.46	3.36
MH1	MH2	0.00	1.24	0.8	0.99 27.42	3.57	0.00	3.54	62	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.11	109.69	109.58	1.13	0.13%	0.08	0.02	0.25	0.01	111.97	111.89	111.69	111.58	118.54	118.27	-6.42	6.85
MH2	MH3	0.00	1.83	0.8	1.46 27.82	3.54	0.00	5.19	216	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.39	109.58	109.19	1.65	0.27%	0.59	0.04	0.25	0.03	111.86	111.27	111.58	111.19	118.27	118.57	-6.41	6.69
MH3	MH4	0.00	1.83	0.8	1.46 28.77	3.48	0.00	5.09	93	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.17	109.19	109.02	1.62	0.27%	0.25	0.04	1.00	0.00	111.27	111.02	111.19	111.02	118.57	118.13	-7.30	7.38
MH4	MH5	0.00	1.83	0.8	1.46 29.19	3.45	0.00	5.05	89	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.16	107.02	106.86	1.61	0.26%	0.23	0.04	1.00	0.00	109.77	109.53	109.02	108.86	118.13	117.71	-8.15	9.11
MH5	MH6	0.00	2.67	0.8	2.14 29.59	3.42	0.00	7.31	168	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.30	106.86	106.56	2.33	0.55%	0.92	0.08	0.25	0.05	109.48	108.56	108.86	108.56	117.71	116.94	-8.23	8.85
MH6	MH7	0.00	7.66	0.8	6.13 30.12	3.39	0.00	20.78	124	36	-	0.11	0.013	22.12	3.1	7.1	9.4	0.14	104.53	104.39	2.94	0.51%	0.63	0.13	0.25	0.10	108.03	107.39	107.53	107.39	116.94	111.35	-8.91	9.41
MH7	MH8	0.00	7.66	0.8	6.13 30.43	3.37	0.00	20.66	165	36	-	0.11	0.013	22.12	3.1	7.1	9.4	0.18	92.39	92.21	2.92	0.51%	0.83	0.13	1.00	0.00	96.04	95.21	95.39	95.21	111.35	98.82	-15.30	15.95
MH8	MH9	0.00	10.33	0.8	8.26 30.84	3.35	0.00	27.66	166	36	-	0.75	0.013	57.76	8.2	7.1	9.4	1.24	83.16	81.92	3.91	0.91%	1.51	0.24	0.25	0.13	86.42	84.92	86.16	84.92	98.82	88.43	-10.45	12.66
MH9	JB OUT	0.00	15.64	0.8	12.51 31.14	3.33	0.00	41.64	259	24	4	0.50	0.013	49.35	6.2	8.0	12.0	1.30	75.61	74.32	5.21	1.88%	4.88	0.42	0.25	0.41	81.19	76.32	77.61	76.32	88.43	79.50	-3.75	10.82
A-2	A-3	0.43	0.43	0.8	0.34 23.62	3.87	1.33	1.33	41	24	-	0.73	0.013	19.33	6.2	3.1	6.3	0.30	112.70	112.40	0.423	0.02%	0.01	0.00	1.25	0.00	114.41	114.40	114.70	114.40	117.50	117.50	-3.09	2.80
A-3	MH5	0.41	0.84	0.8	0.67 24.33	3.81	1.25	2.56	11	24	-	0.95	0.013	22.05	7.0	3.1	6.3	0.10	112.40	112.30	0.814	0.07%	0.01	0.01	0.50	0.01	109.54	109.53	114.40	114.30	117.50	117.71	-7.75	3.10
A-4	A-5	0.74	0.74	0.8	0.59 24.48	3.79	2.25	2.25	41	24	-	0.73	0.013	19.33	6.2	3.1	6.3	0.30	83.00	82.70	0.715	0.05%	0.02	0.01	1.25	0.00	84.99	84.97	85.00	84.70	88.20	88.20	-1.14	3.20
A-5	MH9	0.70	1.44	0.8	1.15 24.90	3.76	2.11	4.33	11	24	-	0.95	0.013	22.05	7.0	3.1	6.3	0.10	82.70	82.60	1.379	0.19%	0.02	0.03	0.50	0.03	84.94	84.92	84.70	84.60	88.20	88.43	-1.31	3.50
A-7	A-6	0.38	0.38	0.8	0.30 23.43	3.88	1.18	1.18	41	18	-	0.25	0.013	5.25	3.0	1.8	4.7	0.10	74.61	74.50	0.668	0.07%	0.03	0.01	1.25	0.00	76.05	76.02	76.11	76.00	79.20	79.20	0.80	3.10
A-6	MH11	0.39	0.77	0.8	0.62 23.88	3.84	1.20	2.37	25	18	-	0.25	0.013	5.25	3.0	1.8	4.7	0.06	74.50	74.44	1.340	0.26%	0.06	0.03	0.50	0.01	76.01	75.94	76.00	75.94	79.20	76.98	0.70	3.20
MH11	OUT	0.77	0.77	0.8	0.62 24.02	3.83	2.36	2.36	12	18	-	0.25	0.013	5.25	3.0	1.8	4.7	0.03	74.44	74.41	1.34	0.26%	0.03	0.03	0.25	0.03	75.94	75.91	75.94	75.91	76.98	76.63	2.85	1.04
B-0	B-1	0.71	0.71	0.8	0.57 24.41	3.80	2.16	2.16	41	24	-	0.73	0.013	19.33	6.2	3.1	6.3	0.30	110.80	110.50	0.687	0.05%	0.02	0.01	1.25	0.00	112.60	112.58	112.80	112.50	116.00	116.00	-3.17	3.20
B-1	MH10	0.53	1.24	0.8	0.99 24.85	3.76	1.60	3.73	21	24	-	0.48	0.013	15.67	5.0	3.1	6.3	0.10	110.50	110.40	1.189	0.14%	0.03	0.02	0.50	0.02	112.56	112.53	112.50	112.40	116.00	114.72	-3.31	3.50
MH10	MH1	0.00	1.24	0.8	0.99 24.98	3.75	0.00	3.72	394	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.71	110.40	109.69	1.185	0.14%	0.55	0.02	0.25	0.00	112.53	111.97	112.40	111.69	114.72	118.54	-2.05	2.32
																															1			
STUB 1	MH6	4.99	4.99	0.8	3.99 28.27	3.51	14.02	14.02	24	30	-	0.13	0.013	14.79	3.0	4.9	7.9	0.03	105.56	105.53	2.856	0.61%	0.14	0.13	1.25	0.13	108.70	108.56	108.06	108.03	116.70	116.94	-8.00	8.64
																															1			
STUB 2	MH8	2.67	2.67	0.8	2.14 26.89	3.61	7.71	7.71	86	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.16	87.37	87.21	2.454	0.60%	0.52	0.09	1.25	0.09	95.73	95.21	89.37	89.21	98.60	98.82	-2.87	9.24
STUB 3	MH9	3.87	3.87	0.8	3.10 27.69	3.55	11.00	11.00	24	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.04	75.66	75.61	3.500	1.23%	0.30	0.19	1.25	0.19	85.21	84.92	77.66	77.61	93.51	88.43	-6.34	15.85
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100 YEAR CALCULATIONS

FROM	CTURE TO	DRAINAGE AREA (ACRES)	TOTAL AREA (ACRES)	RUNOFF C	TOTAL C*A	TC (MIN)	DRAINAGE ARE FLOW 100-YR (CFS)			DIAMETER (IN	SPAN (FT)	DESIGN SLOPE (%)	MANNING'S ROUGHNESS COEFFICIENT "n"	PIPE DESIGN CAPACITY (CFS)	DESIGN VELOCITY (FT/SEC)	AREA (SQ FT)	WETTED PERIMETER (FT)	FALL (FT)	FLOWLINE ELEVATION UPSTREAM (FT)	FLOWLINE ELEVATION DOWNSTREAM (FT	100-YR ACTUAL VELOCITY (FT/SEC)	ACTUAL HYDRAULIC GRADIENT (%)	CHANGE IN HEAD (FT)	TIME VOLUMENT	r) кј	ELEVATION OF 100-YR HYD. GRADE LINE UPSTREAM (FT)	ELEVATION OF 100-YR HYD. GRADE LINE DOWNSTREAM (FT)	TOP OF PIPE ELEVATION UPSTREAM (FT)	TOP OF PIPE ELEVATION DOWNSTREAM (FT)	FINISHED GRADE UPSTREAM (FT)	FINISHED GRADE DOWNSTREAM (FT)		COVER (FT)
A0	A1	0.28	0.28	0.8	0.22	22.99 8.90	1.99	1.99	41	24	-	0.73	0.013	19.33	6.2	3.1	6.3	0.30	113.00	112.70	0.63	0.01%	0.00	0.01	1.25	114.70	114.70	115.00	114.70	118.06	118.06	-3.36	3.06
A1	MH1	0.31	0.59	0.8	0.47	24.07 8.70	2.16	4.11	11	24	-	0.95	0.013	22.05	7.0	3.1	6.3	0.10	112.70	112.60	1.31	0.03%	0.00	0.03	0.50	114.60	114.60	114.70	114.60	118.06	118.27	-3.46	3.36
MH1	MH2	0.00	1.24	0.8	0.99	27.42 8.16	0.00	8.09	62	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.11	109.69	109.58	2.58	0.13%	0.08	0.10	0.25	112.11	112.03	111.69	111.58	118.54	118.27	-6.42	6.85
MH2	MH3	0.00	1.83	0.8	1.46	27.82 8.10	0.00	11.85	216	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.39	109.58	109.19	3.77	0.27%	0.59	0.22	0.25	111.86	111.27	111.58	111.19	118.27	118.57	-6.41	6.69
MH3	MH4	0.00	1.83	0.8	1.46	28.77 7.96	0.00	11.66	93	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.17	109.19	109.02	3.71	0.27%	0.25	0.21	1.00	111.27	111.02	111.19	111.02	118.57	118.13	-7.30	7.38
MH4	MH5	0.00	1.83	0.8	1.46	29.19 7.90	0.00	11.57	89	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.16	107.02	106.86	3.68	0.26%	0.23	0.21	1.00	109.98	109.75	109.02	108.86	118.13	117.71	-8.15	9.11
MH5	MH6	0.00	2.67	0.8	2.14	29.59 7.85	0.00	16.77	168	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.30	106.86	106.56	5.34	0.55%	0.92	0.44	0.25	109.48	108.56	108.86	108.56	117.71	116.94	-8.23	8.85
MH6	MH7	0.00	7.66	0.8	6.13	30.12 7.78	0.00	47.68	124	36	-	0.11	0.013	22.12	3.1	7.1	9.4	0.14	104.53	104.39	6.75	0.51%	0.63	0.71	0.25	108.03	107.39	107.53	107.39	116.94	111.35	-8.91	9.41
MH7	MH8	0.00	7.66	0.8	6.13	30.43 7.74	0.00	47.43	165	36	-	0.11	0.013	22.12	3.1	7.1	9.4	0.18	92.39	92.21	6.71	0.51%	0.83	0.70	1.00	96.04	95.21	95.39	95.21	111.35	98.82	-15.30	15.95
MH8	MH9	0.00	10.33	0.8	8.26	30.84 7.69	0.00	63.54	166	36	-	0.75	0.013	57.76	8.2	7.1	9.4	1.24	83.16	81.92	8.99	0.91%	1.51	1.25	0.25	88.37	86.87	86.16	84.92	98.82	88.43	-10.45	12.66
MH9	JB OUT	0.00	15.64	0.8	12.51	31.14 7.65	0.00	95.71	259	24	4	0.50	0.013	49.35	6.2	8.0	12.0	1.30	75.61	74.32	11.96	1.88%	4.88	2.22	0.25	84.68	79.80	77.61	76.32	88.43	79.50	-3.75	10.82
A-2	A-3	0.43	0.43	0.8	0.34	23.62 8.78	3.02	3.02	41	24	-	0.73	0.013	19.33	6.2	3.1	6.3	0.30	112.70	112.40	0.96	0.02%	0.01	0.01	1.25	114.41	114.40	114.70	114.40	117.50	117.50	-3.09	2.80
A-3	MH5	0.41	0.84	0.8	0.67	24.33 8.65	2.84	5.81	11	24	-	0.95	0.013	22.05	7.0	3.1	6.3	0.10	112.40	112.30	1.85	0.07%	0.01	0.05	0.50	109.75	109.75	114.40	114.30	117.50	117.71	-7.75	3.10
A-4	A-5	0.74	0.74	0.8	0.59	24.48 8.63	5.11	5.11	41	24	-	0.73	0.013	19.33	6.2	3.1	6.3	0.30	83.00	82.70	1.63	0.05%	0.02	0.04	1.25	87.06	87.04	85.00	84.70	88.20	88.20	-1.14	3.20
A-5	MH9	0.70	1.44	0.8	1.15	24.90 8.55	4.79	9.85	11	24	-	0.95	0.013	22.05	7.0	3.1	6.3	0.10	82.70	82.60	3.14	0.19%	0.02	0.15	0.50	86.89	86.87	84.70	84.60	88.20	88.43	-1.31	3.50
A-7	A-6	0.38	0.38	0.8	0.30	23.43 8.81	2.68	2.68	41	18	-	0.25	0.013	5.25	3.0	1.8	4.7	0.10	74.61	74.50	1.52	0.07%	0.03	0.04	1.25	80.00	79.97	76.11	76.00	79.20	79.20	0.80	3.10
A-6	MH11	0.39	0.77	0.8	0.62	23.88 8.73	2.72	5.38	25	18	-	0.25	0.013	5.25	3.0	1.8	4.7	0.06	74.50	74.44	3.04	0.26%	0.06	0.14	0.50	79.90	79.83	76.00	75.94	79.20	76.98	0.70	3.20
MH11	OUT	0.77	0.77	0.8	0.62	24.02 8.71	5.36	5.36	12	18	-	0.25	0.013	5.25	3.0	1.8	4.7	0.03	74.44	74.41	3.04	0.26%	0.03	0.14	0.25	79.83	79.80	75.94	75.91	76.98	76.63	2.85	1.04
B-0	B-1	0.71	0.71	0.8	0.57	24.41 8.64	4.91	4.91	41	24	-	0.73	0.013	19.33	6.2	3.1	6.3	0.30	110.80	110.50	1.56	0.05%	0.02	0.04	1.25	112.83	112.81	112.80	112.50	116.00	116.00	-3.17	3.20
B-1	MH10	0.53	1.24	0.8	0.99	24.85 8.56	3.63	8.49	21	24	-	0.48	0.013	15.67	5.0	3.1	6.3	0.10	110.50	110.40	2.70	0.14%	0.03	0.11	0.50	112.69	112.67	112.50	112.40	116.00	114.72	-3.31	3.50
MH10	MH1	0.00	1.24	0.8	0.99	24.98 8.54	0.00	8.47	394	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.71	110.40	109.69	2.70	0.14%	0.55	0.11	0.25	112.67	112.11	112.40	111.69	114.72	118.54	-2.05	2.32
STUB 1	MH6	4.99	4.99	0.8	3.99	28.27 8.03	32.06	32.06	24	30	-	0.13	0.013	14.79	3.0	4.9	7.9	0.03	105.56	105.53	6.53	0.61%	0.14	0.66	1.25	108.70	108.56	108.06	108.03	116.70	116.94	-8.00	8.64
STUB 2	MH8	2.67	2.67	0.8	2.14	26.89 8.24	17.59	17.59	86	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.16	87.37	87.21	5.60	0.60%	0.52	0.49	1.25	95.73	95.21	89.37	89.21	98.60	98.82	-2.87	9.24
STUB 3	MH9	3.87	3.87	0.8	3.10	27.69 8.12	25.13	25.13	24	24	-	0.18	0.013	9.60	3.1	3.1	6.3	0.04	75.66	75.61	8.00	1.23%	0.30	0.99	1.25	87.16	86.87	77.66	77.61	93.51	88.43	-6.34	15.85
											_ •																•						

INLET CALCULATIONS

		T			Total	Poodway			Manning's			<u> </u>		DE	CECCED INILETS O	N CDADE		Ţ			CAC	C INIL ETC	
INLET	DRAINAGE AREA	Flow	Type of Inlet	Carry-Over	Total Gutter	Roadway Longitudinal	1	Reciprocal of		Gutter Flow Depth	Gutter Flow Spread	Barrasia	Ratio of Frontal		Required Inlet for		Percentage of		Carry Over	Max	Required	S INLETS	Depth of Flow at Inlet
		(Q ₁₀₀)		Flows	Flows	Slope	Cross Slope	Cross Slope	Coefficient	-		Depression	Flow to Gutter	Slope	100% capture	Length	Interception	Carry Over	Destination	Allowable	Length of Inlet	Inlet Size	Throat (25-YR)
Paving Station		(cfs)		(C ₀) (cfs)	(Q _A) (cfs)	S (ft/ft)	Sx (ft/ft)	z (ft/ft)	n	y (ft)	w (ft)	a (ft)	Eo	Se (ft/ft)	Lx(ft)	Li (ft)	E (%)	Q _I -Q _A (cfs)		y (ft)	Ly (ft)		(ft)
LD 15+15.10, 20.5 RT	A-0	2.01	SAG	0.00	2.01	0.0043	0.020	50.00	0.0180	0.23	11.49	0.333	0.400	0.087	7.55	10	100.00%	0.00	A-4	0.50	1.71	10	0.15
LD 15.10, 20.5 LT	A-1	2.22	SAG	0.00	2.22	0.0043	0.020	50.00	0.0180	0.24	11.93	0.333	0.387	0.085	7.99	10	100.00%	0.00	A-5	0.50	1.89	10	0.16
LD 11+08.43, 20.5 RT	A-2	3.03	SAG	0.00	3.03	0.0058	0.020	50.00	0.0180	0.25	12.64	0.333	0.369	0.081	10.23	10	99.89%	0.00	A-6	0.50	2.57	10	0.20
LD 11+08.43, 20.5 LT	A-3	2.91	SAG	0.00	2.91	0.0058	0.020	50.00	0.0180	0.25	12.45	0.333	0.373	0.082	10.00	10	100.00%	0.00	A-7	0.50	2.47	10	0.20
LD 4+68.93, 20.5 RT	A-4	5.08	ON GRADE	0.00	5.08	0.0390	0.020	50.00	0.0180	0.21	10.74	0.333	0.423	0.091	21.13	10	68.47%	1.60	A-8	0.50	4.32	10	0.29
LD 4+69.20, 20.5 LT	A-5	4.87	ON GRADE	0.00	4.87	0.0390	0.020	50.00	0.0180	0.21	10.57	0.333	0.429	0.091	20.62	10	69.71%	1.48	A-9	0.50	4.14	10	0.28
LD 1+86.05, 20.5 RT	A-6	2.74	SAG	1.60	4.34	0.0010	0.020	50.00	0.0180	0.40	20.05	0.333	0.245	0.061	8.42	10	100.00%	0.00	SAG	0.50	3.69	10	0.26
LD 1+86.10, 20.5 LT	A-7	2.71	SAG	1.48	4.19	0.0010	0.020	50.00	0.0180	0.40	19.85	0.333	0.247	0.061	8.21	10	100.00%	0.00	SAG	0.50	3.55	10	0.25
HLW 20+50.12, 20.5 RT	B-0	4.93	SAG	0.00	4.93	0.0071	0.020	50.00	0.0180	0.29	14.61	0.333	0.325	0.074	14.10	10	89.17%	0.53	SAG	0.50	4.19	10	0.28
HLW 20+50.12, 20.5 LT	B-1	3.72	SAG	0.00	3 72	0.0071	0.020	50.00	0.0180	0.26	13.15	0.333	0.356	0.079	12.03	10	95.95%	0.15	SAG	0.50	3 16	10	0.23

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11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Tel. No. (281) 597-9300

KIRKWOOD CROSSING PHASE 1 WS&D

HOUSTON, TX 77048

STORM & INLET CALCULATIONS

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

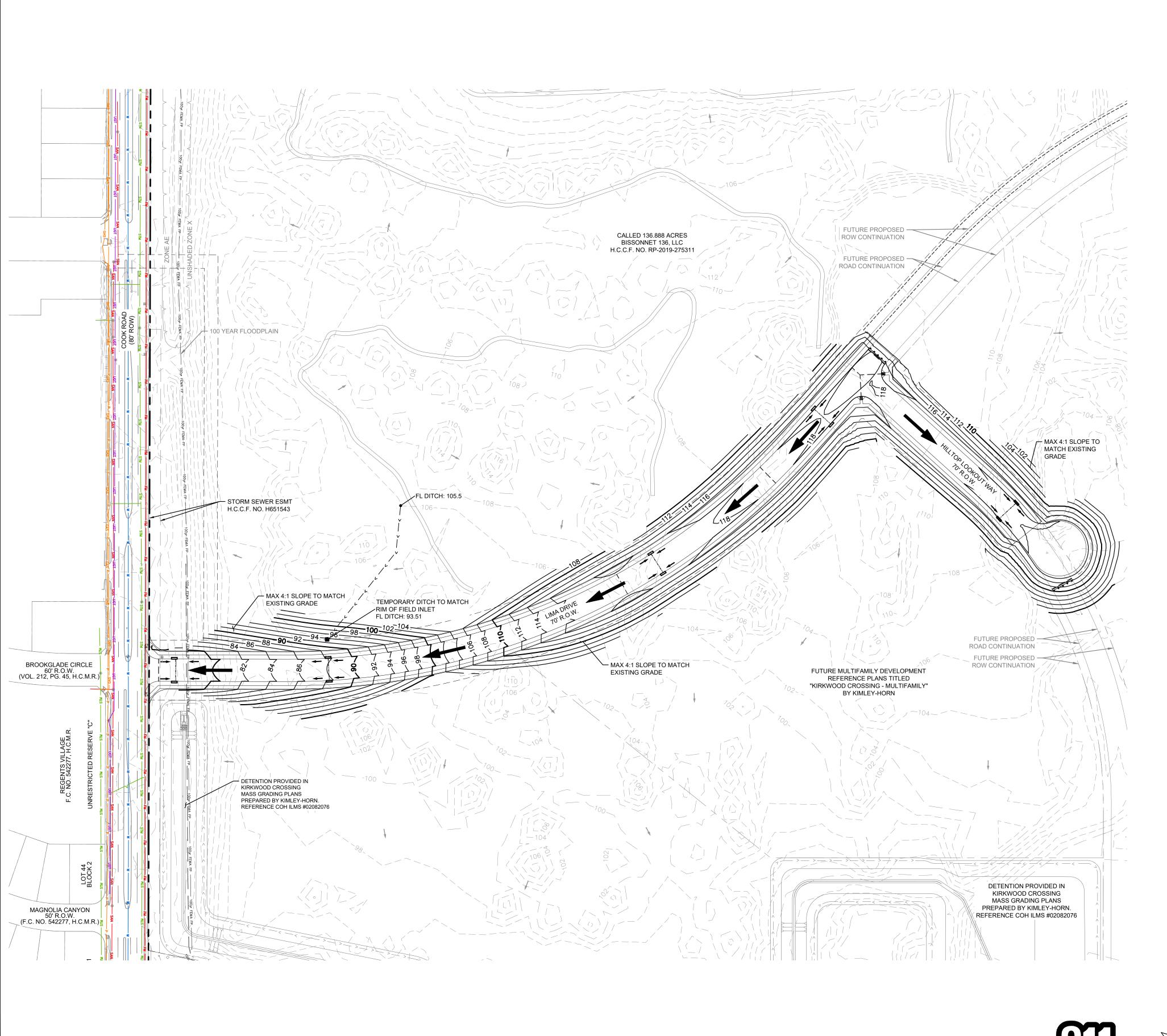
STORM WATER QUALITY WATER

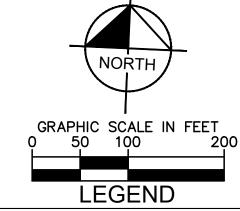
FACILITIES WASTE WATER

STORM WATER TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

FILE NO. HORIZ:

SHEET NO. C11.0 OF C29.0 DRAWING SCALE FOR CITY OF HOUSTON USE ONLY





PROPERTY LINE

STREET DRAINAGE FLOW DIRECTION

EXISTING DRAINAGE FLOW DIRECTION

EXTREME EVENT FLOW DIRECTION

HIGH POINT

LOW POINT

TEMPORARY PROPOSED DRAINAGE SWALE

100yr FEMA FP EXISTING 100 YEAR FLOODPLAIN

GRADING GENERAL NOTES

- ALL PERIMETER SLOPES TO NATURAL GROUND ARE TO BE 4:1 MAX, UNLESS OTHERWISE NOTED.
- ALL SIDEWALKS SHALL MAINTAIN A MAXIMUM 2% CROSS SLOPE AND SHALL NOT IMPEDE PROPOSED DRAINAGE PATTERNS. DRAINAGE STRUCTURES TO BE PLACED IN ORDER TO CONVEY FLOW WHERE NECESSARY.
- PROPOSED CONTOURS SHOWN ARE FOR REFERENCE ONLY. CONTRACTOR TO USE SPOT ELEVATIONS FOR GRADING CONSTRUCTION. NO LOT TO LOT DRAINAGE SHALL BE ALLOWED.
- ALL WORK DONE ON SITE MUST BE IN COMPLIANCE WITH THE GEOTECHNICAL
- REPORT COMPLETED BY GOODHEART & ASSOCIATES PLLC (PROJECT NO. 22-009.001) DATED OCTOBER 21, 2022 AND ANY SUPPLEMENTAL REPORTS ISSUED.

THE CLIENT UNDERSTANDS THAT DIFFERENTIAL SETTLING OF THE SITE WILL OCCUR

FREQUENT BASIS THEN A TYPICAL GREENFIELD SITE.

3. CORRECTIVE MEASURES REGARDING SITE SETTLEMENT, STORMWATER, LANDFILL

CAR OF MONITORING AND LANDFILL CASES ARE TO BE IMPLEMENTED BY THE

AND THAT THE SITE WILL NEED TO BE INSPECTED AND MAINTAINED ON A MORE

- CAP, OR MONITORING, AND LANDFILL GASES ARE TO BE IMPLEMENTED BY THE CLIENT TO THE DEGREE REQUIRED IN ORDER TO MINIMIZE HUMAN HEALTH RISKS OR IMPACTS TO THE ENVIRONMENT.
- 4. A MINIMUM OF 4 FEET OF COVER MUST BE MAINTAINED FROM THE LANDFILL CAP AT ALL TIMES. THE LANDFILL CAP SHALL NOT BE PENETRATED UNLESS IN AREAS WHERE REQUIRED BY INSTALLATION OF UTILITIES OR STORM WATER CONVEYANCE SYSTEMS. WHERE LANDFILL CAP IS PENETRATED, ALL PLANS FOR HANDLING, STOCKPILING, DAILY COVER, AND DISPOSAL OF WASTE ENCOUNTERED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY OTHERS.
- THE FOLLOWING ITEMS SHALL BE COORDINATED WITH THE GEOTECHNICAL ENGINEER WITH REGARD TO SPECIAL STEPS TO BE TAKEN DUE TO THE LANDFILL PRIOR TO DESIGN AND INSTALLATION: SITE LIGHTING FOUNDATIONS, FENCE POSTS, CONCRETE FOOTINGS, AND ANY OTHER IMPROVEMENT THAT WILL INTRUDE INTO THE LANDFILL CAP.
- 6. PROPER VENTILATION OF LANDFILL GASES FROM THE LANDFILL, AS REQUIRED BY PERMIT OR REGULATORY AGENCY OR IF NEEDED, ARE TO BE DESIGNED, OPERATED, AND MAINTAINED BY OTHERS. RELOCATION, PLUGGING, AND ABANDONMENT OF EXISTING GAS VENTS OR MONITORING PROBES AND INSTALLATION OF ADDITIONAL GAS VENTS OR MONITORING PROBES IS TO BE PERFORMED BY OTHERS.
- 7. ALL SITE ACTIVITIES ARE TO BE CONDUCTED IN ACCORDANCE WITH ENVIRONMENTAL PERMIT DOCUMENTATION FOR THE PROJECT, INCLUDING ANY PERMITS REGARDING SOLID WASTE, LANDFILL GAS, MONITORING, AND REPORTING.
- PLANS FOR HANDING, STOCKPILING, DAILY COVER, AND DISPOSAL OF WASTE ENCOUNTERED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY OTHERS
- 9. PLANS FOR HANDLING AND DISPOSAL OF CONTAMINATED SOIL AND WATER GENERATED DURING CONSTRUCTION ARE TO BE PREPARED FOR THE CLIENT BY
- 10. OBSERVATION AND REPORTING ASSOCIATED WITH WASTE OR CONTAMINATED MEDIA GENERATED DURING CONSTRUCTION IS TO BE PROVIDED FOR THE CLIENT BY
- 11. CONTRACTORS SHALL BE RESPONSIBLE FOR PREPARATION, IMPLEMENTATION, MONITORING, AND REPORTING OF THEIR OWN SITE HEALTH AND SAFETY PLANS. HEALTH AND SAFETY PLANS SHALL TAKE INTO ACCOUNT THE KNOWN ENVIRONMENTAL CONDITIONS AND EXPOSURE RISKS ON THE PROPERTY.
- 12. ONSITE MONITORING WELLS ARE TO BE PLUGGED AND ABANDONED BY OTHERS PRIOR TO CONSTRUCTION.

NOTICE:

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Data

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Signature valid for six months.

Date Approved for AT&T underground conduit facilities only.

Signature valid for one year.

Kimley»Horr

11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F—928

Tel. No. (281) 597-9300

STORM WATER

FILE NO.

KIRKWOOD CROSSING PHASE 1 WS&D

HOUSTON, TX 77048

GRADING PLAN

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

WASTE WATER FACILITIES

TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

HORIZ:

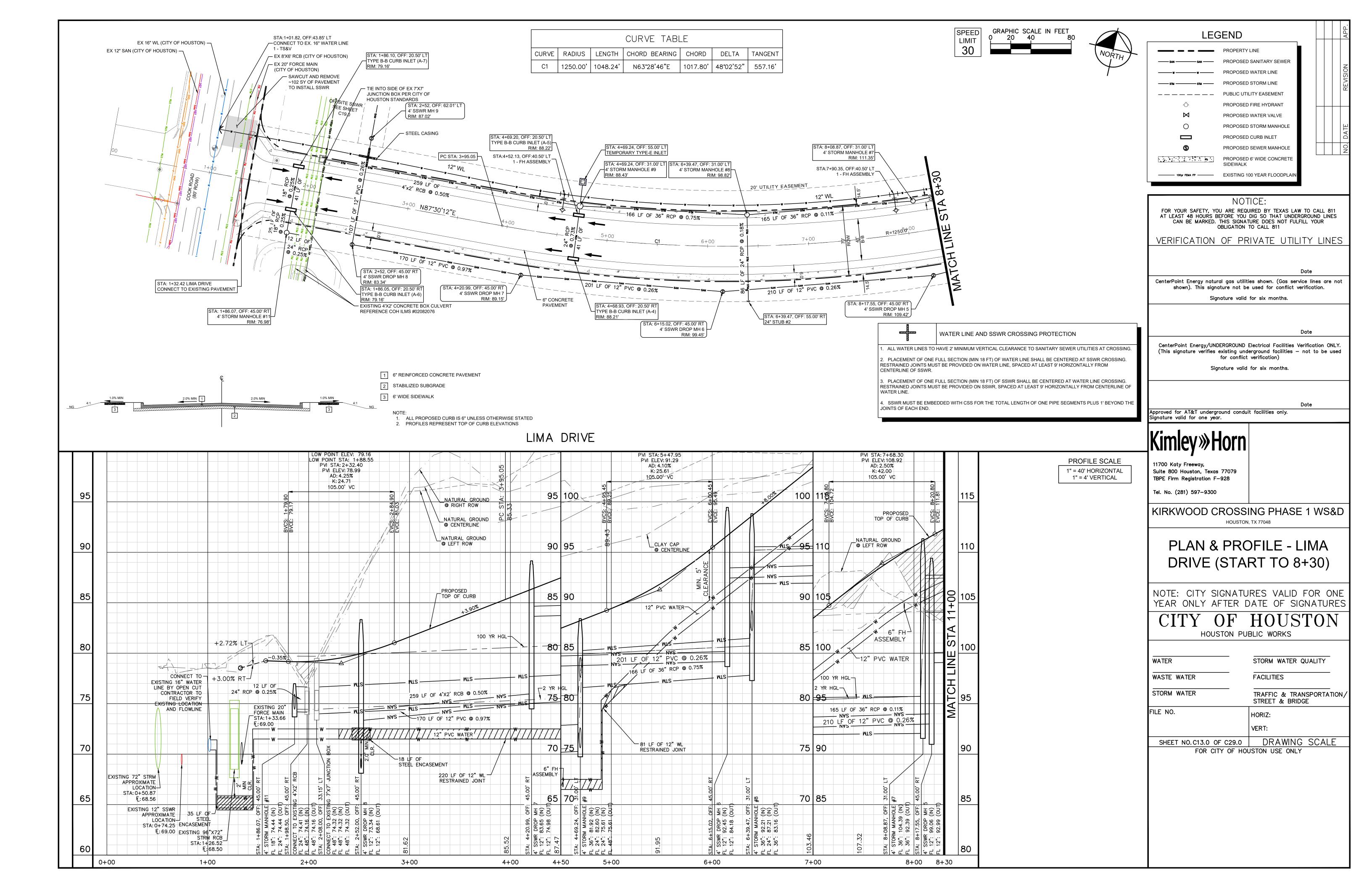
VERT:

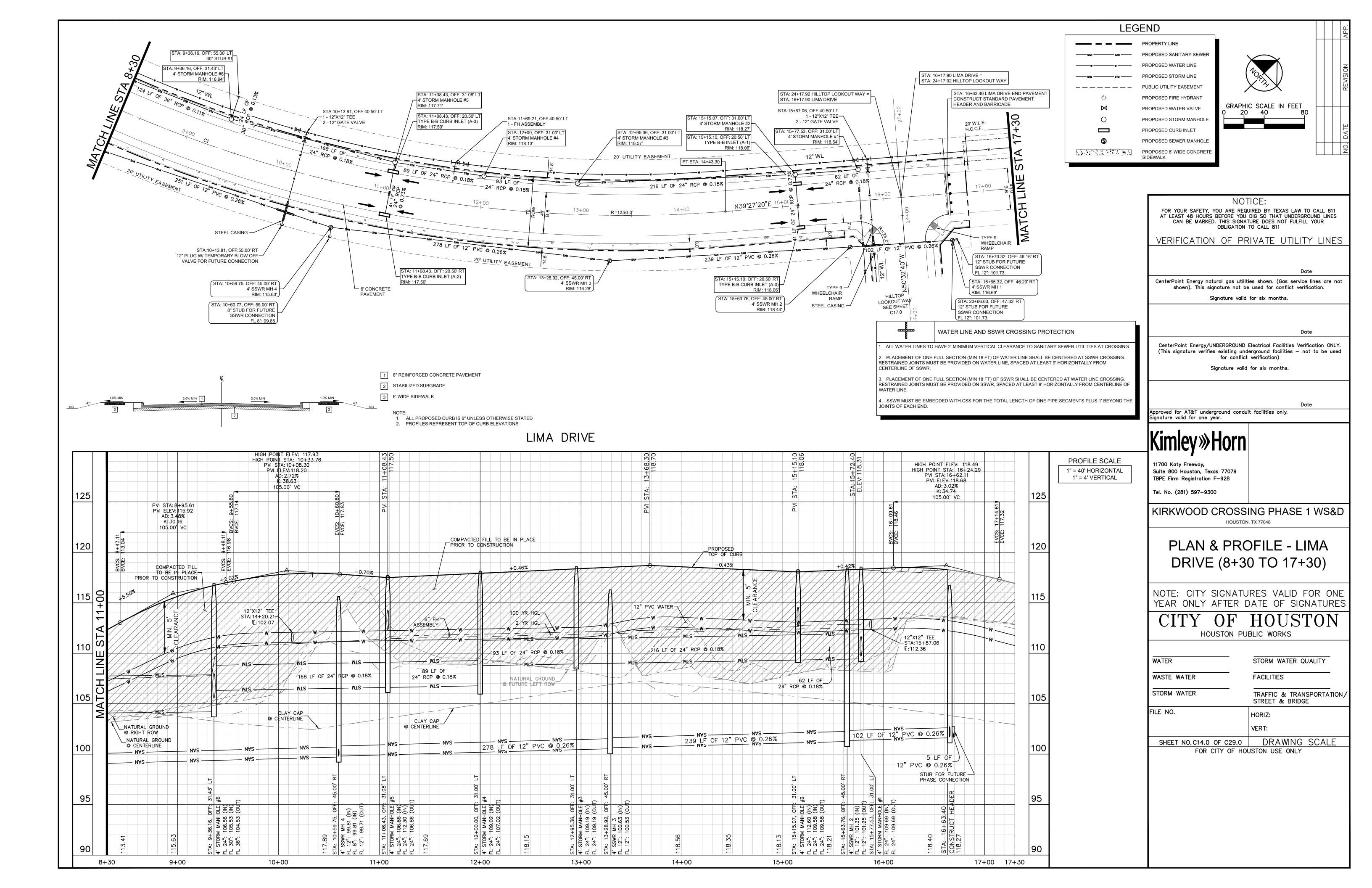
SHEET NO. C12.0 OF C29.0 DRAWING SCALE
FOR CITY OF HOUSTON USE ONLY

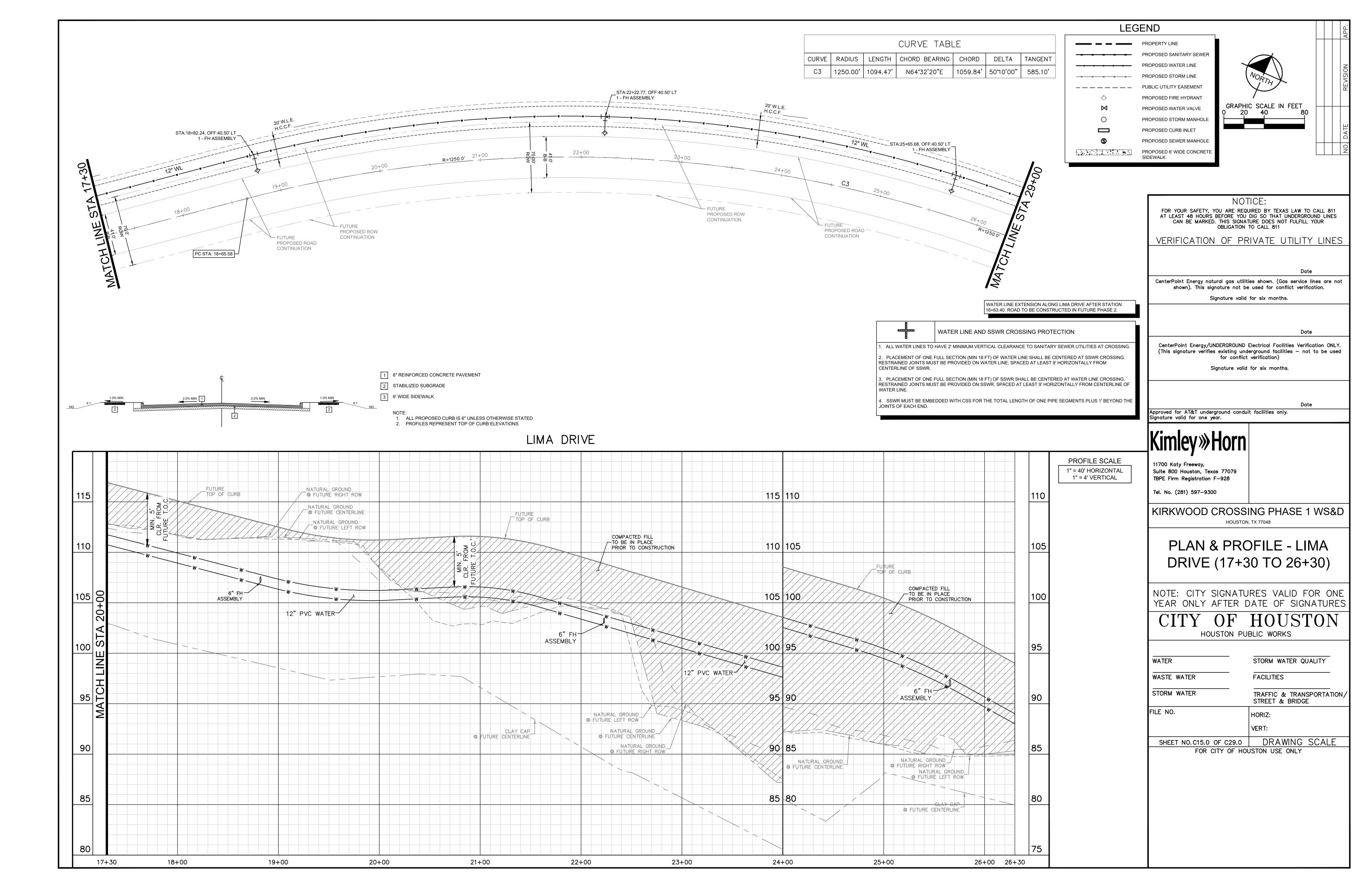
Know what's below.
Call before you dig.

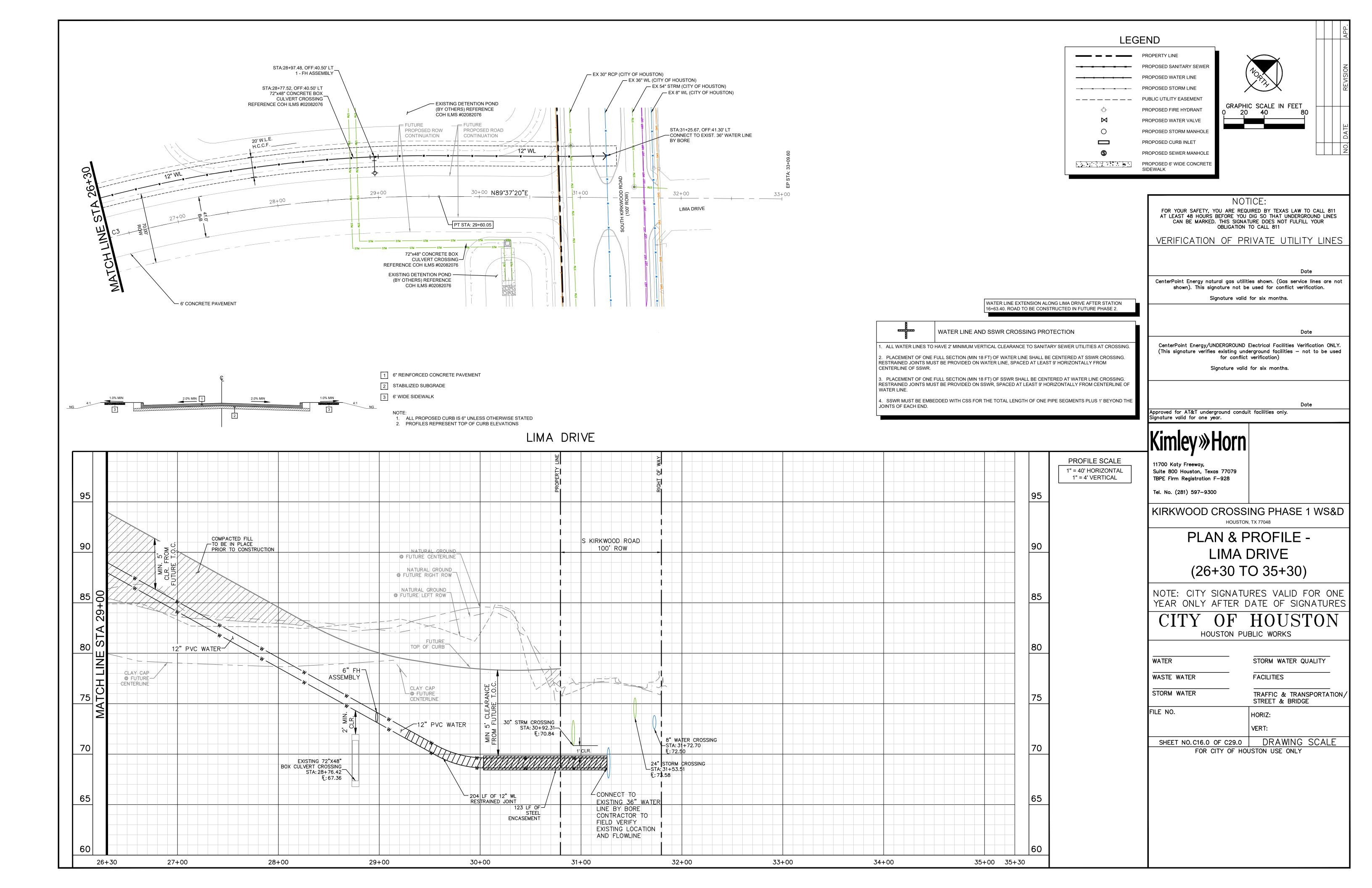
CAUTION!!

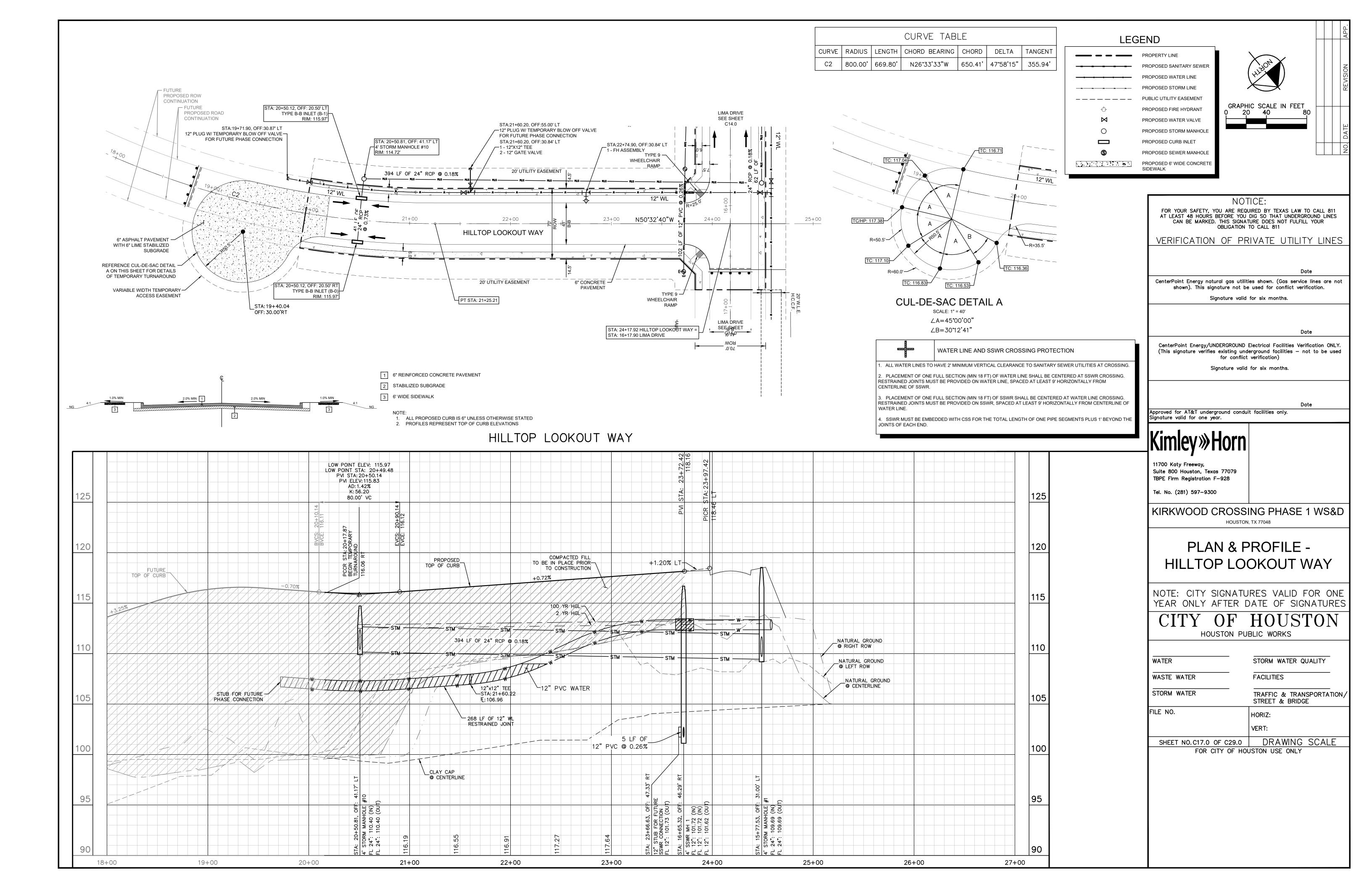
EXISTING UNDERGROUND UTILITIES IN THE AREA
CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE
HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES
PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE
RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE
TO DAMAGE INCURRED DURING CONSTRUCTION.
CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY

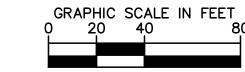












WATER LINE AND SSWR CROSSING PROTECTION

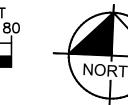
1. ALL WATER LINES TO HAVE 2' MINIMUM VERTICAL CLEARANCE TO SANITARY SEWER UTILITIES AT CROSSING.

2. PLACEMENT OF ONE FULL SECTION (MIN 18 FT) OF WATER LINE SHALL BE CENTERED AT SSWR CROSSING. RESTRAINED JOINTS MUST BE PROVIDED ON WATER LINE, SPACED AT LEAST 9' HORIZONTALLY FROM

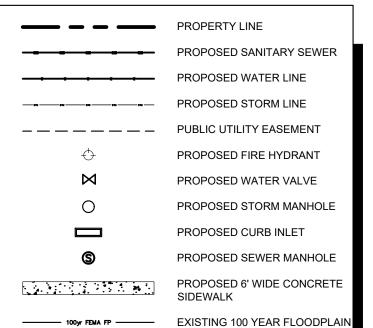
3. PLACEMENT OF ONE FULL SECTION (MIN 18 FT) OF SSWR SHALL BE CENTERED AT WATER LINE CROSSING. RESTRAINED JOINTS MUST BE PROVIDED ON SSWR, SPACED AT LEAST 9' HORIZONTALLY FROM CENTERLINE OF

JOINTS OF EACH END.

4. SSWR MUST BE EMBEDDED WITH CSS FOR THE TOTAL LENGTH OF ONE PIPE SEGMENTS PLUS 1' BEYOND THE







FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811
AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES
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Date

11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Tel. No. (281) 597-9300

KIRKWOOD CROSSING PHASE 1 WS&D

FSITE SSWR (0+00 TO 3+00)

YEAR ONLY AFTER DATE OF SIGNATURES

HOUSTON PUBLIC WORKS

STORM WATER QUALITY WATER WASTE WATER **FACILITIES**

TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

FOR CITY OF HOUSTON USE ONLY

PROFILE SCALE

1" = 40' HORIZONTAL 1" = 4' VERTICAL

Approved for AT&T underground conduit facilities only. Signature valid for one year.

FILE NO.

HOUSTON, TX 77048	
PLAN & PROFILE - OF	

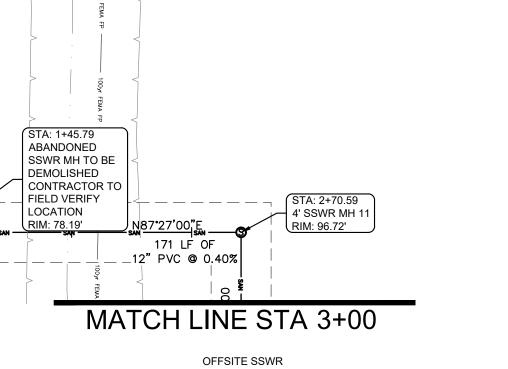
NOTE: CITY SIGNATURES VALID FOR ONE

CITY OF HOUSTON

STORM WATER

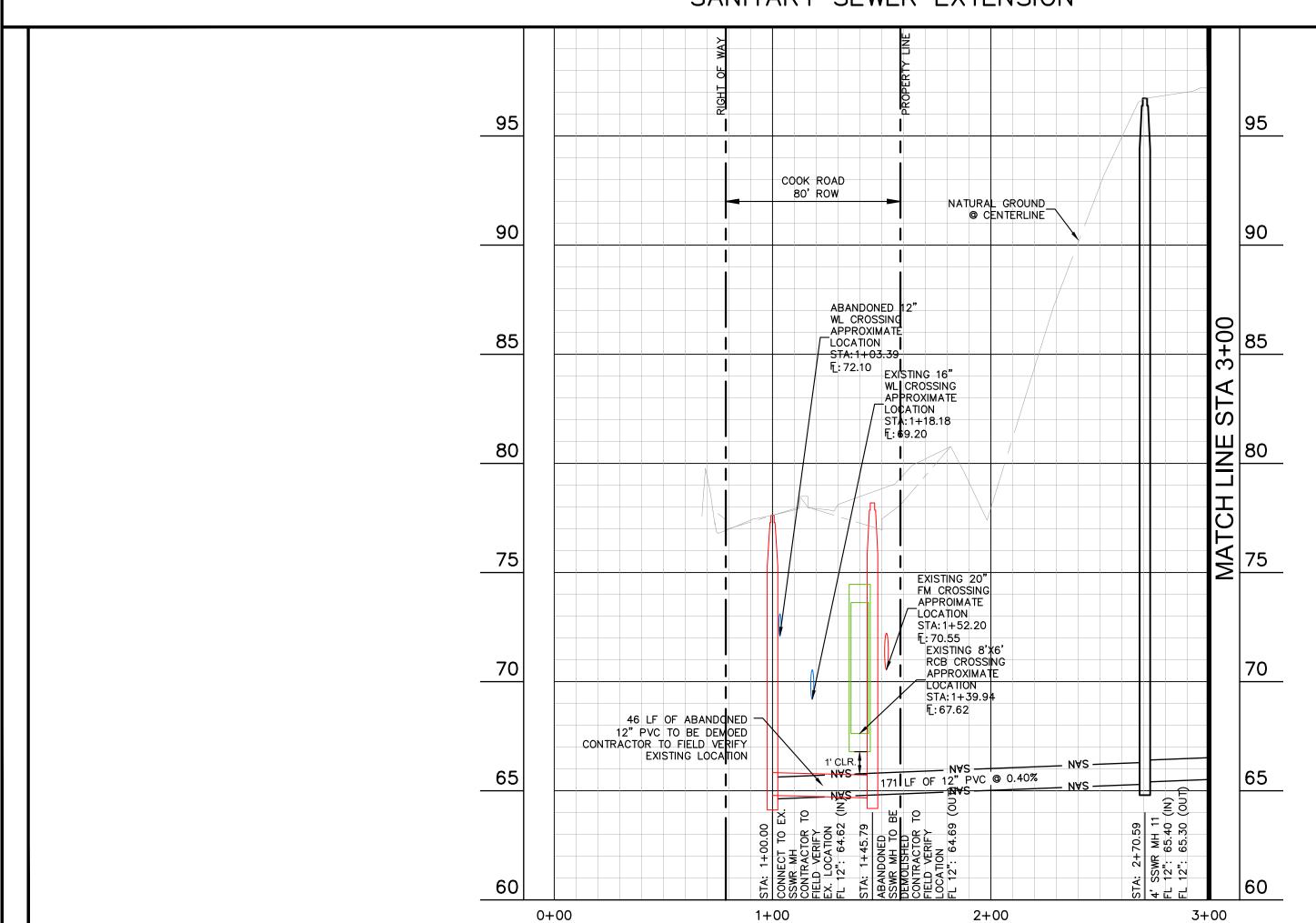
HORIZ:

SHEET NO. C18.0 OF C29.0 DRAWING SCALE



SEE SHEET

SANITARY SEWER EXTENSION



APPROX. 46 LF OF ABANDONED 12" PVC CONTRACTOR

STA: 1+00

SSWR MH

CONNECT TO EX.

CONTRACTOR TO

FIELD VERIFY

EX. LOCATION

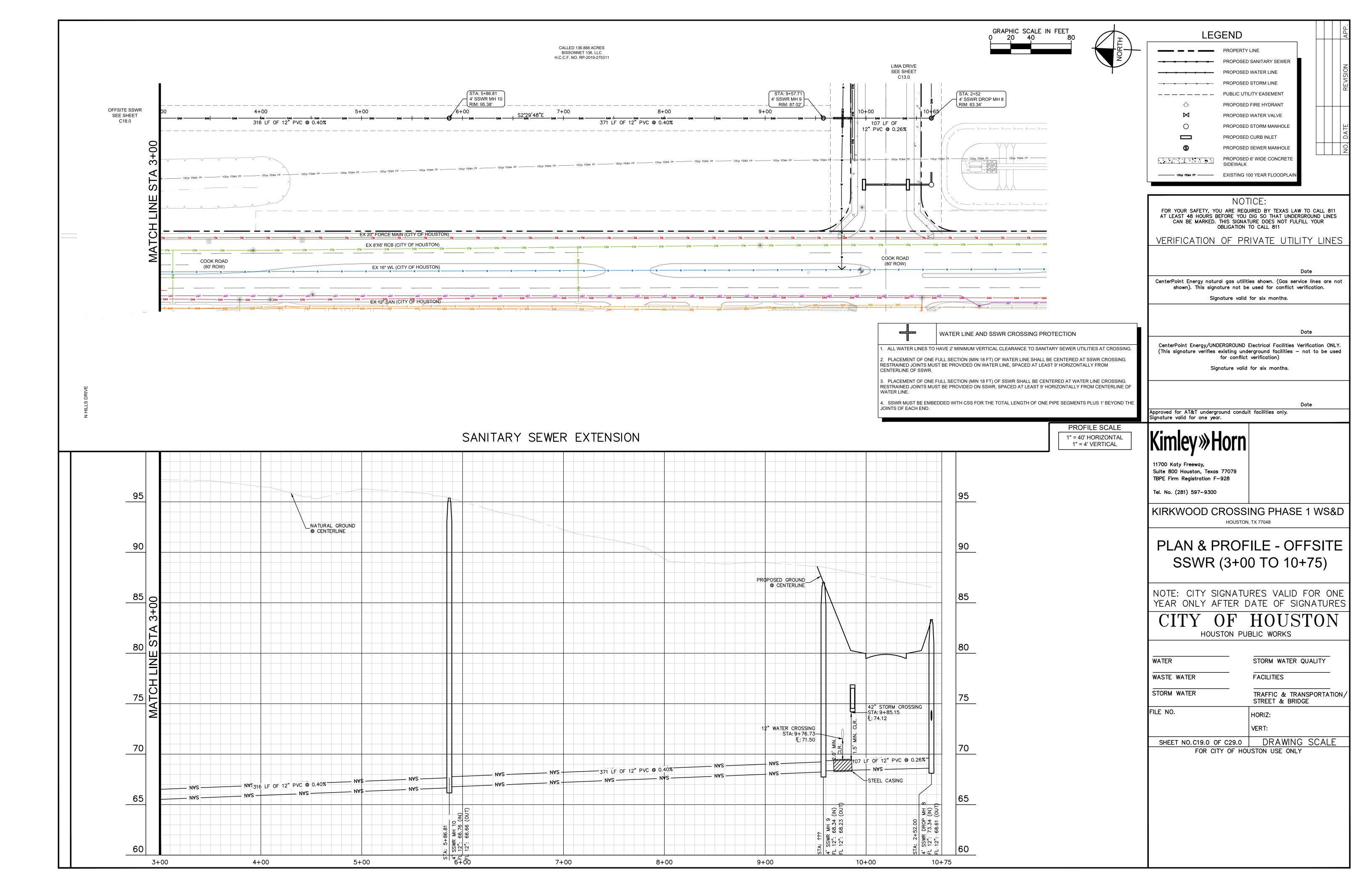
RIM: 77.62'

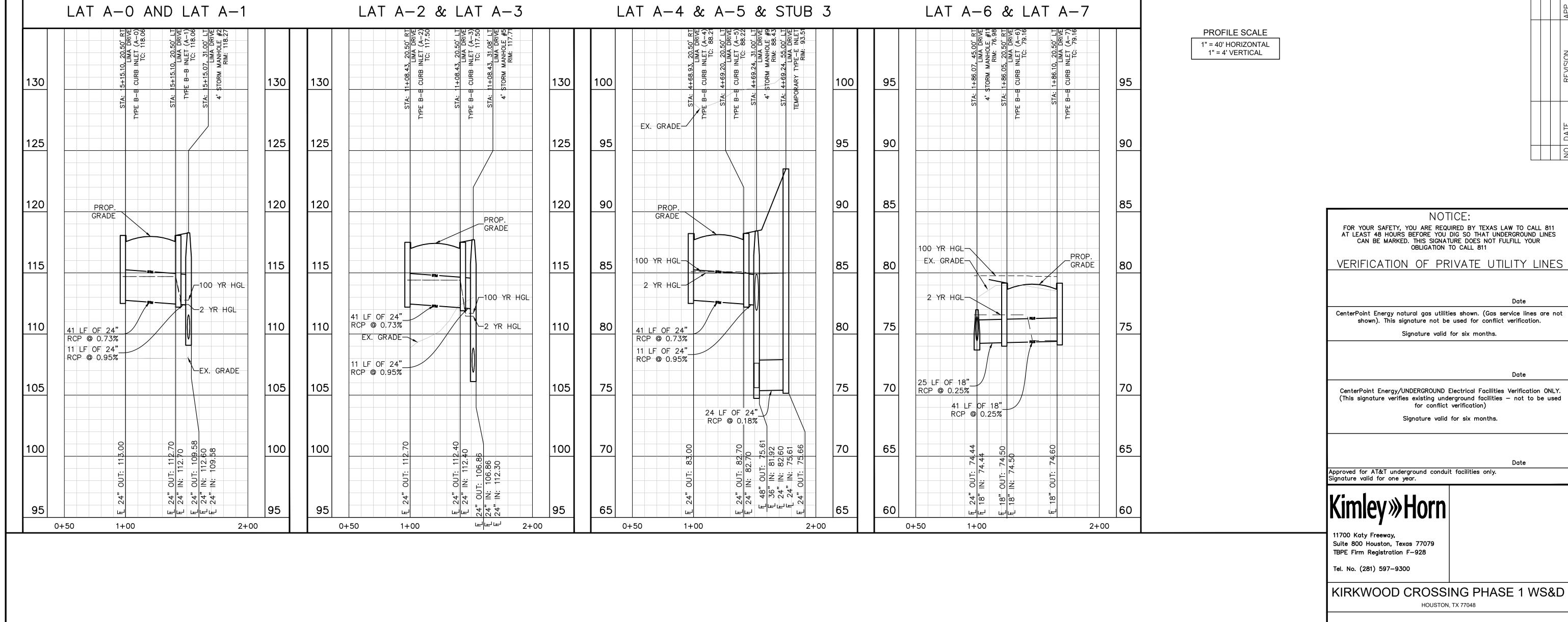
TO FIELD VERIFY

SHANNON HILLS DRIVE

0+00

EXISTING LOCATION -





INTENTIONALLY LEFT BLANK

CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not be used for conflict verification.

CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY. (This signature verifies existing underground facilities — not to be used

STORM PROFILES -LATERALS (1 OF 2)

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

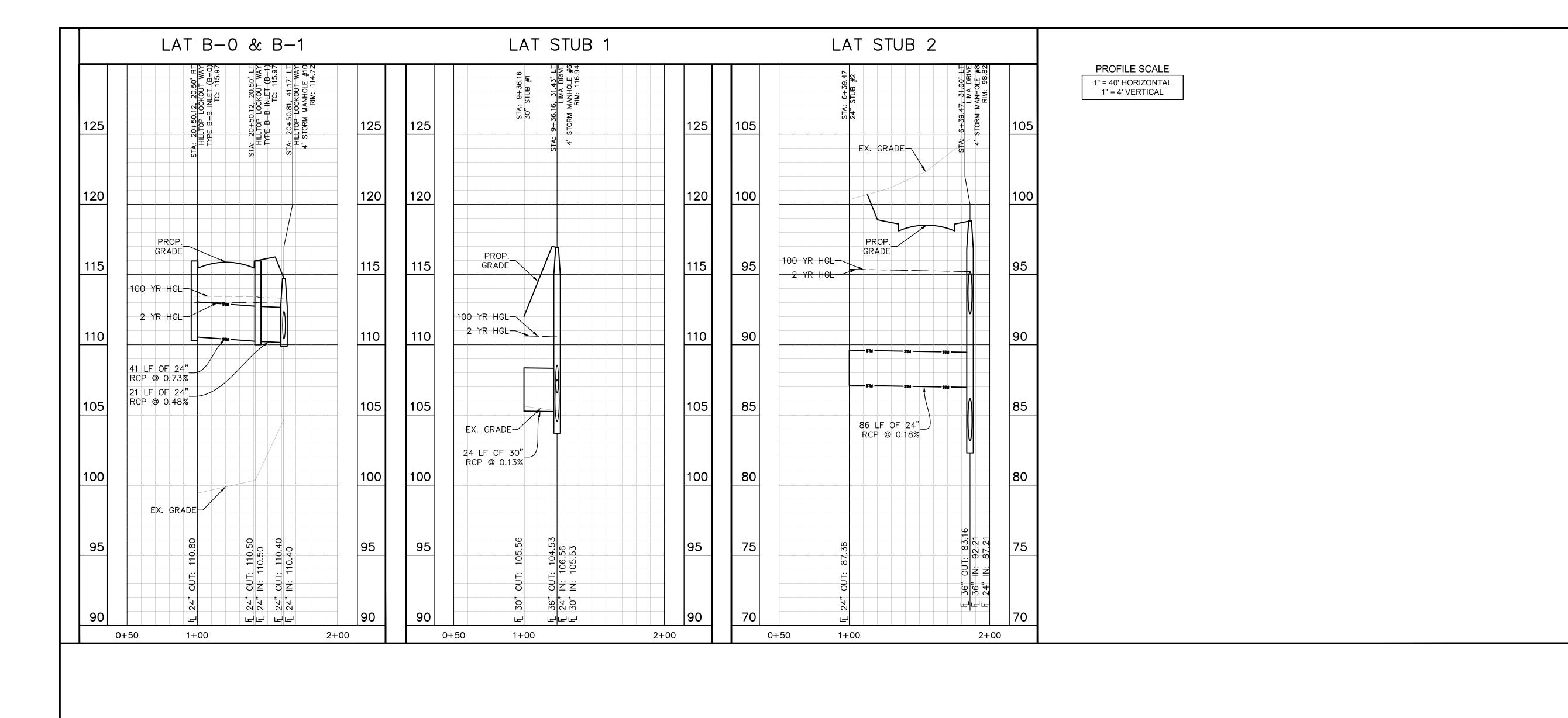
STORM WATER QUALITY WATER

FACILITIES WASTE WATER

FILE NO.

TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

SHEET NO.C20.0 OF C29.0 DRAWING SCALE



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CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR
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11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Tel. No. (281) 597-9300

KIRKWOOD CROSSING PHASE 1 WS&D

STORM PROFILES -LATERALS (2 OF 2)

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CITY OF HOUSTON

HOUSTON PUBLIC WORKS

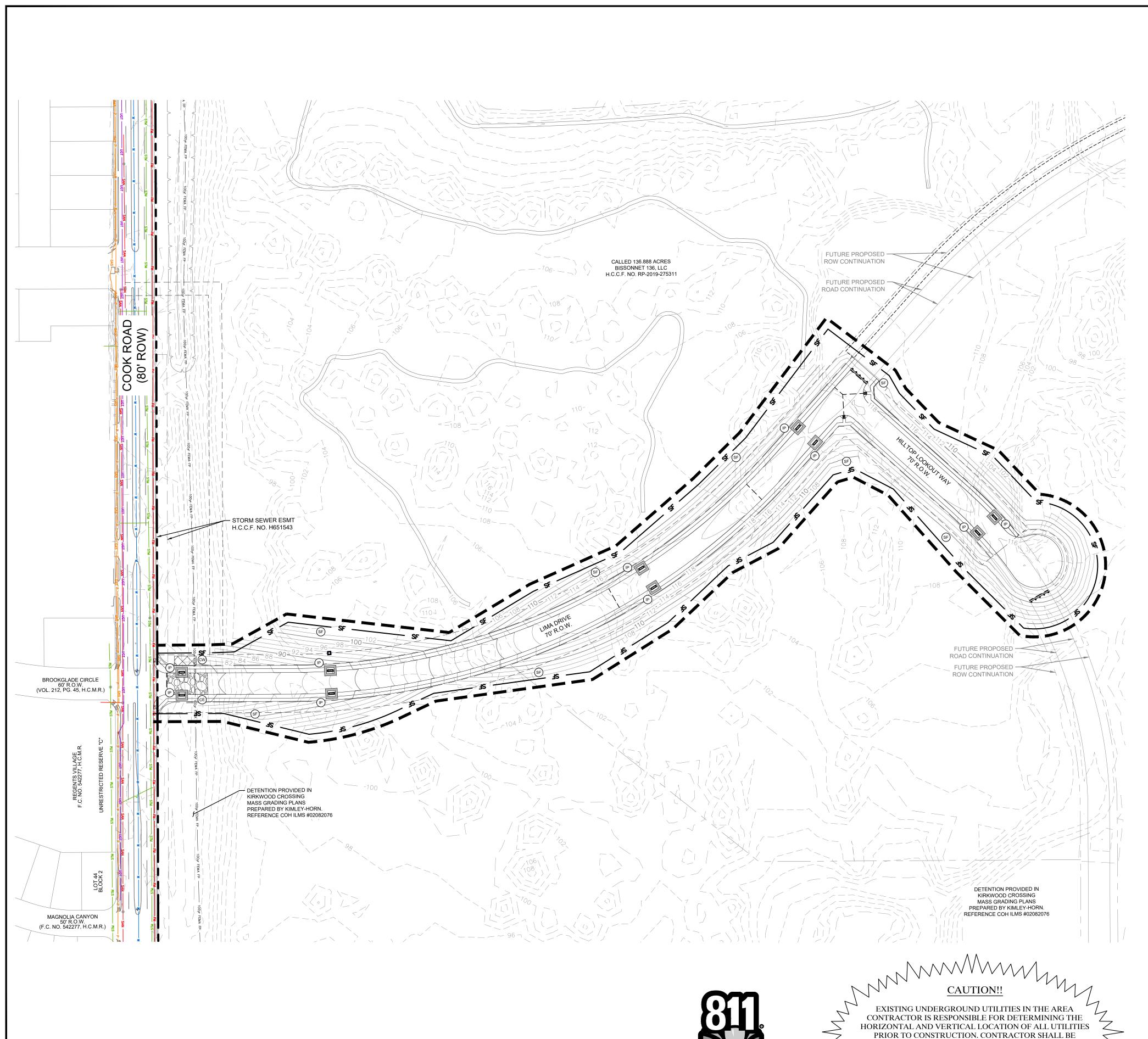
STORM WATER QUALITY WATER

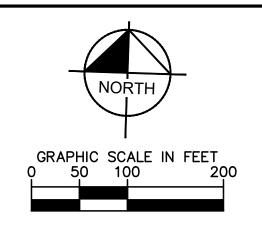
FACILITIES WASTE WATER

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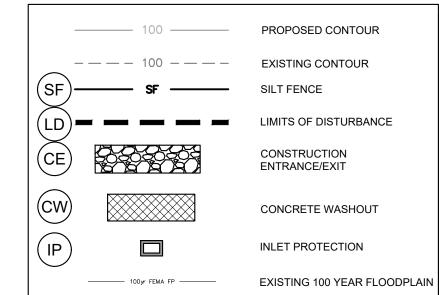
TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

SHEET NO. C21.0 OF C29.0 DRAWING SCALE FOR CITY OF HOUSTON USE ONLY





EROSION CONTROL LEGEND



EROSION CONTROL NOTES

. CONTRACTOR IS SOLELY RESPONSIBLE FOR SELECTION, IMPLEMENTATION, MAINTENANCE, AND EFFECTIVENESS OF ALL SWPPP CONTROLS - CONTROLS SHOWN ON THIS SITE MAP ARE SUGGESTED CONTROLS ONLY.

2. CONTRACTOR SHALL RECORD INSTALLATION, MAINTENANCE OR MODIFICATION, AND REMOVAL DATES FOR EACH BMP EMPLOYED (WHETHER CALLED OUT ON ORIGINAL SWPPP OR NOT) DIRECTLY ON THIS SITE MAP.

3. DRAINAGE PATTERNS ARE SHOWN ON THIS PLAN BY PROPOSED AND EXISTING CONTOURS.

4. TEMPORARY AND PERMANENT STABILIZATION PRACTICES AND BMP'S SHALL BE INSTALLED AT THE EARLIEST POSSIBLE TIME DURING THE CONSTRUCTION SEQUENCE. AS AN EXAMPLE, PERIMETER SILT FENCE SHALL BE INSTALLED BEFORE COMMENCEMENT OF ANY GRADING ACTIVITIES. OTHER BMP'S SHALL BE INSTALLED AS SOON AS PRACTICABLE AND SHALL BE MAINTAINED UNTIL FINAL SITE STABILIZATION IS ATTAINED. CONTRACTOR SHALL ALSO REFERENCE CIVIL PLANS SINCE PERMANENT STABILIZATION IS PROVIDED BY LANDSCAPING AND SITE PAVING..

BMP'S HAVE BEEN LOCATED AS INDICATED ON THIS PLAN IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING PRACTICES IN ORDER TO MINIMIZE SEDIMENT TRANSFER. FOR EXAMPLE: SILT FENCES LOCATED AT TOE OF SLOPE AND INLET PROTECTION FOR INLETS RECEIVING SEDIMENT FROM SITE RUN-OFF

S. SANITARY SEWER EFFLUENT IS DISPOSED OF VIA AN ONSITE SEWER SYSTEM CONNECTED TO A MUNICIPAL SEWER SYSTEM.

7. CONTRACTOR TO PROVIDE INLET PROTECTION IN PUBLIC ROW ONLY DURING EARTH MOVING ACTIVITIES. CONTRACTOR TO ENSURE PONDING DOES NOT OCCUR IN PUBLIC ROW OR ON ADJACENT PROPERTIES AT ANY TIME DURING

3. CONSTRUCTION ENTRANCE SHALL BE LOCATED SO AS TO PROVIDE THE LEAST AMOUNT OF DISTURBANCE TO THE FLOW OF TRAFFIC IN AND OUT OF THE SITE. ADDITIONALLY. THE CONSTRUCTION ENTRANCE SHALL BE LOCATED TO COINCIDE WITH THE PHASING OF THE PARKING LOT CONSTRUCTION.

9. CONTRACTOR SHALL PROVIDE INLET PROTECTION FOR ANY AFFECTED INLETS DOWNSTREAM OF THE PROPOSED IMPROVEMENTS, IF NEEDED.

10. THE NATURE OF THIS SITE'S CONSTRUCTION CONSISTS OF CLEARING & SITE

PREPARATION, EARTHWORK, PAVING AND LANDSCAPING. 11. SEDIMENTATION BASIN: NEITHER A TEMPORARY NOR PERMANENT

SEDIMENTATION BASIN HAS BEEN PROVIDED ON THIS SITE BECAUSE THE SITE IS LESS THAN 10 ACRES IN AREA.

12. POST CONSTRUCTION STORM WATER POLLUTION CONTROL MEASURES INCLUDE STABILIZATION BY PERMANENT PAVING AND LANDSCAPING.

13. DISTURBED PORTIONS OF SITE MUST BE STABILIZED. STABILIZATION PRACTICES MUST BE INITIATED WITHIN 14 DAYS IN PORTIONS OF THE SITE WHERE CONSTRUCTION HAS BEEN EITHER TEMPORARILY OR PERMANENTLY CEASED, UNLESS EXCEPTED WITHIN THE OPDES PERMIT. CONTRACTOR SHALL REMOVE TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF STABILIZATION

14. CONTRACTOR IS RESPONSIBLE FOR MODIFYING THE SWPPP/SITE MAP TO INCLUDE BMP'S FOR ANY OFF-SITE MATERIAL WASTE, BORROW OR EQUIPMENT

15. CONTRACTOR IS RESPONSIBLE FOR SUBMITTAL OF NOI, NOT, POSTING OF SITE NOTICES, AND ANY ADDITIONAL INFORMATION OR SUBMITTALS REQUIRED BY TCEQ, EPA, OR LOCAL JURISDICTION.

16. CONTRACTOR TO MAINTAIN NO MORE THAN 10 ACRES OF DRAINAGE TO ANY SINGLE OUTFALL LOCATION DURING CONSTRUCTION.

17. THE SEQUENCE OF CONSTRUCTION SHOWN ABOVE IS A GENERAL OVERVIEW AND IS INTENDED TO CONVEY THE GENERAL CONCEPTS OF THE EROSION CONTROL DESIGN AND SHOULD NOT BE RELIED UPON FOR CONSTRUCTION PURPOSES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETAILED PHASING AND CONSTRUCTION SEQUENCING NECESSARY TO CONSTRUCT THE PROPOSED IMPROVEMENTS INCLUDED IN THESE PLANS. THE CONTRACTOR SHALL NOTIFY ENGINEER IN WRITING IMMEDIATELY, PRIOR TO AND/OR DURING CONSTRUCTION IF ANY ADDITIONAL INFORMATION ON THE CONSTRUCTION SEQUENCE IS NECESSARY. CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION AND ALL OTHER APPLICABLE LAWS.

SWPP NOTE

ANY OFF-SITE STAGING AREA UTILIZED BY THE OPERATOR OF THIS SITE MUST BE INCLUDED IN THE SWPPP NARRATIVE PLAN AND TO SWPPP SITE PLAN AS REQUIRED BY THE TPDES TEXAS GENERAL PERMIT TXR150000 (SECTION F). ANY SUCH AREA INCLUDED IN THE SWPPP WILL BE TREATED BY THE OPERATOR AS ANY OTHER PART OF THE CONSTRUCTION ACTIVITY FOR THE PURPOSES OF STORM WATER POLLUTION PREVENTION.

RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION.

CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY

Know what's below.

Call before you dig.

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Tel. No. (281) 597-9300

WATER

FILE NO.

STORM WATER

KIRKWOOD CROSSING PHASE 1 WS&D

HOUSTON, TX 77048

EROSION CONTROL PLAN

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON HOUSTON PUBLIC WORKS

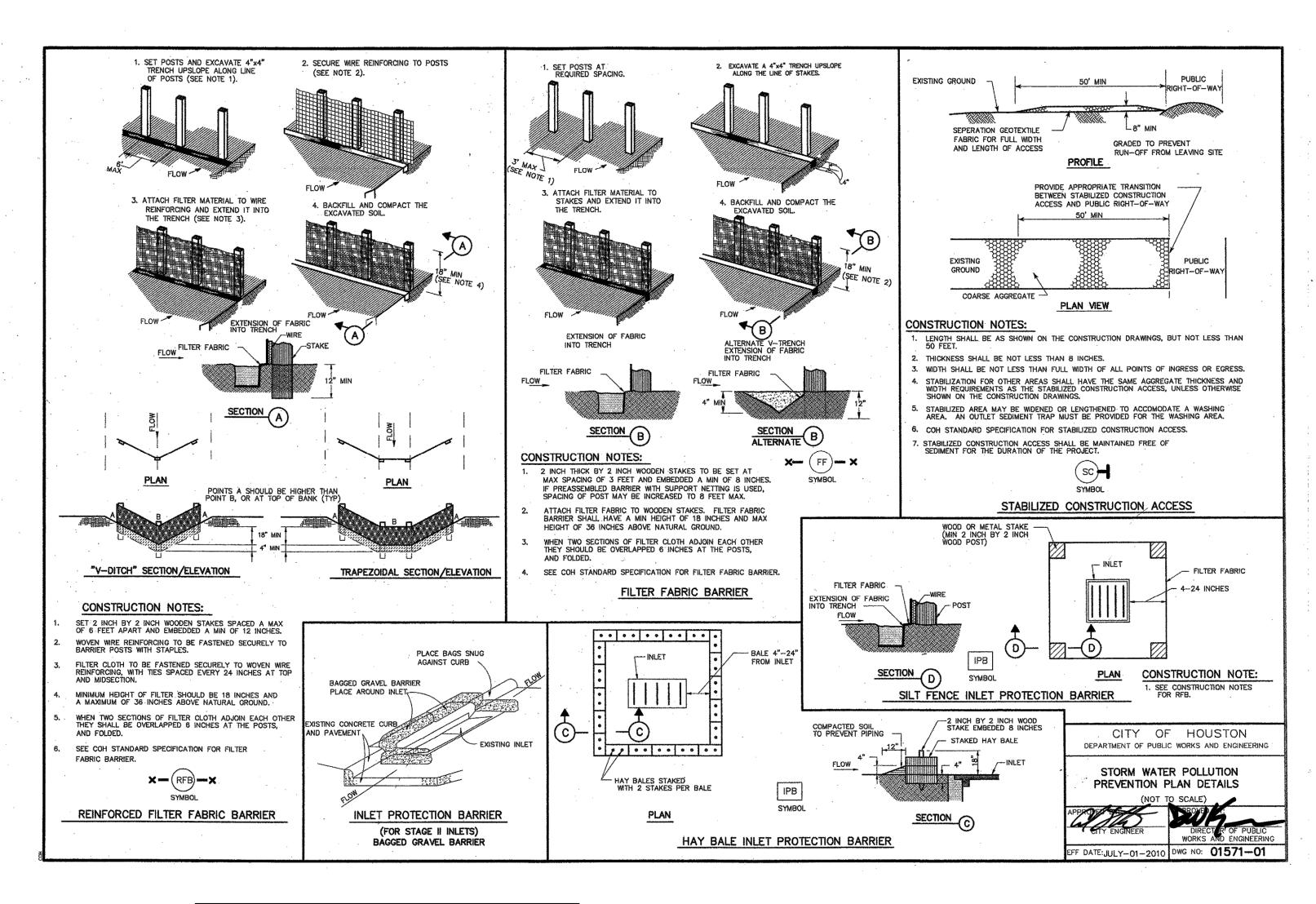
WASTE WATER **FACILITIES**

TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

STORM WATER QUALITY

HORIZ:

SHEET NO.C22.0 OF C29.0 DRAWING SCALE



EROSION CONTROL SCHEDULING AND SEQUENCING		
I. ROUGH GRADING	CONSTRUCTION ENTRANCE/EXIT AND SILT FENCE PROTECTION SHALL BE INSTALLED PRIOR TO THE INITIATION OF ROUGH GRADING, AS NEEDED.	
II. UTILITY INSTALLATION	ALL PRIOR EROSION CONTROL MEASURES INSTALLED ABOVE TO BE MAINTAINED AS NECESSARY DURING UTILITY INSTALLATION. INLET PROTECTION SHALL BE INSTALLED AS STORM DRAINAGE SYSTEM IS CONSTRUCTED	
III. PAVING	ALL PRIOR EROSION CONTROL MEASURES INSTALLED ABOVE TO BE MAINTAINED AS NECESSARY DURING PAVING AND THROUGHOUT THE REMAINDER OF THE PROJECT.	
IV. FINAL GRADING/SOIL STABILIZATION/LANDSCAPING	REFERENCE LANDSCAPE PLANS FOR FINAL STABILIZATION OF SITE. ALL TEMPORARY EROSION CONTROL MEASURES TO BE REMOVED AT THE CONCLUSION OF THE PROJECT ONCE FINAL STABILIZATION HAS BEEN ACHIEVED.	

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TEMPORARY STONE CONSTRUCTION ENTRANCE/EXIT:

INSPECTIONS SHALL BE MADE WEEKLY AND AFTER RAIN STORM EVENTS TO ENSURE THAT THE FACILITY IS FUNCTIONING PROPERLY. AGGREGATE PAD SHALL BE WASHED DOWN OR REPLACED WHEN SEDIMENT OR MUD HAS CLOGGED THE VOID SPACES BETWEEN THE STONES OR MUD IS BEING TRACKED ONTO THE PUBLIC ROADWAY. RUNOFF FROM WASH DOWN OPERATION SHALL BE FILTERED THROUGH ANOTHER B.M.P. PRIOR TO DRAINING OFF—SITE.

INSPECTIONS SHALL BE MADE WEEKLY AND AFTER RAIN STORM EVENTS. SEDIMENT SHALL BE REMOVED FROM BEHIND THE FENCE WHEN THE DEPTH OF SEDIMENT HAS BUILT UP TO ONE—THIRD THE HEIGHT OF THE FENCE ABOVE GRADE. FENCE SHALL BE INSPECTED FOR GAPS AT BASE. INSPECT SUPPORTING POSTS AND FILTER FABRIC. REPLACE IF REQUIRED.

PIPE INLET PROTECTION:

INSPECTIONS SHALL BE MADE WEEKLY AND AFTER RAIN STORM EVENTS TO ENSURE THAT THE DEVICE IS FUNCTIONING PROPERLY. SEDIMENT SHALL BE REMOVED FROM THE STORAGE AREA WHEN SEDIMENT DEPTH HAS BUILT UP TO ONE—HALF THE DESIGN DEPTH. IF DE—WATERING OF THE STORAGE VOLUME IS NOT OCCURRING, CLEAN OR REPLACE THE FILTER STONE SURROUNDING THE PIPE INLET. CLEAN THE STONE SURFACE THE FIRST FEW TIMES BY RAKING. REPEATED SEDIMENT BUILD—UP WILL REQUIRE FILTER STONE

- EROSION CONTROL DEVICES AS SHOWN ON THE EROSION CONTROL PLAN FOR THE PROJECT SHALL BE INSTALLED PRIOR TO THE START OF LAND DISTURBING ACTIVITIES ON THE PROJECT.
- 2. ALL EROSION CONTROL DEVICES ARE TO BE INSTALLED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS FOR THE PROJECT. CHANGES ARE TO BE APPROVED BEFORE CONSTRUCTION BY

THE DESIGN ENGINEER AND HARRIS COUNTY ENGINEERING DIVISION.

- 3. IF THE EROSION CONTROL PLAN AS APPROVED CANNOT CONTROL EROSION AND OFF-SITE SEDIMENTATION FROM THE PROJECT THE EROSION CONTROL PLAN WILL BE REQUIRED TO BE REVISED AND/OR ADDITIONAL EROSION CONTROL DEVICES WILL BE REQUIRED ON SITE.
- 4. IF OFF-SITE BORROW OR SPOILS SITES ARE USED IN CONJUNCTION WITH THIS PROJECT, THIS INFORMATION SHALL BE DISCLOSED AND SHOWN ON THE EROSION CONTROL PLAN. OFF-SITE BORROW AND SPOILS AREAS ARE CONSIDERED PART OF EROSION CONTROL REQUIREMENTS. THESE AREAS SHALL BE STABILIZED WITH GROUND COVER PRIOR TO FINAL APPROVAL OF THE PROJECT.
- INSPECTIONS SHALL BE MADE WEEKLY AND AFTER RAIN STORM EVENTS TO INSURE THAT THE DEVICES ARE FUNCTIONING PROPERLY. WHEN SEDIMENT OR MUD HAS CLOGGED THE VOID SPACES BETWEEN STONES OR MUD IS BEING TRACKED ONTO A PUBLIC ROADWAY THE AGGREGATE PAD MUST BE WASHED DOWN OR REPLACED. RUNOFF FROM THE WASH DOWN OPERATION HALL SHALL NOT BE ALLOWED TO DRAIN DIRECTLY OFF SITE WITHOUT FIRST FLOWING THROUGH ANOTHER MBP TO CONTROL OFF SITE SEDIMENTATION. PERIODIC RE—GRADING OR THE ADDITION OF NEW STONE MAY BE REQUIRED TO MAINTAIN THE EFFICIENCY OF THE CONTRACTOR SHALL HAVE A COPY THE SWPPP ON SITE AT ALL TIMES.
- CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTAL OF N.O.I., N.O.T. AND ANY ADDITIONAL
 7. INFORMATION REQUIRED BY THE E.P.A. CONTRACTOR SHALL COMPLY WITH ALL E.P.A. STORM WATER POLLUTION PREVENTION REQUIREMENTS.
- AFTER FINAL STABILIZATION IS ACHIEVED, CONTRACTOR SHALL CLEAN ON—SITE STORM SEWER SYSTEM.
- CONTRACTOR TO INDICATE LOCATIONS OF ALL FUEL DEPOTS, PORT—A—CANS, DUMPSTERS AND DRUMS FILLED WITH ANY CHEMICALS ON THE SWPPP PLAN.

HOUSTON PUBLIC WORKS SWPPP CONSTRUCTION NOTES

04-01-2018

1. CONTRACTOR SHALL IMPLEMENT INLET PROTECTION DEVICES AND REINFORCED FILTER FABRIC BARRIER ALONG ROAD AND SIDE DITCHES AT LOCATIONS SHOWN ON THE TYPICAL STORM WATER POLLUTION PREVENTION (SWPP) PLANS TO KEEP SILT AND OR EXCAVATED MATERIALS FROM ENTERING INTO THE

STORM WATER INLETS AND DITCHES EVENTUALLY POLLUTING THE RECEIVING STORM.

- 2.DURING THE EXCAVATION PHASE OF THE PROJECT, CONTRACTOR SHALL SCHEDULE THE WORK IN SHORT SEGMENTS SO THAT EXCAVATION MATERIAL CAN BE QUICKLY HAULED AWAY FROM THE SITE AND TO PREVENT IT FROM STAYING UNCOLLECTED ON THE EXISTING PAVEMENT. ANY LOOSE EXCAVATED MATERIAL WHICH FALLS ON PAVEMENTS OR DRIVEWAYS SHALL BE SWEPT BACK INTO THE FYCAVATED AREA
- 3.CONTRACTOR SHALL CLEAN UP THE EXISTING STREET INTERSECTIONS AND DRIVEWAYS DAILY, AS NECESSARY, TO REMOVE ANY EXCESS MUD, SILT OR ROCK TRACKED FORM THE EXCAVATED AREA.
- 4.CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT AND LOOSE MATERIAL AS CONSTRUCTION PROGRESSES.
- 5.CONTRACTOR TO INSPECT AND MAINTAIN THE AREAS LISTED BELOW AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER.
- DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED.
 AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION.
 STRUCTURAL CONTROL MEASURES.
 LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE.
- 6.CONTRACTOR TO BE RESPONSIBLE TO MAINTAIN EXISTING DITCHES AND OR CULVERTS FOR UNOBSTRUCTED DRAINAGE AT ALL TIMES. WHERE SODDING IS DISTURBED BY EXCAVATION ON BACKFILLING OPERATIONS, SUCH AREAS SHALL BE REPLACED BY SEEDING OR SODDING. SLOPES 4:1 OR STEEPER SHALL BE REPLACED BY BLOCK SODDING.

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TBPE Firm Registration F-928

Tel. No. (281) 597-9300

KIRKWOOD CROSSING PHASE 1 WS&D

HOUSTON, TX 77048

EROSION CONTROL DETAILS

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CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

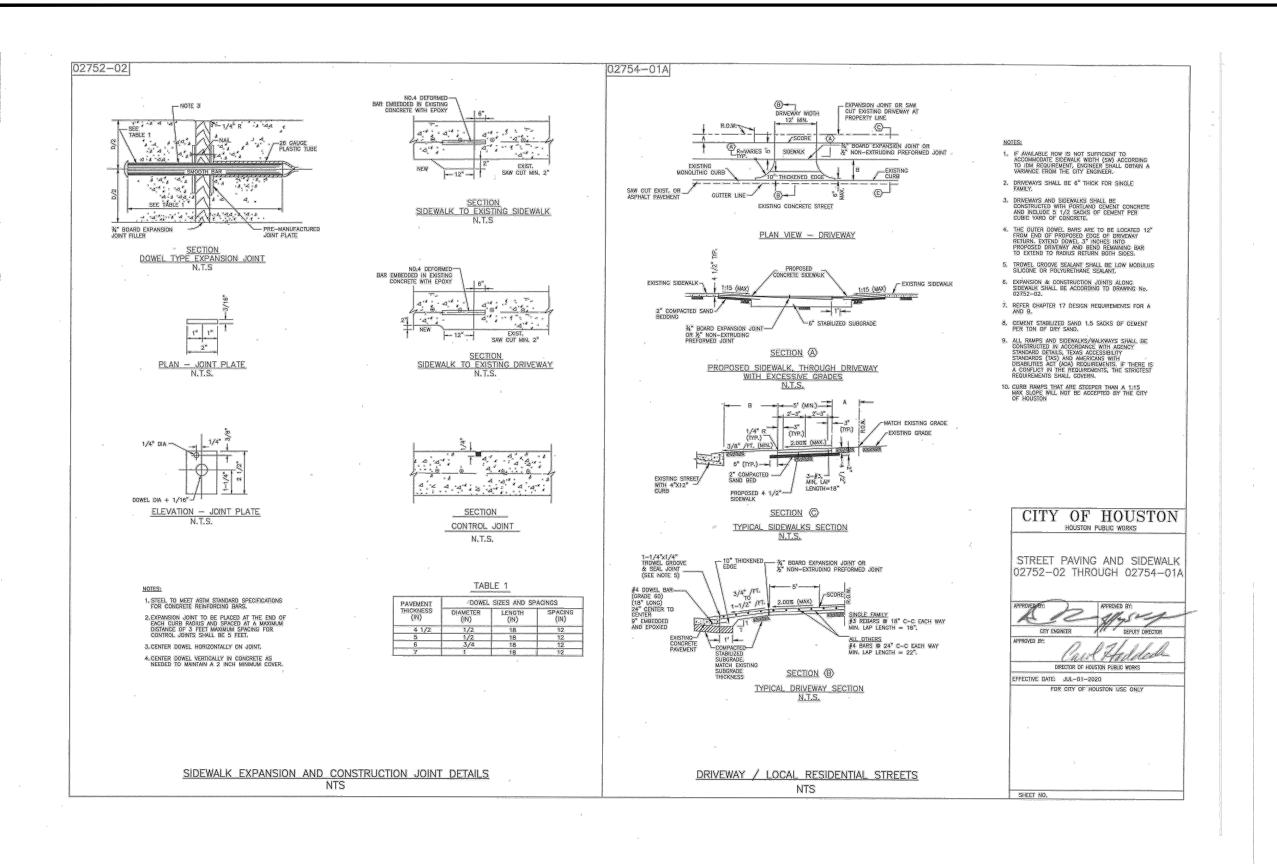
WASTE WATER FACILITIES

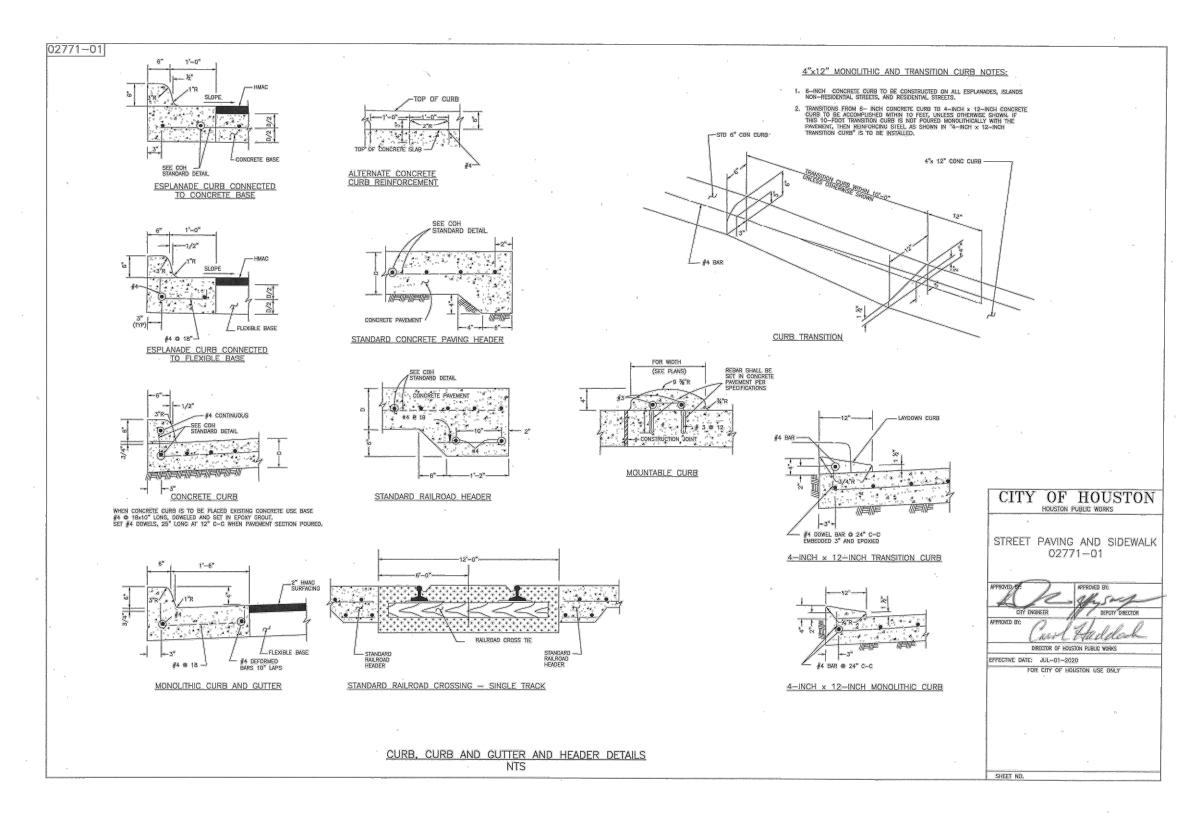
STORM WATER TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

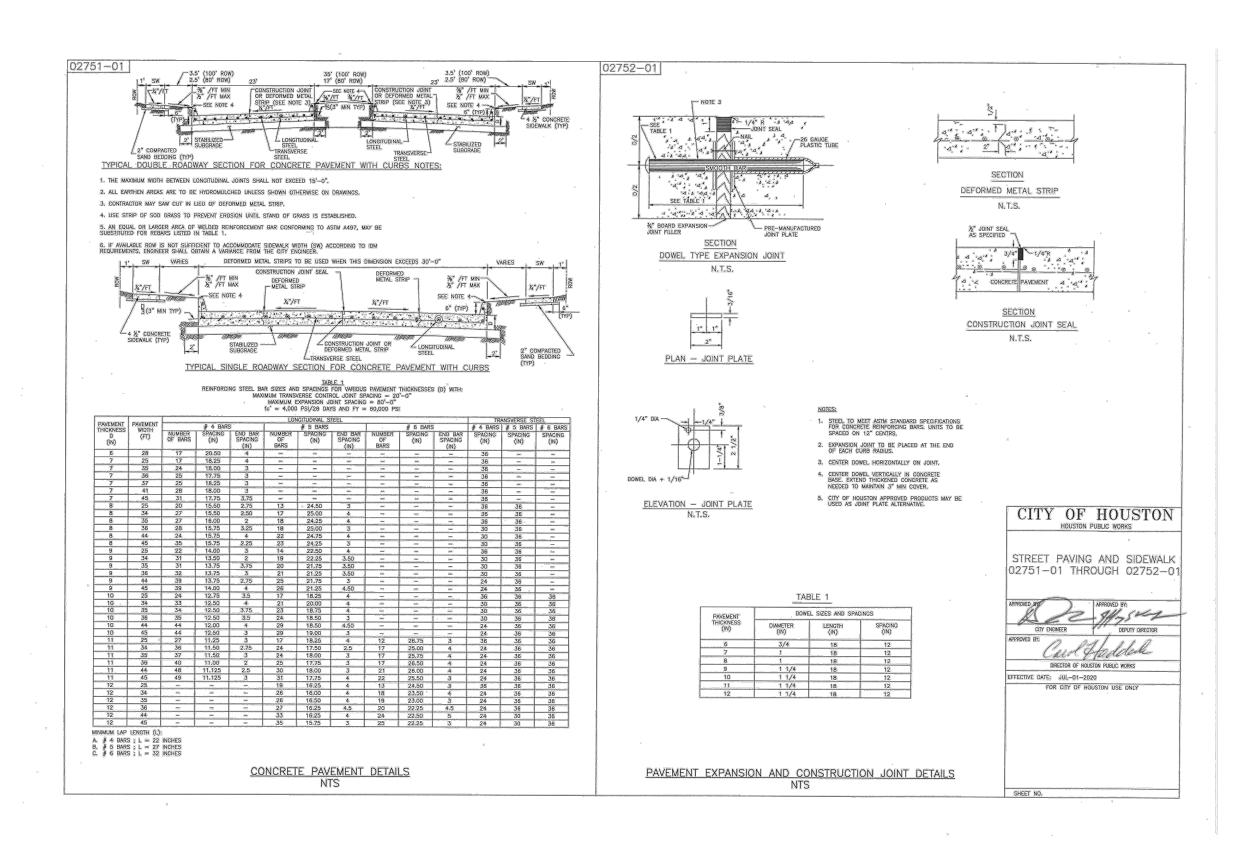
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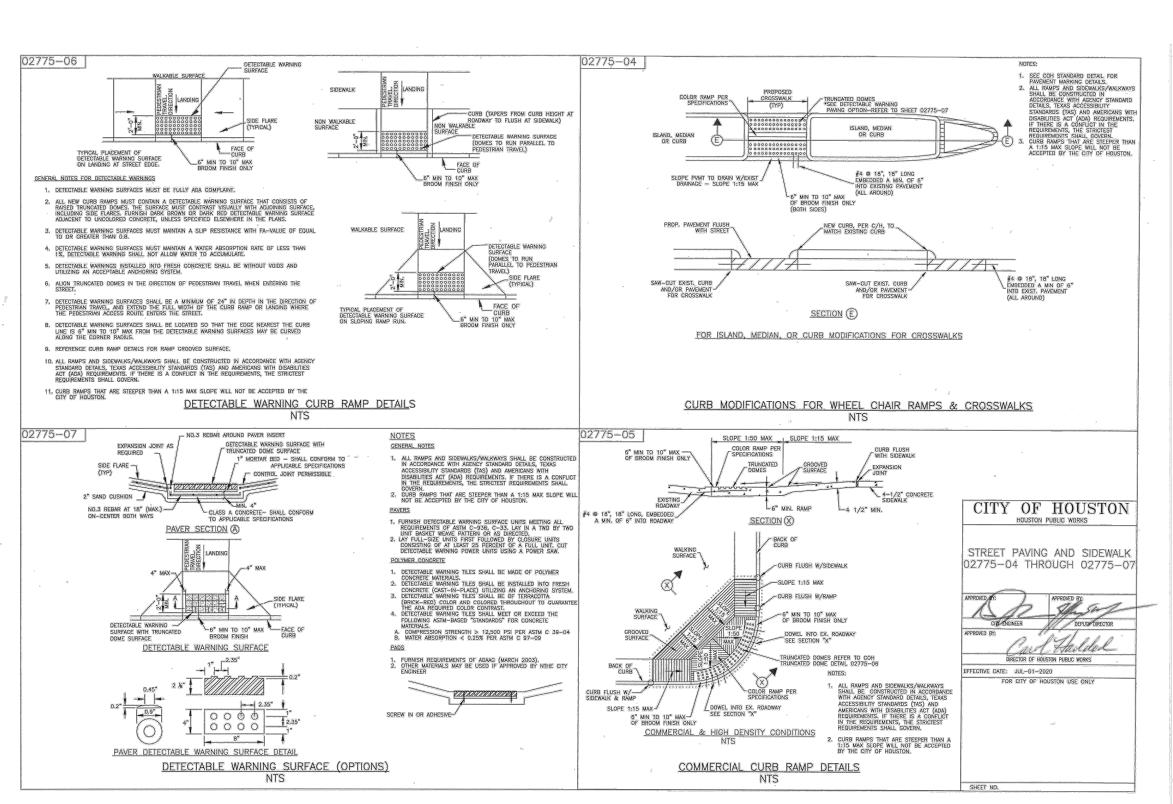
VERT:

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STORM WATER

FILE NO.

KIRKWOOD CROSSING PHASE 1 WS&D

HOUSTON, TX 77048

CONSTRUCTION DETAILS (1 OF 6)

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CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

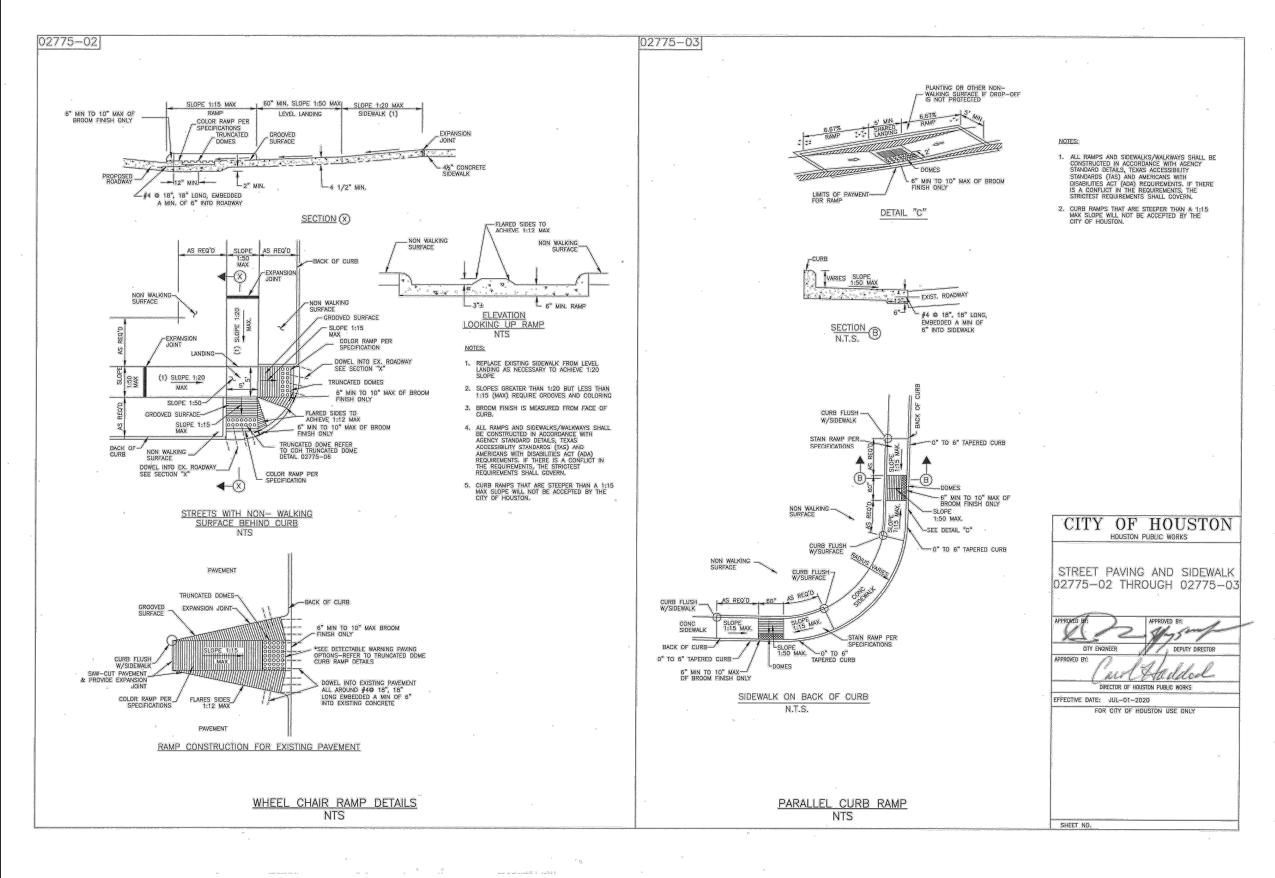
WASTE WATER **FACILITIES**

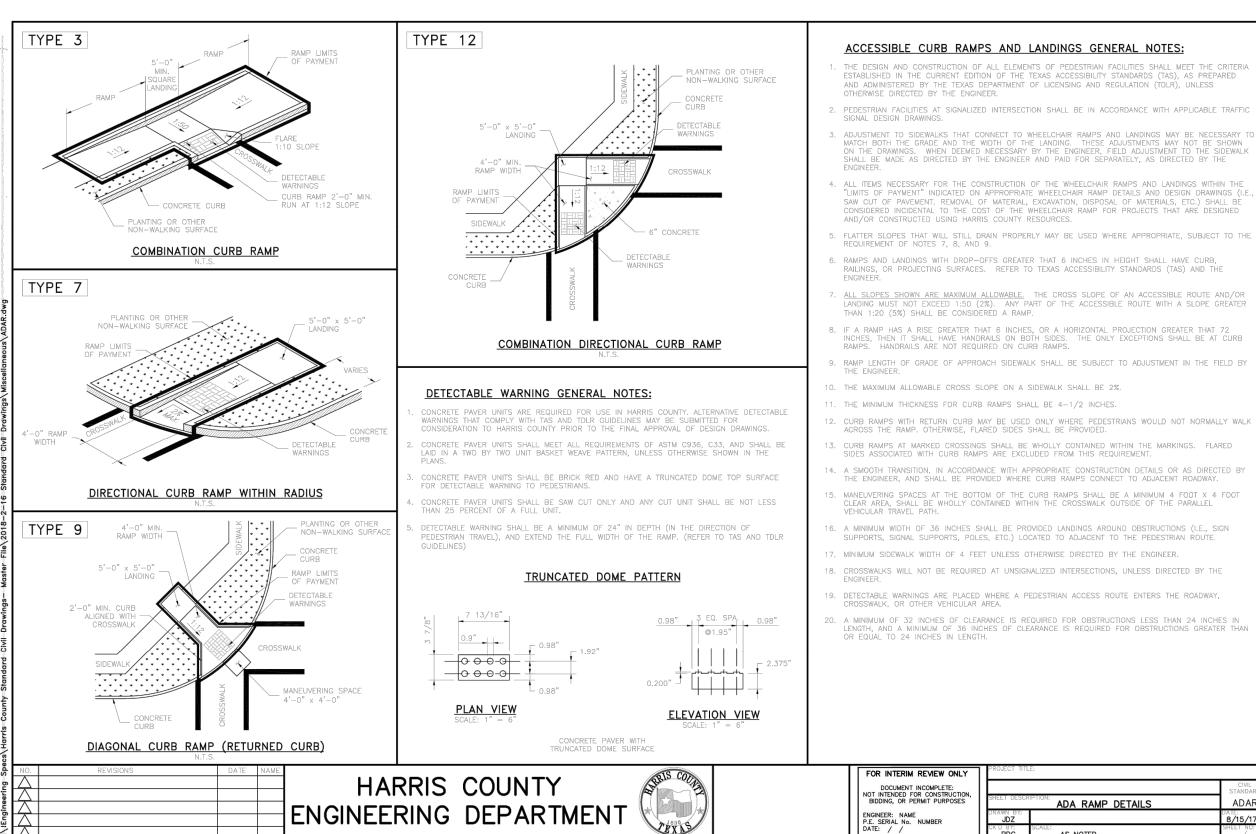
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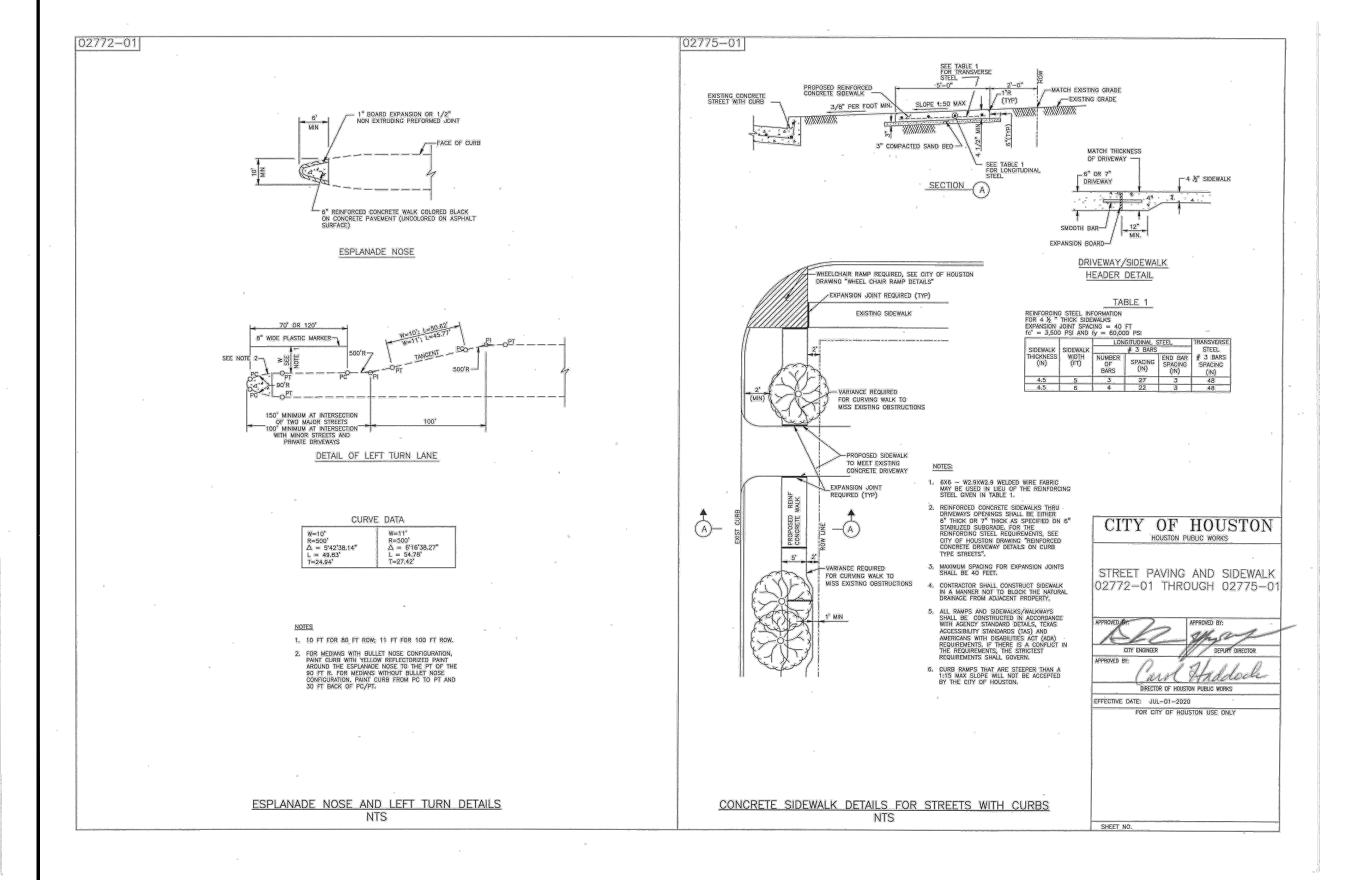
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VERT:

SHEET NO.C24.0 OF C29.0 DRAWING SCALE







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CONSTRUCTION DETAILS (2 OF 6)

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CITY OF HOUSTON HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

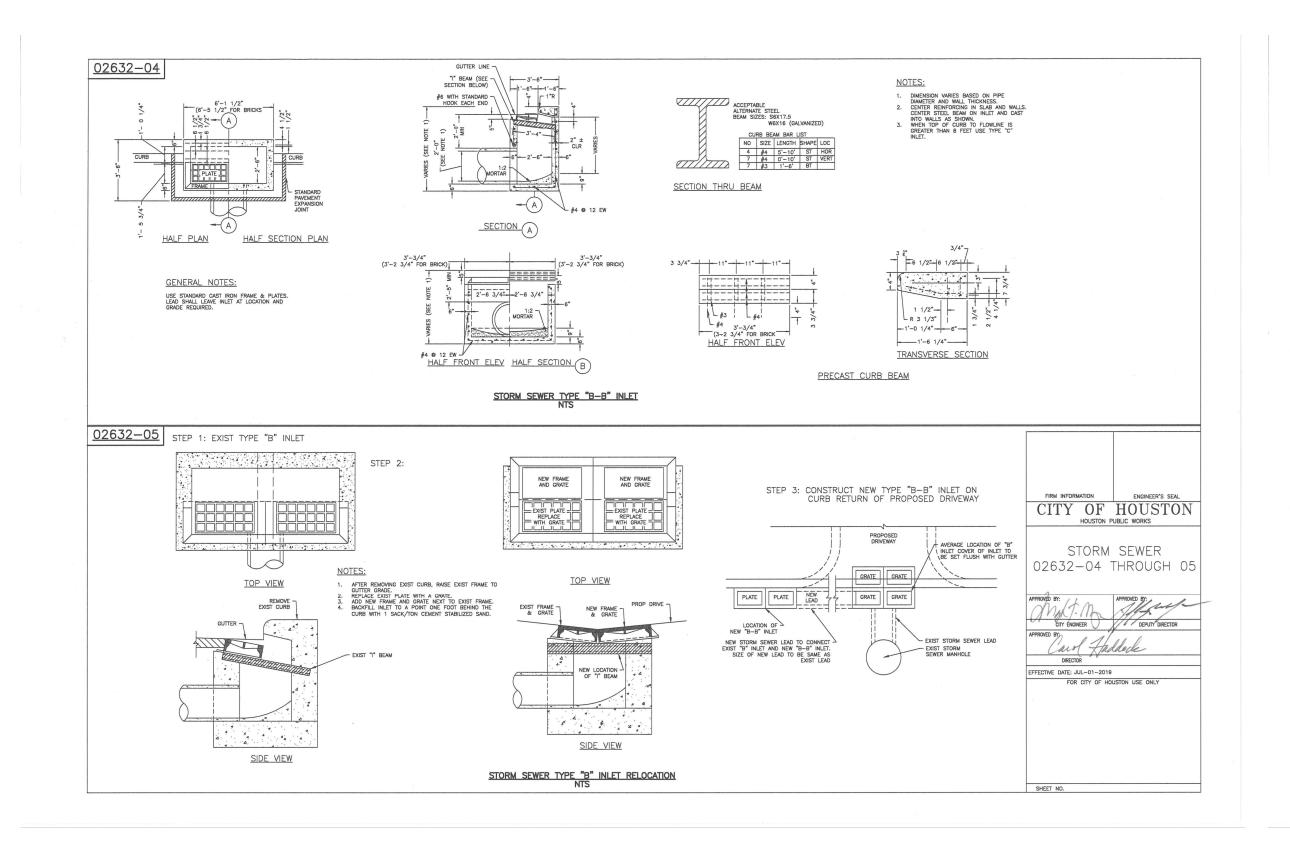
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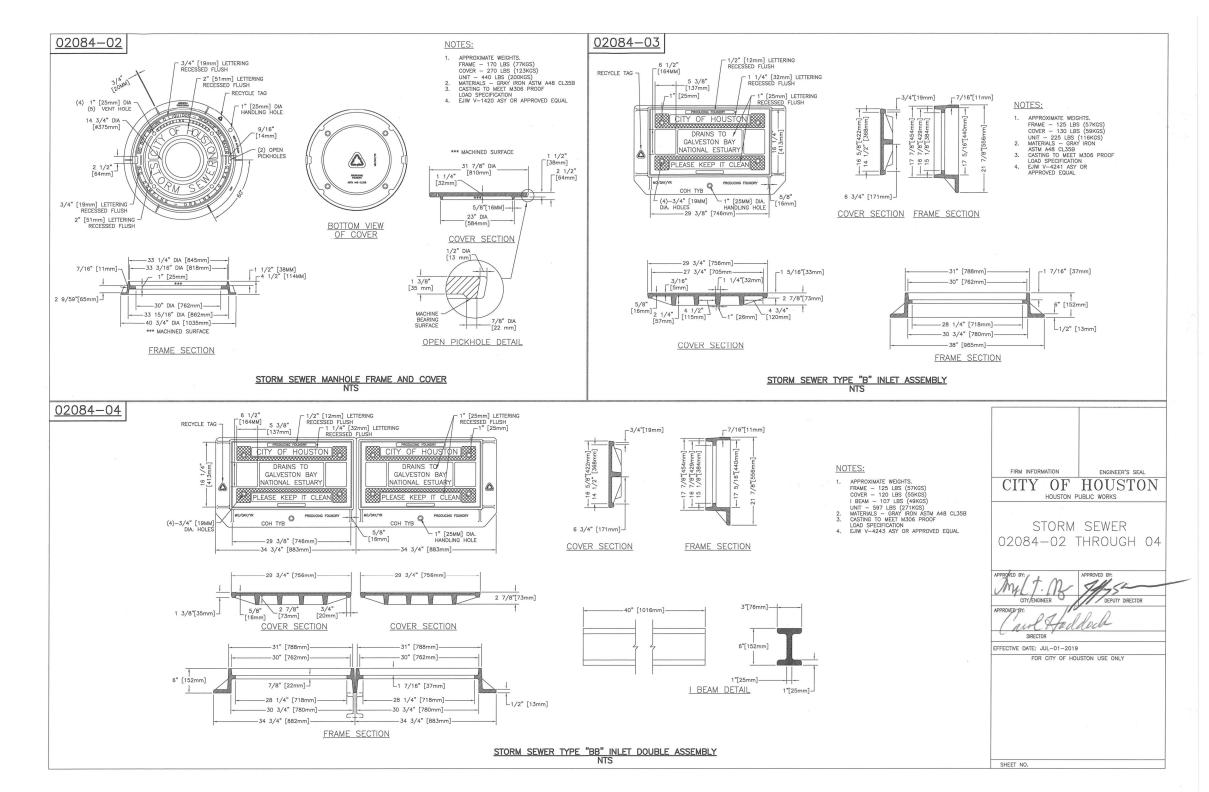
STORM WATER TRAFFIC & TRANSPORTATION

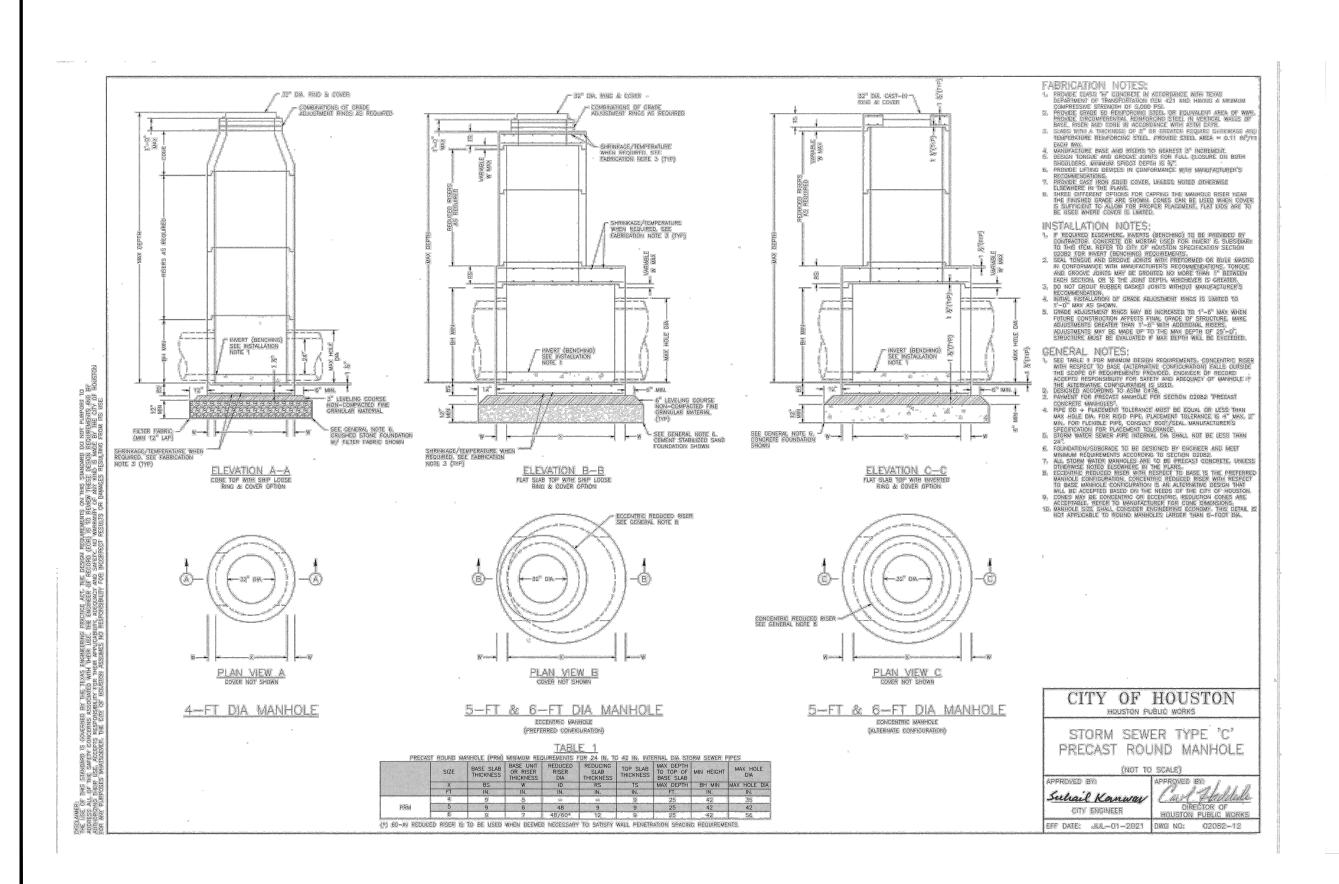
STREET & BRIDGE

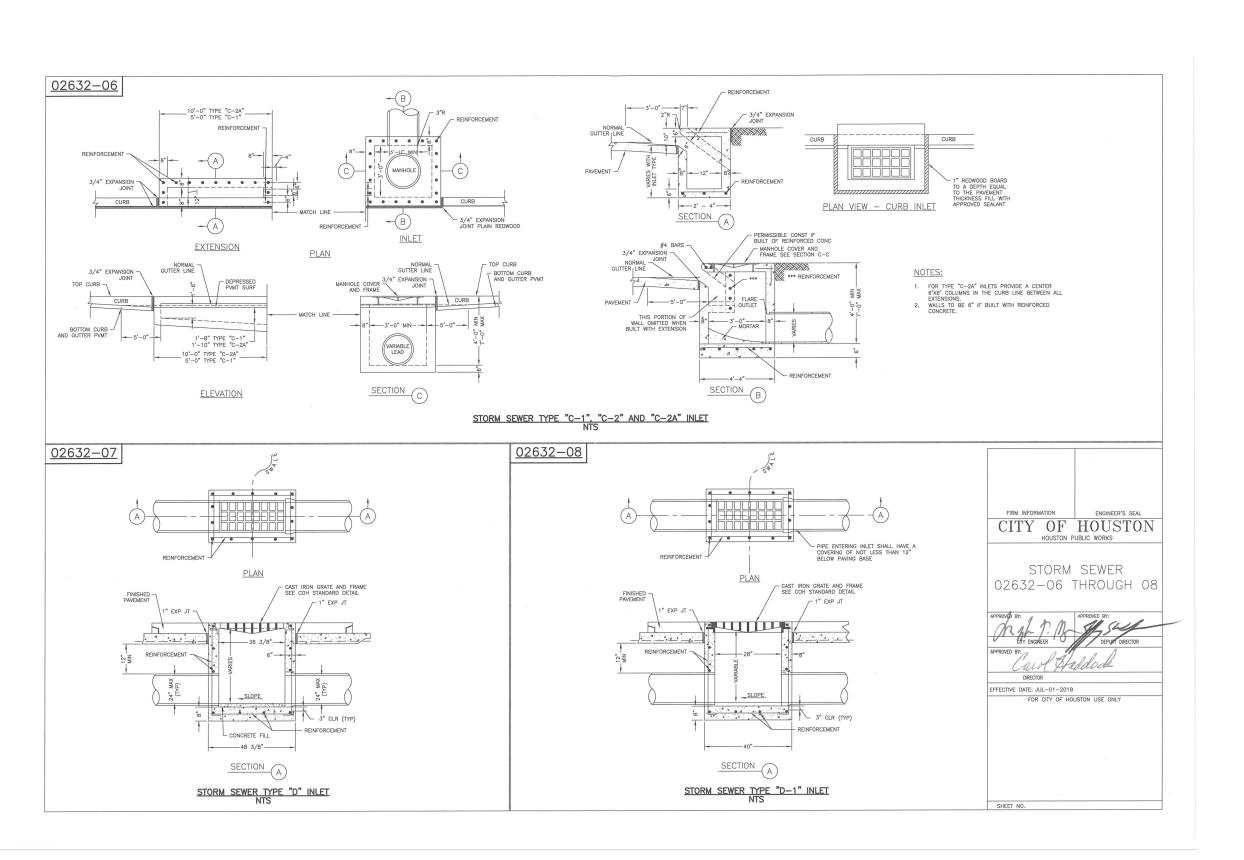
FILE NO. HORIZ:

SHEET NO.C25.0 OF C29.0 DRAWING SCALE
FOR CITY OF HOUSTON USE ONLY









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CONSTRUCTION DETAILS (3 OF 6)

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HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

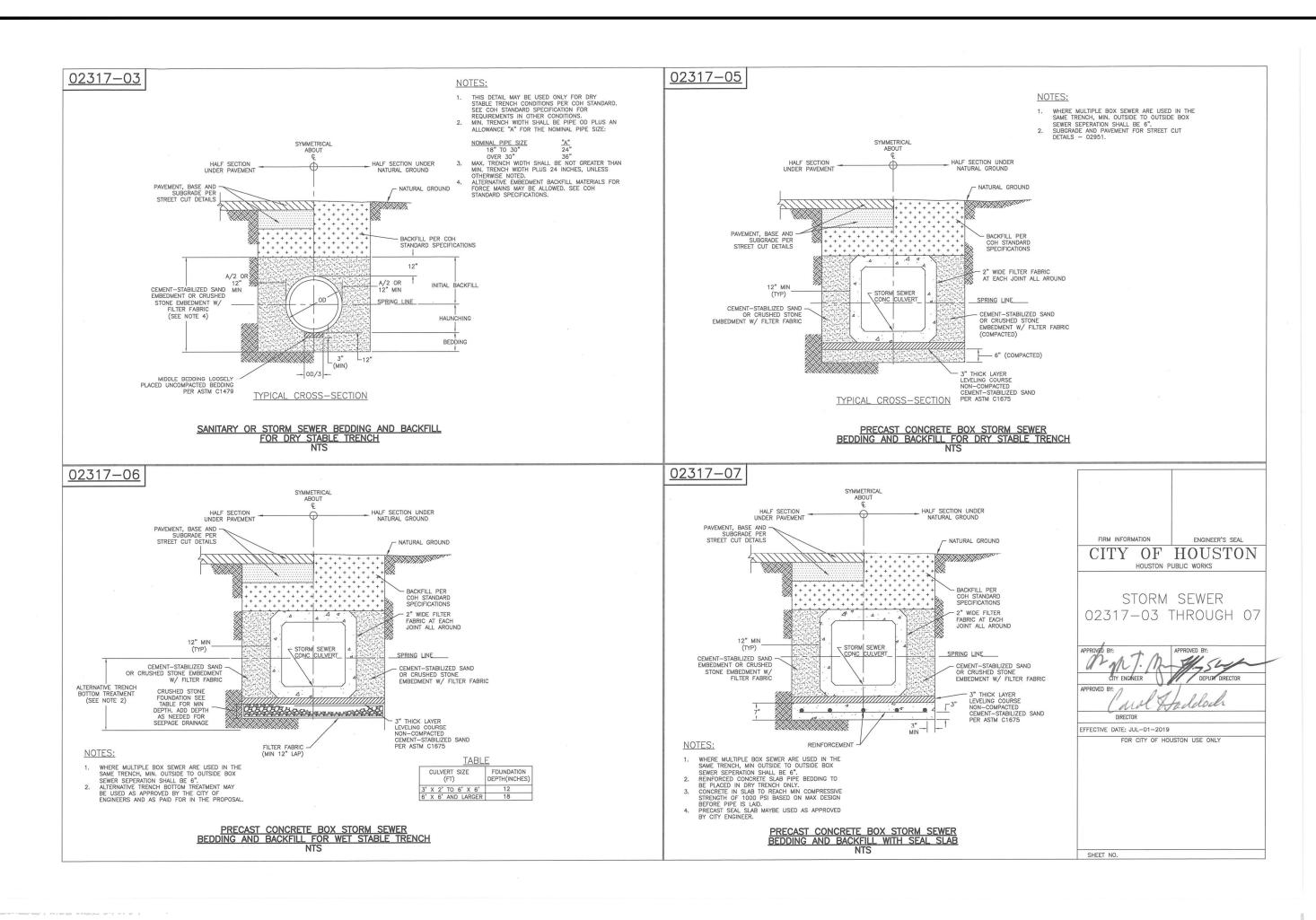
WASTE WATER FACILITIES

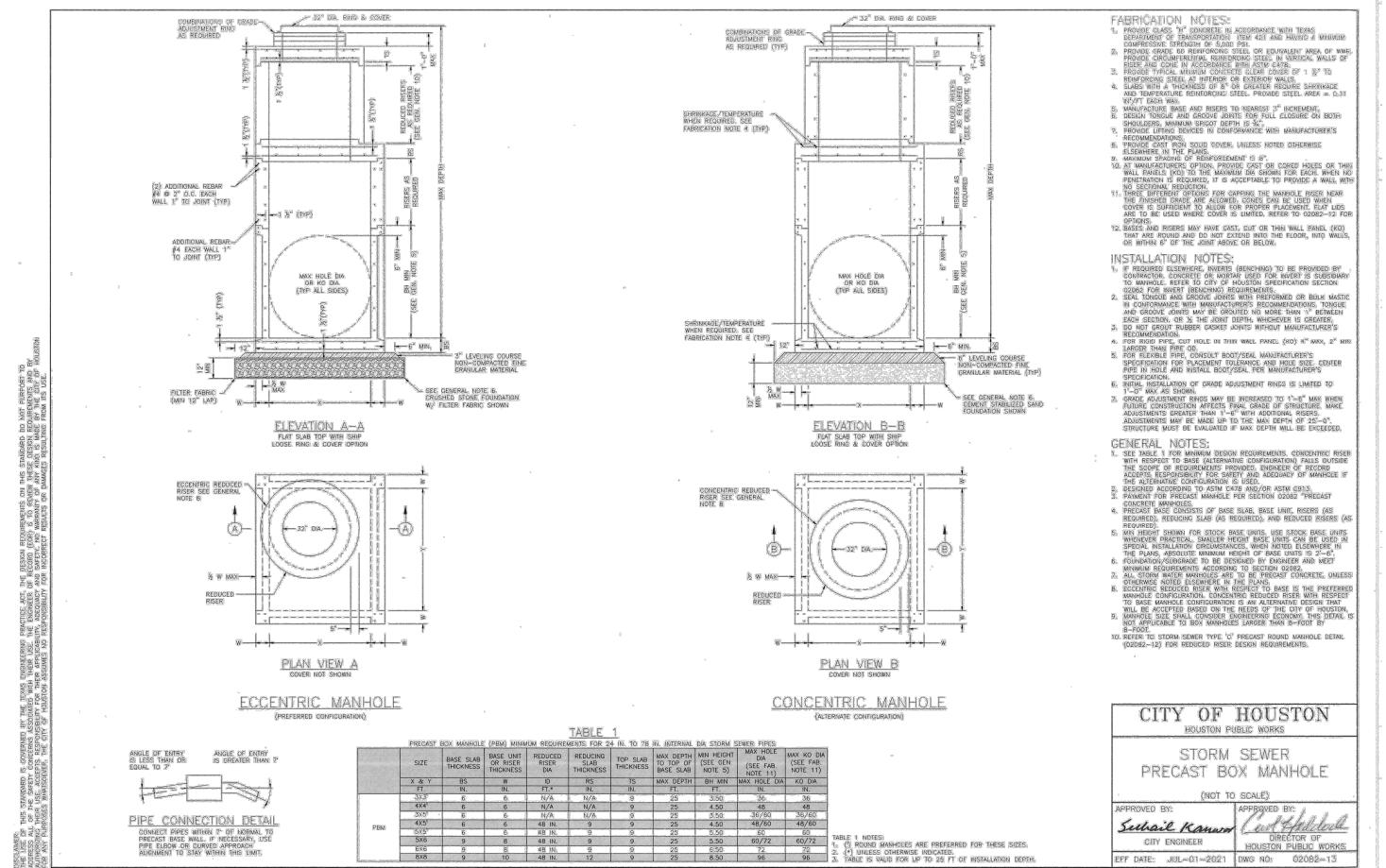
TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

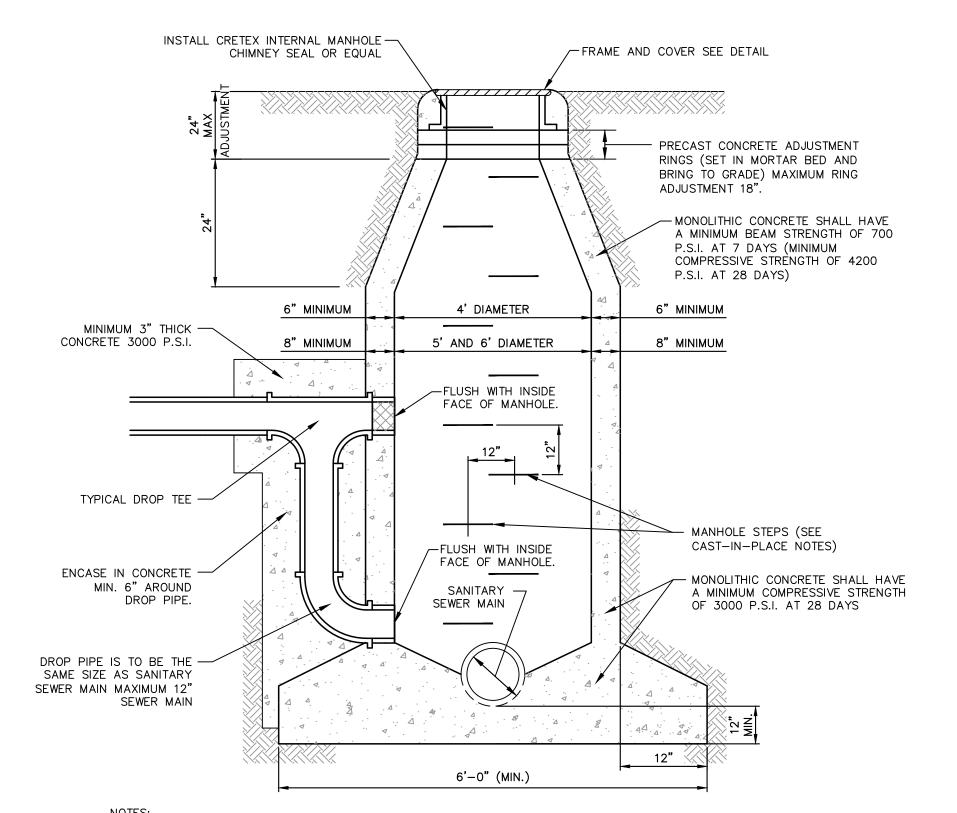
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HORIZ:

SHEET NO.C26.0 OF C29.0 DRAWING SCALE







1. CONCRETE SHALL BE A MONOLITHIC POUR.

 MANHOLE STEPS SHALL BE COPOLYMER POLYPROPYLENE PLASTIC COATED 1/2" GRADE. 60 STEEL REINFORCEMENT STEP MODEL PS2-PF AS MANUFACTURED BY M.A. INDUSTRIES INC. OF PEACHTREE CITY, GEORGIA OR EQUAL.

MANHOLE DROP CONNECTION DETAIL

N.T.S.

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CONSTRUCTION DETAILS (4 OF 6)

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CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

WASTE WATER

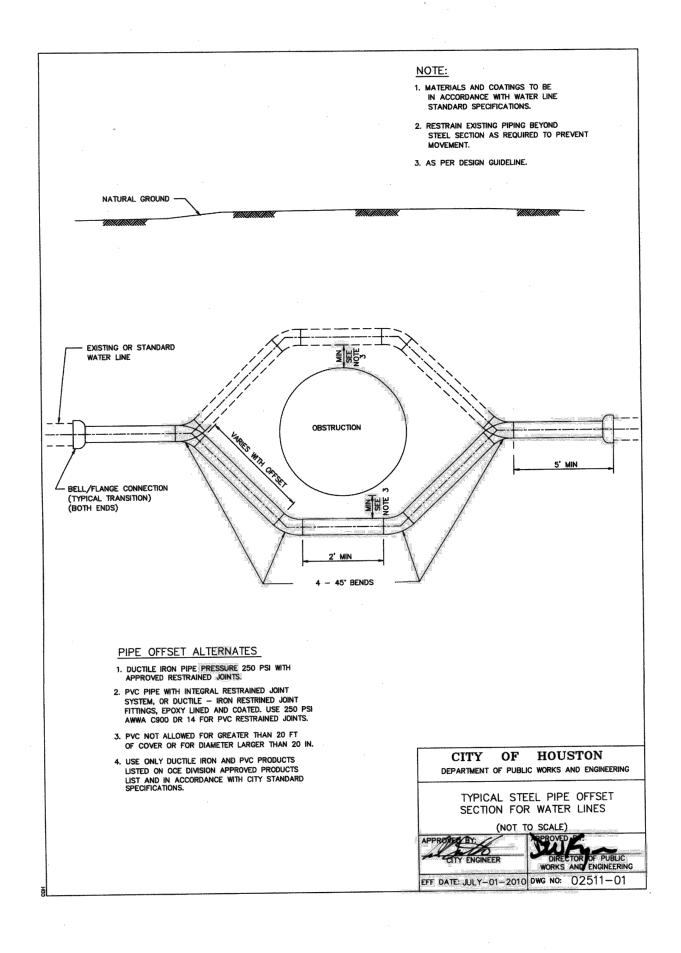
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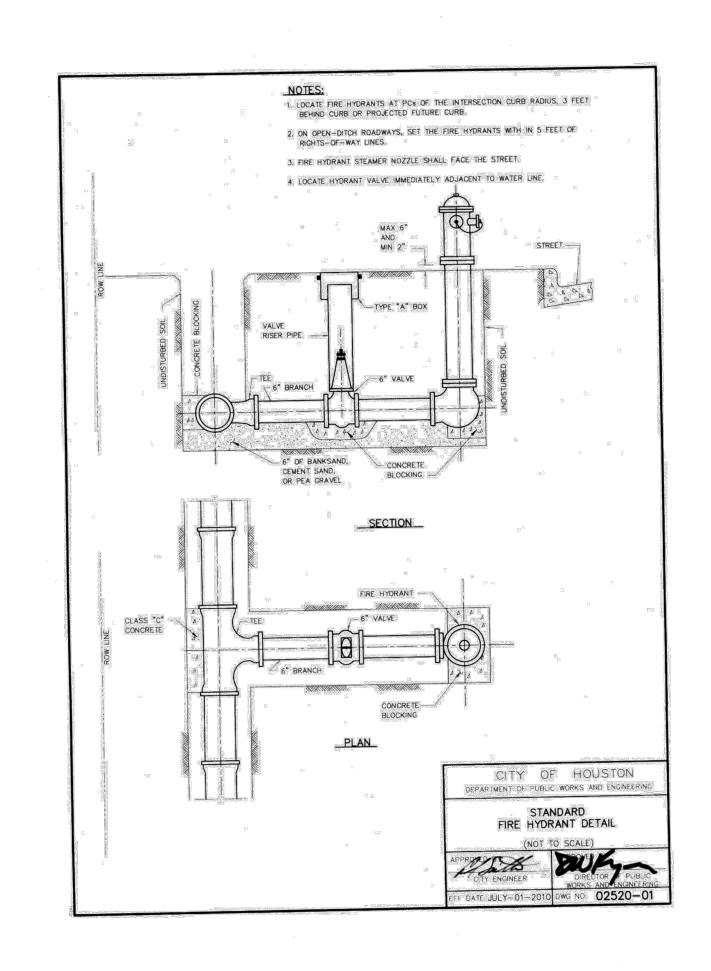
FACILITIES

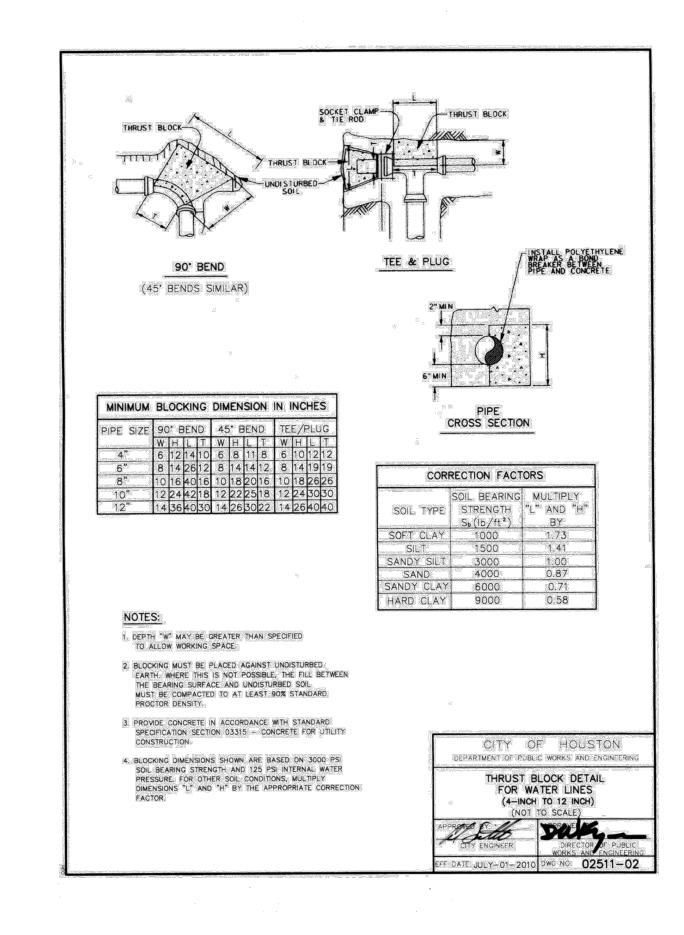
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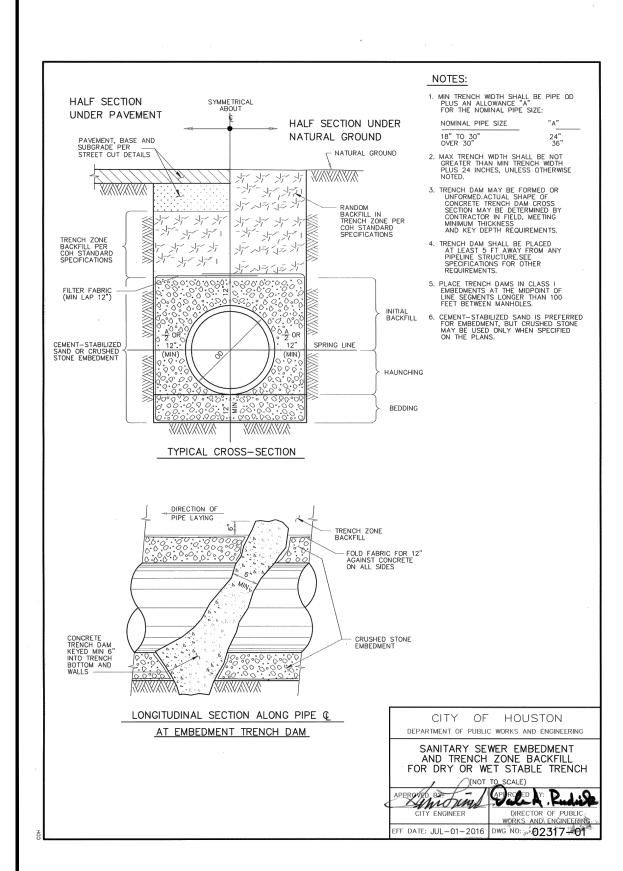
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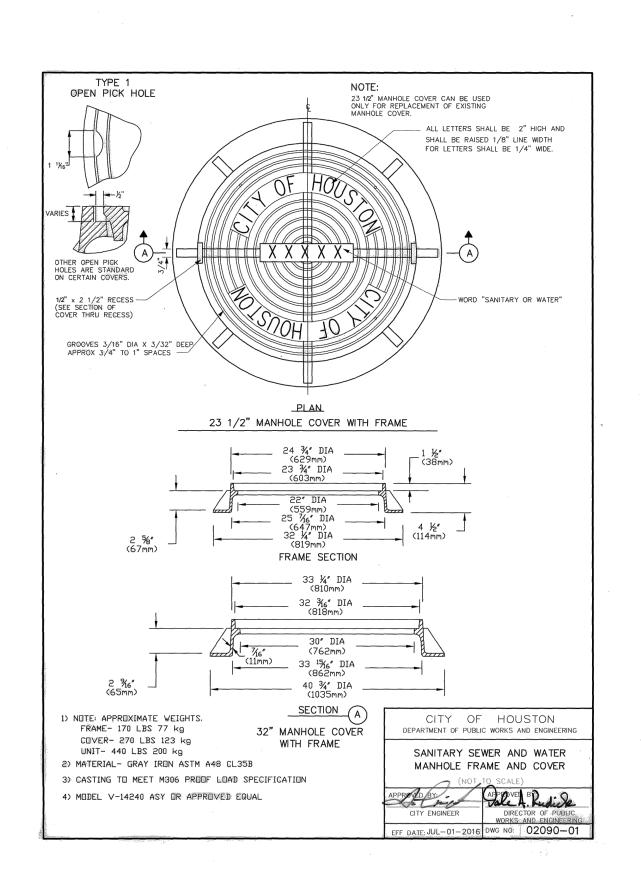
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FOR CITY OF HOUSTON USE ONLY

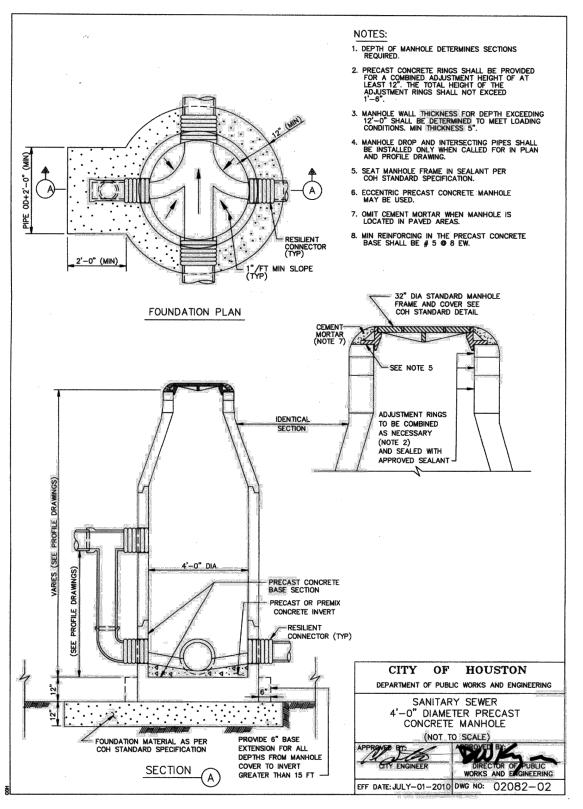


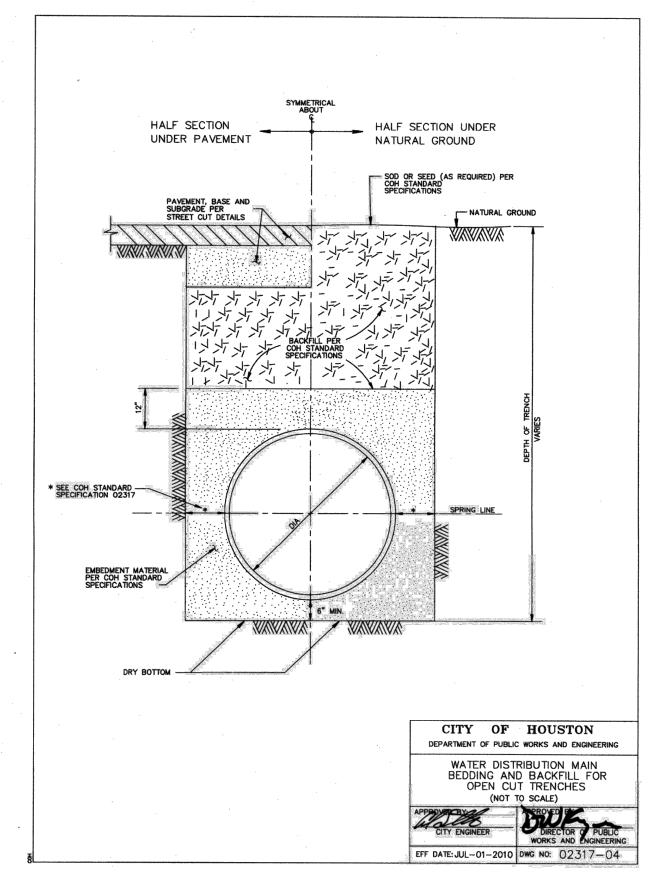












FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

VERIFICATION OF PRIVATE UTILITY LINES

CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not be used for conflict verification.

Signature valid for six months.

Date

CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY. (This signature verifies existing underground facilities — not to be used for conflict verification)

Signature valid for six months.

Date

Approved for AT&T underground conduit facilities only. Signature valid for one year.

Kimley»Hor

11700 Katy Freeway, Suite 800 Houston, Texas 77079 TBPE Firm Registration F-928

Tel. No. (281) 597-9300

STORM WATER

FILE NO.

KIRKWOOD CROSSING PHASE 1 WS&D

HOUSTON, TX 77048

CONSTRUCTION DETAILS (5 OF 6)

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON HOUSTON PUBLIC WORKS

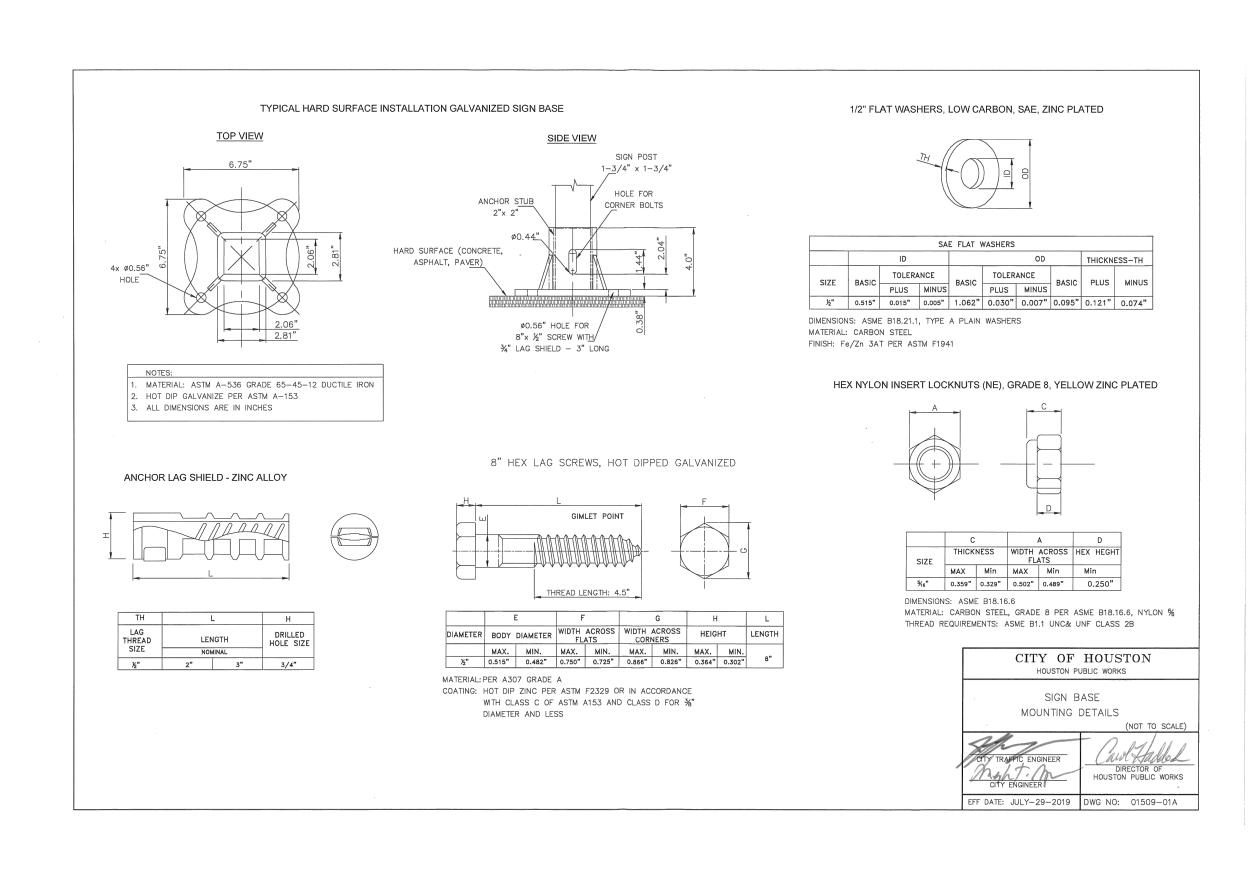
WATER STORM WATER QUALITY
WASTE WATER FACILITIES

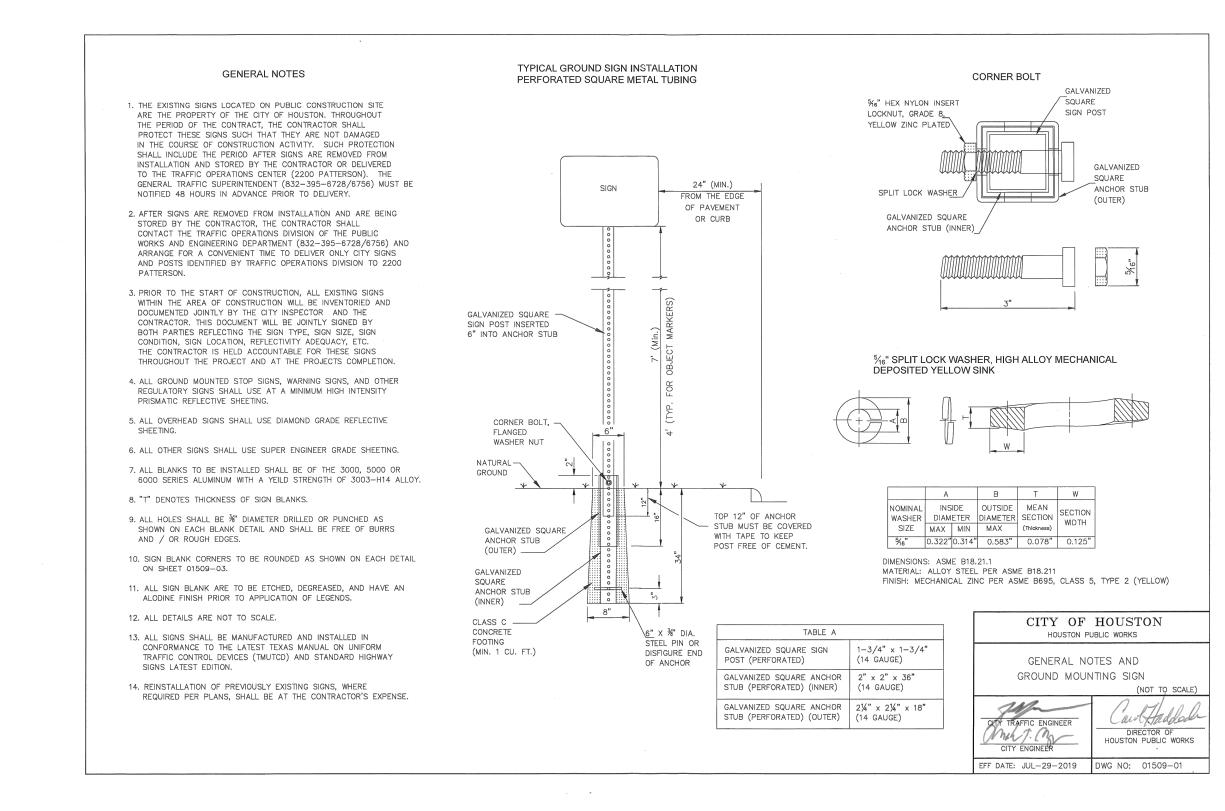
TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

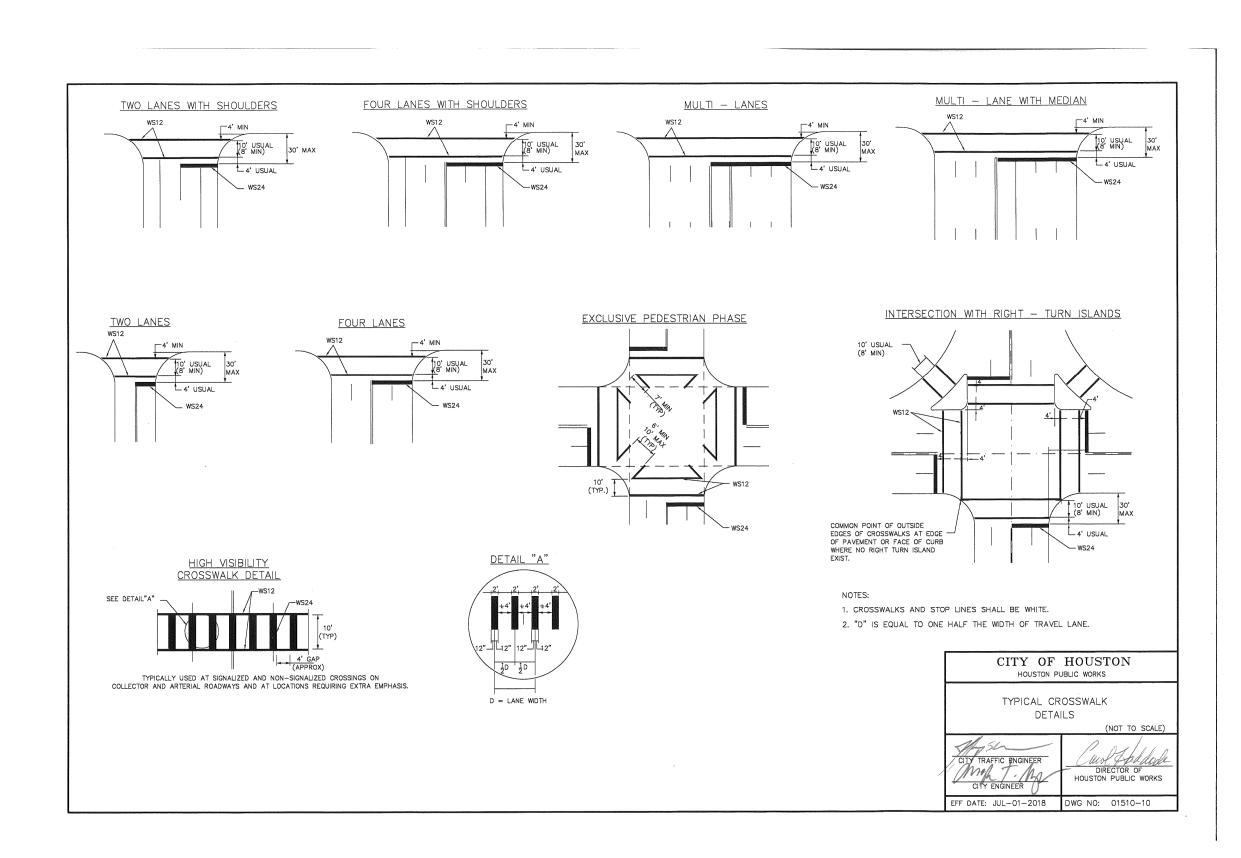
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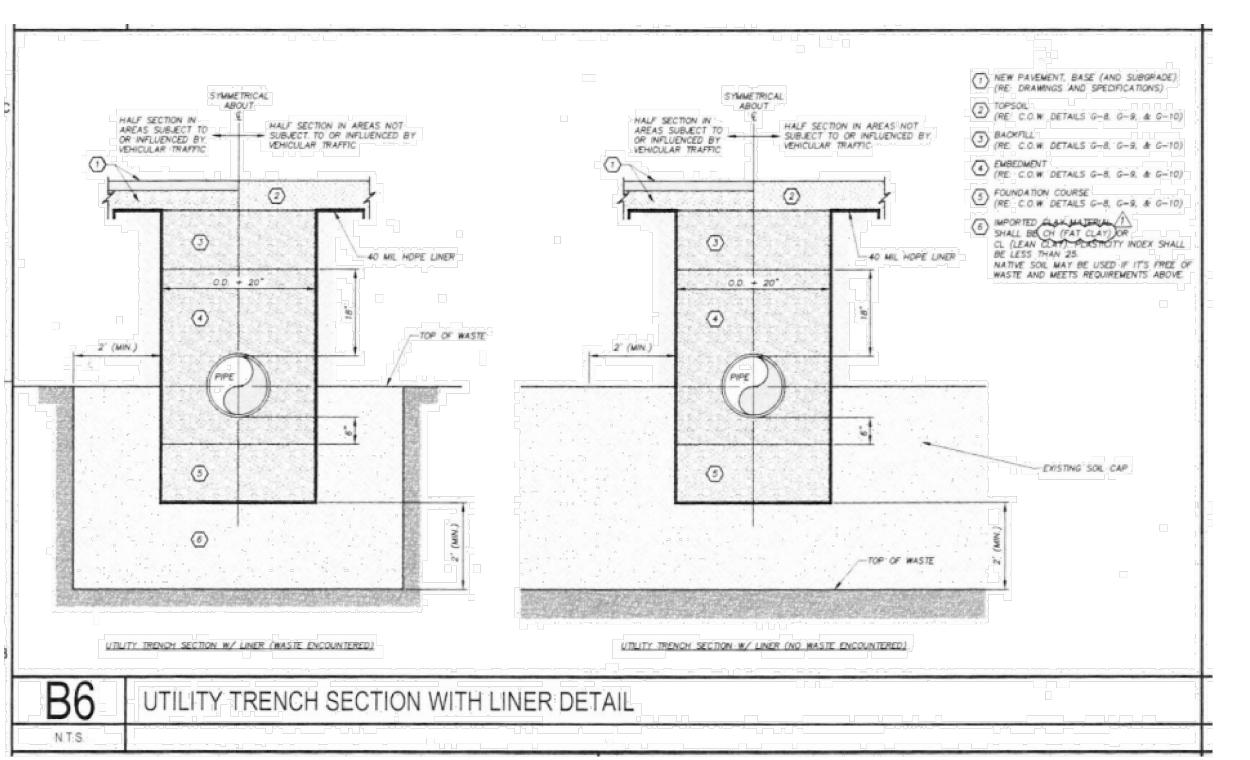
SHEET NO.C28.0 OF C29.0 DRAWING SCALE
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CALL 811 IND LINES OUR









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STORM WATER

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KIRKWOOD CROSSING PHASE 1 WS&D

HOUSTON, TX 77048

CONSTRUCTION DETAILS (6 OF 6)

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER STORM WATER QUALITY

WASTE WATER **FACILITIES**

> TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

HORIZ:

SHEET NO. C29.0 OF C29.0 DRAWING SCALE