Type V Registration Application
Northeast Transfer Station
5711 Neches Street, Houston, Texas

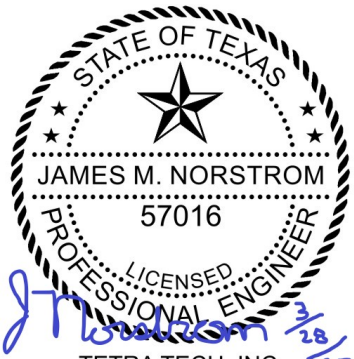
Parts I & II
General Information and Existing Conditions

Prepared for:

City of Houston General Services and Solid Waste Management Departments

611 Walker Street, Houston, Texas 77002

Prepared by:



TETRA TECH, INC.
FIRM REGISTRATION NO. F-3924

TBPELS Registration No. F-3924

1500 CityWest Boulevard, Suite 1000, Houston, TX 77042

936-202-0746

March 2022

Parts I & II
Type V Transfer Station Registration Application
Houston, TX

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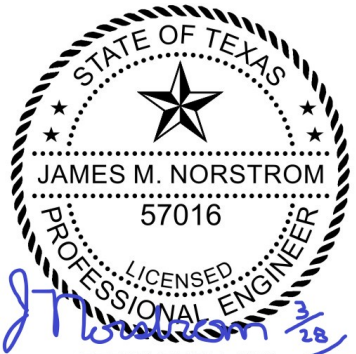

TETRA TECH, INC.
FIRM REGISTRATION NO. F-3924

1.0 PURPOSE OF APPLICATION

The purpose of this application is to register a new Municipal Solid Waste (MSW) Type V Transfer Station, the proposed City of Houston Northeast Transfer Station (facility). The proposed facility is located at 5711 Neches, Street in the City of Houston's North Environmental Service Center.

1.1 Registration Justification 30TAC330.9(f)

A registration is required for any new MSW Type V transfer station that includes a material recovery operation that meets all of the following requirements:

330.9(f)(1) Materials Recovery

The City of Houston operates one or more source-separation recycling programs in the county where the transfer station is located and those source-separation recycling programs manage a total weight or weight equivalent of recyclable materials equal to 10 percent or more by weight or weight equivalent of the incoming waste stream to all transfer stations to which credit is being applied. Records from the City of Houston Solid Waste Department for 2020 and 2021 in the table below demonstrate that the 10 percent diversion requirement is exceeded.

	Compacted Waste (tons)		Non compacted Waste (tons)			Curbside Recycling (tons)			Yard Yaste Recycling (tons)			Tree waste Recycling (tons)		
Month	**2020**	**2021**	**Month**	**2020**	**2021**	**Month**	**2020**	**2021**	**Month**	**2020**	**2021**	**Month**	**2020**	**2021**
Jan	37,877	37,820	**Jan**	13,629	12,293	**Jan**	5,458	5,958	**Jan**	1,081	1,131	**Jan**	5,226	5,310
Feb	31,556	33,401	**Feb**	28,416	24,285	**Feb**	4,090	3,607	**Feb**	990	665	**Feb**	305	385
Mar	38,898	43,061	**Mar**	17,322	18,441	**Mar**	5,027	6,641	**Mar**	1,548	2,324	**Mar**	6,604	8,477
Apr	40,170	40,666	**Apr**	36,977	33,504	**Apr**	5,737	6,022	**Apr**	943	1,508	**Apr**	564	576
May	39,156	36,448	**May**	17,451	25,504	**May**	5,935	5,695	**May**	839	1,060	**May**	13,504	1,035
Jun	40,844	40,401	**Jun**	30,320	33,894	**Jun**	6,073	6,439	**Jun**	780	796	**Jun**	607	856
Jul	40,854	39,655	**Jul**	19,367	17,027	**Jul**	5,994	6,288	**Jul**	870	775	**Jul**	6,187	5,465
Aug	37,423	37,333	**Aug**	28,510	27,699	**Aug**	5,795	5,405	**Aug**	814	506	**Aug**	673	595
Sep	37,796	38,037	**Sep**	10,747	9,212	**Sep**	5,887	6,012	**Sep**	676	545	**Sep**	6,237	8,218
Oct	38,396	35,781	**Oct**	30,169	29,958	**Oct**	5,735	5,402	**Oct**	735	555	**Oct**	417	708
Nov	36,376	38,350	**Nov**	10,702	22,093	**Nov**	5,303	5,195	**Nov**	837	701	**Nov**	5,001	506
Dec	39,758	38,578	**Dec**	24,820	23,964	**Dec**	5,707	5,205	**Dec**	960	791	**Dec**	406	374
Total	**459,104**	**459,532**	**Total**	**268,429**	**277,873**	**Total**	**66,741**	**67,869**	**Total**	**11,073**	**11,357**	**Total**	**45,731**	**32,505**

Total Compacted And non compacted (tons)		**Total diverted from the landfill (tons)**		**%**
2020	**727,533**	2020	**123,545**	**16.98%**
2121	**737,406**	2021	**111,731**	**15.15%**

Notes:

1. Weighing is done at the landfill for waste, FCC MRF on Lay Road for recyclables, and at Living Earth for green waste
2. The City Solid Waste Department collects waste from over 395,000 residences within city limits. The numbers in the table are for all waste collected at the curb from those residences. The City also has a reuse warehouse and three environmental service centers where material is recycled, and those recycled volumes are not included in the table.

330.9(f)(2) Distance to Landfill

The proposed transfer station will transport non-recyclable waste to a landfill that is not more than 50 miles from the facility.

- 5711 Neches Street to the Republic McCarty Road Landfill is 8 road miles
- 5711 Neches Street to the Waste Management Atascocita Landfill is 14 road miles

2.0 PROPERTY AND OWNERSHIP SUMMARY

The proposed facility will be a 3.2-acre MSW Type V Transfer Station located in Houston, Harris County, Texas. The location of the proposed facility is shown on Attachments I-1 and I-2. Additionally, an aerial photograph showing the proposed facility is included as Attachment II-4, and the general topographic map is included as Attachment II-3.

The City of Houston owns the proposed facility property. The physical address is 5711 Neches Street, Houston, Texas 77026.

2.1 Property Owner Information 30TAC330.59(d)

The property ownership information for the proposed facility is summarized in the following sections.

2.1.1 Legal Description

In accordance with 30 TAC §330.59(d)(I), the facility property is depicted on the boundary map in Attachment I-4. The City of Houston Plat approval and Harris County recording information for the property are included on the boundary map.

The property consists of 3.2447 acres situated in the J.S. Collins Survey, A-195, Harris County, Texas.

2.1.2 Property Owner Affidavit

A Property Owner Affidavit is provided by the City of Houston and included in the Part I form.

2.2 Adjacent Land Ownership 30TAC330.59(c)(3)

The Harris County Appraisal District Tax Rolls and Tax Maps were reviewed to determine land ownership of adjacent and potentially affected properties. Searches of the Harris County Secretary of State records did not indicate any mineral interest owners. The land ownership map and list for each tract within a ¼ mile of the facility registration boundary is presented in Attachment I-3.

2.3 Easements 30TAC330.61(c)(10)&(g)

There are three Metropolitan Transit Authority drainage easements as shown and described on the boundary survey (Attachment I-4). Solid waste operations will not be conducted on or within 25 feet of the centerline of any of these easements.

The 40-foot-wide drainage easement shown on Attachment I-4 running from north to south through the property is being vacated and replaced with a drainage easement for the underground 60-inch storm sewer that will run along the east side of the property as shown on the Drainage Exhibit in the Surface Water Drainage Report, Attachment III-8. An updated boundary survey showing easements will be submitted to the TCEQ after the new easement has been approved.

2.4 Legal Authority 30TAC330.59(e)

The City of Houston owns the property as shown on the Landowner Map, Attachment I-3 (No. 125 is City of Houston owned property).

2.5 Evidence of Competency 30TAC330.59(f)

The evidence of competency for this registration application meets the requirements of 30 TAC §330.59(f). The following sections address each subsection of the regulation.

30 TAC §330.59(£)(1)

The Texas solid waste sites that have been owned or operated by City of Houston within the last 10 years are:

Site Name	Site Type	Permit or Registration Number	County	Dates of Operation
Southeast Transfer Station	MSW Type V	40131	Harris	10/13/97 to present
Southwest Transfer Station	MSW Type V	40132	Harris	10/13/97 to present
Northwest Transfer Station	MSW Type V	40133	Harris	10/13/97 to present

30 TAC §330.59(f)(2)

The City of Houston has no financial interest in any solid waste sites in other states, territories, or countries.

30 TAC §330.59(£)(3)

The City of Houston will employ a licensed solid waste facility supervisor, as defined in Chapter 30 of this title (relating to Occupational Licenses and Registrations), before commencing site operation.

30 TAC §330.59(±)(4)

The following officers and supervisors have substantial experience in the waste services industry and are well-qualified principals and supervisors.

DeMarcus Glass
1245 Judiway, Houston Tx, 77018
C. 281-782-8171 O. 832-393-7821 demarcus.glass@houstontx.gov
21 Years Solid Waste Experience

Derek Mebane
1506 Central St., Houston, Texas 77012
C. 713-492-8683 O. 832-393-0441 derek.mebane@houstontx.gov
30 yrs. Solid Waste Experience
TCEQ MSW Operator A (SW0002828-Expired)

Maurice Renfro
11500 South Post Oak, Houston, Texas 77035
C. 832-454-9109 O-832-393-7964 maurice.renfro@houstontx.gov
22 Years Solid Waste Experience
TCEQ MSW Operator A (Expired)

2.6 Appointments 30TAC330.59(g)

Ms. Helvia Quinones, GIS Manager in City of Houston Solid Waste Management Director's Office, is the designated individual who will sign the registration application for the facility.

2.7 Application Fees 30TAC330.59(h)

The application fee was paid online (TCEQ ePay system) - Trace Number: 582EA000482105, Authorization 0000024845, TCEQ Amount: $150.00, Texas.gov Price: $153.64 on March 4, 2022.

2.8 Application Posting Information 30TAC330.57(i)

In accordance with 30 TAC §330.57(i)(l), a complete copy of this registration application is posted to the internet at the following address: **http://houstontx.gov/solidwaste/publicnotice.html.** All future revisions or supplements to this registration application will be posted at the same location.

The TCEQ website will also contain information on the filing of this registration application along with a link to the above-mentioned web address.

In accordance with 30 TAC §330.57(i)(3), the owner or operator is required to post notice signs at specified intervals along the permit boundary bordering a public road (Neches Street) for information purposes.

2.9 Existing Permits/Authorizations

See Part I Application Form TCEQ-0650, Section 11 for a list of permits and construction approvals. Please note the following:

- The applicant or contractor will obtain coverage under the TPDES Construction Stormwater General Permit before starting construction
- The City of Houston will obtain coverage under the Stormwater General Permit for Industrial Facilities before starting operations, unless they obtain a No Exposure Certification.
- This facility qualifies for the Standard Air Permit under 30 TAC 106.981

3.0 WASTE ACCEPTANCE PLAN

The facility will include a transfer station building served by a loading tunnel, scales, paved roadways, a pressurized waterline for fire extinguishing water, a waterline for the restroom, breakroom, and wash-water supply, a grit trap, an employee restroom, an employee breakroom/storage room, parking, and drainage features/structures. The facility will discharge contaminated water and sanitary sewage directly into the City of Houston sanitary sewer system.

The building will be served by a paved entry area in front of the building entrance, which is designed to facilitate waste truck entry to the building while preventing surface water entering the processing floor. The processing area (tipping floor) will be used for unloading, loading, and storage. A Site Layout Plan is included as Attachment III-1. The general design and construction details for the building components are presented in Attachments III-3 through III-6. Operation is discussed in Part IV of the application.

3.1 Sources and Characteristics of Waste 30TAC330.61(b)(1)

The acceptable waste characteristics, waste restrictions, general sources and service areas, waste rates, and storage and disposal requirements for the proposed facility are summarized in the following sections. There are no known constituents or characteristics in the acceptable waste stream that could impact or influence the design and operation of the facility.

General operations will be conducted in a manner that allows for the prompt and efficient unloading of waste. The waste will be discharged from the collection vehicles onto the facility processing floor (tipping

floor). Waste will be loaded into open top transfer trailers, which will be tarped before driving to an authorized disposal facility.

3.1.1 Waste Types

Waste accepted at the facility is expected to consist of the following wastes as defined in 30 TAC §330.3:

Primary Waste Types:

- Municipal Solid Waste - Solid waste resulting from or incidental to municipal, community, commercial, institutional, and recreational activities, including garbage, rubbish, ashes, street cleanings, and all other solid waste other than industrial solid waste
- Putrescible Waste - Organic wastes, such as garbage, that are capable of being decomposed by microorganisms with sufficient rapidity as to cause odors or gases or are capable of providing food for or attracting birds, animals, and disease vectors
- Rubbish – Non-putrescible solid waste (excluding ash), consisting of both combustible and noncombustible waste materials. Combustible rubbish includes paper, rags, cartons, wood, excelsior, furniture, rubber, plastics, brush, or similar materials; noncombustible rubbish includes glass, crockery, tin cans, aluminum cans, and similar materials that will not bum at ordinary incinerator temperatures (1,600 to 1,800 degrees Fahrenheit)
- Yard Waste - Leaves, grass clippings, yard and garden debris, and brush, including clean woody vegetative material not greater than six inches in diameter that results from landscaping maintenance and land-clearing operations. The term does not include stumps, roots, or shrubs with intact root balls
- Construction and demolition (C & D) Debris - Debris resulting from construction or demolition projects; includes all materials that are directly or indirectly the by-products of construction work or that result from demolition of buildings and other structures, including, but not limited to, paper, cartons, gypsum board, wood, excelsior, rubber, and plastics

Other Waste Types:

- Class 2 Industrial Wastes - Any individual solid waste or combination of industrial solid wastes that are not described as Hazardous, Class 1, or Class 3 as defined in §30 TAC 335.506 (relating to Class 2 Waste Determination)
- Class 3 Industrial Wastes - Inert and essentially insoluble industrial solid waste, usually including, but not limited to, materials such as rock, brick, glass, dirt, and certain plastics and rubber, etc., that are not readily decomposable, as further defined in §335.507 of the TCEQ regulations (relating to Class 3 Waste Determination)

The facility will not accept the following wastes:

- Special wastes, other than Class 2 and Class 3 industrial wastes
- Special waste from health-care facilities
- Waste from commercial or industrial wastewater treatment plants, air pollution control facilities, and tanks, drums, or containers used for shipping or storing any material that has been listed as a hazardous constituent in 40 code of Federal Regulations (40 CFR), Part 261, Appendix VIII but has not been listed as a commercial product in 40 CFR, §261.33(e) or (f)
- Slaughterhouse wastes
- Dead animals
- Pesticide (insecticide, herbicide, fungicide, or rodenticide) containers in accordance with 30 TAC §330.136(b)(5)

- Discarded materials containing asbestos
- Incinerator ash
- Soil contaminated by petroleum products, crude oils, or chemicals
- Hazardous wastes
- Polychlorinated biphenyls (PCB) waste
- Radioactive waste
- Unknown chemical or containerized waste
- Class 1 non-hazardous industrial waste
- Regulated Asbestos Containing Materials (RACM)
- Lead acid batteries
- Do-it-Yourself (DIY) used motor vehicle oil
- Used oil filters from internal combustion engines
- Whole used or scrap tires - Tires that are, at minimum, split in half or quartered will be accepted since they are allowed to be disposed of at landfills
- Items containing chlorinated fluorocarbons (CFC' s), such as refrigerators, freezers, and air conditioners, will only be accepted at the site if the generator or transporter provides written certification that the CFC has been evacuated from the unit and that it was not knowingly allowed to escape into the atmosphere
- Liquid waste (any waste material that is determined to contain “free liquids" as deemed by EPA Method 9095 (Paint Filter Test), as described in "Test Methods for Evaluating Solid Wastes, Physical Chemical Methods" (EPA Publication Number SW-846)) shall not be accepted unless it is bulk or non-containerized liquid waste that is household waste other than septic waste, or contained liquid waste and the container is a small container similar in size to that normally found in household waste, the container is designated to hold liquids for use other than storage, or the waste is a household waste

3.1.2 Waste Generation Areas

The proposed transfer station is planned to serve the City of Houston and Harris County and may serve other counties.

3.1.3 Projected Waste Acceptance Rate

The projected amount of waste to be received daily and annually for the next five years of the facility operation is presented below. The daily waste acceptance rate will range from approximately 500 tons per day (182,500 tons/year for 7 days/week operation) to approximately 2,000 tons per day (730,000 tons/year for 7 days/week operation). The estimated waste acceptance rate may fluctuate during the life of the facility and should not be considered a limit.

3.1.4 Projected Population Equivalent

Based on the TCEQ definition for population equivalency, the average volume per ton of waste is three cubic yards with a generation rate of five pounds per person per day.

The population equivalent served by the transfer station based on waste intake rate is:

500 tons/day (182,500 tons/year)

5 pounds per person per day x 365 days per year = 1,825 pounds = 0.91 tons per person per year

Population Equivalent = (182,500 tons per year) / (0.91 tons per person per year) = 200,549 people

2,000 tons/day (730,000 tons/year)

5 pounds per person per day x 365 days per year = 1,825 pounds = 0.91 tons per person per year

Population Equivalent = (730,000 tons per year) / (0.91 tons per person per year) = 802,197 people

3.1.5 Waste Storage and Disposal

The maximum volume of waste that will be stored at the transfer station at any given time is 2,000 tons. All waste storage or holding will occur within the building. No storage of waste materials will occur outside of the building. Solid waste will be stored on average for four hours and a maximum of six hours while being processed. The solid waste will not be allowed to accumulate long enough to allow the creation of nuisances or public health hazards due to odors, fly breeding, or harborage of other vectors. Storage periods significantly above average that are caused by equipment breakdowns will only be permitted for the time required to repair or replace the malfunctioning equipment. The maximum holding time under these circumstances will not exceed 48 hours with an average holding time of 24 hours. During time periods including holidays, the solid waste may be temporarily stored at the site not to exceed 72 hours.

All acceptable wastes received will be landfilled at a Type I landfill permitted by the TCEQ. Whole scrap tires will be removed from the waste stream and disposed of or recycled according to 30 TAC Chapter 328. Whole or scrap tires will be transported to a local registered scrap tire processor. Tires that are, at minimum, split in half or quartered are allowed at Type I landfills. Special wastes, liquid wastes, hazardous wastes, and PCB wastes will not be accepted at the facility.

3.2 Regional Solid Waste Management 30TAC330.61(p)

30 TAC §330.61(p) requires that the owner or operator provide documentation that Parts I and II of the registration application were submitted for review to the applicable council of governments for compliance with regional solid waste plans. The regional authority for Harris County is the Houston- Galveston Area Council (HGAC). The HGAC is an intergovernmental planning agency that serves a 13-county region, encompassing the Houston metropolitan area. HGAC's solid waste management plan is presented in DRAFT Regional Solid Waste Management Plan 2020 – 2042.

Parts I and II of this application have been sent to the HGAC for review. A copy of the related correspondence is included in Attachment II-7.

3.3 Local Solid Waste Management 30TAC330.61(p)

30 TAC §330.61(p) requires that the owner or operator requests a review letter from local governments for compliance with the local solid waste plan. The City of Houston provided a letter indicating compliance with their long-term solid waste management plan, which is entitled the Integrated Resource Recovery Management Plan, available at http://www.houstontx.gov/solidwaste/longrange (Attachment II-7). Harris County does not have a solid waste management plan, therefore, submittal to Harris County was not necessary.

4.0 EXISTING CONDITIONS SUMMARY

In accordance with 30 TAC 330.61, the following sections include Part II of the registration application that summarize the existing conditions of the facility property and the surrounding area. The main topics include land use and zoning, population and community growth trends, locations of water and oil/gas wells, prevailing wind direction, transportation analysis, general geology, soils, groundwater and surface water information, and floodplain, wetlands, and endangered species data.

4.1 Impact on Surrounding Area 30 TAC 330.61(h)

A land use and zoning compatibility analysis was performed for the Northeast Transfer Station. The results of the analysis are summarized in the following sections.

4.1.1 Zoning

The Northeast Transfer Station site and area within one mile from the site boundary are located within the City of Houston in Harris County, Texas. The City of Houston does not have a zoning ordinance, therefore, there are no zoning restrictions for the facility.

4.1.2 Character of Surrounding Land Use

Existing uses of the site and the surrounding area are shown on Attachment II-5, Land Use Map. The map was prepared based on a field reconnaissance study (Tetra Tech, January 18, 2022) and a review of recent aerial photographs (Google Maps™ and GoogleEarth™) of the surrounding area. Most of the land within a one-mile radius is developed with a wide variety of commercial, industrial, and residential uses. Several subdivisions/home communities, schools, churches, and day care centers are located within a one-mile radius of the site. Residential represents the largest percentage of land use within a one-mile radius of the site. The second most common land use within a one-mile radius of the site is commercial/industrial. The breakdown of overall land use within the one-mile radius is shown below.

Land Use Within One Mile of Site Boundary

Land Use	Area, acres	Percentage of Total Area, %
Northeast Transfer Station Site	3.2	0.14
City of Houston Environmental Service Center - North	19.9	0.87
Residential	1,551.5	67.70
Commercial / Industrial	283.0	12.35
Transportation Corridors	323.9	14.13
Agricultural or Open Space	57.1	2.49
Ponds and Lakes	0	0
Cemeteries	0	0
Bus Terminal	21.3	0.93
Total	2,291.7	100

4.1.3 Population and Community Growth Trends

Population projections for Harris County, as tabulated by the Houston-Galveston Area Council (H-GAC) are summarized below. The data is from the 2018 Regional Growth Forecast.

H-GAC Regional Growth forecast: Counties

Year	Projected Population of Harris County
2020	4,810,000
2025	5,189,000
2030	5,567,000
2035	5,595,000
2040	6,212,000
2045	6,434,000

4.1.4 Growth Trends

The facility is located within the City of Houston. According to HGAC Regional Population Growth Trends, the household population growth trends for the areas shown are presented in the table below for the period 2020 to 2040.

Houston Growth Forecast

Houston Sector	Area, square miles	2020 Population Forecast	2030 Population Forecast	2040 Population Forecast
Concentric Area between I-610 & Beltway 8	435	1,752,683	1,996,614	2,254,308
City of Houston	671	2,407,492	2,688,163	3,045,030

H-GAC predicts that the population and employment growth will increase strongly in Houston in general.

4.1.5 Proximity to Residential and Other Uses

In accordance with 30 TAC 330.61(h)(4), the following paragraphs describe certain specific uses of the properties within one mile of the site boundary. The locations of schools, licensed day care facilities, residences, churches, and commercial and industrial areas within a one-mile radius of the facility are shown on Attachment II-5 and are discussed in further detail below.

No known hospitals, archeological or historical sites, or sites with exceptional aesthetic qualities were identified within one mile of the facility boundary. The nearest hospital is the Lyndon B. Johnson Hospital located 1.5 miles to the east.

Ponds and Lakes

No ponds or lakes were observed during our field survey nor when researching Google Maps or Google Earth.

Residential

Our review of a Google Earth aerial photo, Google Maps, and our driving survey of the area in 2022 indicates several residential areas within one mile of the site boundary. We estimate that there are over 2,680 single-family homes within one mile of the facility. The nearest existing residence is approximately 0.16 miles west of the site boundary. All residential areas are shown on the Land Use Map, Attachment II-5.

Churches

Our review of a Google Earth aerial photo, Google Maps, and our driving survey of the area in 2021 indicates that there are 25 existing churches within one mile of the facility. The closest church is the New Saint John Missionary Baptist Church at 1909 Eastex Freeway, Houston, TX 77026 about 0.44 miles south of the site boundary.

Licensed Day Care Facilities

Our review of a Google Earth aerial photo, Google Maps, and our driving survey of the area in 2022 indicates that there are two licensed day care centers within one mile of the facility, with the nearest being the Infant Club Society located at 4003 Kelley Street, Houston, TX 77026, about 0.4 miles east-northeast of the proposed transfer station.

Parks and Recreational Areas

A driving survey of the area on January 18, 2022 and review of recent aerial photography indicated no parks or recreational areas located within one mile of the site boundary. Several athletic fields are located at schools within the one-mile radius.

Cemeteries

We discovered no cemeteries within the one-mile radius.

Schools

Our review of a Google Earth aerial photo, Google Maps, and our driving survey of the area in 2022 indicates that there are 12 schools within one mile of the property boundary or slightly beyond. The nearest school is the Barbara Jordan Career Center, a vocational high school, located across Interstate 69 about 0.2 miles to the east as shown on the Land Use Map, Attachment II-5.

Commercial and Industrial

A driving survey of the area in 2022 and review of recent aerial photography indicated that there are over 100 commercial and industrial properties within one mile of the facility. Commercial and industrial areas are shown on the Land Use Map, Attachment II-5.

Historic Site and Cultural Resources

In accordance with 30 TAC §330.61(0), a letter was sent to the Texas Historical Commission (THC) for concurrence that there are no historical, archeological, or sites with exceptional aesthetic quality on the facility property or in the surrounding area that would be affected by the proposed transfer station. The THC responded in an email on September 2, 2021 that there are no historic properties in the site vicinity and the project may proceed. A copy of the THC email is included in Attachment II-7.

Miscellaneous Uses

The proposed transfer station is on property within the Houston North Environmental Service Center. The Houston Solid Waste Management Department owns and manages the North Environmental Service Center where they operate and maintain a waste collection fleet, training facilities, and offices.

The Metropolitan Transit Authority of Harris County operates the Kashmere Bus Operating Facility across Interstate 69 about 0.22 miles to the southeast.

4.1.6 Structures and Inhabitable Buildings 30TAC330.61(c)(3)

In accordance with 30TAC330.61(c)(3), the structures and inhabitable buildings within 500 feet of the registration boundary are shown on Attachment II-1.2. All buildings within 500 feet are on the City of Houston Environmental Service Center North Property, which include:

- Covered truck wash (68 feet to the southeast)
- City of Houston (COH) Solid Waste Management Department Facility Warehouse, 5711 Eastex Freeway (140 feet to the east)
- Fueling area (171 feet to the southeast)
- COH Administration and Training Building, 5614 Neches Street (320 feet to the south-southeast)
- COH Main Vehicle Maintenance Building (353 feet to the south)
- Parks and Recreation Building, 5703 Eastex Freeway (380 feet to the east)
- COH Light Vehicle Maintenance Shop (466 feet to the east-southeast)

4.1.7 Water and Oil/Gas Wells 30TAC330.61(h)(5) & 30TAC330.61(l)

The locations of groundwater wells and oil/gas wells within 500 feet of the site boundary were determined by our database searches using the Texas Water Development Board's Groundwater Data Viewer (https://www3.twdb.texas.gov/apps/WaterDataInteractive/GroundWaterDataViewer) and the Texas Railroad Commission's Public GIS Viewer (https://www.rrc.texas.gov/resource-center/research/gis-viewer/).

We found no known water well locations within 500 feet of the proposed transfer station registration boundary as shown on Attachment II-1.3, with the exception of a plugged well along the south boundary of the North Environmental Service Center.

There are no active, inactive, or plugged oil or natural gas wells on the proposed transfer station property nor within 500 feet of the proposed transfer station site boundary based on our search using the Texas Railroad Commission Public GIS Viewer (see Attachment II-1.3).

4.1.8 Prevailing Wind Direction 30TAC330.61(c)(1)

A wind rose is included on Attachment II-1.1 to illustrate the prevailing wind direction. This wind rose from Houston Hobby Airport covering the period 1972 to 2021 indicates that the prevailing wind is from the south-southeast. The average wind speed is 8.3 miles per hour, with calm winds 12.4 percent of the time.

4.2 Transportation Analysis 30TAC330.61(i)

The transportation analysis presented in Attachment II-8 includes data on the availability and adequacy of roads that the owner or operator will use to access the facility, data on the volume of vehicular traffic on access roads within one mile of the facility, both existing and during the expected life of the facility, projected volume of traffic expected to be generated by the facility on the access roads within one mile of the facility, documentation of coordination of all designs associated with site entrances with the agency with maintenance responsibility of the public roadway involved, and documentation of coordination with the City of Houston and Texas Department of Transportation (TxDOT) for traffic and location restrictions. Agency correspondence is provided in Attachment II-7.

4.2.1 Site Access

Public access to the facility will be provided by one entrance on Neches Street for waste collection trucks and transfer trailers. All vehicles will leave the facility via the exit on Neches Street, located north of the entrance. The owner or operator will obtain required permits from appropriate governmental agencies prior to construction of a new driveway entrance. Vehicular traffic to the facility will generally access the facility using Kelley Street, then Neches Street.

The site entrance and exit will be at least 24-foot-wide paved driveways. The driveways will intersect Neches Street at a 90-degree angle at a location with no sight restrictions or conflicts that impair the turning of the trucks or the view of drivers. Trucks that turn into the proposed site entrance driveway will have

approximately 120 feet of queueing room before they reach the building. The exit will be controlled by a stop sign.

Based on the proposed access routes and attached Transportation Study, the roadways that provide access to the facility are adequate in capacity and structure to continue to serve the needs of the transfer station and general public. There are no proposed public roadway improvements such as turning lanes or storage lanes associated with the site entrance.

Correspondence with TxDOT and Harris County is included in Attachment II-7.

4.2.2 Traffic Volumes

See the transportation analysis by Dally and Associates presented in Attachment II-8.

4.2.3 Traffic Generated by the Proposed Facility

See the transportation analysis by Dally and Associates presented in Attachment II-8.

4.2.2 Airport Locations

There are no public use airports within six miles of the site. The nearest runway of a public-use airport is at the Houston Hobby Airport, located approximately 11 miles south-southeast of the proposed transfer station site. In accordance with 30 TAC 330.6l(i)(5), an airport impact evaluation is required only for landfill units and landfill mining operations, and thus not required for transfer stations.

4.2.3 TXDOT Correspondence

In accordance with 30TAC330.61(i)(4), the applicant contacted TxDOT for any traffic or location restrictions that may apply to the facility. Correspondence with TxDOT is included in Attachment II-7.

4.3 General Geology and Soils Statement 30TAC330.61(j)

In accordance with 30 TAC §330.6l(j), a general discussion of the geology and soils at the Northeast Transfer Station is included in the following sections.

4.3.1 Physiography and Topography

The site is in Houston, Harris County, Texas. The topography of Harris County slopes downward toward Galveston Bay, generally from northwest to southeast. The topography is relatively flat with elevation changes on the order of one foot per mile. The site is in the Coastal Prairie portion of the Gulf Coastal Plain physiographic province. The depositional plain of the Gulf Coast region is typically flat with primary relief provided by shallow valleys cut by streams. Attachment II-3 shows the general site topography based on United States Geological Survey (USGS) maps, dated 2019.

The major rivers in the area are the Brazos, Colorado, San Jacinto, and Trinity Rivers. Numerous constructed lakes and reservoirs are present in the area and influence the water table on a local scale. The Gulf of Mexico and Galveston Bay have a large effect on both the downdip ground-water system and the climate of the area. Winter is short and mild with a few days of freezing temperatures. Area rainfall averages are approximately 49.77 inches per year (averaged between 1981 and 2010 for the Houston, Texas area (www.noaa.gov)).

The transfer station site drains to the Hunting Bayou watershed, which drains an area of about 31 square miles in Harris County, Texas, and encompasses portions of the cities of Houston, Jacinto, and Galena Park. The watershed includes the primary stream Hunting Bayou (Harris County Flood Control District Unit No. H100-00-00), and several tributaries. The watershed includes about 54 miles of streams and is a highly developed watershed. A tributary to Hunting Bayou (Harris County Flood Control District Unit No. H113-00-00

to Hunting Bayou) is located adjacent to the facility, with Hunting Bayou about one-half mile south of the facility.

The approximate existing ground elevation of the facility is 47 ft-msl.

4.3.2 Geologic Setting

The following discussion describes the geology beneath the facility.

The site is located within the Gulf Coast sedimentary basin, which consists of thousands of feet of sediments deposited through deltaic, alluvial, eolian dune, bay-estuarine, and barrier island-shoreline geologic processes. The thick mass of sediments dips and thickens toward the Gulf of Mexico and successively older geologic formations are exposed progressively further inland.

The Pleistocene age Beaumont Formation underlies the project site and is characterized by clay, silt, sand, and minor amounts of siliceous gravel. Beaumont clays are typically red, brown, tan, and/or gray with irregularly distributed calcareous nodules and ferrous nodules, interstratified with sands. Thickness ranges from 25 to 400 feet. The Beaumont overlies the Lissie Formation and underlies Recent coastal marsh deposits in the eastern division of the Texas-Louisiana Gulf Coastal Plain.

4.3.3 On-Site Geology

Ninyo and Moore conducted a geotechnical investigation of the site in January 2022 and their Geotechnical Evaluation report is presented as Attachment II-9. Nine borings indicate that the Beaumont Formation soils are predominantly clay (low and high plasticity) with intermittent sand layers in some places. Findings and recommendations in the Ninyo and Moore report will be used to design foundations and retaining structures for the new transfer station. In the Ninyo and Moore report, soil stratigraphy is described in Section 4.3.

4.3.4 On-Site Soils

The Soil Conservation Service General Soil Map for Harris County shows soils at the site of the proposed transfer station to be Clodine-Addicks-Gessner association: poorly drained, moderately permeable soils.

4.4 Ground and Surface Water Statement 30TAC330.61(k)

In accordance with 30 TAC 330.61(k), a general discussion of the groundwater and surface water conditions at the proposed Transfer Station is included in the following sections.

4.4.1 Groundwater Conditions

The Chicot and Evangeline aquifers are the major hydrologic units used for groundwater supply in Harris County and grouped together are known as the Gulf Coast Aquifer. These aquifers are composed of gravel, sand, silt, and clay of Pliocene, Pleistocene, and Holocene ages. Units of the Chicot aquifer comprise the uppermost aquifer in the facility area.

In the Ninyo and Moore report, groundwater is described in Section 4.4.

4.4.2 Surface Water Features

The transfer station site drains to the Hunting Bayou watershed, which drains an area of about 31 square miles in Harris County, Texas, and encompasses portions of the cities of Houston, Jacinto, and Galena Park. The watershed includes the primary stream Hunting Bayou (Harris County Flood Control District Unit No. H100-00-00), and several tributaries. The watershed includes about 54 miles of streams and is a highly developed watershed. A tributary to Hunting Bayou (Harris County Flood Control District Unit No. H113-00-00 to Hunting Bayou) is located adjacent to the facility, with Hunting Bayou about one-half mile south of the facility.

4.4.3 Texas Pollutant Discharge Elimination System

The transfer station facility will not perform vehicle or equipment maintenance or rehabilitation, vehicle repairs, painting, fueling, lubrication, or cleaning. Therefore, the site is not subject to the requirements of the Texas Pollutant Discharge Elimination System (TPDES) multi-sector general permit, as required by 402 of the Clean Water Act. The facility will, however, obtain a stormwater permit for "construction only" prior to construction of the facility.

4.5 Floodplains and Wetlands Statement 30TAC330.61(m)

4.5.1 Floodplains

The property proposed for the transfer station is outside the 100-year floodplain according to the FEMA National Flood Hazard Layer FIRMette which was derived directly from the authoritative NFHL web services provided by FEMA. The map was exported on 2/2/2022 and is included as Attachment II-11. The minimum ground surface elevation of the transfer station property after development will be 46.5 feet MSL, while the bottom of the detention pond will be at Elevation 42 feet.

4.5.2 Wetlands

Tetra Tech (TT) performed a wetlands study for the proposed transfer station property. The purpose of the study was to determine the approximate sizes and locations of wetlands and other areas that could potentially be classified as "Jurisdictional Waters of the United States" and to identify wetlands on the facility according to the Texas Water Code (TWC) §11.502. TT identified no jurisdictional wetlands on the transfer station property as stated in their report presented in Attachment II-10.

4.6 Protection of Endangered Species 30TAC330.61(n)

TT performed a threatened and endangered species assessment of the proposed transfer station property. The objective of the assessment was to evaluate the potential for the existence of species and/or their habitat that are considered protected under the Endangered Species Act of 1973 and subsequent amendments and listings in accordance with the requirements of 30 TAC §330.6l(n). TT concluded that there will be "no effect" on listed threatened or endangered species from development of the proposed transfer station property, as stated in their report presented in Attachment II-10.

A request for verification of threatened and endangered species assessment was submitted to the Texas Parks and Wildlife Department (TPWD). The TT request and TPWD response are provided in Attachment II-7.

4.7 Site-Specific Conditions Requiring Special Design Considerations

In accordance with 30 TAC §330.61(a), the requirements of 30 TAC §330.61(h) through (o) have been evaluated and discussed in the above Sections 3.1 through 3.6 of the existing conditions summary. There are no special design considerations or possible mitigation of conditions required at the facility.

4.8 Additional Standard Registration Conditions for Municipal Solid Waste Facilities

If at any time during the life of the facility the City of Houston (COH) becomes aware of any condition in the registration that necessitates a change to accommodate new technology or improved methods or that makes it impractical to keep the facility in compliance, the COH will submit to the Executive Director requested changes to the registration in accordance with 30 TAC 305.62 relating to Amendments or 30 TAC 305.70 relating to MSW registration modifications. The requested changes must be approved prior to their implementation.

The COH will obtain and submit certification by a Texas-licensed professional engineer that the facility has been constructed as designed in accordance with the issued registration and in general compliance with the

regulations prior to initial operation. The COH will maintain that certification in the site operating record as described in Part IV, the Site Operating Plan.

After initial construction has been completed and prior to accepting solid waste, the COH will contact the TCEQ Austin office and the region office in writing to request a pre-opening inspection. The TCEQ will conduct a pre-opening inspection within 14 days of notification that all construction activities have been completed, accompanied by representatives of the COH and the engineer.

The facility will not accept solid waste until the TCEQ has confirmed in writing that all applicable submissions required by the permit and 30 TAC Chapter 330 have been received and found to be acceptable, and that construction complies with the registration and approved Site Development Plan. If the TCEQ does not provide a written or verbal response within 14 days of completion of the pre-opening inspection, the facility will be considered approved for operation.

5.0 SUPPLEMENTARY TECHNICAL REPORT

In accordance with 30 TAC 305.45(a)(8), a supplementary technical report is required to be submitted with an application to provide a general description of the facilities and the systems used for or in connection with the collection, transportation, treatment, and disposal of waste, or used in connection with an injection activity. There is no injection activity proposed at the subject transfer station, therefore, the related portions of 30 TAC 305.45(a)(8) are not applicable. The volume and rate of acceptance, the types of allowable wastes, the physical properties and characteristics of the allowable wastes, and the general sequence of operation of the facility are discussed in Section 2.0 Waste Acceptance Plan.

6.0 LOCATION RESTRICTIONS

In accordance with Subchapter M of Chapter 330, the applicability of location restrictions is addressed in the following sections.

6.1 Easements and Buffer Zones 30TAC330.543

No solid waste unloading, storage, or processing activity will occur within any easements, buffer zones, or right-of-way that cross the facility. There will be no solid waste disposal at the facility. As applicable, all pipeline and utility easements will be clearly marked with posts that extend at least six feet above ground level, spaced at intervals no greater than 300 feet. The easements at the facility are shown on Attachment I-4.

A minimum separating distance of 50 feet will be maintained from the solid waste processing and storage areas to the facility registration boundary.

6.2 Airport Safety 30TAC330.545

This regulatory requirement is not applicable to this registration application.

6.3 Floodplains 30TAC330.547

The property proposed for the transfer station is outside the 100-year floodplain according to the FEMA National Flood Hazard Layer FIRMette which was derived directly from the authoritative NFHL web services provided by FEMA. The map was exported on 2/2/2022 and is included as Attachment II-11. The minimum ground surface elevation of the transfer station property after development will be 46.5 feet MSL, while the bottom of the detention pond will be at Elevation 42 feet (see Attachment II-11 for finished site elevations).

6.4 Groundwater 30TAC330.549

The proposed site is not located over the recharge zone of the Edwards Aquifer; therefore, this regulatory requirement is not applicable to this registration application.

6.5 Endangered or Threatened Species 30TAC330.551

Tetra Tech conducted an endangered or threatened species study for this application. The report is presented in Attachment II-10.

6.6 Wetlands 30TAC330.553

Tetra Tech conducted a wetlands study for this application and concluded that there are no wetlands on site. The report is presented in Attachment II-10.

6.7 Fault Areas 30TAC330.555

This regulatory requirement is not applicable to this registration application. However, the Geotechnical Evaluation Report (Attachment II-9) discusses surface faulting is described in Section 4.2.1.

6.8 Seismic Impact Zones 30TAC330.557

This regulatory requirement is not applicable to this registration application. However, the Geotechnical Evaluation Report (Attachment II-9) discusses seismic design considerations is described in Section 4.2.2.

6.9 Unstable Areas 30TAC330.559

This regulatory requirement is not applicable to this registration application. However, the Geotechnical Evaluation Report (Attachment II-9) discusses subsurface conditions and presents engineering analyses and design considerations.

7.0 ATTACHMENTS TO PART I

I-1 General Location Map

I-2 TXDOT County Map

I-3 Land Ownership Map and List

I-4 Boundary Survey Drawing

I-5 Core Data Form

8.0 ATTACHMENTS TO PART II

II-1.1 General Location Map

II-1.2 Buildings Within 500 feet of Site Boundary

II-1.3 Water Wells, Oil & Gas Wells

II-2 Facility Layout Map

II-3 General Topographic Map

II-4 Aerial Photograph

II-5 Land Use Map

II-6 Zoning Map (Intentionally Blank)

II-7 Agency Letters and Responses

II-8 Transportation Study

II-9 Geotechnical Evaluation

II-10 Wetlands and Endangered Species Report

II-11 Floodplain Map

REFERENCE: TEXAS DEPARTMENT OF TRANSPORTATION, OFFICIAL TRAVEL MAP (HOUSTON, TX)

NO.	REVISION DESCRIPTION	DATE

SITE ADDRESS:
5711 NECHES ST
HOUSTON TX, 77026
LAT 29°48'43.668"N
LON -95°20'10.212"W

STATE OF TEXAS
JAMES M. NORSTROM
57016
LICENSED PROFESSIONAL ENGINEER
3/28/22

TETRA TECH, INC.
FIRM REGISTRATION NO. F-3924

TETRA TECH
1500 CityWest Blvd, Suite 1000
Houston, TX 77042
TEL 936.202.0746 FAX 713.784.2962

CITY OF HOUSTON NORTHEAST TRANSFER STATION TYPE V REGISTRATION APPLICATION

GENERAL LOCATION MAP

FIGURE I - 1

J:\HOUSTON Office Projects\Houston Transfer Station\2021 TCEQ Registration Application\CAD\SheetFiles\Figures\C-801 General Location Map.dwg

REFERENCE: TEXAS DEPARTMENT OF TRANSPORTATION, OFFICIAL TRAVEL MAP (HOUSTON, TX)

NO.	REVISION DESCRIPTION	DATE

SITE ADDRESS:
5711 NECHES ST
HOUSTON TX, 77026
LAT 29°48'43.668"N
LON -95°20'10.212"W

STATE OF TEXAS
JAMES M. NORSTROM
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TETRA TECH
1500 CityWest Blvd, Suite 1000
Houston, TX 77042
TEL 936.202.0746 FAX 713.784.2962

CITY OF HOUSTON NORTHEAST TRANSFER STATION TYPE V REGISTRATION APPLICATION

TEXAS DEPARTMENT OF TRANSPORTATION COUNTY MAP

FIGURE I - 2

J:\HOUSTON Office Projects\Houston Transfer Station\2021 TCEQ Registration Application\CAD\SheetFiles\Figures\C-802 TXDOT County Map.dwg

Attachment I–3 Land Ownership Map and List

LEGEND:

TYPE 5 REGISTRATION BOUNDARY

1/4 MILE BUFFER LINE

ADJACENT AND POTENTIALLY AFFECTED LANDOWNER PROPERTY BOUNDARIES

(115) ADJACENT LANDOWNER NUMBER

0 300 600 900

N

NOTE:

LANDOWNER LIST AND PROPERTY LINES TAKEN FROM HARRIS COUNTY APPRAISAL DISTRICT WEBSITE AS OF AUGUST 30, 2021.

LANDOWNER LIST WITH ADDRESSES ACCOMPANIES THIS MAP

STATE OF TEXAS
REGISTERED
KEVIN A OLSON
4524
PROFESSIONAL
LAND SURVEYOR
9/22/2021

TETRA TECH

Attachment____

CITY OF HOUSTON
NORTHEAST TRANSFER STATION TYPE V
REGISTRATION APPLICATION

5711 NECHES STREET
HARRIS COUNTY, TEXAS

FIRM REGISTRATION NO. 10194114

MARTIN OLSON SURVEY INC.

PROFESSIONAL SURVEYORS, BOUNDARY CONSTRUCTION & TOPOGRAPHIC SURVEYS

227 DERRICK DR.
HUMBLE, TX 77338

PH: 281-446-8899

MARTIN FILE: COH NE Transfer Station Boundary.DWG

City of Houston Northeast Transfer Station Type V Registration Application

5711 Neches Street, Houston, TX 77026

1)	TRIPLE-S STEEL SUPPLY CO	6000 JENSEN DR.	HOUSTON, TX.	77026-1113
2)	TRIPLE-S OPERATIONS LP	PO BOX 21119	HOUSTON, TX.	77226-1119
3)	UNION PACIFIC RAILROAD CO.	1400 DOUGLAS ST STOP 1640	OMAHA, NE.	68179-1001
4)	METRO TRANSIT AUTHORITY	PO BOX 61429	HOUSTON, TX.	77208-1429
5)	CARRIERE MILDRED ESTATE	2906 REID ST.	HOUSTON, TX.	77026-1237
6)	CHISM JOHN JR	2908 REID ST.	HOUSTON, TX.	77026-1237
7)	RAMIREZ ABEL & REBECCA H	2914 REID ST.	HOUSTON, TX.	77026-1237
8)	SMITH TRAVIS E	2916 REID ST.	HOUSTON, TX.	77026-1237
9)	CARTWRIGHT GLADYS LEWIS	5039 FRANCINE LN.	HOUSTON, TX.	77016-2911
10)	HENSON BETTY J	3012 REID ST.	HOUSTON, TX.	77026-1239
11)	ROLLINS DOLLIE M	3014 REID ST.	HOUSTON, TX.	77026-1239
12)	SILVA FRANCISCO	3201 KING ST.	HOUSTON, TX.	77026-1319
13)	GONZALEZ NAPOLION & MARIA I	3022 REID ST.	HOUSTON, TX.	77026-1239
14)	SMITH BEVERLY A	3026 REID ST.	HOUSTON, TX.	77026-1239
15)	GOLSTON LOU JANE	3206 REID ST.	HOUSTON TX.	77026-1326
16)	TREVINO JOSE	3208 REID ST.	HOUSTON, TX.	77026-1326
17)	GONZALES JERRY	1215 COMMON PARK DR	HOUSTON, TX.	77009-7834
18)	GRACIA ANGELICA & P SANTIAGO	3302 REID ST.	HOUSTON, TX.	77026-1328
19)	DE LEON ARMANDO & BLANCA	3304 REID ST.	HOUSTON, TX.	77026-1328
20)	DELEON ARAMANDO III	1212 SOREN LN	HOUSTON, TX.	77076-4447
21)	HERNANDEZ ELIZABETH	3316 REID ST.	HOUSTON, TX.	77026-1300

22) HADEN SANDRA	3505 REID ST.	HOUSTON, TX.	77026-1331
23) PENA RUBEN & MARIA E	3507 REID ST.	HOUSTON, TX.	77026-1331
24) FUENTES R & PENA EVELYN	3513 REID ST.	HOUSTON, TX.	77026-1331
25) SANTOS PENA & ISABEL	3611 REID ST.	HOUSTON, TX.	77026-1333
26) JOHNSON JANIE	7255 LAKEWOOD DR.	HOUSTON, TX.	77016-3418
27) MENDOZA GUADALUPE M	3602 CAPLIN ST.	HOUSTON, TX.	77026-1314
28) GARCIA GUADALUPE & MARIA C	3506 CAPLIN ST.	HOUSTON, TX.	77026-1312
29) CAMPOS FLORINDA	3510 CAPLIN ST.	HOUSTON, TX	77026-1312
30) GARCIA GUADALUPE & MARY LOU	3506 CAPLIN ST.	HOUSTON, TX.	77026-1312
31) GEE NORMA J	3406 BOSTIC ST.	HOUSTON, TX.	77093-8306
32) OGDEN JOHN SR	3404 CAPLIN ST.	HOUSTON, TX.	77026-1310
33) DELA-FUENTE JOSE A	3402 CAPLIN ST.	HOUSTON, TX.	77026-1310
34) RIVAS RAMON	3400 CAPLIN ST.	HOUSTON, TX.	77026-1310
35) PILLAI G K	10100 EAST FWY STE 203	HOUSTON, TX.	77029-1965
36) HARRIS RODESSIA SMITH	3314 CAPLIN ST.	HOUSTON, TX.	77026-1308
37) ST JULIAN KATHRYN A	3310 CAPLIN ST.	HOUSTON, TX.	77026-1308
38) RE MART INVESTMENT	PO BOX 65	BARKER, TX.	77413-0065
39) DAVIS RAYMOND ESTATE OF	3302 CAPLIN ST.	HOUSTON, TX.	77026-1308
40) GARY CLESMIE & THELMA	3214 CAPLIN ST.	HOUSTON, YX.	77026-1306
41) NEWSOME LEORNA	3210 CAPLIN ST.	HOUSTON, TX.	77026-1306
42) RIVERA J GUADALUPE M	6122 BARNSTON ST.	HOUSTON, TX.	77026-1203
43) BROWN KELVIN & JACQUELINE	3402 CAPLIN ST.	HOUSTON, TX.	77026-1310
44) FRANCO E & CHRISTINA	PO BOX 21648	HOUSTON, TX.	77226-1648

45) RODRIGUEZ RENE S	6121 BARNSTON ST.	HOUSTON, TX.	77026-1202
46) HERNANDEZ JOSE	3016 CAPLIN ST.	HOUSTON, TX.	77026-1209
47) ZAMARRIPA ERNESTINA	3108 CAPLIN ST.	HOUSTON, TX.	7026-1211
48) DELAFUETE GUADALUPE	3507 CAPLIN ST.	HOUSTON, TX.	77026-1311
49) GUERRERO VERONICA	3509 CAPLIN ST.	HOUSTON, TX.	77026-1311
50) STATE DEPT HWY & PUB TRANS	PO BOX 1386	HOUSTON, TX.	77251-1386
51) BISHOP ALFRED III	1751 MARSHALL ST.	HOUSTON, TX.	77098-2801
52) DAVILA LUIS A	3806 CAPLIN ST.	HOUSTON, TX.	77026-1404
53) RODRIIGUEZ JOSUE L TROCHEZ	3810 CAPLIN ST.	HOUSTON, TX.	77026-1404
54) CARDENAS IRMA & RAFAEL	3816 CAPLIN ST.	HOUSTON, TX.	77026-1404
55) BRIGGS EARL D	3901 REID ST.	HOUSTON, TX.	77026-1426
56) JOHNSON WARREN & JULIA	12134 COBBS CREEK RD.	HOUSTON, TX.	77067-1280
57) DIEGO RICARDO	3701 COLLINGSWORTH	HOUSTON, TX.	77026-4663
58) CURRENT OWNER	508 SIKES ST.	HOUSTON, TX.	77018-4532
59) RANDALL HARGIE L SR ESTATE	3809 REID ST.	HOUSTON, TX.	77026-1424
60) RAMIREZ MARIA JAIME	3918 PINEMONT DR.	HOUSTON, TX.	77018-1102
61) 3801 LINDER LLC	111 E JERICHO TPKE FL 2	MINEOLA, NY.	11501-3145
62) FLORES JUAN E	3810 REID ST.	HOUSTON, TX.	77026-1425
63) PEREZ FLORENTINO	11540 CHIMNEY ROCK RD. APT 215	HOUSTON, TX.	77035-2941
64) BRIGGS NARONIA & TENTHERIAL	3901 REID ST.	HOUSTON, TX.	77026-1426
65) JARMON CHARLES & DORA	3906 REID ST.	HOUSTON, TX.	77026-1427
66) BARBARA J SMITH	PO BOX 10475	HOUSTON, TX.	77026-0475
67) DAWSON DEMETRICA M	3514 BRYMOOR CT.	PEARLAND, TX.	77584-4830

68) ADUBA MOSES	4706 PENINSULA GARDEN WAY	HUMBLE, TX.	77396-3053
69) FRANCIS EMEAL ET UX	3913 LINDER ST.	HOUSTON, TX.	77026-1418
70) ARVEALO GUADALUPE R	3903 LINDER ST.	HOUSTON, TX.	77026-1418
71) MORAN TANYEL T	PO BOX 88066	HOUSTON, TX.	77288-0066
72) JOHNSON WILBERT ESTATE OF	3819 LINDER ST.	HOUSTON, TX.	77026-1416
73) ANDERSON DECEBRA	7212 DARIEN ST.	HOUSTON, TX.	77028-3132
74) ERVIN CLIFTON	3813 LINDER ST.	HOUSTON, TX.	77026-1416
75) LONG ISSAC	3809 LINDER ST.	HOUSTON, TX.	77026-1416
76) KHOIKAN VAHAK A	7108 MULLINS DR.	HOUSTON, TX.	77081-5908
77) GREATER EMMANUEL F W C	3915 KELLY ST.	HOUSTON, TX.	77026-1411
78) WILLIAMS MATTIE LEE	3910 LINDER ST.	HOUSTON, TX.	77026-1419
79) MARTINEZ THERESA	3914 LINDER ST.	HOUSTON, TX.	77026-1419
80) ROSALES MAURICIO	3918 LINDER ST.	HOUSTON, TX.	77026-1419
81) LANDIN JOSE	PO BOX 550544	HOUSTON, TX.	77255-0544
82) CRUZ ESPERANZA A	18226 SHAMAN DR.	GALVESTON, TX.	77554-6708
83) TRINITY TABERNACLE	4318 POLK AVE	HOUSTON, TX.	77023-1824
84) HOUSTON ISD	4400 W 18TH ST.	HOUSTON, TX.	77092-8501
85) BUSH LUELLA	PO BOX 22356	SEATTLE, WA.	98122-0356
86) CARR VERNON ET AL	5201 NECHES ST.	HOUSTON, TX.	77026-2507
87) GREENLOW PROPERTIES LLC	1251 S KIRKWOOD RD.	HOUSTON, TX.	77077-2602
88) N/A			
89) PV JENSEN DR. LLC	5810 S RICE AVE.	HOUSTON, TX.	77081-2912

90)	CHEATMAN B & DESMORE J	2910 FAIRBANKS ST.	HOUSTON, TX.	77026-2119
91)	EVANS JOYCE A ESTATE OF	2912 FAIRBANKS ST.	HOUSTON, TX.	77026-2119
92)	CLEAR CHANNEL OUTDOOR INC	200 E BASSE RD	SAN ANTONIO, TX.	78209-4489
93)	BURNETT LIZZIE	2915 FAIRBANKS ST.	HOUSTON, TX.	77026-2118
94)	REYES JOSE JESUS	222 REBECCA ST.	HOUSTON, TX.	77022-3125
95)	CHEATHAM ESTER RUTH	2821 FAIRBANKS ST.	HOUSTON, TX.	77026-2116
96)	VALENZUELA ALONSO	2819 FAIRBANKS ST.	HOUSTON, TX.	77026-2116
97)	CHEATHAM DOROTHY ESTATE OF	2817 FAIRBANKS ST.	HOUSTON, TX.	77026-2116
98)	GARZA JESUS A	5331 LAUREL CREEK WAY	HOUSTON, TX.	77017-6250
99)	ESCAMILLA NOLVIA	6646 RUSTY RIDGE LN.	KATY, TX.	77449-6332
100)	COX JACOB RYAN	1212 WRIGHTWOOD ST.	HOUSTON, TX.	77009-7632
101)	CHANDLER BENJAJUAIN	5505 JENSEN DR.	HOUSTON, TX.	77026-2223
102)	PATINO BERNARDO	4399 ASHLYN REBECCA DR.	SNELLVILLE, GA.	30039-2750
103)	RIVERA SERGIO	2810 WOOWARD ST.	HOUSTON, TX.	77026-2131
104)	BARNUM ZENO JR	28306 JONSPORT LN.	SPRING, TX.	77386-1845
105)	GONZALEZ SAUL	5050 YALE ST. #62	HOUSTON, TX.	77018-2225
106)	MARY DELL WYATT TRUST	2904 WOODWARD ST.	HOUSTON, TX.	77026-2133
107)	HUNTER ALICE ESTATE OF	2908 WOODWARD ST.	HOUSTON, TX.	77026-2133
108)	JONES MILTON	5602 BRACKENRIDGE ST.	HOUSTON, TX.	77026-2107
109)	SANCHEZ JUAN P	5606 BRACKENRIDGE ST.	HOUSTON, TX.	77026-2107
110)	HAYNES HAZOR	5610 BRACKENRIDGE ST.	HOUSTON, TX.	77026-2107
111)	LUMBRERAS JULIO	5708 BRACKENRIDGE ST.	HOUSTON, TX.	77026-2109
112)	SILVIA CINDY	5710 BRACKENRIDGE ST.	HOUSTON, TX.	77026-2109

113)	SLISZ ASHLEY & JOSHUA	5712 BRACKENRIDGE ST.	HOUSTON, TX.	77026-2109
114)	MOUTON PAMELA & TONY	5716 BRACKENRIDGE ST.	HOUSTON, TX.	77026-2109
115)	GARZA RAUL	5616 57 16 2814 JENSEN CRITTENDEN #1	HOUSTON, TX.	77026-
116)	ROBLES S JAIME & MARIA	5707 BRACKENRIDGE ST.	HOUSTON, TX.	77026-2108
117)	GEORGE LINBERG & LOUVENIA	5703 BRACKENRIDGE ST.	HOUSTON, TX.	77026-2108
118)	MTA PROPERTIES LLC	5606 JENSEN DR.	HOUSTON, TX.	77026-2226
119)	FELLOWSHIP CHURCH	5601 BRACKENRIDGE ST.	HOUSTON, TX.	77026-2106
120)	BELL BOBBY LEE	5505 JENSEN DR.	HOUSTON, TX.	77026-2223
121)	XIRA PROPERTIES LLC	1500 DAIRY ASHFORD RD. STE 325	HOUSTON, TX.	77077-3861
122)	ROHINI ENTERPRISES INC	5605 N SHEPHERD DR.	HOUSTON, TX.	77091-4251
123)	CURRENT OWNER	9503 STONE TERRACE CT	HOUSTON, TX.	77089-2237
124)	EMMOMNS J B ESTATE OF	2607 WILLOWYCK CIR	PEARLAND, TX.	77584-4837
125)	CITY OF HOUSTON	PO BOX 1562	HOUSTON, TX.	77251-1562
126)	JARMON ETTA LANELL	2917 REID ST.	HOUSTON, TX.	77026-1236
127)	HERRERA ROLAND	3005 REID ST.	HOUSTON, TX.	77026-1238
128)	WEST ELLA SEONIA ESTATE OF	3009 REID ST.	HOUSTON, TX.	77026-1238
129)	GUZMAN BARBARITA E & ROSA L	3013 REID ST.	HOUSTON, TX.	77026-1238
130)	GARCIA ERIC J	3017 REID ST.	HOUSTON, TX.	77026-1238
131)	GUZMAN JANIE ELIA	3021 REID ST.	HOUSTON, TX.	77026-1238
132)	GUZMAN MARIA & MARGARITA	3025 REID ST.	HOUSTON, TX.	77026
133)	SMITH JESSIE R	3201 REID ST.	HOUSTON, TX.	77026-1325
134)	JORDAN HAROLD R	3213 REID ST.	HOUSTON, TX.	77026-1325
135)	MCCANN BREDA	3209 REID ST.	HOUSTON, TX.	77026-1325

136)	DAVIS WILLIE V ESTATE OF	3301 REID ST.	HOUSTON, TX.	77026-1327
137)	PORTILLO ANGEL G	4309 OXFORD ST.	HOUSTON, TX.	77022-3952
138)	RE-MART INVESTMENTS	PO BOX 1525	HOUSTON, TX.	77251-1525
139)	PARIKH RAJ	4511 ANCHOR POINT CT.	MISSOURI CITY, TX.	77459-1614
140)	WHITE REGINA K	3317 REID ST.	HOUSTON, TX.	77026-1327
141)	WIDDOW YOLANDA M	3401 REID ST.	HOUSTON, TX.	77026-1329

Attachment I–4 Boundary Survey

STATE OF TEXAS

COUNTY OF HARRIS

WE, CITY OF HOUSTON, ACTING BY AND THROUGH SYLVESTER TURNER, MAYOR BEING OFFICER OF CITY OF HOUSTON, OWNER (OR OWNERS) HEREINAFTER REFERRED TO AS OWNERS (WHETHER ONE OR MORE) OF THE 3.2447 ACRE TRACT DESCRIBED IN THE ABOVE AND FOREGOING MAP OF NEW MULTI USE FACILITY AT NECHES STREET, DO HEREBY MAKE AND ESTABLISH SAID SUBDIVISION AND DEVELOPMENT PLAN OF SAID PROPERTY ACCORDING TO ALL LINES, DEDICATIONS, RESTRICTIONS AND NOTATIONS ON SAID MAPS OR PLAT AND HEREBY DEDICATE TO THE USE OF THE PUBLIC FOREVER, ALL STREETS (EXCEPT THOSE STREETS DESIGNATED AS PRIVATE STREETS, OR PERMANENT ACCESS EASEMENTS), ALLEYS, PARKS, WATER COURSES, DRAINS, EASEMENTS AND PUBLIC PLACES SHOWN THEREON FOR THE PURPOSES AND CONSIDERATIONS THEREIN EXPRESSED; AND DO HEREBY BIND OURSELVES, OUR HEIRS, SUCCESSORS AND ASSIGNS TO WARRANT AND FOREVER DEFEND THE TITLE ON THE LAND SO DEDICATED.

FURTHER, OWNERS HAVE DEDICATED AND BY THESE PRESENTS DO DEDICATE TO THE USE OF PUBLIC FOR PUBLIC UTILITY PURPOSES FOREVER UNOBSTRUCTED AERIAL EASEMENTS. THE AERIAL EASEMENTS SHALL EXTEND HORIZONTALLY AN ADDITIONAL ELEVEN FEET, SIX INCHES (11'6") FOR TEN FEET (10'0") PERIMETER GROUND EASEMENTS OR SEVEN FEET INCHES (7'6") FOR FOURTEEN FEET (14'0") PERIMETER GROUND EASEMENTS OR FIVE FEET, SIX INCHES (5'6") FOR SIXTEEN FEET (16'0") PERIMETER GROUND EASEMENTS, FROM A PLANE SIXTEEN FEET (16'0") ABOVE GROUND LEVEL UPWARD, LOCATED ADJACENT TO AND ADJOINING SAID PUBLIC UTILITY EASEMENTS THAT ARE DESIGNED WITH AERIAL EASEMENTS (U.E. AND A.E.) AS INDICATED AND DEPICTED, HEREON, WHEREBY THE AERIAL EASEMENTS TOTALS TWENTY ONE FEET, SIZE INCHES (21' 6") IN WIDTH.

FURTHER, OWNERS HAVE DEDICATED AND BY THESE PRESENTS DO DEDICATE TO THE USE OF THE PUBLIC FOR PUBLIC UTILITY PURPOSE FOREVER UNOBSTRUCTED AERIAL EASEMENTS. THE AERIAL EASEMENTS SHALL EXTEND HORIZONTALLY AN ADDITIONAL TEN FEET (10'0") FOR TEN FEET (10'0") BACK-TO-BACK GROUND EASEMENTS, OR EIGHT FEET (8'0") FOR FOURTEEN FEET (14'0") BACK-TO-BACK GROUND EASEMENTS OR SEVEN FEET (7'0") FOR SIXTEEN FEET (16'0") BACK-TO-BACK GROUND EASEMENTS, FROM A PLANE SIXTEEN FEET (16'0") ABOVE GROUND LEVEL UPWARD, LOCATED ADJACENT TO BOTH SIDES AND ADJOINING SAID PUBLIC UTILITY EASEMENTS THAT ARE DESIGNED WITH AERIAL EASEMENTS (U.E. AND A.E.) AS INDICATED AND DEPICTED HERON, WHEREBY THE AERIAL EASEMENTS TOTALS THIRTY FEET (30'0") IN WIDTH.

FURTHER, OWNERS DO HEREBY COVENANT AND AGREE THAT ALL THE PROPERTY WITHIN THE BOUNDARIES OF THIS PLAT IS HEREBY RESTRICTED TO PREVENT THE DRAINAGE OF ANY SEPTIC TANKS INTO ANY PUBLIC OR PRIVATE STREET, PERMANENT ACCESS EASEMENTS, ROAD OR ALLEY OR ANY DRAINAGE DITCH, EITHER DIRECTLY OR INDIRECTLY.

FURTHER, OWNERS DO HEREBY DEDICATE TO THE PUBLIC STRIP OF LAND FIFTEEN (15' 0") FEET WIDE ON EACH SIDE OF THE CENTER LINE OF ANY AND ALL BAYOUS, CREEKS, GULLIES, RAVINES, DRAWS, SLOUGHS, OR OTHER NATURAL DRAINAGE COURSES LOCATED IN SAID PLAT, AS EASEMENTS FOR DRAINAGE PURPOSES, GIVING THE CITY OF HOUSTON, HARRIS COUNTY, OR ANY OTHER GOVERNMENTAL AGENCY, THE RIGHT TO ENTER UPON SAID EASEMENTS AT ANY TIMES FOR THE PURPOSE OF CONSTRUCTION AND MAINTENANCE OF DRAINAGE FACILITIES AND STRUCTURES.

FURTHER, OWNERS DO HEREBY COVENANT AND AGREE THAT ALL OF THE PROPERTY WITHIN THE BOUNDARIES OF THIS PLAT AND ADJACENT TO ANY DRAINAGE EASEMENT, DITCH, GULLY, CREEK OR NATURAL DRAINAGE IS HEREBY RESTRICTED TO KEEP SUCH DRAINAGE WAYS AND EASEMENTS CLEAR OF FENCES, BUILDINGS, PLANTING AND OTHER OBSTRUCTIONS TO THE OPERATIONS AND MAINTENANCE OF THE DRAINAGE FACILITY AND THAT SUCH ABUTTING PROPERTY SHALL NOT BE PERMITTED TO DRAIN DIRECTLY INTO THIS EASEMENTS EXCEPT BY MEANS OF AN APPROVED DRAINAGE STRUCTURE.

FURTHER, OWNERS DO HEREBY CERTIFY THAT THIS REPLAT DOES NOT ATTEMPT TO ALTER, AMEND, OR REMOVE AN COVENANTS OR RESTRICTIONS; WE FURTHER CERTIFY THAT NO PORTION OF THE PRECEDING PLAT WAS LIMITED BY DEED RESTRICTION TO RESIDENTIAL USE FOR MORE THAN TWO (2) RESIDENTIAL UNITS PER LOT.

IN TESTIMONY, WHEREOF, CITY OF HOUSTON HAS CAUSED THESE PRESENTS TO BE SIGNED BY SYLVESTER TURNER, IT'S MAYOR THIS _____, DAY OF_____, 2021.

CITY OF HOUSTON

BY: _____

NAME: SYLVESTER TURNER

TITLE: MAYOR

STATE OF TEXAS

COUNTY OF HARRIS

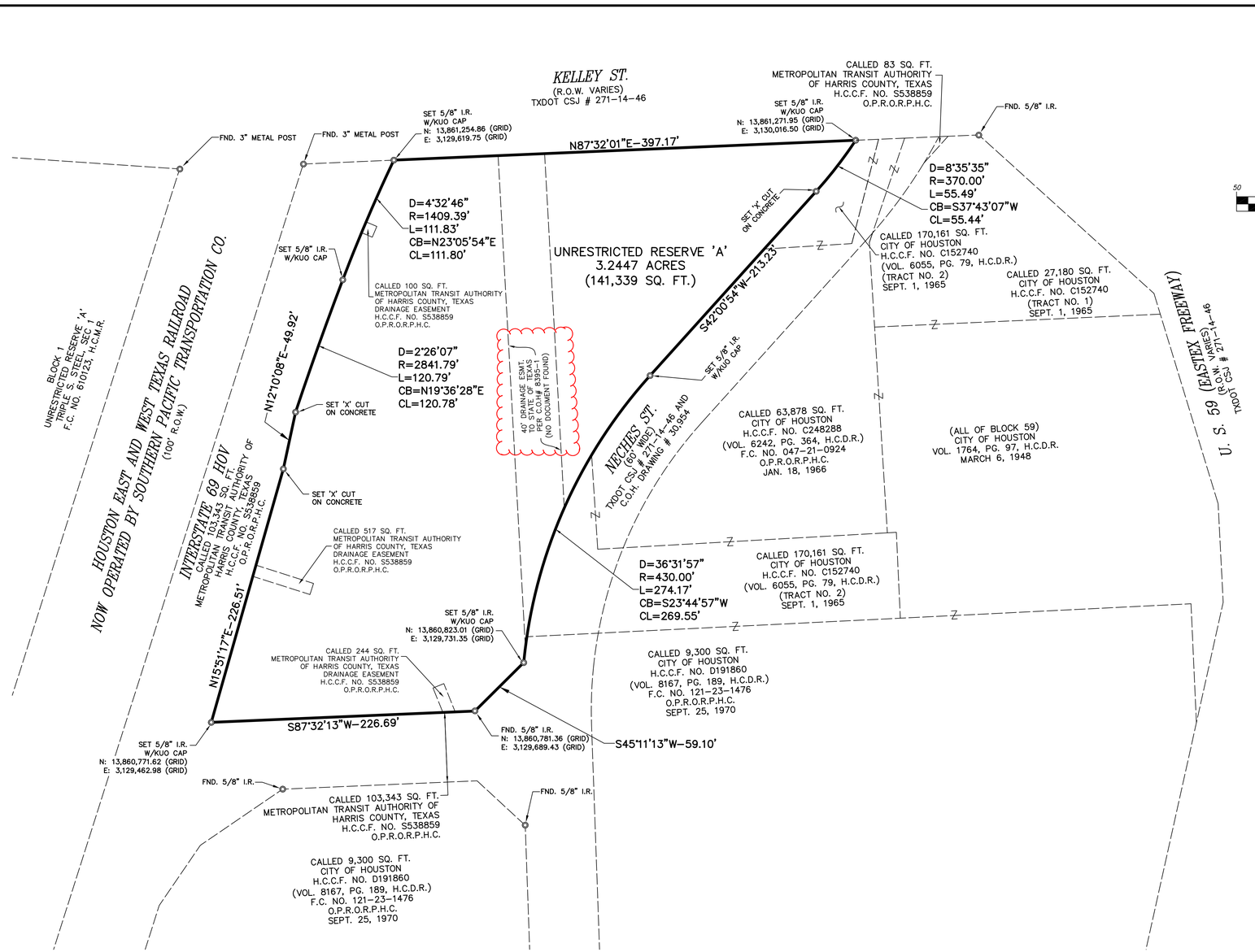
BEFORE ME, THE UNDERSIGNED AUTHORITY, ON THIS DAY PERSONALLY APPEARED SYLVESTER TURNER, MAYOR OF THE CITY OF HOUSTON, KNOWN TO ME TO BE THE PERSON(S) WHOSE NAME(S) IS SUBSCRIBED TO THE FOREGOING INSTRUMENT AND ACKNOWLEDGED TO ME THAT THEY EXECUTED THE SAME FOR THE PURPOSES AND CONSIDERATIONS THEREIN EXPRESSED (ADD FOR CORPORATIONS, "AND IN THE CAPACITY THEREIN AND HEREIN STATED, AND AS THE ACT AND DEED OF SAID COOPERATION".)

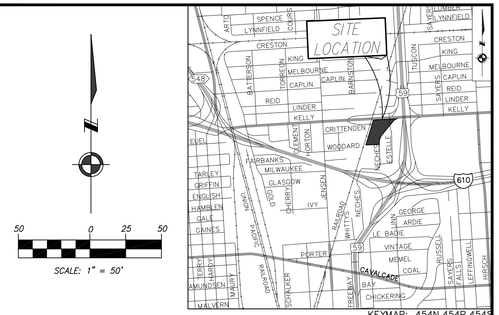
GIVEN UNDER MY HAND AND SEAL OF OFFICE, THIS _____ DAY OF _____, 2021.

_____
NOTARY PUBLIC IN AND FOR THE STATE OF TEXAS

NAME: _____

MY COMMISSION EXPIRES: _____





VICINITY MAP
N.T.S.

KEYMAP: 454N,454P,454S

NOTES:

1. ALL BEARINGS AND DISTANCES ARE BASED ON TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NAD83 (CORS96). ALL DISTANCES ARE IN SURFACE.

2. THE COORDINATES SHOWN HEREON ARE TEXAS SOUTH CENTRAL ZONE NO. 4204 STATE PLANE GRID COORDINATES (NAD83) AND MAY BE BROUGHT TO SURFACE BY DIVIDING BY THE COMBINED SCALE FACTOR 0.999870017.

3. UNLESS OTHERWISE INDICATED, THE BUILDING LINES, WHETHER ONE OR MORE, SHOWN ON THIS SUBDIVISION PLAT ARE ESTABLISHED TO EVIDENCE COMPLIANCE WITH THE APPLICABLE PROVISIONS OF CHAPTER 42, CODE OF ORDINANCES, CITY OF HOUSTON, TEXAS, IN EFFECT AT THE TIME THIS PLAT WAS APPROVED, WHICH MAY BE AMENDED FROM TIME TO TIME.

4. IF THIS PLAT IS PROPOSED TO BE MULTI-FAMILY RESIDENTIAL, IT IS SUBJECT TO THE PARKS AND OPEN SPACE REQUIREMENTS OF 42-251. A FEE PER UNIT WILL BE ASSESSED AT THE TIME OF PERMITTING AT THE THEN-CURRENT FEE RATE. IF A PRIVATE PARK IS TO BE PROPOSED OR PUBLIC PARK LAND IS TO BE DEDICATED, PARK LAND RESERVES OR LAND DEDICATION MUST BE SHOWN ON THE FACE OF PLAT AT THIS TIME.

5. ABSENT WRITTEN AUTHORIZATION BY THE AFFECTED UTILITIES, ALL UTILITY AND AERIAL EASEMENTS MUST BE KEPT UNOBSTRUCTED FROM ANY NON-UTILITY IMPROVEMENTS OR OBSTRUCTIONS BY THE PROPERTY OWNER. ANY UNAUTHORIZED IMPROVEMENTS OR OBSTRUCTIONS MAY BE REMOVED BY ANY PUBLIC UTILITY AT THE PROPERTY OWNER'S EXPENSE. WHILE WOODEN POSTS AND PANELED WOODEN FENCES ALONG THE PERIMETER AND BACK TO BACK EASEMENTS AND ALONGSIDE REAR LOTS LINES ARE PERMITTED, THEY TOO MAY BE REMOVED BY PUBLIC UTILITIES AT THE PROPERTY OWNER'S EXPENSE SHOULD THEY BE AN OBSTRUCTION. PUBLIC UTILITIES MAY PUT SAID WOODEN POSTS AND PANELED WOODEN FENCES BACK UP, BUT GENERALLY WILL NOT REPLACE WITH NEW FENCING.

6. THE SUBJECT TRACT IS LOCATED IN PARK SECTOR 2.

SURVEYOR'S CERTIFICATION:

I, SHAHEEN CHOWDHURY, AM AUTHORIZED (OR REGISTERED) UNDER THE LAWS OF THE STATE OF TEXAS TO PRACTICE THE PROFESSION OF SURVEYING AND HEREBY CERTIFY THAT THE ABOVE SUBDIVISION IS TRUE AND ACCURATE; WAS PREPARED FROM AN ACTUAL SURVEY OF THE PROPERTY MADE UNDER MY SUPERVISION ON THE GROUND; THAT, EXCEPT AS SHOWN ALL BOUNDARY CORNERS, ANGLE POINTS, POINTS OF CURVATURE AND OTHER POINTS OF REFERENCE HAVE BEEN MARKED WITH IRON (OR OTHER OBJECTS OF A PERMANENT NATURE) PIPES OR RODS HAVING AN OUTSIDE DIAMETER OF NOT LESS THAN FIVE EIGHTHS (5/8) INCH AND A LENGTH OF NOT LESS THAN THREE (3) FEET; AND THAT THE PLAT BOUNDARY CORNERS HAVE BEEN TIED TO THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE.

_____
SHAHEEN CHOWDHURY, R.P.L.S.
TEXAS REGISTRATION NO. 5858

STATE OF TEXAS · REGISTERED · SHAHEEN CHOWDHURY · 5858 · PROFESSIONAL · LAND SURVEYOR

THIS IS TO CERTIFY THAT THE PLANNING COMMISSION OF THE CITY OF HOUSTON, TEXAS, HAS APPROVED THIS PLAT AND SUBDIVISION OF NEW MULTI USE FACILITY AT NECHES STREET IN CONFORMANCE WITH THE LAWS OF THE STATE OF TEXAS AND THE ORDINANCES OF THE CITY OF HOUSTON AS SHOWN HEREON AND AUTHORIZED THE RECORDING OF THIS PLAT THIS _____, DAY OF _____, 2021.

BY: _____
MARTHA L. STEIN, CHAIR
OR
M. SONNY GARZA, VICE CHAIR

BY: _____
MARGARET WALLACE BROWN, AICP, CNU-A

I, TENESHIA HUDSPETH, COUNTY CLERK OF HARRIS COUNTY, DO HEREBY CERTIFY THAT THE WITHIN INSTRUMENT WITH ITS CERTIFICATE OF AUTHENTICATION WAS FILED FOR REGISTRATION IN MY OFFICE ON_____, 2021, AT_____O'CLOCK __M., AND DULY RECORDED ON _____, 2021, AT _____O'CLOCK __M., AND AT FILM CODE NO._____ OF THE MAP RECORDS OF HARRIS COUNTY FOR SAID COUNTY.

WITNESS MY HAND AND SEAL OF OFFICE, AT HOUSTON, THE DAY AND DATE LAST ABOVE WRITTEN.

_____
TENESHIA HUDSPETH
COUNTY CLERK
OF HARRIS COUNTY, TEXAS

BY_____
DEPUTY

ABBREVIATIONS

A.E.-AERIAL EASEMENT
ESMT.-EASEMENT
B.L.-BUILDING LINE
DR.-DRIVE
FND.-FOUND
F.C. NO.-FILM CODE NUMBER
H.C.C.F. NO.-HARRIS COUNTY CLERK'S FILE NUMBER
H.C.D.R.-HARRIS COUNTY DEED RECORDS
H.C.M.R.-HARRIS COUNTY MAP RECORDS
O.P.R.O.R.P.H.C.-OFFICIAL PUBLIC RECORDS OF REAL PROPERTY HARRIS COUNTY
I.P.-IRON PIPE
I.R.-IRON ROD
RD.-ROAD
R.O.W.-RIGHT OF WAY
P.O.B.-POINT OF BEGINNING
P.O.C.-POINT OF COMMENCING
S.S.E.-SANITARY SEWER EASEMENT
STM. S.E.-STORM SEWER EASEMENT
U.E.-UTILITY EASEMENT
VOL., PG.-VOLUME AND PAGE
W.L.E.-WATER LINE EASEMENT

NEW MULTI USE FACILITY AT NECHES STREET

BEING A SUBDIVISION OF A
3.2447 ACRES (141,339 SQ. FT.)
SITUATED IN THE
J. S. COLLINS SURVEY, A-195
HARRIS COUNTY, TEXAS

1 BLOCK 1 RESERVE

KUO JOB NO. 21043

OWNER:
CITY OF HOUSTON

ENGINEER/SURVEYOR:

KUO & associates, Inc.
Consulting Engineers & Surveyors
10300 Westoffice Drive., Suite 800
Houston, TX 77042
Tel: (713) 975-8769
Fax: (713) 975-0920
www.kuoassosciates.com
Engineering Firm Registration No. F-4578
Survey Firm Registration No. 1007560

Attachment I–5 Core Data Form

TCEQ Core Data Form

TCEQ Use Only

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

SECTION I: General Information

1. Reason for Submission *(If other is checked please describe in space provided.)*

☒ New Permit, Registration or Authorization *(Core Data Form should be submitted with the program application.)*

☐ Renewal *(Core Data Form should be submitted with the renewal form)* ☐ Other

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number *(if issued)*
CN 600128995		RN

SECTION II: Customer Information

4. General Customer Information | **5. Effective Date for Customer Information Updates** (mm/dd/yyyy)

☐ New Customer ☒ Update to Customer Information ☐ Change in Regulated Entity Ownership

☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)* *If new Customer, enter previous Customer below:*

City of Houston

7. TX SOS/CPA Filing Number	8. TX State Tax ID (11 digits)	9. Federal Tax ID (9 digits)	10. DUNS Number *(if applicable)*

11. Type of Customer: ☐ Corporation ☐ Individual Partnership: ☐ General ☐ Limited

Government: ☒ City ☐ County ☐ Federal ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees ☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☒ 501 and higher

13. Independently Owned and Operated? ☐ Yes ☒ No

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☐ Owner ☐ Operator ☒ Owner & Operator

☐ Occupational Licensee ☐ Responsible Party ☐ Voluntary Cleanup Applicant ☐ Other:

15. Mailing Address:								
	611 Walker Street							
	12th Floor							
	City	Houston	State	TX	ZIP	77002	ZIP + 4	

16. Country Mailing Information *(if outside USA)*	17. E-Mail Address *(if applicable)*

18. Telephone Number	19. Extension or Code	20. Fax Number *(if applicable)*
(832) 393-0462		(713) 837-9243

SECTION III: Regulated Entity Information

21. General Regulated Entity Information *(If 'New Regulated Entity" is selected below this form should be accompanied by a permit application)*

☒ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated in order to meet TCEQ Agency Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name *(Enter name of the site where the regulated action is taking place.)*

Northeast Transfer Station

23. Street Address of the Regulated Entity: *(No PO Boxes)*	5711 Neches Street							
	City	Houston	**State**	TX	**ZIP**	77026	**ZIP + 4**	
24. County	Harris							

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:					
26. Nearest City			**State**		**Nearest ZIP Code**

27. Latitude (N) In Decimal:	29.811881		**28. Longitude (W) In Decimal:**	-95.337474	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	48	42.771	95	20	14.9064

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
4953		495302	

33. What is the Primary Business of this entity? *(Do not repeat the SIC or NAICS description.)*

City of Houston, Solid Waste Management Department

34. Mailing Address:	**611 Walker Street**							
	12th Floor							
	City	**Houston**	**State**	**TX**	**ZIP**	**77002**	**ZIP + 4**	
35. E-Mail Address:	**helvia.quinones@houstontx.gov**							

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(832) 393-462		**(713) 837-9243**

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☐ Edwards Aquifer	☐ Emissions Inventory Air	☐ Industrial Hazardous Waste
☒ Municipal Solid Waste	☐ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☐ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
☐ Voluntary Cleanup	☐ Waste Water	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

SECTION IV: Preparer Information

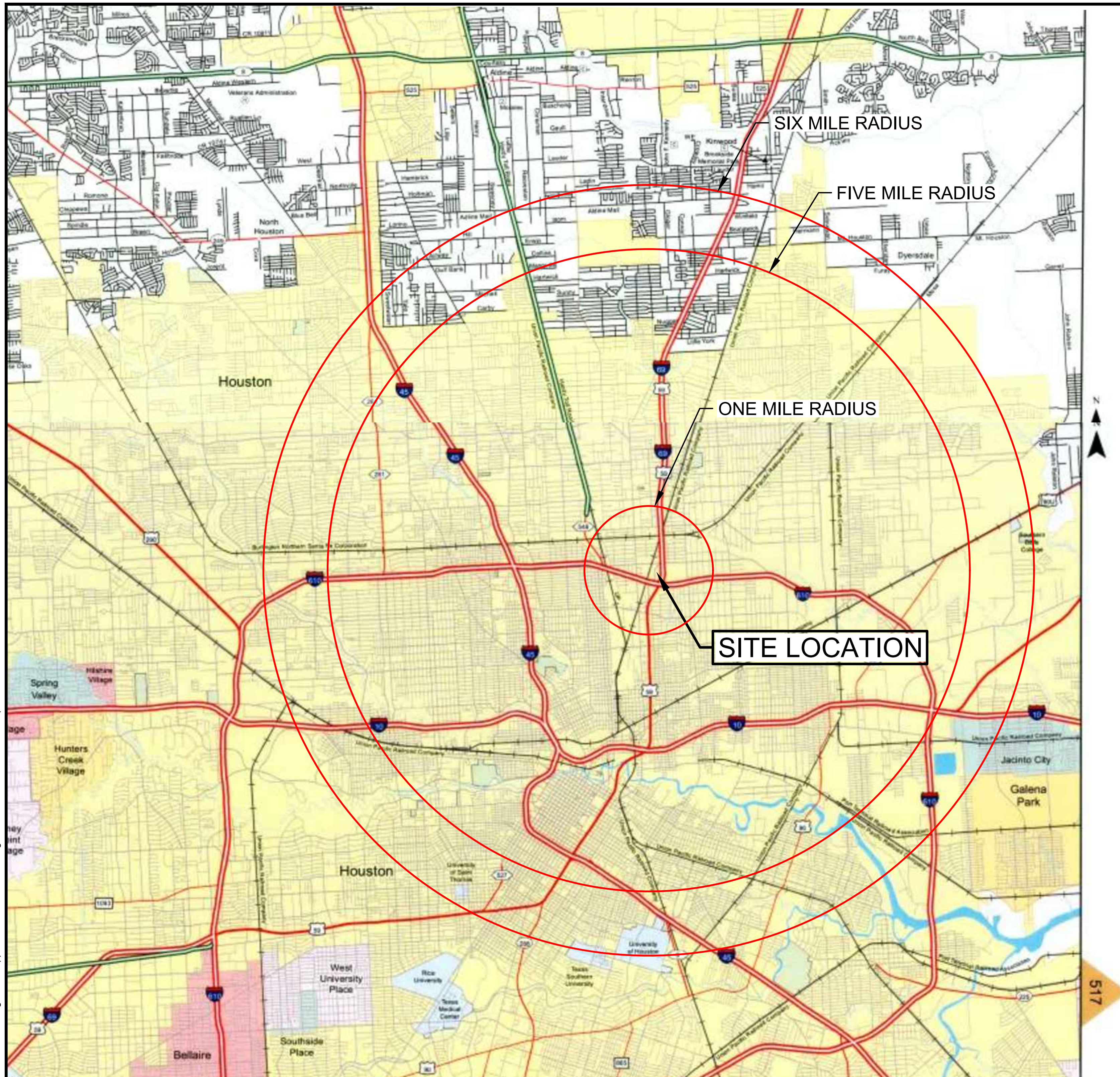
40. Name:	Jim Norstrom	**41. Title:**	Senior Project Manager

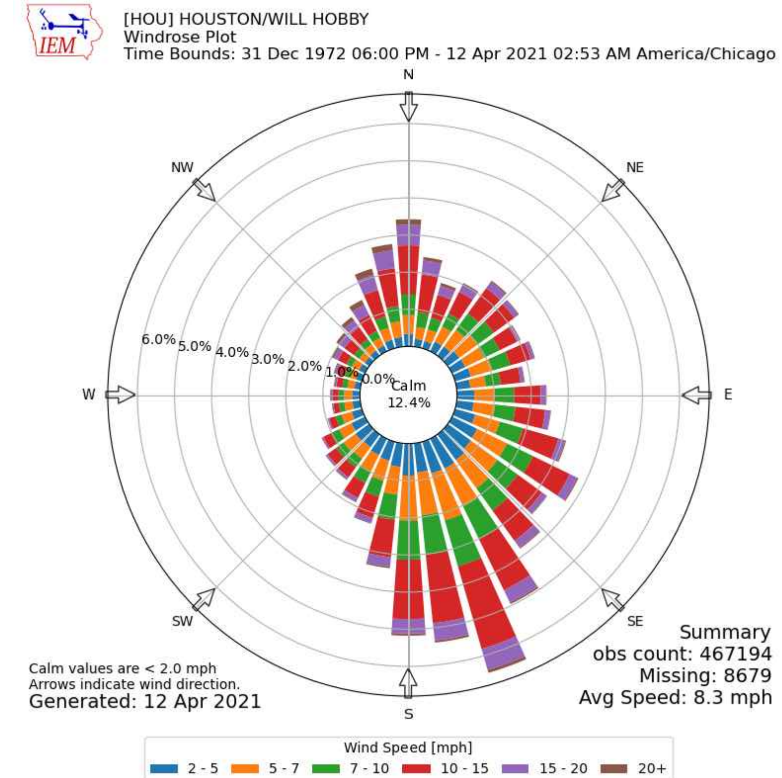
42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(936) 202-0746		( ) -	jim.norstrom@tetratech.com

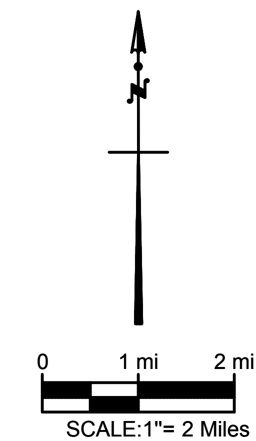
SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	City of Houston	**Job Title:**	GIS Manager, Director's Office, Solid Waste Mgt.
Name *(In Print):*	Helvia L. Quinones	**Phone:**	(832) 393- **0462**
Signature:		**Date:**	3 - 8 - 22







LEGEND

ONE MILE RADIUS

Legend

- IH, BI
- US, BU, UA, UP
- SH, BS
- SL, SS, PR
- FM, BF, RM, RR, RE, RS, PA
- Tollroad
- County Road
- City Street or other Non-County Maintained Road
- Railroad
- County Line
- River
- Flowing Stream
- Intermittent Stream
- Canal
- Gulf Intracoastal Waterway
- Body of Water
- Dam
- Airport
- Airport
- Airport Runway
- Cemetery
- Campground
- Park or Protected Land
- School
- Military Installation
- Prison
- Incorporated City
- Unincorporated Community

NOTES:

1. THE NEAREST AIRPORT is Houston Hobby (HOU) which is 11 miles to the SSE.
2. THERE ARE NO ARCHEOLOGICAL, HISTORIC, OR EXCEPTIONAL AESTHIC SITES ADJACENT TO THE FACILITY.

REFERENCE: TEXAS DEPARTMENT OF TRANSPORTATION, OFFICIAL TRAVEL MAP - HOUSTON, TX (2014)

STATE OF TEXAS
JAMES M. NORSTROM
57016
LICENSED
PROFESSIONAL ENGINEER
3/28/22

TETRA TECH, INC.
FIRM REGISTRATION NO. F-3924

TETRA TECH
1500 CityWest Blvd, Suite 1000
Houston, TX 77042
TEL 936.202.0746 & 832.251.5160

AGENCY NAME

DESIGNED BY :	-
DRAWN BY :	A.K.
CHECKED BY :	V.Y.
APPROVED BY :	J.N.
DATE:	09-2021
PROJ. NO.:	2021-0080

CITY OF HOUSTON NORTHEAST TRANSFER STATION
TYPE V REGISTRATION APPLICATION

GENERAL LOCATION MAP

FIGURE II - 1.1

J:\HOUSTON Office Projects\Houston Transfer Station\2021 TCEQ Registration Application\CAD\SheetFiles\Figures\C-805 General Location Map

N

0 250 500

SCALE:1"= 500'

LEGEND

APPROXIMATE PROPERTY BOUNDARY

500 FEET FROM LANDFILL MINING SITE BOUNDAEY

REFERENCE: GOOGLE EARTH AERIAL IMAGE,

STATE OF TEXAS
JAMES M. NORSTROM
57016
LICENSED PROFESSIONAL ENGINEER

3/28/22

TETRA TECH, INC.
FIRM REGISTRATION NO. F-3924

TETRA TECH
1500 CityWest Blvd, Suite 1000
Houston, TX 77042
TEL 936.202.0746 & 832.251.5160

AGENCY NAME

DESIGNED BY : -
DRAWN BY : A.K.
CHECKED BY : V.Y.
APPROVED BY : J.N.

DATE: 09-2021
PROJ. NO.: 2021-0080

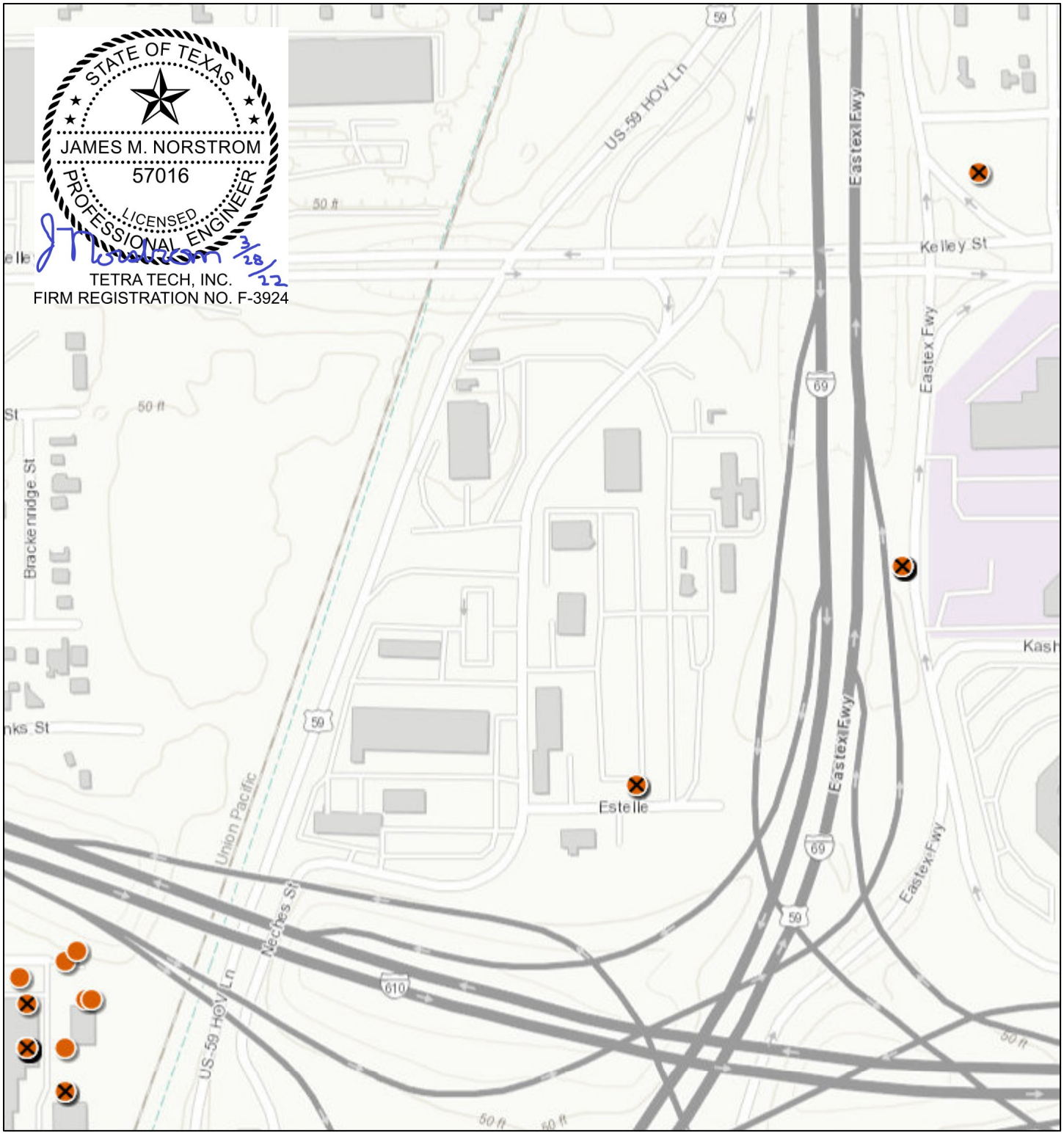
CITY OF HOUSTON NORTHEAST TRANSFER STATION
TYPE V REGISTRATION APPLICATION

BUILDINGS WITHIN 500 FEET OF SITE BOUNDARY

FIGURE II - 1.2

J:\HOUSTON Office Projects\Houston Transfer Station\2021 TCEQ Registration Application\CAD\SheetFiles\Figures\C-806 Buildings Within 500 Ft Of Site Boundary

5711 Neches Street Water Well Map



Texas Water Development Board

August 16, 2021

0 0.0375 0.075 0.15 mi

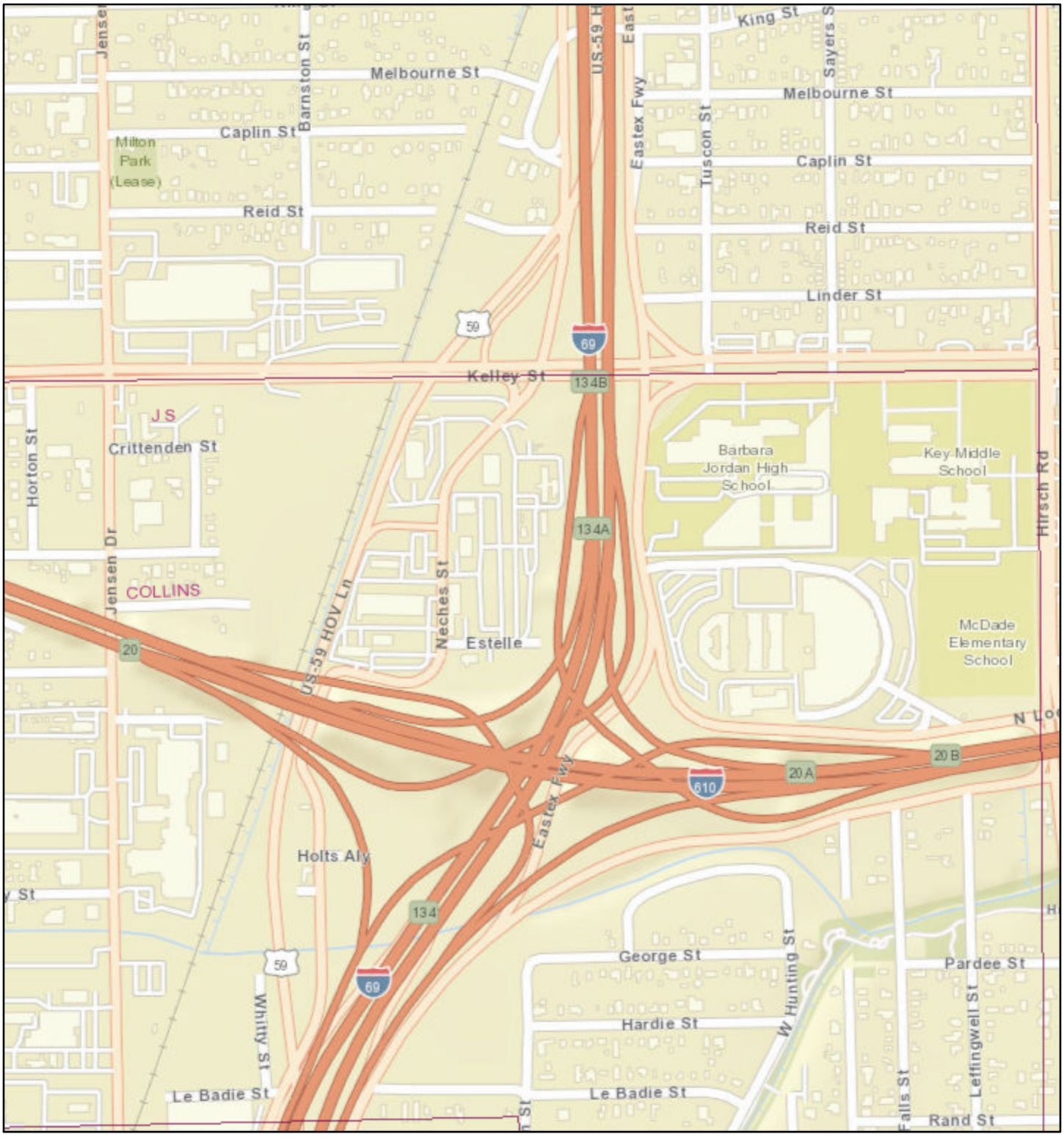
0 0.05 0.1 0.2 km

1:4,514

Plugging Reports Well Reports

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Attachment II-1.3 Water, Oil, & Gas Wells



August 16, 2021

1:9,028

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

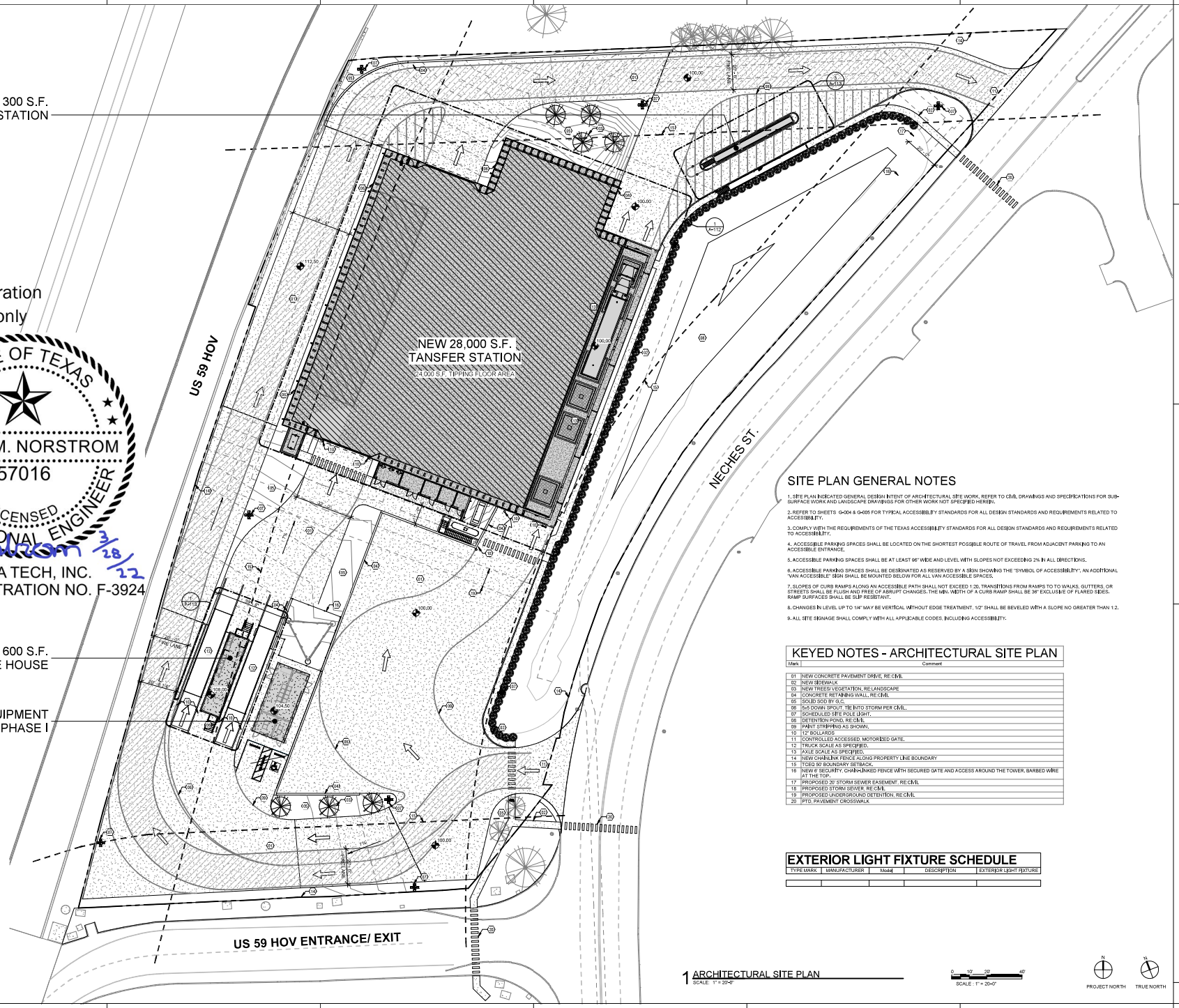
STATE OF TEXAS
JAMES M. NORSTROM
57016
LICENSED PROFESSIONAL ENGINEER

3/28/22

TETRA TECH, INC.
FIRM REGISTRATION NO. F-3924

Attachment II-1.3 Water, Oil, & Gas Wells

Attachment II–2 Facility Layout Map



For Registration purposes only

STATE OF TEXAS
JAMES M. NORSTROM
57016
LICENSED PROFESSIONAL ENGINEER

3/28/22

TETRA TECH, INC.
FIRM REGISTRATION NO. F-3924

SITE PLAN GENERAL NOTES

1. SITE PLAN INDICATED GENERAL DESIGN INTENT OF ARCHITECTURAL SITE WORK. REFER TO CIVIL DRAWINGS AND SPECIFICATIONS FOR SUB-SURFACE WORK AND LANDSCAPE DRAWINGS FOR OTHER WORK NOT SPECIFIED HEREIN.
2. REFER TO SHEETS G-004 & G-005 FOR TYPICAL ACCESSIBILITY STANDARDS FOR ALL DESIGN STANDARDS AND REQUIREMENTS RELATED TO ACCESSIBILITY.
3. COMPLY WITH THE REQUIREMENTS OF THE TEXAS ACCESSIBILITY STANDARDS FOR ALL DESIGN STANDARDS AND REQUIREMENTS RELATED TO ACCESSIBILITY.
4. ACCESSIBLE PARKING SPACES SHALL BE LOCATED ON THE SHORTEST POSSIBLE ROUTE OF TRAVEL FROM ADJACENT PARKING TO AN ACCESSIBLE ENTRANCE.
5. ACCESSIBLE PARKING SPACES SHALL BE AT LEAST 96" WIDE AND LEVEL WITH SLOPES NOT EXCEEDING 2% IN ALL DIRECTIONS.
6. ACCESSIBLE PARKING SPACES SHALL BE DESIGNATED AS RESERVED BY A SIGN SHOWING THE "SYMBOL OF ACCESSIBILITY". AN ADDITIONAL "VAN ACCESSIBLE" SIGN SHALL BE MOUNTED BELOW FOR ALL VAN ACCESSIBLE SPACES.
7. SLOPES OF CURB RAMPS ALONG AN ACCESSIBLE PATH SHALL NOT EXCEED 1:20. TRANSITIONS FROM RAMPS TO TO WALKS, GUTTERS, OR STREETS SHALL BE FLUSH AND FREE OF ABRUPT CHANGES. THE MIN. WIDTH OF A CURB RAMP SHALL BE 36" EXCLUSIVE OF FLARED SIDES. RAMP SURFACES SHALL BE SLIP RESISTANT.
8. CHANGES IN LEVEL UP TO 1/4" MAY BE VERTICAL WITHOUT EDGE TREATMENT, 1/2" SHALL BE BEVELED WITH A SLOPE NO GREATER THAN 1:2.
9. ALL SITE SIGNAGE SHALL COMPLY WITH ALL APPLICABLE CODES, INCLUDING ACCESSIBILITY.

KEYED NOTES - ARCHITECTURAL SITE PLAN

Mark	Comment
01	NEW CONCRETE PAVEMENT DRIVE, RE:CIVIL
02	NEW SIDEWALK
03	NEW TREES/ VEGETATION, RE:LANDSCAPE
04	CONCRETE RETAINING WALL, RE:CIVIL
05	SOLID SOD BY G.C.
06	5x5 DOWN SPOUT, TIE INTO STORM PER CIVIL.
07	SCHEDULED SITE POLE LIGHT.
08	DETENTION POND, RE:CIVIL
09	PAINT STRIPPING AS SHOWN.
10	12" BOLLARDS
11	CONTROLLED ACCESSED, MOTORIZED GATE.
12	TRUCK SCALE AS SPECIFIED.
13	AXLE SCALE AS SPECIFIED.
14	NEW CHAIN-LINK FENCE ALONG PROPERTY LINE BOUNDARY
15	TCEQ 50' BOUNDARY SETBACK.
16	NEW 8' SECURITY, CHAIN-LINKED FENCE WITH SECURED GATE AND ACCESS AROUND THE TOWER, BARBED WIRE AT THE TOP.
17	PROPOSED 20' STORM SEWER EASEMENT, RE:CIVIL
18	PROPOSED STORM SEWER, RE:CIVIL
19	PROPOSED UNDERGROUND DETENTION, RE:CIVIL
20	PTD. PAVEMENT CROSSWALK

EXTERIOR LIGHT FIXTURE SCHEDULE

TYPE MARK	MANUFACTURER	Model	DESCRIPTION	EXTERIOR LIGHT FIXTURE

1 ARCHITECTURAL SITE PLAN
SCALE: 1" = 20'-0"

SCALE : 1" = 20'-0"

PROJECT NORTH | TRUE NORTH

ISSUE LOG

DATE	DESCRIPTION
02.17.2022	ISSUE FOR DESIGN DEVELOPMENT

REVISION LOG

NO	DATE	DESCRIPTION

CONSULTANTS:

RDLR ARCHITECTS, INC.
800 Sampson Street #104
Houston, TX 77003
713.868.3121

TETRA TECH
1500 CityWest Boulevard, Suite 1000
Houston, TX 77042
832-251-5160

INFRASTRUCTURE ASSOCIATES
6117 RICHMOND AVE. #200
Houston, TX 77057
713.622.0120

PGA ENGINEERS
3838 N Sam Houston Pkwy E
Houston, TX 77032
346.570.2418

ASAKURA ROBINSON
2500 Summer St #3228
Houston, TX 77007
713.337.5830

DALLY + ASSOCIATES, INC.
9800 Richmond Ave #460
Houston, TX 77042
713.337.8681

SEALS:

THIS DOCUMENT IS RELEASED FOR INTERIM REVIEW PURPOSES ONLY. IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING, OR PERMITTING.

AUTHORIZED: DANIEL ORTIZ, AIA
LICENSE NUMBER: 25004
DATE: 3/9/2022 10:20:01 AM

PROJECT NAME:
NEW MULTI-USE SWMD FACILITY
5711 NECHES ST.
HOUSTON, TX 77026

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

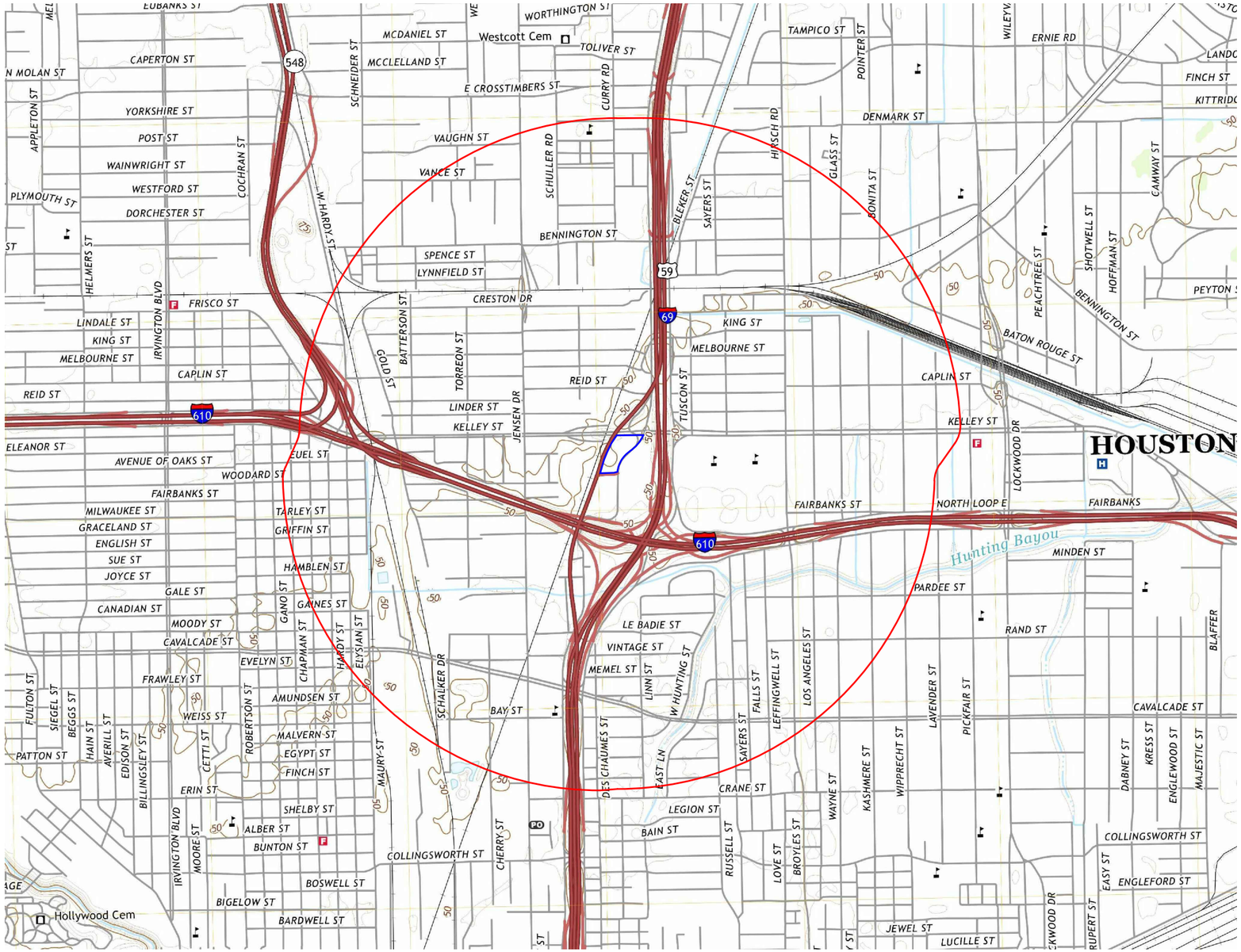
DATE: XX.XX.XX
WBS NO.:
SCALE:
DRAWN BY:
CHECKED BY:

SHEET TITLE:
PHASE II - ARCHITECTURAL SITE PLAN

SHEET NO.:
A-012

CITY DWG NO.:

Attachment II-2



0 1000 2000

SCALE:1"= 2000'

LEGEND

APPROXIMATE PROPERTY BOUNDARY

ONE MILE RADIUS

ROAD CLASSIFICATION

Expressway	Local Connector
Secondary Hwy	Local Road
Ramp	4WD
Interstate Route	US Route
State Route	

Produced by the United States Geological Survey

North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 15R

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, September 2016 - November 2016
Roads..... U.S. Census Bureau, 2015
Names.....GNIS, 1979 - 2018
Hydrography.....National Hydrography Dataset, 2002
Contours.....National Elevation Dataset, 2010
Boundaries.....Multiple sources; see metadata file 2016 - 2017

Wetlands.....FWS National Wetlands Inventory 1993 - 2006

MN
GN
2°17′
41 MILS
1°9′
20 MILS

UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000 - m Square ID
TP
TN
Grid Zone Designation 15R

Note: All potential access highways and streets within one mile have concrete or asphalt surfaces.

REFERENCE: U.S. DEPARTMENT OF THE INTERIOR USGS - HOUSTON, TX, 7.5 MINUTE QUADRANGLE MAP (2019)

STATE OF TEXAS
JAMES M. NORSTROM
57016
LICENSED PROFESSIONAL ENGINEER
3/28/22
TETRA TECH, INC.
FIRM REGISTRATION NO. F-3924

TETRA TECH
1500 CityWest Blvd, Suite 1000
Houston, TX 77042
TEL 936.202.0746 & 832.251.5160

AGENCY NAME

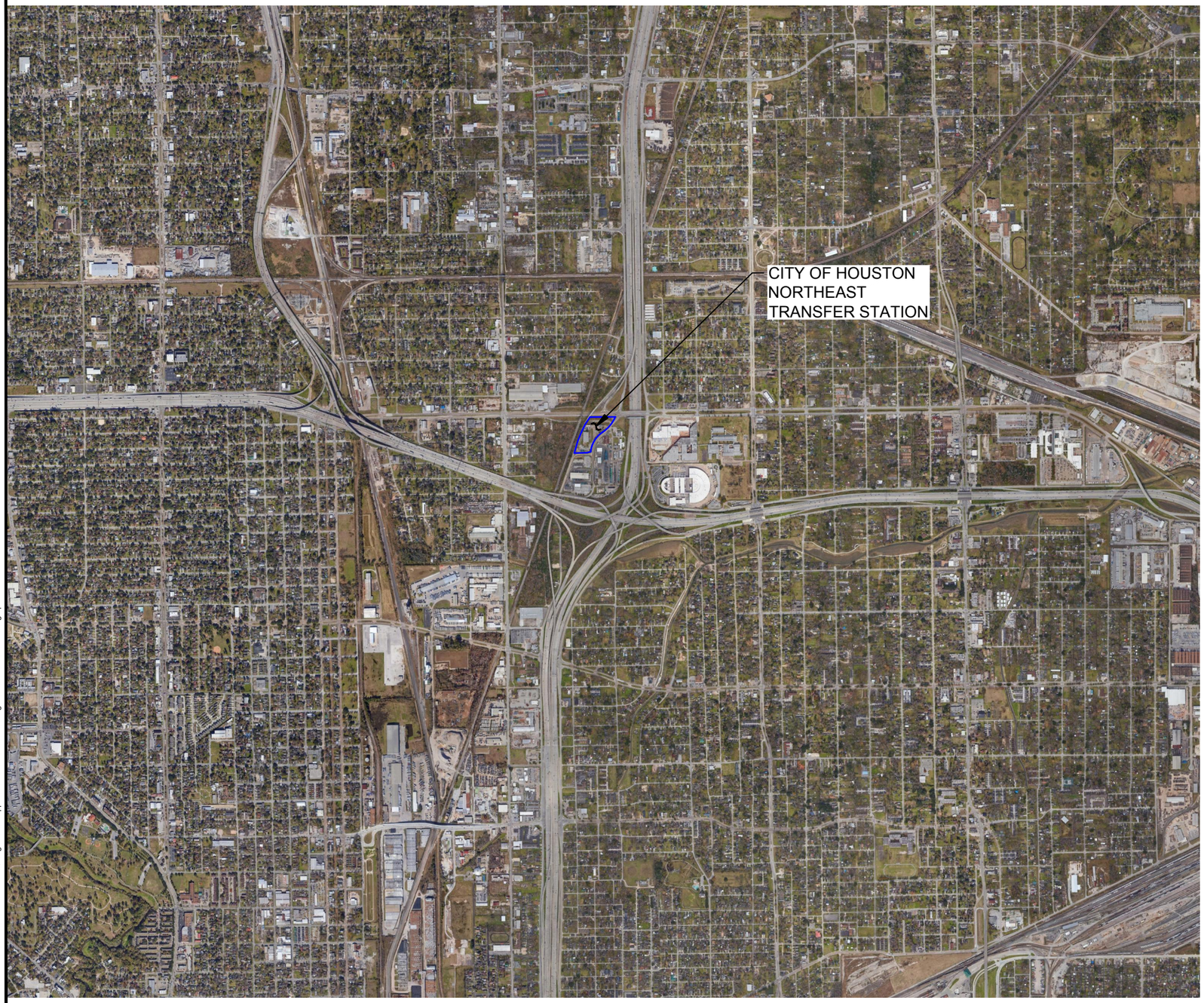
DESIGNED BY : -
DRAWN BY : A.K.
CHECKED BY : V.Y.
APPROVED BY : J.N.
DATE: 09-2021
PROJ. NO.: 2021-0080

CITY OF HOUSTON NORTHEAST TRANSFER STATION
TYPE V REGISTRATION APPLICATION

GENERAL TOPOGRAPHIC MAP

Attach II - 3

J:\HOUSTON Office Projects\Houston Transfer Station\2021 TCEQ Registration Application\CAD\SheetFiles\FiguresIC-809 General Topographic Map



N

0 1000 2000

SCALE:1"= 2000'

LEGEND

APPROXIMATE PROPERTY BOUNDARY

REFERENCE: GOOGLE EARTH AERIAL IMAGE, 2018.

STATE OF TEXAS
JAMES M. NORSTROM
57016
LICENSED
PROFESSIONAL ENGINEER

3/28/22

TETRA TECH, INC.
FIRM REGISTRATION NO. F-3924

TETRA TECH
1500 CityWest Blvd, Suite 1000
Houston, TX 77042
TEL 936.202.0746 & 832.251.5160

AGENCY NAME

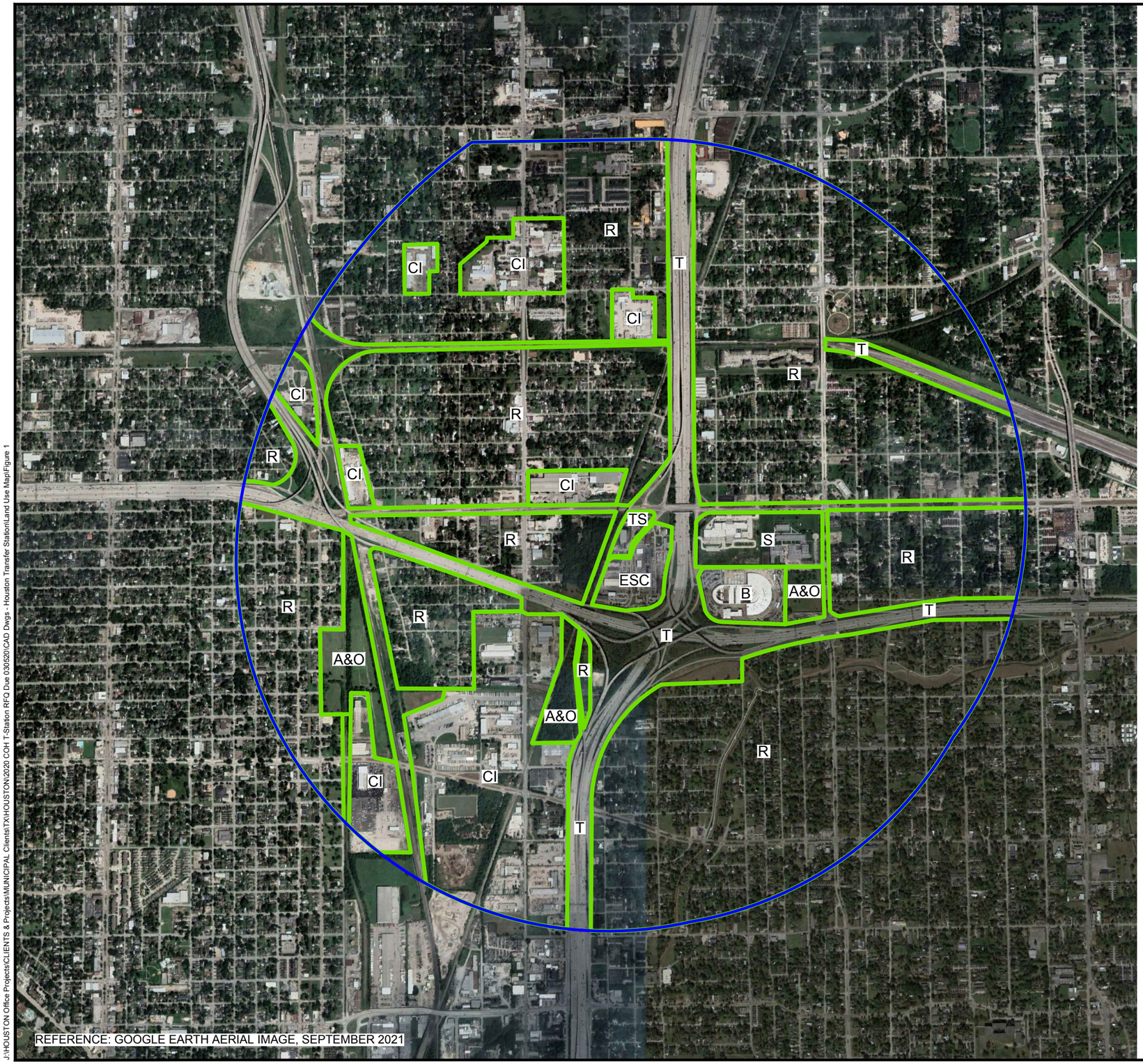
DESIGNED BY : -	DATE: 09-2021		
DRAWN BY : A.K.	PROJ. NO.: 2021-0080		
CHECKED BY : V.Y.			
APPROVED BY : J.N.			

CITY OF HOUSTON NORTHEAST TRANSFER STATION
TYPE V REGISTRATION APPLICATION

AERIAL PHOTOGRAPH

Attach II - 4

J:\HOUSTON Office Projects\Houston Transfer Station\2021 TCEQ Registration Application\CAD\SheetFiles\Figures\C-810 Aerial Photograph



STATE OF TEXAS
JAMES M. NORSTROM
57016
LICENSED
PROFESSIONAL ENGINEER
3/28/22

TETRA TECH, INC.
FIRM REGISTRATION NO. F-3924

N

0 750 1500
SCALE:1"= 1500'

LEGEND

	ONE MILE FROM TRANSFER STATION
B	BUS TERMINAL
CI	COMMERCIAL AND INDUSTRIAL
R	RESIDENTIAL
S	SCHOOL
T	TRANSPORT CORRIDOR
TS	5711 NECHES STREET TRANSFER STATION
U	AGRICULTURAL OR OPEN SPACE
ESC	CITY OF HOUSTON ENVIRONMENTAL SERVICE CENTER - NORTH

LAND USE	AREA, ACRES	PERCENTAGE OF TOTAL AREA, %
NORTHEAST TRANSFER STATION SITE	3.2	0.14
CITY OF HOUSTON ENVIRONMENTAL SERVICE CENTER - NORTH	19.9	0.87
RESIDENTIAL	1551.5	67.70
COMMERCIAL / INDUSTRIAL	283.0	12.35
TRANSPORTATION CORRIDORS	323.9	14.13
AGRICULTURAL OR OPEN SPACE	57.1	2.49
SCHOOLS	31.8	1.39
PONDS AND LAKES	0	0
CEMETERIES	0	0
BUS TERMINAL	21.3	0.93
TOTAL	2291.7	100

TETRA TECH
1500 City West Blvd, Suite 1000
Houston, TX 77042
TEL 936.202.0746 & 832.251.5160

CITY OF HOUSTON

DESIGNED BY :
DRAWN BY : S.T.
CHECKED BY : V.H.Y.
APPROVED BY : J.N.
DATE: 01-2022
PROJ. NO.: 2021-0080

HOUSTON NORTHEAST TRANSFER STATION

LAND USE MAP

Attachment II-5

J:\HOUSTON Office Projects\CLIENTS & Projects\MUNICIPAL Clients\TX\HOUSTON\2020 COH T-Station RFQ Due 030520\CAD Dwgs - Houston Transfer Station\Land Use Map\Figure 1

Attachment II–6 Zoning Map

There is no published zoning map.

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Attachment II–7 Copies of Coordination Letters and Responses

CITY OF HOUSTON
Solid Waste Management Department

Sylvester Turner
Mayor

Mark Wilfalk
Director
P.O. Box 1562
Houston, Texas 77251-1562

T. (832) 393.0454
F. (832) 393.0333
www.houstontx.gov

Municipal Solid Waste Permits Section, MC124
Waste Permits Division
Texas Commission on Environmental Quality
12100 Park 35 Circle
Austin, TX 78753

February 3, 2022

Subject: City of Houston Northeast Transfer Station MSW Type V Registration Application
5711 Neches Street, Houston, Harris County, Texas 77026

Dear TCEQ:

To comply with the requirements of 30 TAC Chapter 330.61(p) for the subject registration application, on behalf of the City of Houston (COH), I hereby confirm that the proposed transfer station complies with the City of Houston Integrated Resource Recovery Management Plan dated June 2, 2020 (see Page 57).

This letter will be presented as an attachment to the subject registration application.

Sincerely,

Ms. Helvia L. Quinones
GIS Manager, Director's Office, Solid Waste Management Department

cc: Jim Norstrom - Tetra Tech

TETRA TECH

August 3, 2021

Mr. Mark Wolfe Executive Director
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

Subject: Request for Review and Acknowledgement of Code Compliance
Proposed Type V Municipal Solid Waste Transfer Station
5711 Neches Street, Houston, Texas
29° 48' 43.668" N, 95° 20' 10.212" W (29.812130, -95.336170)

Dear Mr. Wolfe:

On behalf of the City of Houston, Tetra Tech (TT) submits this letter as notification of a proposed Type V MSW Transfer Station Registration Application to TCEQ. The address of the proposal facility is 5711 Neches Street, Houston, TX 77026, which currently contains a warehouse / office building, radio tower, and parking lots.

The City of Houston (COH) is planning to construct a municipal solid waste transfer station on their Northeast Environmental Service Center. They currently own and operate MSW transfer stations in the northwest, southwest, and southeast quadrants of the City. Please see the attached figure for the site layout.

This letter is submitted in accordance with Texas Commission on Environmental Quality (TCEQ) Municipal Solid Waste Regulations which state:

- 30 TAC 330.61(o) Texas Historical Review. The owner or operator shall submit a review letter from the Texas Historic Commission documenting compliance with the Natural Resources Code, Chapter 191, Texas Antiquities Code."

Please provide your written acknowledgement that the proposed project complies with the Natural Resource Code, Chapter 191, Texas Antiquities Code. Feel free to respond via email (jim.norstrom@tetratech.com) or call with any questions (936-202-0746).

Sincerely,

Jim Norstrom, P.E.
Senior Project Manager

Attachments - COH Northeast Service Center and 5711 Neches Site Boundary

Tetra Tech
1500 CityWest Boulevard, Suite 1000, Houston, TX 77042
Cell 936-202-0746 Tel 832-251-5160 jim.norstrom@tetratech.com

From: noreply@thc.state.tx.us
To: Norstrom, Jim; reviews@thc.state.tx.us
Subject: Section 106 Submission - TX Historical Comm Response 9/2/21
Date: Thursday, September 2, 2021 10:14:27 AM

Re: Project Review under the Antiquities Code of Texas
THC Tracking #202114341
Date: 09/02/2021
COH NE Transfer Station
5711 Neches Street
Houston,TX 77026

Description: The City of Houston (COH) is planning to construct a waste transfer station at 5711 Neches in Houston, TX. On their behalf, we request a TX Antiquities Code compliance review.

Dear Jim Norstrom:
Thank you for your submittal regarding the above-referenced project. This response represents the comments of the Executive Director of the Texas Historical Commission (THC), pursuant to review under the Antiquities Code of Texas.

The review staff, led by Bill Martin, Caitlin Brashear, has completed its review and has made the following determinations based on the information submitted for review:

Above-Ground Resources

- No historic properties are present or affected by the project as proposed. However, if historic properties are discovered or unanticipated effects on historic properties are found, work should cease in the immediate area; work can continue where no historic properties are present. Please contact the THC's History Programs Division at 512-463-5853 to consult on further actions that may be necessary to protect historic properties.

Archeology Comments

- No effect on identified archeological sites or other cultural resources. However, if cultural materials are encountered during project activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas. If the project

changes, or if new historic properties are found, please contact the review staff. If you have any questions concerning our review or if we can be of further assistance, please email the following reviewers: bill.martin@thc.texas.gov, caitlin.brashear@thc.texas.gov.

This response has been sent through the electronic THC review and compliance system (eTRAC). Submitting your project via eTRAC eliminates mailing delays and allows you to check the status of the review, receive an electronic response, and generate reports on your submissions. For more information, visit http://thc.texas.gov/etrac-system.

Sincerely,

for Mark Wolfe, State Historic Preservation Officer
Executive Director, Texas Historical Commission

Please do not respond to this email.

December 6, 2021

Chuck Ardizzone
U.S. Fish and Wildlife Service
Houston Field Office

RE: City of Houston Northeast Transfer Station
5711 Neches Street, Houston, Harris County, Texas
ESA Consultation

Mr. Ardizzone,

Tetra Tech, Inc. ("Tetra Tech") has been contracted by the City of Houston to support Texas Commission on Environmental Quality (TCEQ) registration application for a new waste transfer station. TCEQ application requirements dictate the applicant demonstrate compliance with applicable federal regulations, including Endangered Species Act (ESA) regulations. As such, Tetra Tech conduced desktop evaluations and an in-field pedestrian survey for presence of or habitat that would support species that are listed as rare, threatened, or endangered under the ESA and have the potential to occur in the vicinity of the proposed Northeast Transfer Station Project (Project) in Harris County, Texas (see location map, Attachment 1, Figure 1).

The project area consists of an approximately 3-acre site that is currently utilized for City of Houston parking and radio communications. The site has been developed, comprised of concrete parking areas, industrial buildings, and radio communication equipment, with small areas of maintained lawn (St. Augustine and bermudagrass). No listed species or listed species habitat was observed during a site visit conducted on September 24, 2021. The results of this analysis are included in Attachment 1.

On behalf of the City of Houston, Tetra Tech respectively requests that the USFWS – Texas Ecological Services Field Office review the information included herein, and provide concurrence that additional site development and conversion of the property to a waste transfer station would have no effect on species listed under the ESA.

The City of Houston appreciates your timely review of this request. If questions arise during your review, please contact me at Jason.speights@tetratech.com or (979) 270-2055.

Sincerely,
Tetra Tech, Inc.

Jason Speights
Project Manager

Tetra Tech, Inc.
1500 CityWest Boulevard, Ste 1000 | Houston, TX 77042

Enclosures:
Attachment 1: City of Houston Northeast Transfer Station
Federally Listed Species Habitat Assessment and Wetland Determination Report
5711 Neches Street, Houston, Harris County, Texas

cc: Jim Norstrom – Tetra Tech

Attachment 1

City of Houston Northeast Transfer Station
Federally Listed Species Habitat Assessment and Wetland Determination Report
5711 Neches Street, Houston, Harris County, Texas

Norstrom, Jim

From: Norstrom, Jim
Sent: Tuesday, February 1, 2022 5:03 PM
To: Norstrom, Jim
Subject: NE TS - USFWS Response to Endangered Species Report

From: Hoth, David <david_hoth@fws.gov>
Sent: Monday, December 20, 2021 9:00 AM
To: Speights, Jason <Jason.Speights@tetratech.com>
Cc: Ardizzone, Chuck CA <chuck_ardizzone@fws.gov>
Subject: Fw: [EXTERNAL] TCEQ Permit - USFWS Consultation

Good Morning Mr. Speights,

The concurrence you seek from the U.S. Fish and Wildlife Service (Service) is consistent with Section 7 of the Endangered Species Act (ESA). Section 7 is between two federal agencies where it is the responsibility of the federal action agency to make a determination pursuant to Section 7 of the ESA to ensure that projects do not jeopardize the continued existence of threatened or endangered species. That determination will dictate the level of consultation pursuant to Section 7 with our office. It is our understanding that the City of Houston and TCEQ made a no effect determination regarding this project. However, the Service cannot provide a concurrence pursuant to Section 7 of the ESA due to your non-federal status. In addition, the Service does not concur with no effect determinations; however, we encourage you to visit our Information for Planning and Consultation (IPAC) website at https://ecos.fws.gov/ipac/ . You can obtain an official letter regarding your project once you go through the steps at our IPAC system. The letter generated, speaks to our position regarding no effect determinations which may be useful documentation related to your request.

If you have any questions, please feel free to give me a call.

Sincerely,

David Hoth
Assistant Field Supervisor
U.S Fish and Wildlife Service
Texas Coastal Ecological Services Field Office
17629 El Camino Real, Suite 211
Houston, Texas 77058
O: (281) 212-1504
M: (281) 705-7436

From: Ardizzone, Chuck CA <chuck_ardizzone@fws.gov>
Sent: Friday, December 17, 2021 10:45 AM
To: Hoth, David <david_hoth@fws.gov>
Subject: Fw: [EXTERNAL] TCEQ Permit - USFWS Consultation

David,

didn't see you on this email so sending it to you so you can get it assigned.

Chuck Ardizzone
Project Leader
Texas Coastal Ecological Services
U.S. Fish & Wildlife Service
17629 El Camino Real, Ste 211
Houston, TX 77058
W: (281) 286-8282 Ext 26506
C: (713) 882-1912
F: (281) 488-5882

From: Speights, Jason <Jason.Speights@tetratech.com>
Sent: Friday, December 17, 2021 09:37
To: Ardizzone, Chuck CA <chuck_ardizzone@fws.gov>
Subject: [EXTERNAL] TCEQ Permit - USFWS Consultation

Mr. Ardizzone,

On behalf of the City of Houston, Tetra Tech is preparing and submitting the required permit application materials to the TCEQ for authorization for a new solid waste transfer station. As part of the application, TCEQ requests concurrence from the USFWS that the project would have no effect on listed species.

This project is located on a fully developed parcel within the city of Houston. I have attached a consultation letter and summary memo that describes conditions on-site.

I respectfully request your review of the documentation provided.

Please reach out with any questions.

Best regards,

Jason Speights | Environmental Permitting Manager/Biologist
Mobile 979.270.2055 | Houston Office 832.251-6024
jason.speights@tetratech.com

December 6, 2021

U.S. Army Corps of Engineers
Galveston District
P.O Box 1229
Galveston, Texas 77553

RE: City of Houston Northeast Transfer Station
5711 Neches Street, Houston, Harris County, Texas
Clean Water Act – Section 404/10 Consultation

To whom it may concern,

Tetra Tech, Inc. ("Tetra Tech") has been contracted by the City of Houston to support Texas Commission on Environmental Quality (TCEQ) registration application for a new waste transfer station. TCEQ application requirements dictate the applicant demonstrate compliance with applicable federal regulations, including Clean Water Act – Section 404/10 regulations. As such, Tetra Tech conduced desktop evaluations and an in-field pedestrian survey for potential regulated wetlands and waterbodies with potential to occur in the vicinity of the proposed Northeast Transfer Station Project (Project) in Harris County, Texas (see location map, Attachment 1, Figure 1).

The project area consists of an approximately 3-acre site that is currently utilized for City of Houston parking and radio communications. The site has been developed, comprised of concrete parking areas, industrial buildings, and radio communication equipment, with small areas of maintained lawn (St. Augustine and bermudagrass). No wetland or waterbodies were identified during a site visit conducted on September 24, 2021. The results of this analysis are included in Attachment 1.

On behalf of the City of Houston, Tetra Tech respectively requests that the USACE – Galveston District review the information included herein, and provide concurrence that additional site development and conversion of the property to a waste transfer station would not require permit coverage under Section 404/10 of the Clean Water Act.

The City of Houston appreciates your timely review of this request. If questions arise during your review, please contact me at Jason.speights@tetratech.com or (979) 270-2055.

Sincerely,
Tetra Tech, Inc.

Jason Speights
Project Manager

Enclosures:
Attachment 1: City of Houston Northeast Transfer Station
Federally Listed Species Habitat Assessment and Wetland Determination Report
5711 Neches Street, Houston, Harris County, Texas

cc: Jim Norstrom – Tetra Tech

Attachment 1

City of Houston Northeast Transfer Station
Federally Listed Species Habitat Assessment and Wetland Determination Report
5711 Neches Street, Houston, Harris County, Texas

Norstrom, Jim

From: Norstrom, Jim
Sent: Friday, March 11, 2022 10:50 AM
To: Ahmed.Ghaly@houstontx.gov
Cc: Harrell, Ricky - GSD; Helvia.Quinones@houstontx.gov; Gabe Olmos; Drew Comer
Subject: City of Houston Northeast Transfer Station - Transportation Analysis for Review
Attachments: NE TS JKnesek Transportation Analysis 031022.pdf

Good morning,
On behalf of the City of Houston, Tetra Tech (TT) plans to submit a Type V Registration Application to the TCEQ Solid Waste Permits Division for the proposed Northeast Transfer Station to be located at 5711 Neches Street, Houston, TX 77026. JKnesek & Associates, Inc. (working with Dally and Associates, Inc.) prepared the attached Transportation Analysis which will be part of the Registration Application to TCEQ. Attachment A shows the proposed site layout and driveways.

Under Title 30 Texas Administrative Code Section 330.61(i), the applicant is required to "submit documentation of coordination of all designs of proposed public roadway improvements such as turning lanes, storage lanes, etc., associated with site entrances with the agency exercising maintenance responsibility of the public roadway involved. In addition, the owner or operator shall submit documentation of coordination with the Texas Department of Transportation for traffic and location restrictions."

Please review the attached Transportation Analysis and let me know if you have any questions or comments. Thanks.

Jim Norstrom, P.E. | Senior Project Manager
Cell **936-202-0746** | Direct 832-251-5165 | Main 832-251-5160 | Fax 713-784-2962 | jim.norstrom@tetratech.com

Tetra Tech | *Leading with Science®*
1500 CityWest Boulevard, Suite 1000 | Houston, TX 77042 | tetratech.com

Norstrom, Jim

From: Norstrom, Jim
Sent: Tuesday, March 22, 2022 11:55 AM
To: 'Mergo, Cheryl'
Cc: 'Harrell, Ricky - GSD'; Helvia.Quinones@houstontx.gov; Gabe Olmos
Subject: Type V Transfer Station Registration Application - HGAC Review Request
Attachments: TT to HGAC - COH NE Transfer Station Type V Application Parts I&II 032222.pdf; NE TS Applic Parts I&II 030922.pdf; NE TS - Part 1 Application Form 0650 030422.pdf

Good morning Cheryl:

On behalf of the City of Houston, Tetra Tech (TT) plans to submit a Type V Registration Application to the TCEQ Solid Waste Permits Division for the proposed Northeast Transfer Station to be located at 5711 Neches Street, Houston, TX 77026 within the City's North Environmental Service Center. A General Location Map is included in the attached Parts I and II of the application.

Under 30 TAC Section 330.6l (p), the applicant is required to submit Parts I and II of the application to the applicable Council of Governments for review and confirmation that the proposed project is consistent with regional solid waste plans.

Thanks.

Jim Norstrom, P.E. | Senior Project Manager
Cell **936-202-0746** | Direct 832-251-5165 | Main 832-251-5160 | Fax 713-784-2962 | jim.norstrom@tetratech.com

Tetra Tech | *Leading with Science®*
1500 CityWest Boulevard, Suite 1000 | Houston, TX 77042 | tetratech.com

TETRA TECH

March 22, 2022

Ms. Cheryl Mergo
Solid Waste Program Coordinator
Houston-Galveston Area Council of Governments
P.O. Box 22777
Houston, Texas 77227-2777

Subject: Regional Solid Waste Management Plan Review by Local Council of Governments
MSW TYPE V Transfer Station Registration Application
City of Houston Northeast Transfer Station – Houston, Harris County, Texas

Dear Ms. Mergo:

On behalf of the City of Houston, Tetra Tech (TT) plans to submit a Type V Registration Application to the TCEQ Solid Waste Permits Division for the proposed Northeast Transfer Station to be located at 5711 Neches Street, Houston, TX 77026 within the City's North Environmental Service Center. A General Location Map is enclosed with Parts I and II of the application.

Under 30 TAC Section 330.6l (p), the applicant is required to submit Parts I and II of the application to the applicable Council of Governments for review and confirmation that the proposed project is consistent with regional solid waste plans. If you find that the project is consistent with your solid waste plan, please respond via email to jim.norstrom@tetratech.com

Or, if you have any questions about the project or would like to visit the site, please contact me.

Sincerely,

Jim Norstrom, P.E.
Senior Project Manager

Attachment - Type V Registration Application Parts I & II

cc: Ricky Harrell – Senior Project Manager, City of Houston General Services
Helvia Quinones – GIS Manager, City of Houston Solid Waste Management Department
Gabe Olmos – Project Manager, RDLR Architects, Inc.

Tetra Tech
1500 CityWest Boulevard, Suite 1000, Houston, TX 77042
Cell 936-202-0746 Tel 832-251-5160 jim.norstrom@tetratech.com

Texas Department of Transportation

P.O. Box 1386 | Houston, Texas | 77251-1386 | (713) 802-5000 | WWW.TXDOT.GOV

April 6, 2022

Jim Norstrom, P.E.
Senior Project Manager
Tetra Tech
1500 City West Boulevard, Suite 1000
Houston, Texas 77042

RE: **Transportation Study Review Request**
City of Houston Northeast Transfer Station
MSW Type V Registration Application to TCEQ
5711 Neches Street, Houston, Texas 77026
Harris County

Dear Mr. Norstrom:

The Texas Department of Transportation (TxDOT) is in receipt of your letter dated March 11, 2022. The letter requests a Transportation Study Review for a proposed City of Houston (City) Northeast Transfer Station Project at 5711 Neches Street, Houston, Texas 77026.

After reviewing the information provided in the letter and the roadways within one (1) mile of the proposed facility, TxDOT has no restrictions or objections to the facility's proposed traffic impact.

Should you have questions, regarding this matter please contact Sylvester Onwas at (713) 803-5831 or via email at Sylvester.Onwas@txdot.gov or Ugonna Ughanze at (713) 802-5171 or via email at Ugonna.Ughanze@txdot.gov.

Sincerely,

Eliza C. Paul, P.E.

Eliza C. Paul, P.E.
District Engineer
Houston District

Attachment

CC: Ugonna U. Ughanze, P.E., Director of Transportation Operations, Houston District. TxDOT
Sylvester E. Onwas, P.E., Transportation Engineer Supervisor, Houston District. TxDOT
Phillip B. Garlin, P.E., North Harris Area Engineer, Houston District, TxDOT
John C. Williams, North Harris Maintenance Section Supervisor, Houston District. TxDOT

TETRA TECH

March 11, 2022

Ms. Eliza Paul
District Engineer, Houston District #12
Texas Department of Transportation
7600 Washington Avenue
Houston, Texas 77007

Subject: Transportation Study Review Request
City of Houston Northeast Transfer Station
MSW Type V Registration Application to TCEQ
5711 Neches Street, Houston, TX 77026

Dear Ms. Paul:

On behalf of the City of Houston, Tetra Tech (TT) plans to submit a Type V Registration Application to the TCEQ Solid Waste Permits Division for the proposed Northeast Transfer Station Project. Dally and Associates, Inc. prepared the attached Transportation Study which will be part of the Registration Application.

The transfer station will allow City of Houston and other waste collection vehicles to unload inside the transfer station building so that waste can be reloaded into larger transfer trailers for transport to municipal solid waste landfills. The City currently operates three such transfer stations in the northwest, southwest and southeast quadrants of the city.

Under Title 30 Texas Administrative Code Section 330.61(i), the applicant is required to "submit documentation of coordination of all designs of proposed public roadway improvements such as turning lanes, storage lanes, etc., associated with site entrances with the agency exercising maintenance responsibility of the public roadway involved. In addition, the owner or operator shall submit documentation of coordination with the Texas Department of Transportation for traffic and location restrictions."

On behalf of The City of Houston, we request your review of the attached transportation study.

Please call with any questions (936-202-0746).

Sincerely,

Jim Norstrom, P.E.
Senior Project Manager

Attachment – Transportation Study by JKnesek & Associates, Inc.

cc: Ricky Harrell – City of Houston, General Services Department
Drew Comer – Dally & Associates, Inc.

Tetra Tech
1500 CityWest Boulevard, Suite 1000, Houston, TX 77042
Cell 936-202-0746 **Tel** 832-251-5160 jim.norstrom@tetratech.com

Attachment II–8 Transportation Study

TRANSPORTATION ANALYSIS

FOR

CITY OF HOUSTON NEW MULTI-USE SWMD FACILITY

Located at:

5614 Neches Drive
Houston, TX 77026
Harris County, Texas

Transportation Analysis Prepared for:

City of Houston General Services Division
900 Bagby Street
Houston, TX 77002

Transportation Analysis Prepared by:

JKnesek & Associates, Inc.
3418 S Texas 6, Ste. 336
Houston, TX 77082
(713) 775-6490

COH Multi-Use SWMD Facility
Harris County,
Texas

TABLE OF CONTENTS

I. Transportation Analysis

The transportation analysis includes data on the availability and adequacy of roads that the owner or operator will use to access the facility; data on the volume of vehicular traffic on access roads within one mile of the facility, both existing and expected, during the expected life of the facility; projected volume of traffic expected to be generated by the facility on the access roads within one mile of the facility; documentation of coordination of all designs associated with site entrances with the agency exercising maintenance responsibility of the public roadway involved; and documentation of coordination with the Texas Department of Transportation (TxDOT) for traffic and location restrictions.

A. Site Access

Public access to the facility will be provided by an entrance from Neches Street on the south side of the site located just north of an IH 69 access ramp and an exit to Neches Street on the north side of the site approximately 270 feet south of Kelley Street. The entrance to the site is located approximately 440 feet south of the exit from the site. The proposed driveways appear to be located at or near existing driveways.

Vehicular traffic to the facility will generally access the facility using Neches Street, Kelley Street, the IH 69 frontage roads, and the IH 69 HOV access road.

Neches Street is a four-lane undivided roadway adjacent to the proposed site that transitions to a two-lane undivided roadway just south of the site.

Kelley Street is a six-lane roadway with a raised median. In the site vicinity, the outside lane on each side of the roadway is restricted to bicycle traffic.

The IH 69 northbound frontage road is a one-way roadway that intersects Kelley Street in the site vicinity. The IH 69 southbound road frontage road is a one-way roadway that intersects Kelley Street in the site vicinity then transitions to a two-way roadway (Neches Street) on the south side of Kelley Street. The IH 69 northbound frontage road at Kelley Street intersection is located approximately 420 feet east of the IH 69 frontage road / Neches Street at Kelley Street intersection. Both intersections are controlled by traffic signals and appear to be coordinated with each other.

The IH 69 HOV access road is a one lane roadway that splits into two lanes at Neches Street. The direction of the roadway depends on the time of day.

It is projected that the majority of vehicles travelling to the site will be northbound and southbound vehicles on IH 69 that exit to Kelley Street then turn south to Neches Street to access the entrance driveway. A small percentage of the vehicles travelling to the site are projected to be northbound and southbound vehicles that utilize the IH 69 HOV Lane to the access ramp located just south of the development. A small percentage of the vehicles travelling to the site are projected to be northbound vehicles on Neches Street. It is projected that vehicles exiting the site will utilize the roadway system in a similar manner as the vehicles entering the site.

The site entrance and the site exit are 26-foot-wide concrete paved driveways. The driveways will intersect Neches Street at near 90-degree angles at locations that do not appear to present any sight restrictions or conflicts that impair the turning of the trucks or the view of drivers on Neches Street. Trucks that turn into

the proposed site (see Appendix A) will have approximately 1,070 feet of stacking room in a traffic loop on-site. This should prevent any traffic congestion on Neches Street due to trucks waiting to access the facility. The exit driveway will be controlled by a stop sign.

Based on the information above, the roadways that provide access to the facility are adequate in capacity and structure to continue to serve the needs of the owner or operator, and the general public. There are no proposed public roadway improvements such as turning lanes, storage lanes, etc., associated with the site entrance.

B. *Traffic Volumes*

All traffic accesses the facility via the entrance off Neches Street. Additionally, Kelley Street, the IH 69 frontage roads, and the IH 69 HOV access road will be used to access the facility.

The 2016 TxDOT daily traffic volumes in the vicinity of the facility were obtained which represent the average two-way traffic passing a specific location in a 24-hour period. See Table 1.

The Year 2022 traffic counts were collected on January 25, 2022. See Table 1.

Future traffic is projected through the year 2040 using a 0.7 percent annual growth rate (based on population growth in Harris County, 2022) on the Year 2022 traffic counts. See Table 1.

The actual site operating life for the transfer station may vary due to various future factors. The existing traffic volumes for roadways within one mile of the facility are shown on Table 1.

Table 1: Existing Traffic Volumes For Roadways Within One Mile of the Facility

Roadway	Segment	2016 Volumes[1,3]	2022 Traffic Counts[3]	Future Volumes[3]	Capacity[2,3]
Neches Street	South of Kelley Street	1,534	1,821	2,063	30,000
Kelley Street	West of IH 69	7,631	6,665	7,787	30,000
IH 69 NBD FR	South of Kelley Street	-	3,041	3,448	30,000
IH 69 SBD FR	North of Kelley Street	-	2,287	2,593	30,000
IH 69 HOV Access Road	West of Neches Street	-	112	127	14,000

1. Source: txdot.maps.arcgis.com
2. Source: Existing capacity was determined from guidelines prepared by the City of Houston.
3. Traffic volumes are in units of vehicles per day.

C. *Facility Generated Traffic Volumes*

Traffic generated by the facility is estimated based on the projected incoming waste rate and assumptions regarding the vehicles used for waste transport in and out of the facility. The maximum total volume of traffic generated by the facility after construction of Phase 2 is expected to be approximately 250 route truck trips per day and 83 transfer trailer trips per day.

Comparison of the traffic to be generated at the facility with the traffic data on Table 1 shows that the volume of the traffic generated by the facility represents a relatively small percentage of the existing volumes, projected volumes, and roadway capacity on the access roads within one mile of the facility. Based on the findings of this traffic study, there are no existing or future restrictions on the main access roadways within one mile of the facility that would prevent safe and efficient operations for both the transfer station-generated traffic as well as the other vehicles in the area.

APPENDIX A

PHASE II CIVIL SITE PLAN

0' 15' 30' 60'

SCALE: 1"=30'

LEGEND

- CUT AREA
- FILL AREA

GENERAL CONSTRUCTION NOTES

1. ALL UNDERGROUND UTILITIES SHOWN ARE NOT GUARANTEED TO BE COMPLETE OR DEFINITE, BUT WERE OBTAINED FROM THE BEST INFORMATION AVAILABLE.
2. CONTRACTOR TO VERIFY ALL UNDERGROUND UTILITIES IN THE FIELD PRIOR TO CONSTRUCTION AND NOTIFY ENGINEER IF DISCREPANCIES OCCUR.
3. THE LOCATION OF ALL UTILITIES PRESENTED ON THESE DRAWINGS IS 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.
4. CONTRACTOR TO OBTAIN ALL PERMITS AND APPROVALS REQUIRED PRIOR TO STARTING CONSTRUCTION.
5. CONTRACTOR PERFORMING THE WORK SHALL BE RESPONSIBLE FOR SECURING ALL UTILITY PERMITS, PRIOR TO INSTALLATION OF ANY UTILITIES INCLUDING WATER, SEWER, ELECTRIC, CABLE TELEVISION AND GAS.
6. ALL DISTURBED AREAS SHALL BE SODDED UPON COMPLETION IF NOT TO BE PAVED OR LANDSCAPED.

ISSUE LOG

NO	DATE	DESCRIPTION

CONSULTANTS:

RDLR ARCHITECTS, INC.
800 Sampson Street #104
Houston, TX 77003
713.868.3121

TETRA TECH
1500 CityWest Boulevard, Suite 1000
Houston, TX 77042
832-251-5160

INFRASTRUCTURE ASSOCIATES
6117 RICHMOND AVE. #200
Houston, TX 77057
713.622.0120

PGA ENGINEERS
3838 N Sam Houston Pkwy E
Houston, TX 77032
346.570.2418

ASAKURA ROBINSON
2500 Summer St #3228
Houston, TX 77007
713.337.5830

DALLY + ASSOCIATES, INC.
9800 Richmond Ave #460
Houston, TX 77042
713.337.8881

SEALS:

Dally+ Associates, Inc
Texas Registered Engineering Firm F-003426
INTERIM REVIEW ONLY
Not to be used for permit, bidding or construction.
Engineer: FRED DALLY
P.E. Serial No. 90504
Date: DECEMBER 9, 2021

PROJECT NAME:

NEW MULTI-USE SWMD FACILITY
5614 Neches St.
Houston, TX 77026

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

PROJECT MANAGER: SPONSORING DEPARTMENT:

PROJECT MANAGER:

N PROJECT NORTH

N TRUE NORTH

DATE:
WBS NO.:
SCALE:
DRAWN BY:
CHECKED BY:

SHEET TITLE:

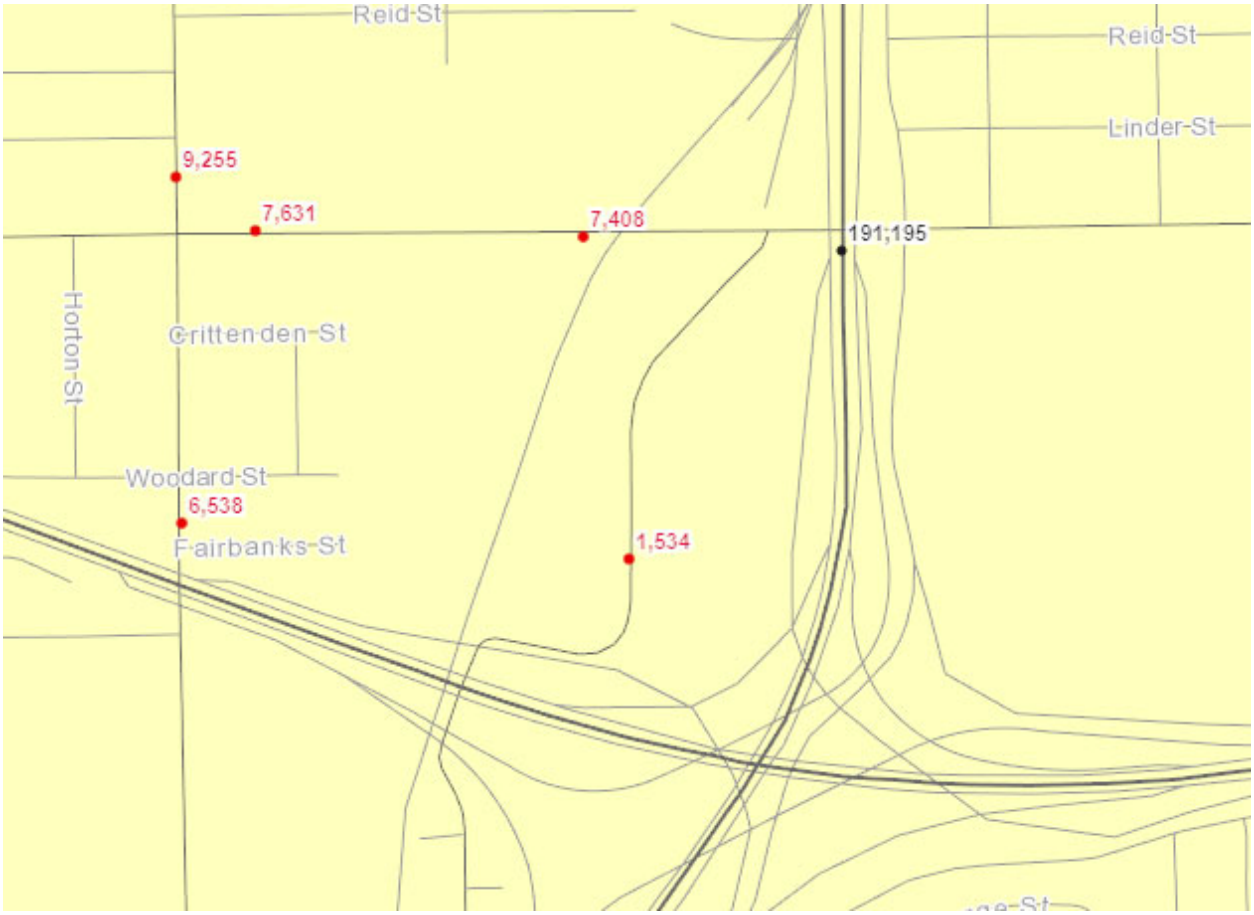
GRADING PLAN

SHEET NO.:

C-400

CITY DWG NO.:

https://txdot.maps.arcgis.com/apps/webappviewer/index.html?id=06fea0307dda42c1976194bf5a98b3a1



APPENDIX B

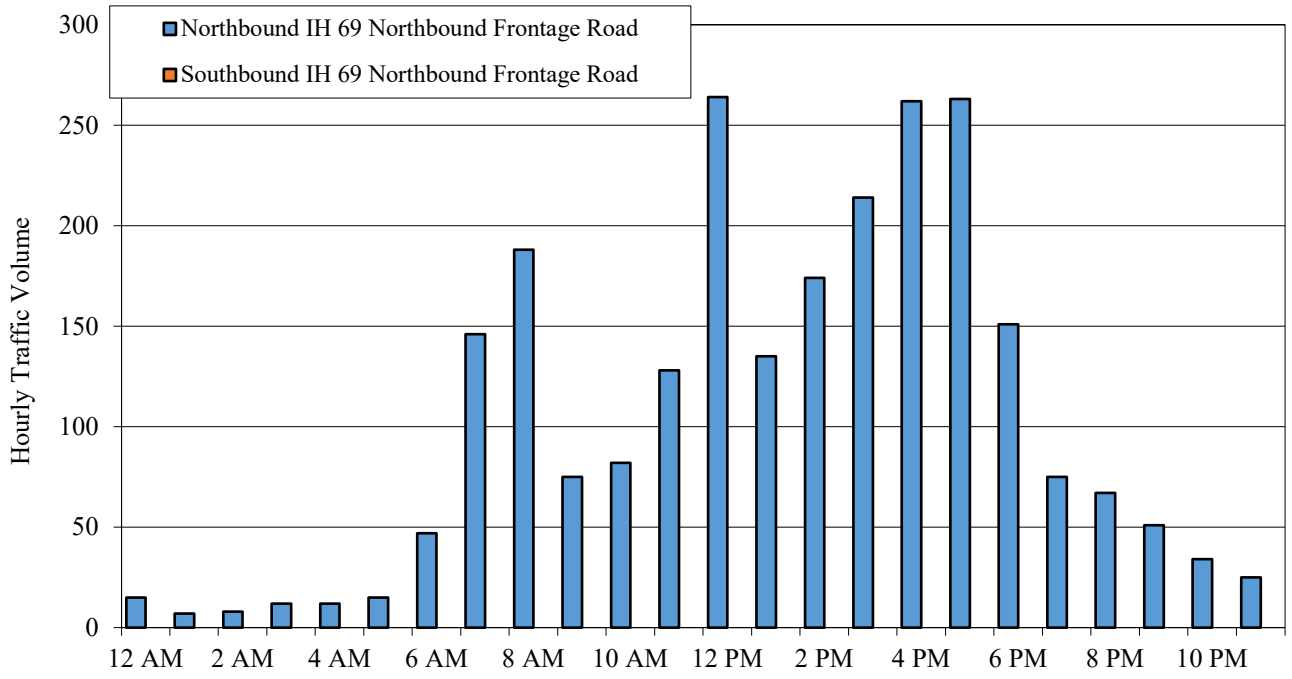
24-HOUR TRAFFIC COUNTS

IH 69 NORTHBOUND FRONTAGE ROAD NORTH OF KELLEY STREET

24-Hour Traffic Counts - January 25, 2022

Time	Northbound IH 69 Northbound Frontage Road					Southbound IH 69 Northbound Frontage Road				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	5	1	5	4	15	0	0	0	0	0
1 AM	3	1	2	1	7	0	0	0	0	0
2 AM	2	2	2	2	8	0	0	0	0	0
3 AM	4	2	3	3	12	0	0	0	0	0
4 AM	1	2	3	6	12	0	0	0	0	0
5 AM	4	2	7	2	15	0	0	0	0	0
6 AM	9	11	13	14	47	0	0	0	0	0
7 AM	28	35	40	43	146	0	0	0	0	0
8 AM	39	56	55	38	188	0	0	0	0	0
9 AM	22	19	15	19	75	0	0	0	0	0
10 AM	15	14	26	27	82	0	0	0	0	0
11 AM	34	23	28	43	128	0	0	0	0	0
12 PM	153	43	42	26	264	0	0	0	0	0
1 PM	26	27	34	48	135	0	0	0	0	0
2 PM	34	37	59	44	174	0	0	0	0	0
3 PM	48	49	60	57	214	0	0	0	0	0
4 PM	87	62	50	63	262	0	0	0	0	0
5 PM	65	67	66	65	263	0	0	0	0	0
6 PM	32	44	44	31	151	0	0	0	0	0
7 PM	22	20	21	12	75	0	0	0	0	0
8 PM	22	13	14	18	67	0	0	0	0	0
9 PM	6	15	14	16	51	0	0	0	0	0
10 PM	4	12	10	8	34	0	0	0	0	0
11 PM	8	6	6	5	25	0	0	0	0	0
24 Hour	2,450					0				

AM Peak Hour: 193 7:45 AM to 8:45 AM
PM Peak Hour: 266 3:30 PM to 4:30 PM

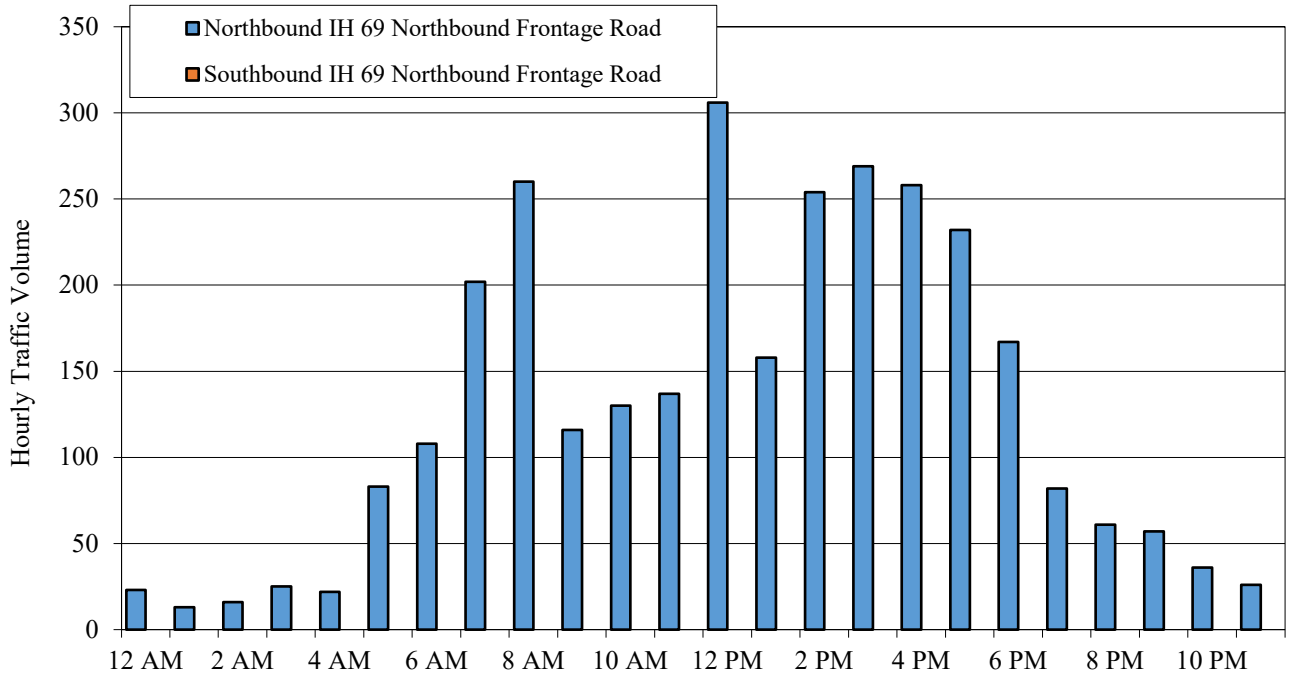


IH 69 NORTHBOUND FRONTAGE ROAD SOUTH OF KELLEY STREET

24-Hour Traffic Counts - January 25, 2022

Time	Northbound IH 69 Northbound Frontage Road					Southbound IH 69 Northbound Frontage Road				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	12	5	4	2	23	0	0	0	0	0
1 AM	2	3	2	6	13	0	0	0	0	0
2 AM	3	5	3	5	16	0	0	0	0	0
3 AM	7	4	7	7	25	0	0	0	0	0
4 AM	3	3	6	10	22	0	0	0	0	0
5 AM	9	15	32	27	83	0	0	0	0	0
6 AM	27	30	23	28	108	0	0	0	0	0
7 AM	27	46	67	62	202	0	0	0	0	0
8 AM	66	76	74	44	260	0	0	0	0	0
9 AM	33	29	26	28	116	0	0	0	0	0
10 AM	27	27	29	47	130	0	0	0	0	0
11 AM	28	28	28	53	137	0	0	0	0	0
12 PM	162	50	50	44	306	0	0	0	0	0
1 PM	50	35	37	36	158	0	0	0	0	0
2 PM	50	47	105	52	254	0	0	0	0	0
3 PM	59	56	82	72	269	0	0	0	0	0
4 PM	74	69	62	53	258	0	0	0	0	0
5 PM	65	58	59	50	232	0	0	0	0	0
6 PM	37	51	35	44	167	0	0	0	0	0
7 PM	26	21	25	10	82	0	0	0	0	0
8 PM	23	16	12	10	61	0	0	0	0	0
9 PM	12	19	14	12	57	0	0	0	0	0
10 PM	12	10	7	7	36	0	0	0	0	0
11 PM	10	7	2	7	26	0	0	0	0	0
24 Hour	3,041					0				

AM Peak Hour: 278 7:45 AM to 8:45 AM
PM Peak Hour: 306 12:00 PM to 1:00 PM

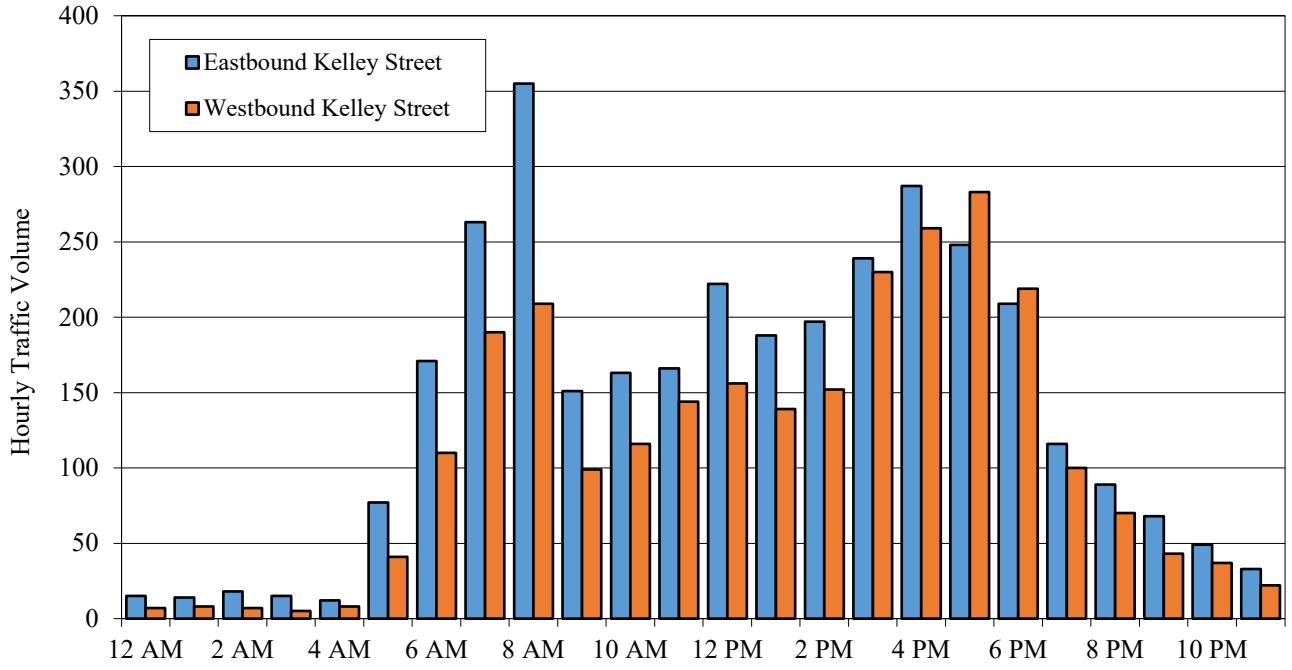


KELLEY STREET EAST OF IH 69 NORTHBOUND FRONTAGE ROAD

24-Hour Traffic Counts - January 25, 2022

Time	Eastbound Kelley Street					Westbound Kelley Street				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	5	6	1	3	15	2	2	2	1	7
1 AM	3	3	0	8	14	2	3	1	2	8
2 AM	4	5	5	4	18	1	4	1	1	7
3 AM	3	4	3	5	15	3	0	2	0	5
4 AM	1	5	2	4	12	1	3	0	4	8
5 AM	6	13	35	23	77	1	7	13	20	41
6 AM	28	34	51	58	171	20	28	27	35	110
7 AM	52	62	68	81	263	33	42	64	51	190
8 AM	83	90	124	58	355	56	62	47	44	209
9 AM	49	35	34	33	151	27	22	24	26	99
10 AM	43	43	28	49	163	18	39	30	29	116
11 AM	34	38	53	41	166	31	31	40	42	144
12 PM	74	47	49	52	222	56	37	36	27	156
1 PM	45	52	48	43	188	36	32	30	41	139
2 PM	46	40	57	54	197	39	31	42	40	152
3 PM	61	63	52	63	239	68	44	56	62	230
4 PM	87	77	75	48	287	71	71	60	57	259
5 PM	70	57	60	61	248	64	84	72	63	283
6 PM	50	68	55	36	209	54	66	57	42	219
7 PM	34	34	24	24	116	34	26	20	20	100
8 PM	38	18	14	19	89	24	13	15	18	70
9 PM	12	22	20	14	68	10	9	14	10	43
10 PM	13	14	13	9	49	7	7	12	11	37
11 PM	11	9	6	7	33	6	3	7	6	22
24 Hour	3,365					2,654				

AM Peak Hour: 594 7:45 AM to 8:45 AM
PM Peak Hour: 566 3:45 PM to 4:45 PM

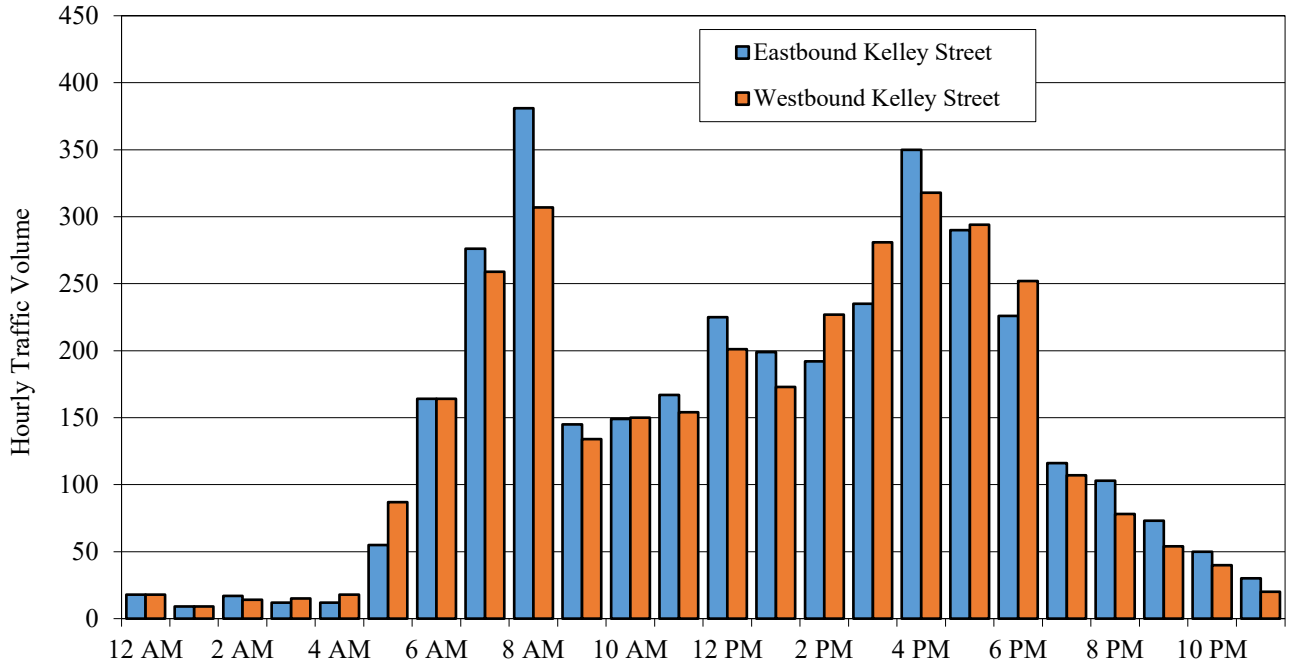


KELLEY STREET WEST OF IH 69 NORTHBOUND FRONTAGE ROAD

24-Hour Traffic Counts - January 25, 2022

Time	Eastbound Kelley Street					Westbound Kelley Street				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	5	7	2	4	18	9	7	2	0	18
1 AM	4	2	0	3	9	2	4	1	2	9
2 AM	4	5	5	3	17	2	7	2	3	14
3 AM	2	4	3	3	12	5	2	6	2	15
4 AM	1	5	1	5	12	3	4	2	9	18
5 AM	4	8	24	19	55	4	15	27	41	87
6 AM	27	31	51	55	164	37	44	37	46	164
7 AM	60	67	65	84	276	40	58	88	73	259
8 AM	87	97	138	59	381	87	89	80	51	307
9 AM	43	36	34	32	145	32	33	35	34	134
10 AM	42	41	26	40	149	29	50	31	40	150
11 AM	36	42	56	33	167	27	40	43	44	154
12 PM	82	46	49	48	225	73	43	44	41	201
1 PM	38	52	57	52	199	53	40	42	38	173
2 PM	42	47	48	55	192	51	48	79	49	227
3 PM	53	69	48	65	235	71	57	74	79	281
4 PM	121	86	81	62	350	92	87	78	61	318
5 PM	79	64	79	68	290	73	82	84	55	294
6 PM	49	74	65	38	226	58	79	58	57	252
7 PM	35	35	24	22	116	39	28	24	16	107
8 PM	41	21	16	25	103	28	19	15	16	78
9 PM	10	24	20	19	73	14	15	14	11	54
10 PM	9	18	14	9	50	11	9	10	10	40
11 PM	7	9	7	7	30	4	4	4	8	20
24 Hour	3,494					3,374				

AM Peak Hour: 735 7:45 AM to 8:45 AM
PM Peak Hour: 689 3:45 PM to 4:45 PM

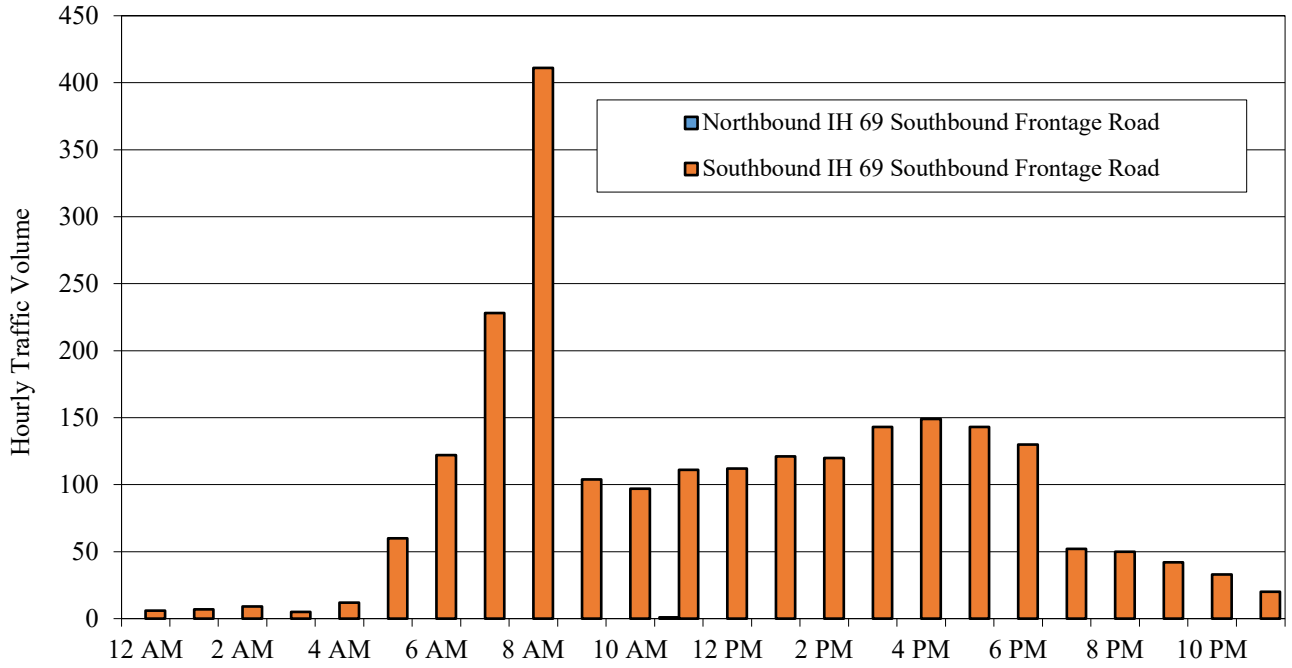


IH 69 SOUTHBOUND FRONTAGE ROAD NORTH OF KELLEY STREET

24-Hour Traffic Counts - January 25, 2022

Time	Northbound IH 69 Southbound Frontage Road					Southbound IH 69 Southbound Frontage Road				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	0	0	0	0	0	2	1	1	2	6
1 AM	0	0	0	0	0	2	1	0	4	7
2 AM	0	0	0	0	0	1	0	6	2	9
3 AM	0	0	0	0	0	1	1	1	2	5
4 AM	0	0	0	0	0	6	0	2	4	12
5 AM	0	0	0	0	0	5	8	21	26	60
6 AM	0	0	0	0	0	35	29	24	34	122
7 AM	0	0	0	0	0	44	61	59	64	228
8 AM	0	0	0	0	0	121	102	143	45	411
9 AM	0	0	0	0	0	28	23	24	29	104
10 AM	0	0	0	0	0	30	18	27	22	97
11 AM	1	0	0	0	1	34	33	23	21	111
12 PM	0	0	0	0	0	29	18	40	25	112
1 PM	0	0	0	0	0	31	29	36	25	121
2 PM	0	0	0	0	0	26	28	34	32	120
3 PM	0	0	0	0	0	29	30	36	48	143
4 PM	0	0	0	0	0	49	40	32	28	149
5 PM	0	0	0	0	0	25	42	33	43	143
6 PM	0	0	0	0	0	31	37	34	28	130
7 PM	0	0	0	0	0	12	18	12	10	52
8 PM	0	0	0	0	0	22	7	9	12	50
9 PM	0	0	0	0	0	9	16	13	4	42
10 PM	0	0	0	0	0	10	9	6	8	33
11 PM	0	0	0	0	0	7	5	6	2	20
24 Hour	1					2,287				

AM Peak Hour: 430 7:45 AM to 8:45 AM
PM Peak Hour: 173 3:30 PM to 4:30 PM

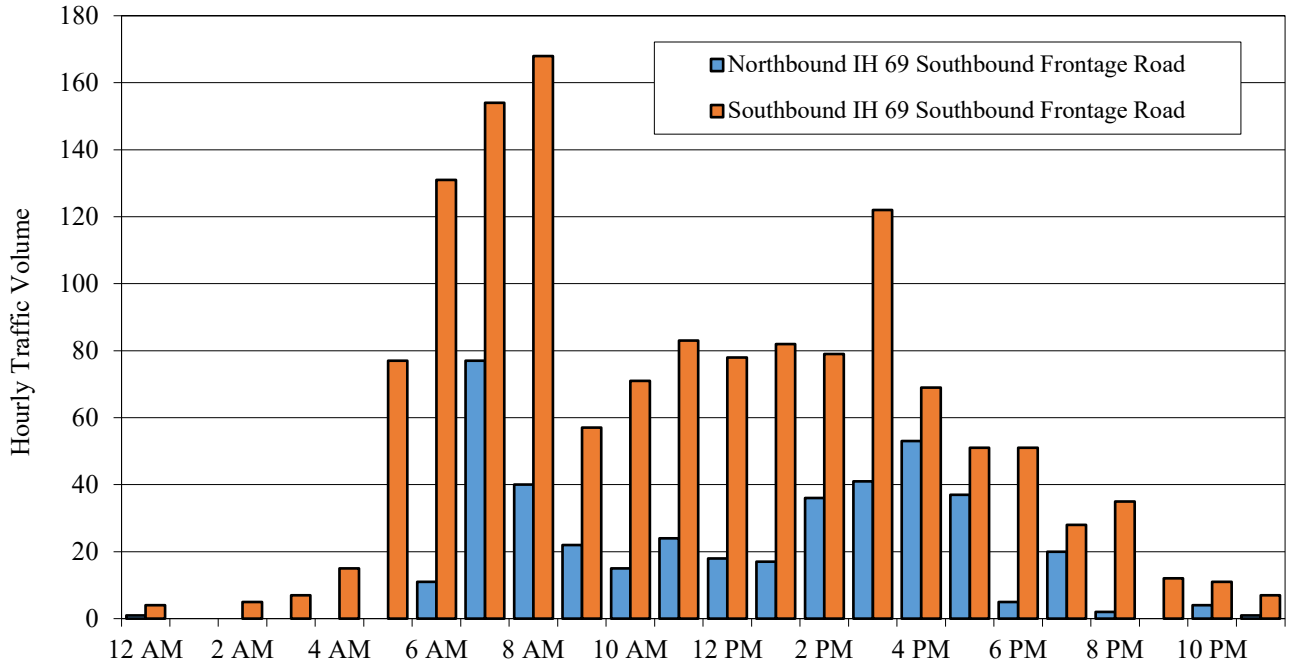


IH 69 SOUTHBOUND FRONTAGE ROAD SOUTH OF KELLEY STREET

24-Hour Traffic Counts - January 25, 2022

Time	Northbound IH 69 Southbound Frontage Road					Southbound IH 69 Southbound Frontage Road				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	1	0	0	0	1	2	2	0	0	4
1 AM	0	0	0	0	0	0	0	0	0	0
2 AM	0	0	0	0	0	0	1	3	1	5
3 AM	0	0	0	0	0	1	3	2	1	7
4 AM	0	0	0	0	0	3	1	5	6	15
5 AM	0	0	0	0	0	8	10	21	38	77
6 AM	2	1	1	7	11	45	35	28	23	131
7 AM	32	24	8	13	77	21	35	50	48	154
8 AM	6	9	13	12	40	67	39	44	18	168
9 AM	5	8	7	2	22	11	16	10	20	57
10 AM	3	2	6	4	15	14	21	16	20	71
11 AM	6	4	5	9	24	19	23	22	19	83
12 PM	2	3	5	8	18	15	17	24	22	78
1 PM	1	8	4	4	17	20	18	26	18	82
2 PM	3	10	18	5	36	13	13	29	24	79
3 PM	4	12	15	10	41	29	30	40	23	122
4 PM	24	7	19	3	53	24	15	17	13	69
5 PM	14	6	11	6	37	14	19	9	9	51
6 PM	1	2	2	0	5	16	10	12	13	51
7 PM	3	7	8	2	20	12	8	5	3	28
8 PM	0	1	1	0	2	20	3	5	7	35
9 PM	0	0	0	0	0	4	4	3	1	12
10 PM	0	0	4	0	4	3	2	3	3	11
11 PM	0	0	1	0	1	3	1	2	1	7
24 Hour	424					1,397				

AM Peak Hour: 251 7:15 AM to 8:15 AM
PM Peak Hour: 178 3:15 PM to 4:15 PM

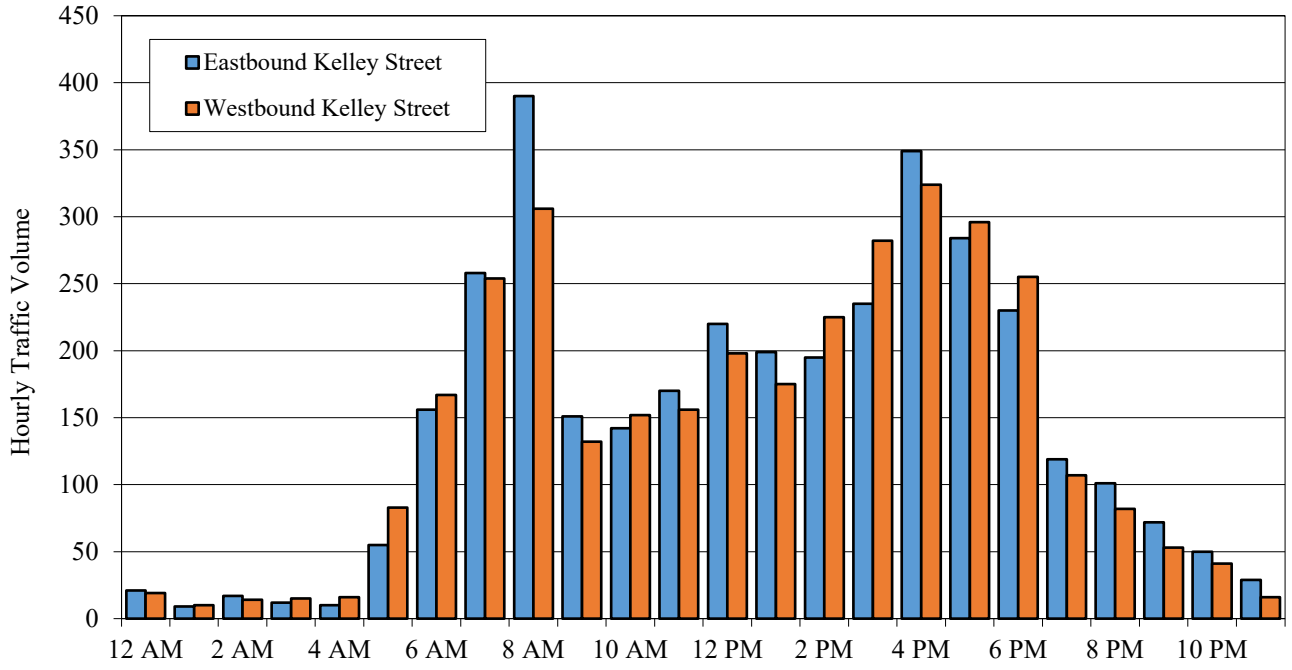


KELLEY STREET EAST OF IH 69 SOUTHBOUND FRONTAGE ROAD

24-Hour Traffic Counts - January 25, 2022

Time	Eastbound Kelley Street					Westbound Kelley Street				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	8	5	3	5	21	10	7	2	0	19
1 AM	4	2	0	3	9	2	5	1	2	10
2 AM	4	4	5	4	17	2	7	2	3	14
3 AM	2	4	3	3	12	5	2	6	2	15
4 AM	0	4	2	4	10	2	4	2	8	16
5 AM	6	8	18	23	55	5	16	19	43	83
6 AM	19	33	46	58	156	38	40	41	48	167
7 AM	56	67	62	73	258	38	54	86	76	254
8 AM	85	92	142	71	390	84	89	79	54	306
9 AM	46	38	36	31	151	31	35	35	31	132
10 AM	41	40	28	33	142	31	51	32	38	152
11 AM	39	41	52	38	170	28	40	43	45	156
12 PM	81	45	45	49	220	68	50	37	43	198
1 PM	41	51	59	48	199	55	31	50	39	175
2 PM	44	45	54	52	195	48	49	79	49	225
3 PM	53	59	60	63	235	71	61	73	77	282
4 PM	110	93	87	59	349	95	86	83	60	324
5 PM	77	72	65	70	284	72	84	85	55	296
6 PM	53	65	70	42	230	61	80	58	56	255
7 PM	38	33	27	21	119	41	30	22	14	107
8 PM	38	25	17	21	101	30	20	16	16	82
9 PM	10	27	19	16	72	13	15	14	11	53
10 PM	13	17	10	10	50	12	9	10	10	41
11 PM	8	9	6	6	29	3	4	5	4	16
24 Hour	3,474					3,378				

AM Peak Hour: 720 7:45 AM to 8:45 AM
PM Peak Hour: 694 3:45 PM to 4:45 PM

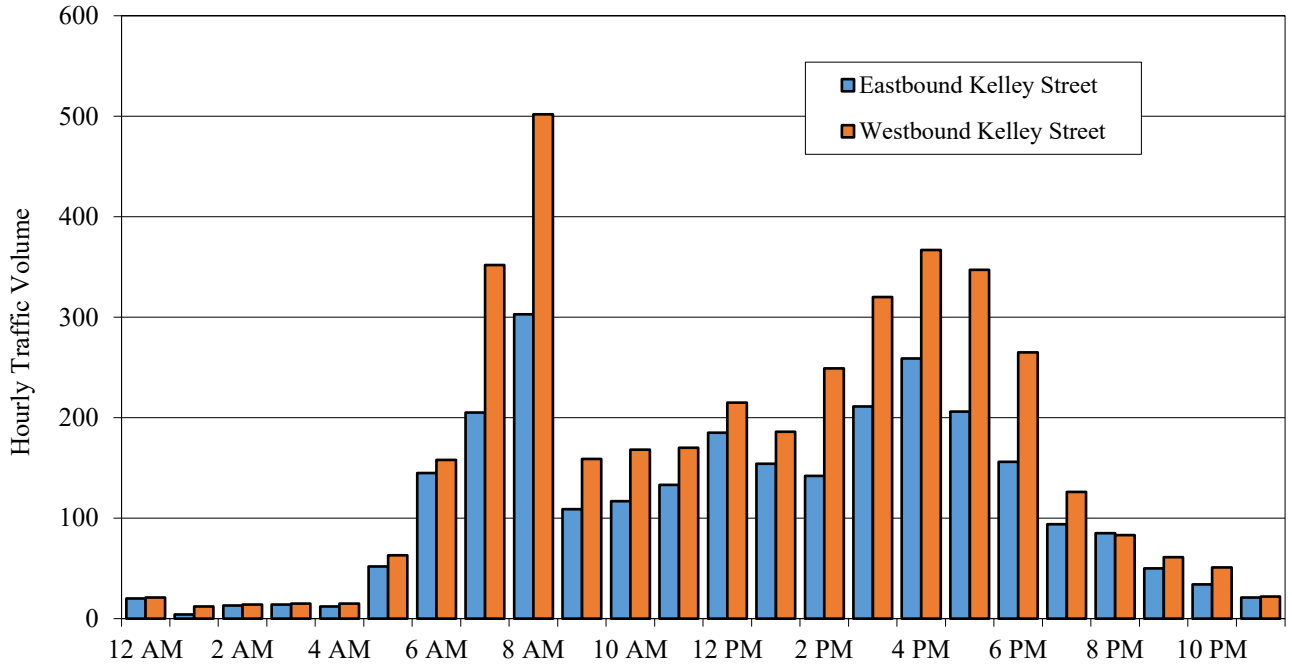


KELLEY STREET WEST OF IH 69 SOUTHBOUND FRONTAGE ROAD

24-Hour Traffic Counts - January 25, 2022

Time	Eastbound Kelley Street					Westbound Kelley Street				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	6	6	3	5	20	9	7	3	2	21
1 AM	2	1	0	1	4	2	5	1	4	12
2 AM	3	5	2	3	13	2	7	2	3	14
3 AM	1	7	3	3	14	4	3	5	3	15
4 AM	1	4	3	4	12	6	3	0	6	15
5 AM	6	8	14	24	52	2	14	15	32	63
6 AM	19	31	45	50	145	30	33	37	58	158
7 AM	37	49	52	67	205	74	86	93	99	352
8 AM	65	76	109	53	303	124	145	158	75	502
9 AM	38	27	21	23	109	45	39	41	34	159
10 AM	29	36	22	30	117	38	46	43	41	168
11 AM	30	35	42	26	133	39	48	39	44	170
12 PM	73	38	34	40	185	76	47	47	45	215
1 PM	31	37	42	44	154	57	36	47	46	186
2 PM	30	28	40	44	142	50	57	88	54	249
3 PM	45	60	59	47	211	67	74	83	96	320
4 PM	84	74	57	44	259	118	99	87	63	367
5 PM	71	46	41	48	206	91	87	96	73	347
6 PM	41	42	48	25	156	65	86	60	54	265
7 PM	32	27	21	14	94	38	41	31	16	126
8 PM	33	20	14	18	85	27	20	18	18	83
9 PM	6	18	12	14	50	14	18	17	12	61
10 PM	8	11	8	7	34	14	10	15	12	51
11 PM	6	6	4	5	21	5	5	8	4	22
24 Hour	2,724					3,941				

AM Peak Hour: 843 7:45 AM to 8:45 AM
PM Peak Hour: 662 3:45 PM to 4:45 PM

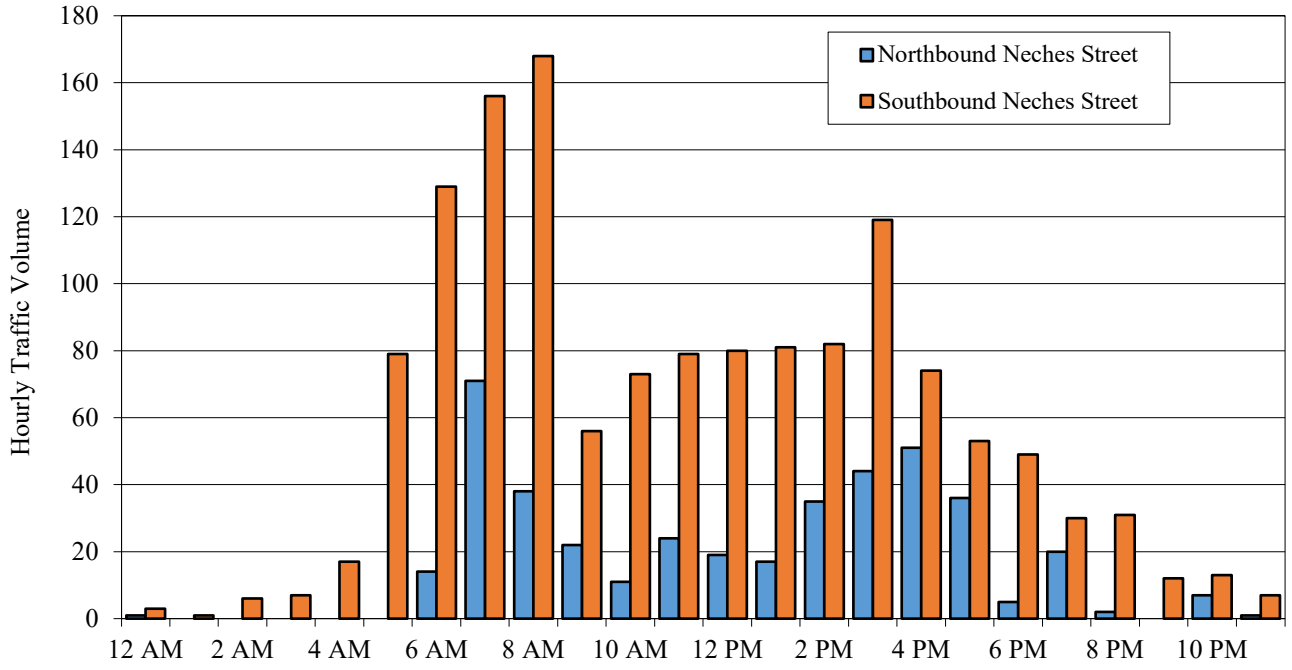


NECHES STREET NORTH OF DRIVEWAY 1

24-Hour Traffic Counts - January 25, 2022

Time	Northbound Neches Street					Southbound Neches Street				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	1	0	0	0	1	2	1	0	0	3
1 AM	0	0	0	0	0	0	1	0	0	1
2 AM	0	0	0	0	0	0	1	4	1	6
3 AM	0	0	0	0	0	1	3	2	1	7
4 AM	0	0	0	0	0	2	2	5	8	17
5 AM	0	0	0	0	0	8	8	23	40	79
6 AM	2	1	0	11	14	42	35	26	26	129
7 AM	34	17	8	12	71	25	33	49	49	156
8 AM	6	11	9	12	38	70	36	44	18	168
9 AM	4	9	6	3	22	15	13	11	17	56
10 AM	2	3	4	2	11	15	22	15	21	73
11 AM	6	4	6	8	24	18	23	22	16	79
12 PM	3	2	5	9	19	18	16	25	21	80
1 PM	1	7	4	5	17	22	16	25	18	81
2 PM	4	8	18	5	35	15	16	26	25	82
3 PM	4	14	14	12	44	27	25	46	21	119
4 PM	22	7	18	4	51	27	14	20	13	74
5 PM	13	6	11	6	36	13	21	9	10	53
6 PM	1	2	2	0	5	12	11	13	13	49
7 PM	4	8	6	2	20	12	8	6	4	30
8 PM	0	1	1	0	2	18	3	4	6	31
9 PM	0	0	0	0	0	5	4	3	0	12
10 PM	0	0	7	0	7	4	3	2	4	13
11 PM	0	0	1	0	1	2	2	1	2	7
24 Hour	418					1,405				

AM Peak Hour: 244 7:15 AM to 8:15 AM
PM Peak Hour: 181 3:15 PM to 4:15 PM

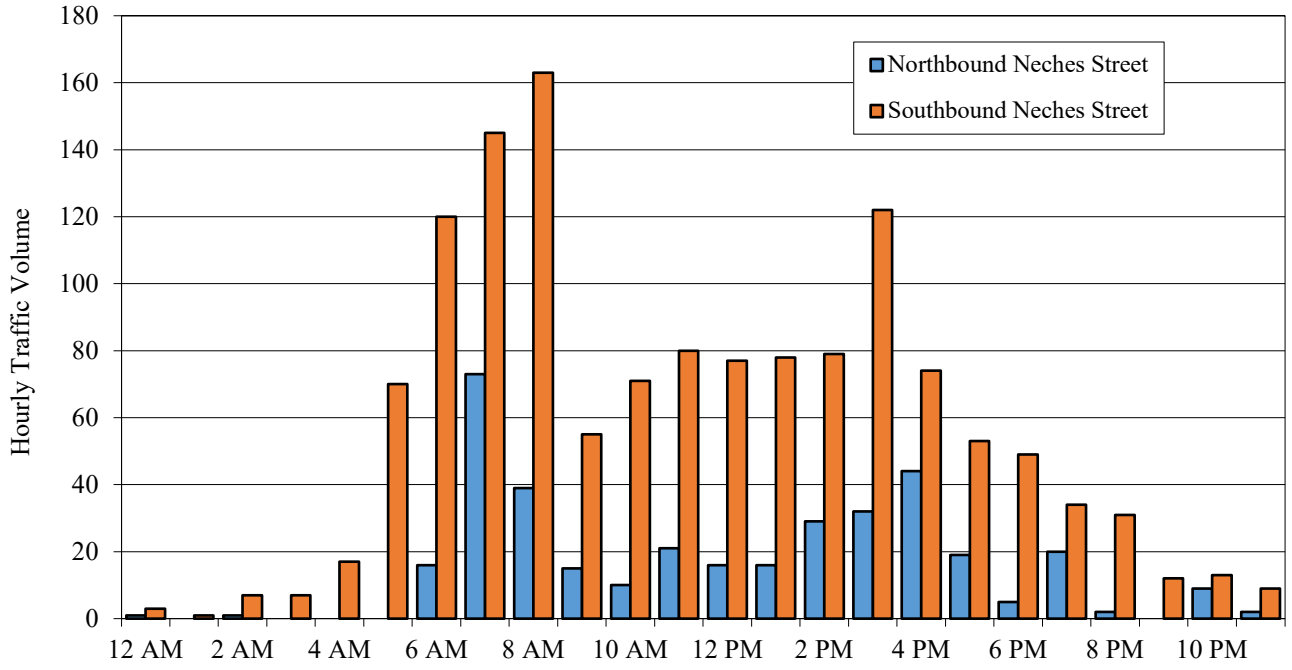


NECHES STREET SOUTH OF DRIVEWAY 1

24-Hour Traffic Counts - January 25, 2022

Time	Northbound Neches Street					Southbound Neches Street				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	1	0	0	0	1	2	1	0	0	3
1 AM	0	0	0	0	0	0	1	0	0	1
2 AM	0	0	1	0	1	0	1	5	1	7
3 AM	0	0	0	0	0	1	3	2	1	7
4 AM	0	0	0	0	0	2	2	5	8	17
5 AM	0	0	0	0	0	7	8	19	36	70
6 AM	0	1	0	15	16	39	30	25	26	120
7 AM	35	19	9	10	73	24	33	42	46	145
8 AM	8	9	9	13	39	65	40	43	15	163
9 AM	2	6	5	2	15	14	14	11	16	55
10 AM	1	3	3	3	10	12	20	16	23	71
11 AM	4	4	5	8	21	19	23	23	15	80
12 PM	2	2	4	8	16	18	16	24	19	77
1 PM	0	8	3	5	16	22	15	24	17	78
2 PM	4	6	15	4	29	13	16	26	24	79
3 PM	3	13	5	11	32	23	26	48	25	122
4 PM	20	7	14	3	44	28	13	19	14	74
5 PM	5	4	6	4	19	14	20	8	11	53
6 PM	1	2	2	0	5	12	11	13	13	49
7 PM	4	8	6	2	20	13	8	6	7	34
8 PM	0	1	1	0	2	18	3	4	6	31
9 PM	0	0	0	0	0	5	4	3	0	12
10 PM	0	0	9	0	9	3	4	2	4	13
11 PM	0	0	1	1	2	2	2	2	3	9
24 Hour	370					1,370				

AM Peak Hour: 232 7:15 AM to 8:15 AM
PM Peak Hour: 176 3:15 PM to 4:15 PM

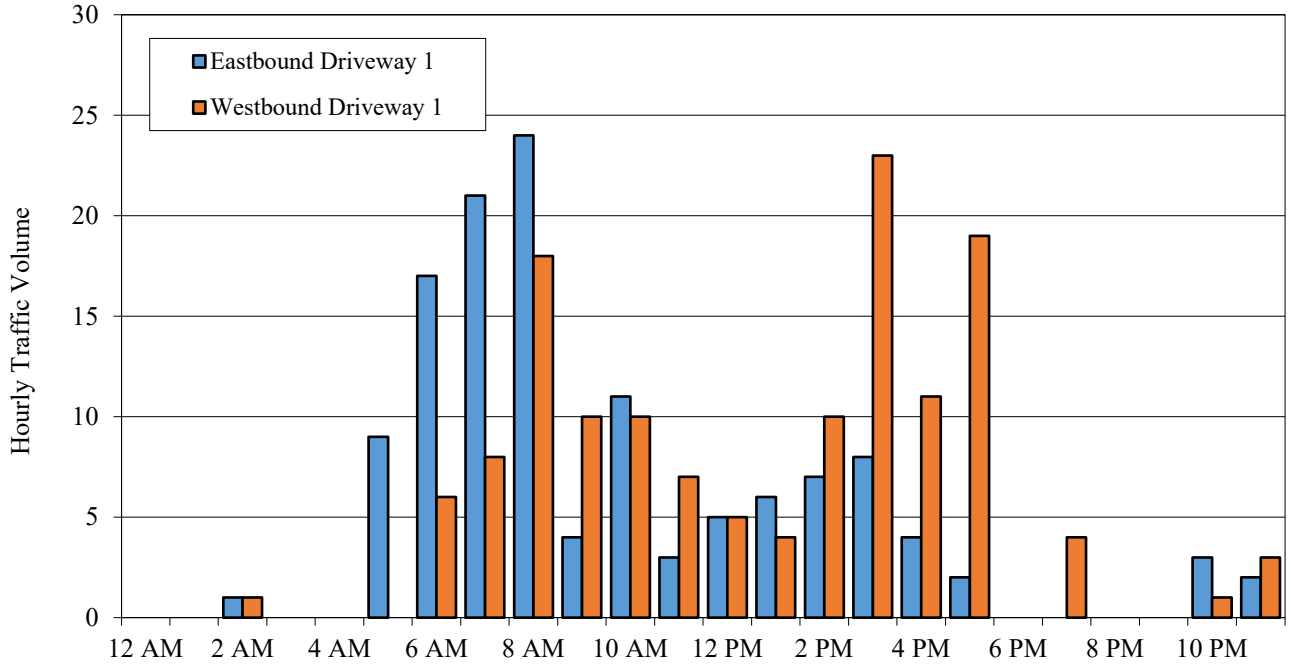


DRIVEWAY 1 EAST OF NECHES STREET

24-Hour Traffic Counts - January 25, 2022

Time	Eastbound Driveway 1					Westbound Driveway 1				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	0	0	0	0	0	0	0	0	0	0
1 AM	0	0	0	0	0	0	0	0	0	0
2 AM	0	0	1	0	1	0	0	1	0	1
3 AM	0	0	0	0	0	0	0	0	0	0
4 AM	0	0	0	0	0	0	0	0	0	0
5 AM	1	0	4	4	9	0	0	0	0	0
6 AM	3	5	2	7	17	2	0	1	3	6
7 AM	3	4	10	4	21	1	2	2	3	8
8 AM	9	3	4	8	24	2	9	3	4	18
9 AM	2	1	0	1	4	3	5	1	1	10
10 AM	3	4	2	2	11	1	2	4	3	10
11 AM	1	1	0	1	3	4	1	2	0	7
12 PM	0	0	1	4	5	1	0	1	3	5
1 PM	2	2	1	1	6	3	0	1	0	4
2 PM	2	1	2	2	7	0	3	5	2	10
3 PM	4	1	1	2	8	1	3	12	7	23
4 PM	1	2	1	0	4	4	1	4	2	11
5 PM	0	1	1	0	2	9	2	5	3	19
6 PM	0	0	0	0	0	0	0	0	0	0
7 PM	0	0	0	0	0	1	0	0	3	4
8 PM	0	0	0	0	0	0	0	0	0	0
9 PM	0	0	0	0	0	0	0	0	0	0
10 PM	1	0	2	0	3	0	1	0	0	1
11 PM	0	0	1	1	2	0	0	2	1	3
24 Hour	127					140				

AM Peak Hour: 42 8:00 AM to 9:00 AM
PM Peak Hour: 31 3:15 PM to 4:15 PM

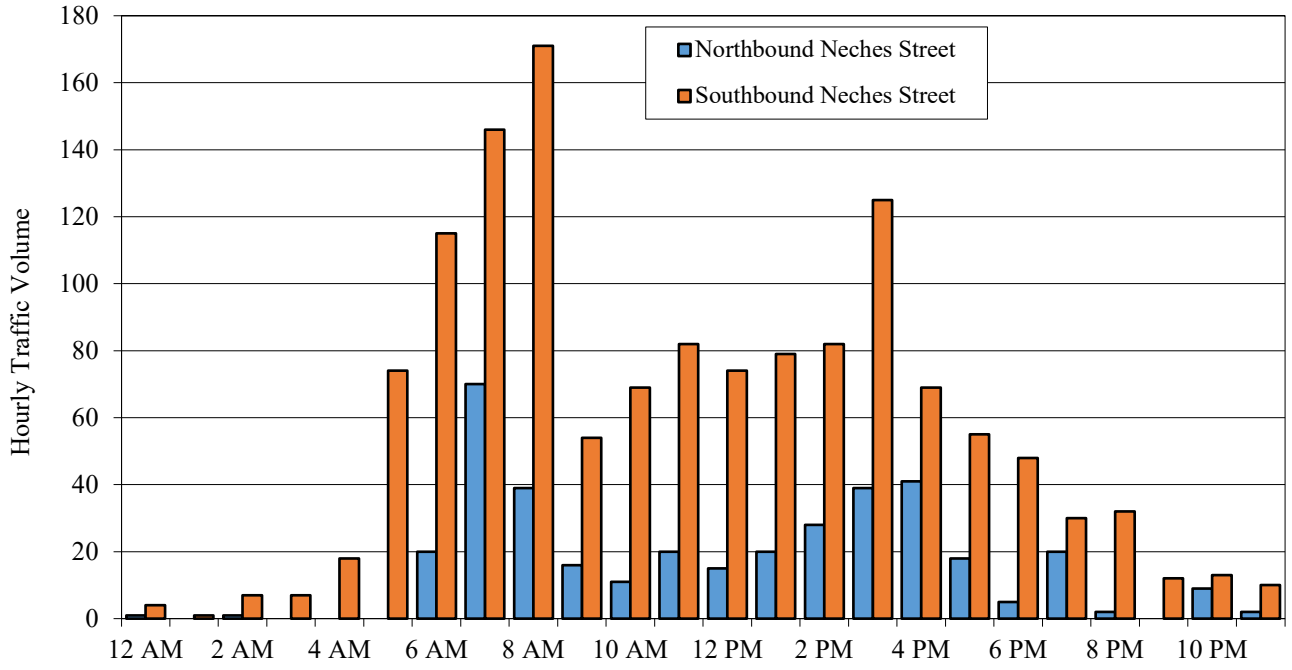


NECHES STREET NORTH OF HOV ACCESS

24-Hour Traffic Counts - January 25, 2022

Time	Northbound Neches Street					Southbound Neches Street				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	1	0	0	0	1	2	2	0	0	4
1 AM	0	0	0	0	0	0	1	0	0	1
2 AM	0	0	1	0	1	0	1	5	1	7
3 AM	0	0	0	0	0	1	3	3	0	7
4 AM	0	0	0	0	0	3	2	4	9	18
5 AM	0	0	0	0	0	6	9	22	37	74
6 AM	0	1	2	17	20	36	30	25	24	115
7 AM	32	20	8	10	70	22	33	43	48	146
8 AM	7	7	12	13	39	65	37	49	20	171
9 AM	3	6	5	2	16	15	12	13	14	54
10 AM	2	3	4	2	11	11	20	16	22	69
11 AM	5	3	7	5	20	17	25	22	18	82
12 PM	2	3	4	6	15	18	15	23	18	74
1 PM	2	6	5	7	20	21	18	22	18	79
2 PM	5	5	13	5	28	16	16	26	24	82
3 PM	4	16	9	10	39	26	29	46	24	125
4 PM	19	7	12	3	41	24	15	16	14	69
5 PM	4	5	5	4	18	17	18	7	13	55
6 PM	1	2	2	0	5	11	10	12	15	48
7 PM	4	8	6	2	20	10	8	6	6	30
8 PM	1	0	1	0	2	19	3	4	6	32
9 PM	0	0	0	0	0	5	4	3	0	12
10 PM	0	1	8	0	9	3	4	2	4	13
11 PM	0	0	1	1	2	2	2	2	4	10
24 Hour	377					1,377				

AM Peak Hour: 235 7:45 AM to 8:45 AM
PM Peak Hour: 177 3:15 PM to 4:15 PM

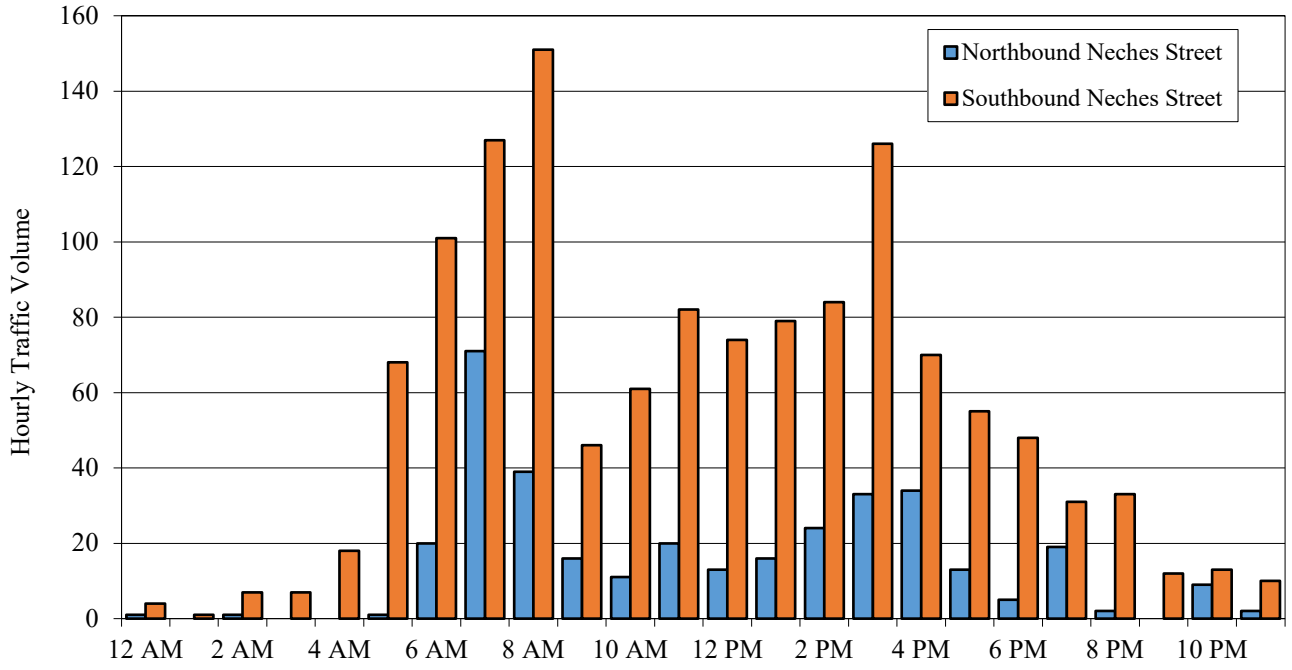


NECHES STREET SOUTH OF HOV ACCESS

24-Hour Traffic Counts - January 25, 2022

Time	Northbound Neches Street					Southbound Neches Street				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	1	0	0	0	1	2	2	0	0	4
1 AM	0	0	0	0	0	0	1	0	0	1
2 AM	0	0	1	0	1	0	1	5	1	7
3 AM	0	0	0	0	0	1	3	3	0	7
4 AM	0	0	0	0	0	3	2	4	9	18
5 AM	0	0	0	1	1	5	8	20	35	68
6 AM	0	1	2	17	20	33	28	20	20	101
7 AM	32	20	8	11	71	18	29	42	38	127
8 AM	7	7	12	13	39	59	31	44	17	151
9 AM	3	6	5	2	16	13	10	10	13	46
10 AM	2	3	4	2	11	8	17	15	21	61
11 AM	5	3	7	5	20	17	25	22	18	82
12 PM	2	3	4	4	13	18	15	23	18	74
1 PM	1	4	4	7	16	21	18	22	18	79
2 PM	5	4	12	3	24	17	17	26	24	84
3 PM	3	12	9	9	33	27	29	46	24	126
4 PM	17	7	10	0	34	24	16	16	14	70
5 PM	4	4	3	2	13	17	18	7	13	55
6 PM	1	2	2	0	5	11	10	12	15	48
7 PM	4	8	5	2	19	10	9	6	6	31
8 PM	1	0	1	0	2	20	3	4	6	33
9 PM	0	0	0	0	0	5	4	3	0	12
10 PM	0	1	8	0	9	3	4	2	4	13
11 PM	0	0	1	1	2	2	2	2	4	10
24 Hour	350					1,308				

AM Peak Hour: 214 7:15 AM to 8:15 AM
PM Peak Hour: 170 3:15 PM to 4:15 PM

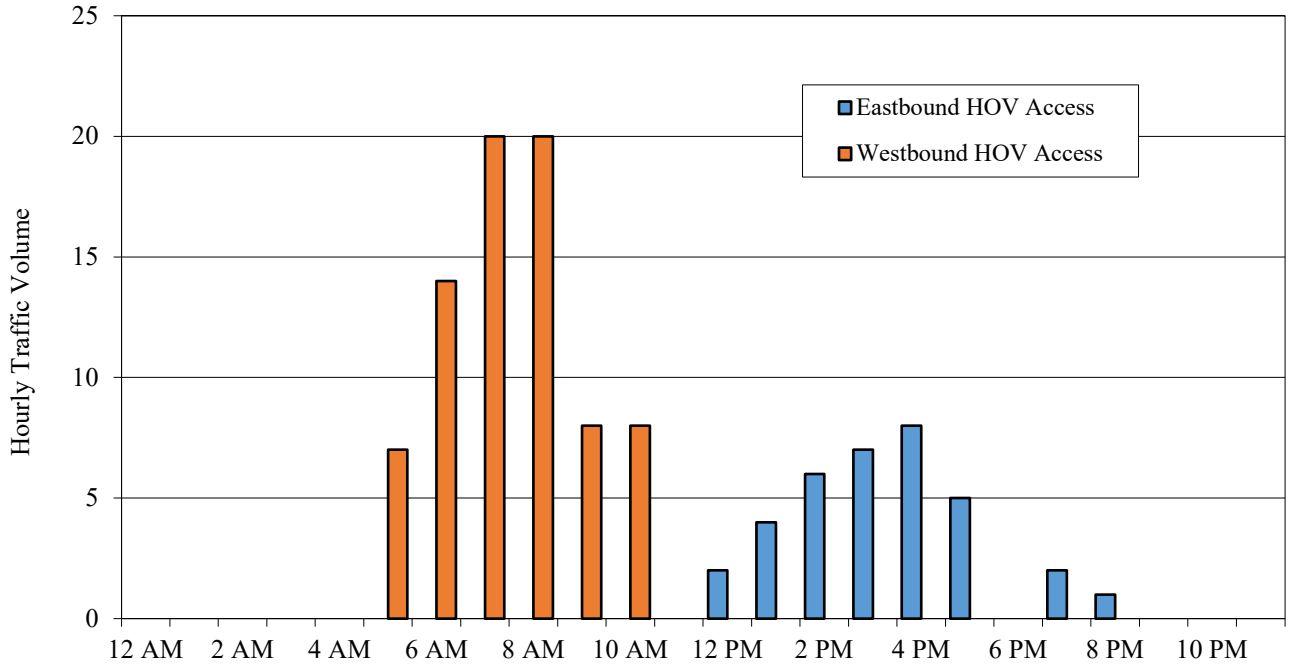


HOV ACCESS WEST OF NECHES STREET

24-Hour Traffic Counts - January 25, 2022

Time	Eastbound HOV Access					Westbound HOV Access				
Start	:00	:15	:30	:45	Ttl.	:00	:15	:30	:45	Ttl.
12 AM	0	0	0	0	0	0	0	0	0	0
1 AM	0	0	0	0	0	0	0	0	0	0
2 AM	0	0	0	0	0	0	0	0	0	0
3 AM	0	0	0	0	0	0	0	0	0	0
4 AM	0	0	0	0	0	0	0	0	0	0
5 AM	0	0	0	0	0	1	1	2	3	7
6 AM	0	0	0	0	0	3	2	5	4	14
7 AM	0	0	0	0	0	4	4	1	11	20
8 AM	0	0	0	0	0	6	6	5	3	20
9 AM	0	0	0	0	0	2	2	3	1	8
10 AM	0	0	0	0	0	3	3	1	1	8
11 AM	0	0	0	0	0	0	0	0	0	0
12 PM	0	0	0	2	2	0	0	0	0	0
1 PM	1	2	1	0	4	0	0	0	0	0
2 PM	1	2	1	2	6	0	0	0	0	0
3 PM	2	4	0	1	7	0	0	0	0	0
4 PM	2	1	2	3	8	0	0	0	0	0
5 PM	0	1	2	2	5	0	0	0	0	0
6 PM	0	0	0	0	0	0	0	0	0	0
7 PM	0	1	1	0	2	0	0	0	0	0
8 PM	1	0	0	0	1	0	0	0	0	0
9 PM	0	0	0	0	0	0	0	0	0	0
10 PM	0	0	0	0	0	0	0	0	0	0
11 PM	0	0	0	0	0	0	0	0	0	0
24 Hour			35					77		

AM Peak Hour: 28 7:45 AM to 8:45 AM
PM Peak Hour: 9 2:30 PM to 3:30 PM



https://worldpopulationreview.com/us-counties/tx/harris-county-population

Harris County, Texas Population 2022

Harris County, Texas's estimated population is 4,813,165 with a growth rate of 0.70% in the past year according to the most recent United States census data. Harris County, Texas is the 2nd largest county inTexas. The 2010 Population was 4,107,666 and has seen a growth of 17.18% since this time.

Note: 2021 and 2022 data is projected

#FVY#VR Q#

Year	Population	Growth	Annual Growth Rate
2022	4,813,165	33,280	0.70%
2021	4,779,885	33,280	0.70%
2020	4,746,605	33,280	0.71%
2019	4,713,325	33,280	0.71%
2018	4,680,045	22,073	0.47%
2017	4,657,972	34,012	0.74%
2016	4,623,960	66,114	1.45%
2015	4,557,846	101,852	2.29%
2014	4,455,994	102,807	2.36%
2013	4,353,187	90,093	2.11%
2012	4,263,094	83,526	2.00%
2011	4,179,568	71,902	1.75%
2010	4,107,666	1,289,466	45.75%
1990	2,818,200	408,650	16.96%
1980	2,409,550	667,640	38.33%
1970	1,741,910	498,750	40.12%
1960	1,243,160	436,459	54.10%
1950	806,701	277,740	52.51%
1940	528,961	169,633	47.21%

Year	Population	Growth	Annual Growth Rate
1930	359,328	172,661	92.50%
1920	186,667	70,974	61.35%
1910	115,693	51,907	81.38%
1900	63,786	26,537	71.24%
1890	37,249	9,264	33.10%
1880	27,985	10,610	61.06%
1870	17,375	8,305	91.57%
1860	9,070	4,402	94.30%
1850	4,668		0.00%

https://www.houstontx.gov/planning/transportation/docs_pdfs/2015_PolicyStatement.pdf

City of Houston Major Thoroughfare and Freeway Plan Policy Statement

Volume Thresholds

Volume thresholds are indicative of LOS as defined per day. Current traffic volumes for streets within the city limits were obtained from the City of Houston, PWE, Traffic Management Branch and TxDOT.

Based on national research and observations in the Houston area, the following volume thresholds have been established to determine capacity needs for planning purposes.

ADT, veh/day	2-Lane Road	4-Lane Road	6-Lane Road
Maximum Throughput to maintain reasonable LOS	14,000-16,000	30,000-33,000	40,000-45,000

Attachment II–9 Geotechnical Evaluation

Geotechnical Evaluation
New Multi-Use SWMD Facility
5711 Neches Street
Houston, Texas

RDLR Architects, Inc.

800 Sampson Street, Suite 104 | Houston, Texas 77003

March 15, 2022 | Project No. 701099001

Environmental | Construction Inspection & Testing | Forensic Engineering & Expert Witness

Geophysics | Engineering Geology | Laboratory Testing | Industrial Hygiene | Occupational Safety | Air Quality | GIS

CELEBRATING 35 YEARS

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Geotechnical & Environmental Sciences Consultants

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CELEBRATING 35 YEARS

March 15, 2022
Project No. 701099001

Mr. Daniel Ortiz, AIA – LEED AP
RDLR Architects
800 Sampson Street, Suite 104
Houston, Texas 77003

Subject: Geotechnical Evaluation
New Multi-Use Solid Waste Management Department (SWMD) Facility
5711 Neches Street
Houston, Texas

Dear Mr. Ortiz:

The attached report presents our methodology, findings, geotechnical considerations, and recommendations for design and construction of the planned Multi-use SWMD facility.

We appreciate the opportunity to be of service to you during this phase of the project.

Sincerely,
NINYO & MOORE
TBPE Firm No. F-9782

Ronald A. Gutierrez
Graduate Engineer

Jeffrey S. Rodgers, PE, PG
Principal Engineer

STATE OF TEXAS
JEFFREY S. RODGERS
118726
LICENSED PROFESSIONAL ENGINEER
3/15/2022

RAG/JSR/JTS/ls

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EXECUTIVE SUMMARY

Ninyo & Moore was selected to perform a geotechnical evaluation for the new multi-use (Solid Waste Management District) SWMD Facility Project. The project consists of the design and construction of a new solid waste management transfer facility located at 5711 Neches Street, Houston, Texas.

The project will include the demolition of an existing building and the design and construction of a new solid waste material transfer building, radio tower equipment, new scales, and concrete-paved drive paths. In addition, new retaining walls and a detention pond are planned for this project. Based on grading plans, we understand at some areas the grade will be raised by 6 to 12 feet above existing grade. Retaining walls are planned to support abrupt changes in grade at some areas.

The new transfer station and radio tower equipment building will be single-story structures supported on slabs-on-grade. Structural loading was not available at the time of our report; however, we assume the loads will be typical for these structure types.

The purpose of our evaluation was to assess the subsurface conditions at the site to provide geotechnical recommendations for the design and construction of the project. Field exploration and laboratory testing were performed in general accordance with the City of Houston Geotechnical Guidelines, dated July 2020.

From January 20 through 26, 2022, Ninyo & Moore performed a subsurface exploration at the site to evaluate the subsurface conditions and collect soil samples for laboratory testing. Our evaluation consisted of drilling, logging, and sampling nine exploratory soil borings, designated as B-1 through B-9 (Figure 2). Boring B-3 was moved from the original location due to an obstruction 7½ feet below the ground surface (bgs). Laboratory tests performed consisted of natural moisture contents, Atterberg limits, percent of soil particles passing No. 200 Sieve, and unconfined compression.

Pavement was encountered at the surface of each of our borings, except for Borings B-2 and B-9. In Borings B-1, B-3, B-4, and B-5, the pavement consisted of Portland cement concrete (PCC) and ranged in thickness from about 6 to 7 inches. Borings B-4 and B-5 had approximately 1¼ inches asphalt concrete overlying PCC pavement. In Borings B-6 through B-8, approximately 2 inches of asphalt concrete was observed overlying 5 to 8 inches of limestone base.

Fill soils were encountered below the pavement in Borings B-2, B-3, B-6, B-7, and B-9. The fill generally extended to depths of about 2 to 8 feet bgs and consisted of lean clays (CL) with varying sand fractions.

Naturally-deposited soils from the Beaumont Formation were encountered underlying the existing pavement and/or fill soils and extended to the total explored depths of about 10 to 30 feet bgs. These soils generally consisted of interlayered deposits of cohesive lean and fat clays (CL, CH). A 2-foot silty sand layer (SM) was encountered in borings B-2 and B-5 at a depth of about 14 feet.

The borings were initially drilled using dry-auger techniques in an attempt to measure depth-to-water in the open boreholes. Free water was encountered in each of our borings, except Boring B-9, at about 10 to 16 feet bgs. Mud rotary drilling methods were used below approximately 10 to 16 feet to the termination of Borings B-1 through B-5. Because this method introduces water and drilling mud into the boreholes, after-drilling water level readings were not performed in these borings. Water level readings were recorded to be at about 6 feet bgs in Boring B-8 after 24 hours.

Existing buildings currently occupy the site, including portions of the new building footprint. Foundation remnants or other obstructions from previous structures may also be encountered during construction. The demolition contractor should discuss any existing foundation elements

observed or suspected within the planned building footprint with the Geotechnical Engineer-of-Record prior to removal.

We understand that about 10 to 12 feet of new fill will be placed for the new building, therefore, within the area of the existing structure, we recommend the upper 4 feet of existing fill be completely removed and proofrolled. After proofrolling, a layer of geogrid (TX160 or equivalent) should be placed on the exposed subgrade and any new fill to raise the grade should be engineered fill and should be placed as outlined in the Fill and Compaction section of this report. The edges of the excavations should be sloped at 3:1(Horizontal:Vertical) to avoid any abrupt changes in fill thickness.

A PVR of about 2½ inches was calculated for the conditions observed at this site. We understand the radio and solid transfer buildings will be elevated approximately 12 feet above existing grade. We recommend fill placed below the building structures consist of select, engineered fill. For structures constructed at or near the natural grade, we recommend a 3½-foot-thick select, engineered fill pad be placed below the structures. Clayey general fill with a PI comparable to that of the native clay is appropriate for fill below the recommended 3½-foot-thick select, engineered fill building pad. Select, engineered fill pads should extend a distance of 5 feet laterally beyond the structures.

Shallow spread, strip, and/or combined footings should bear on compacted engineered fill at a depth of 2 feet or more bgs for the retaining walls around the radio building. The footings may be designed using an allowable bearing pressure of 2,000 psf. This bearing pressure is based on a factor of safety of 3. This value may be increased by a factor of 1/3 for transient loads, such as wind and seismic. Continuous (strip) footings should have a width of 18 inches or more and isolated spread footings should have a width of 24 inches or more.

Due to the relatively high settlement potential of the undocumented fill at the site, we recommend supporting the new SWMD building and the retaining walls between the SWMD building and detention pond on drilled-and-underreamed piers. Drilled-and-underreamed piers should bear on stiff, naturally deposited clays at a depth of 10 feet below the existing ground surface (at the time of our study). The piers should be designed as end-bearing units using an allowable bearing pressure of 4,000 psf for dead plus sustained live loads. This value may be increased by a factor of 1/3 for total loads, including wind and seismic. The bottom of the piers should bear at a depth such that the bells are cut from undisturbed, naturally deposited, cohesive soils.

Alternatively, the new SWMD building and the retaining walls between the SWMD building and detention pond may be supported on straight-sided drilled shafts. Straight-sided drilled shafts should be designed as friction units proportioned using an allowable unit skin friction of 450 psf in compression. We recommend drilled shafts have a diameter of 24 inches or more. The contribution of skin friction for the upper 10 feet of the newly placed fill should be neglected due to seasonal moisture variation and construction-related disturbance. End bearing should also be neglected.

We understand the detention pond will be at a depth of about 5 feet. Cohesive soils were encountered in the borings performed for this study within the planned pond depths. We recommend 3:1 (horizontal to vertical) slopes or flatter should be used for slopes less than 10 feet in height in cohesive soils; 4:1 or flatter slopes should be used where cohesionless soils are encountered.

The water level should not be allowed to drop quickly after water has remained ponded for an extended period of time (such that the side slopes have become saturated), which would result in a rapid draw-down condition. The condition of side slopes (erosion and/or surface sloughing) should be evaluated and repaired as part of routine maintenance program.

The subgrade soils should then be chemically treated to a depth of 8 inches. Based on the borings performed for this study, the pavement subgrade will consist primarily of moderate to high-plasticity clays. Chemical treatment for this type of soil should consist of lime treatment. Lime treatment for cohesive soils should be done in accordance with City of Houston (COH) Standard Specifications, Section 02336.

The soils should be mixed with a sufficient quantity of hydrated lime to reduce the soil-lime mixture plasticity index to 20 or less. If a PI of 20 is not achievable, sufficient lime should be added until the pH reaches a value of about 12.4 (or lime fixation). The soil and lime should be blended for the lime treatment to be effective. For estimating purposes, we recommend about 6 to 8 percent lime by dry soil weight be assumed.

We understand Portland cement concrete (PCC) pavements are planned for the project parking and driveway areas. There will be a high volume of heavy vehicles throughout the project site. Based on the COH Infrastructure Design Manual, we recommend a pavement section of 10 inches thick or more of PCC overlaying 8 inches of chemically lime treated subgrade.

Concrete pavements should have longitudinal and transverse joints as designed by the Civil Engineer. We recommend reinforcement for the concrete pavement areas consist of No. 4 reinforcing bars placed 24 inches on-center (each way) in the middle one-third of slab height.

1 INTRODUCTION

1.1 Authorization

In accordance with our proposal dated September 1, 2020, the Standard Form of Agreement Between Architect and Consultant dated June 8, 2021, and your authorization, Ninyo & Moore has performed a geotechnical evaluation for the planned transfer facility located at 5711 Neches Street in Houston, Texas (Figure 1). The purpose of our evaluation was to assess the subsurface conditions at the site to provide geotechnical recommendations for the design and construction of the project. Field exploration and laboratory testing were performed in general accordance with the City of Houston Geotechnical Guidelines, dated July 2020.This report presents the results of our evaluation, geotechnical considerations, and geotechnical design parameters for the planned structures.

1.2 Location and Description of the Project

The project site is located at 5711 Neches Street in Houston, Texas. The site is currently the City of Houston Radio Systems Management. At the time of our field evaluation, there was an existing building raised approximately 7-feet above grade. The building is surrounded by a concrete driveway/ramp and an asphalt parking lot. A small portion of the footprint was vegetated with grass. The project site is bounded by Kelly Street to the north, Neches Street to the east, I-69 HOV on/off ramp to the south and I-69 HOV to the west. Hunting Bayou is located approximately ½-mile south of the project site.

Based on the topography survey from KUO & Associates, Inc, the elevation of the site ranges from about 46 to 54 feet relative to mean sea level (MSL). Based on the information presented on this topographic quadrangle map, the natural topography of the site is generally flat, sloping gradually down from the northwest to the southeast.

Aerial photographs dated 1944 through 2020 were reviewed for this project. Photographs dated 1944 to 1977 depict the project site as undeveloped, vacant land. Neches Street is depicted in a photograph dated 1973. A photograph dated 1978 depicts a structure and associated parking/driveways. A photograph dated 1989 depicts an expansion to the parking/driveways. A photograph dated 2002 depicts a portion of the western side of the property is removed for the I-69 HOV lane. Photographs dating 2002 through 2021 show the site as being similar to its current condition.

1.3 Purpose

The project consists of the design and construction of a new solid waste management transfer facility in Houston, Texas. The project will include the demolition of an existing building and the design and construction of a new solid waste material transfer building, radio tower equipment, new scales, and concrete-paved drive paths. In addition, new retaining walls and a detention pond are planned for this project.

Based on grading plans, we understand at some areas the grade will be raised by 6 to 12 feet above existing grade. The building area grades will be raised about 10 feet. Retaining walls are planned to support abrupt changes in grade at some areas.

The new transfer station and radio tower equipment building will be single-story structures supported on slabs-on-grade. Structural loading was not available at the time of our report; however, we assume the loads will be typical for these structure types.

1.4 Scope of Services

Our scope of services included the following:

- Reviewing readily available published and in-house geological literature, including maps and reports pertaining to the project site and vicinity.
- Performing a visual reconnaissance of the site, marking out boring locations, and notifying Texas811 of the boring locations prior to drilling.
- Drilling, logging, and sampling nine exploratory soil borings to depths ranging from about 10 to 30 feet below the existing ground surface.
- Performing laboratory tests on selected samples obtained from our borings to evaluate the in-situ moisture content, percent of particles finer than No. 200 sieve, Atterberg limits, and shear strength.
- Compiling the collected data and performing engineering analyses.
- Preparing this report presenting our findings, conclusions, and recommendations regarding the design and construction of the project.

Our scope of services did not include environmental consulting services such as hazardous waste sampling or analytical testing at the site. In addition, a fault study was beyond the scope of this study. If needed, a scope and fee for these services can be provided.

2 FIELD INVESTIGATION

2.1 General

From January 20 through 26, 2022, Ninyo & Moore performed a subsurface exploration at the site to evaluate the subsurface conditions and collect soil samples for laboratory testing. Our evaluation consisted of drilling, logging, and sampling nine exploratory soil borings, designated as B-1 through B-9 (Figure 2). Boring B-3 was moved from the original location due to an obstruction 7½ feet below the ground surface (bgs). The borings were drilled using a drill rig mounted on an all-terrain vehicle and equipped with straight-flight augers and rotary wash equipment.

2.2 Geotechnical Borings

Soil samples were collected at selected intervals and were logged in general accordance with American Society of Testing Materials (ASTM) standard D2488. Disturbed soil samples were collected during Standard Penetration testing using a split-spoon sampler. Relatively undisturbed soil samples were collected at regular intervals by hydraulically pushing Shelby tube samplers. A pocket penetrometer was used to approximate the unconfined compressive strength as an indicator of soil consistency for intact cohesive samples. The boring excavations were backfilled with soil cuttings. The borings, except B-2 and B-9, were patched with concrete or asphalt on conclusion of our fieldwork.

Brief descriptions of field sampling procedures used are presented on Figure A-1, Explanation of Field Sampling Procedures, in Appendix A. Descriptions of the soils encountered in our borings are presented on boring logs in Appendix A.

3 LABORATORY TESTING

The soil samples collected from our drilling activities were transported to our laboratory for geotechnical laboratory testing. Selected samples were visually classified and tested to evaluate their engineering properties as a basis for providing geotechnical design recommendations and construction considerations. Laboratory testing included natural moisture contents (ASTM D 2216), Atterberg limits (ASTM D 4318 Method B), percent of particles finer than the No. 200 sieve (ASTM D 1140), and unconfined compression tests (ASTM D 2166).

Brief descriptions of laboratory test procedures used are presented on Figure B-1, Methods of Laboratory Testing, in Appendix B. Individual test results are presented either on the boring logs or on summaries of laboratory results found on Figures B-2 through B-4 in Appendix B.

4 SUBSURFACE CONDITIONS

The geology and subsurface conditions at the site are described in the following sections.

4.1 Geology

The site is located in the West Gulf Coastal Plain Province of the Atlantic Plain physiographic region. This province extends from the southern tip of Texas along the Gulf Coast to the Mississippi Alluvial Plain to the east. This physiographic region is characterized as a gently sloping plain with gentle rolling hills.

The Geologic Atlas of Texas, Houston Sheet (1982) describes the geology of the site as the Beaumont Formation. The Beaumont Formation is heterogeneous, containing interlayered deposits of clay, sand, and silt. According to the USDA Web Soil Survey, the native surficial soils at the project site consist of Mocarey-Urban land complex. This soil type generally exhibits non-plastic to high plasticity.

4.2 General Fault Information

The following sections describe potential geologic hazards at the site, including faulting and seismicity.

4.2.1 Surface Faulting

A fault study was not part of our scope of work for this project. Based on a review of published geologic data in our library, the closest documented surface expression of a non-seismic growth fault to the project area is the Pecore East, mapped about ½-mile south of the project site (USGS, 2005). This fault trends in the direction of the site.

4.2.2 Seismic Design Considerations

Design of the proposed improvements should be performed in accordance with the requirements of the governing jurisdictions and applicable building codes. Table 1 presents the seismic design parameters for the site in accordance with the 2015 International Building Code (IBC) guidelines and adjusted maximum considered earthquake spectral response acceleration parameters evaluated using the web-based Structural Engineers Association of California (SEAOC) Seismic Design Map tool.

Table 1 – 2015 International Building Code Seismic Design Criteria

Site Coefficients and Spectral Response Acceleration Parameters	Values
Site Class	D
Site Coefficient, F_a	1.6
Site Coefficient, F_v	2.4
Mapped Spectral Acceleration at 0.2-second Period, S_s	0.072g
Mapped Spectral Acceleration at 1.0-second Period, S_1	0.039g
Spectral Acceleration at 0.2-second Period Adjusted for Site Class, S_{MS}	0.116g
Spectral Acceleration at 1.0-second Period Adjusted for Site Class, S_{M1}	0.094g
Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	0.077g
Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	0.062g

4.3 Soils Stratigraphy

Our understanding of the subsurface conditions at the project site is based on the results of our field exploration, laboratory tests, and our experience. More detailed stratigraphic information as well as a key to the soil symbols and terms used on the boring logs is provided in Appendix A. The boring logs contain our field and laboratory test results, as well as our interpretation of conditions believed to exist between actual samples retrieved. Therefore, these boring logs contain both factual and interpretive information. Lines delineating subsurface strata on the boring logs are intended to group soils having similar engineering properties and characteristics. They should be considered approximate, as the actual transition between soil types (strata) may be gradual.

4.3.1 Existing Pavement

Pavement was encountered at the surface of each of our borings, except for Borings B-2 and B-9. In Borings B-1, B-3, B-4, and B-5, the pavement consisted of Portland cement concrete (PCC) and ranged in thickness from about 6 to 7 inches. Borings B-4 and B-5 had approximately 1¼ inches asphalt concrete overlying PCC pavement. In Borings B-6 through

B-8, approximately 2 inches of asphalt concrete was observed overlying 5 to 8 inches of limestone base.

4.3.2 Fill Soils

Fill soils were encountered below the pavement in Borings B-2, B-3, B-6, B-7, and B-9. The fill generally extended to depths of about 2 to 8 feet bgs and consisted of lean clays (CL) with varying sand fractions.

4.3.3 Beaumont Formation

Naturally-deposited soils from the Beaumont Formation were encountered underlying the existing pavement and/or fill soils and extended to the total explored depths of about 10 to 30 feet bgs. These soils generally consisted of interlayered deposits of cohesive lean and fat clays (CL, CH). A 2-foot silty sand layer (SM) was encountered in borings B-2 and B-5 at a depth of about 14 feet.

4.4 Water Levels

The borings were initially drilled using dry-auger techniques in an attempt to measure depth-to-water in the open boreholes. Free water was encountered in each of our borings, except Boring B-9, at about 10 to 16 feet bgs. Mud rotary drilling methods were used below approximately 10 to 16 feet to the termination of Borings B-1 through B-5. Because this method introduces water and drilling mud into the boreholes, after-drilling water level readings were not performed in these borings. Water level readings were recorded to be at about 6 feet bgs in Boring B-8 after 24 hours.

Fluctuations in groundwater may occur at this site as a function of seasonal moisture variation, close proximity to Hunting Bayou, precipitation, temperature, and groundwater withdrawal. Future construction activities may alter the surface and subsurface drainage characteristics of this site. In addition, perched groundwater may be encountered at the site, particularly after periods of heavy precipitation. Contractors should be prepared for shallow groundwater conditions at the site.

5 POTENTIAL SEASONAL MOVEMENTS

The Potential Vertical Rise (PVR) was calculated using the Texas Department of Transportation (TxDOT) Method for determining Potential Vertical Rise (PVR) (TEX-124-E), and engineering judgment and experience. The estimated ground movements due to swelling of the soils at this site were estimated to be about 2½ inches. This value was estimated using a surcharge load of 1.0 pounds per square inch (psi) and dry moisture conditions within the zone of seasonal moisture variation.

The TxDOT Method for PVR is an empirical method, and it should be noted that actual soil movements may exceed the estimated PVR, depending on moisture fluctuation, water seepage, etc. For example, movements exceeding those predicted above could occur if positive drainage of surface water is not maintained away from foundation elements or if soils are subject to an outside water source, such as leakage from a utility line or subsurface moisture migration from offsite locations.

6 ENGINEERING ANALYSIS AND RECOMMENDATIONS

6.1 Geotechnical Considerations

Based on the results of our subsurface evaluation, laboratory testing, and data analysis, the proposed construction is feasible from a geotechnical standpoint provided the recommendations in this report are incorporated into the design and construction of the project. Geotechnical considerations include the following:

- Due to the heterogeneous nature of the project area soils, and the relatively wide spacing between our borings, soils different than those encountered in our borings should be anticipated during construction.
- Foundations or other obstructions may be encountered in the subsurface during construction.
- Settlement due to the self-weight of deep fills can be about 1 to 1½ percent of the fill height.
- The PVR of the soils at this site was estimated to be about 2½ inches. A select, engineered fill building pad will be needed to reduce the PVR to an acceptable magnitude.
- Undocumented fill was encountered to depths of 4 to 8 feet below the ground surface in our borings and will need to be improved.
- Conventional earthmoving construction equipment may be used.
- Free water was encountered in our borings at about 10 to 16 feet bgs. Relatively shallow groundwater and/or perched water may be encountered by the Contractor during construction, particularly after periods of heavy precipitation.
- New fill placed in the building area should consist of select, engineered fill. Imported soils and soils generated from onsite excavation activities that exhibit a very low to low swell potential, have a plasticity index (PI) between 8 and 20, and have a liquid limit (LL) less than 40 can generally be used for select, engineered fill.
- Many of the onsite soils are suitable for re-use as select, engineered fill. Soils that do not meet the select fill criteria may be re-used as general fill for site grading and utility trench backfill at the site, provided they are free of deleterious materials.

6.2 Recommendations

The following sections present our geotechnical recommendations and were developed based on our understanding of the proposed construction, the observed subsurface conditions, and our experience. If the proposed construction is changed from that discussed herein or subsurface conditions other than those shown on the boring logs are observed at the time of construction, Ninyo & Moore should be retained to review the new information and evaluate the need for additional recommendations.

6.2.1 Earthwork

The following sections present our general earthwork recommendations for this project. In general, local construction standards and specifications are expected to apply, unless otherwise noted.

6.2.2 Demolition

As discussed in Section 1.2, existing buildings currently occupy the site, including portions of the new building footprint. Foundation remnants or other obstructions from previous structures may also be encountered during construction. The demolition contractor should discuss any existing foundation elements observed or suspected within the planned building footprint with the Geotechnical Engineer-of-Record prior to removal. Such elements may include, but are not limited to, footings or drilled piers. Removal of such elements may cause disturbance to the bearing soils. The demolition of existing foundation elements should be addressed by the design team on a case-by-case basis.

Outside the footprint of the new building, any foundation elements should be removed or cut off 2 feet or more below finished grade or pavement or detention system subgrade, whichever is deeper. Any area disturbed during removal of the existing structures should be re-compacted in accordance with recommendations provided in Section 6.2.10. Abandoned utility lines should be either removed and properly backfilled or grouted in place to reduce the potential for possible water seepage into the subsurface clay materials.

6.2.3 Existing Fill

As discussed in Section 4.3.1, undocumented fill was encountered in the borings from the ground surface to depths of about 4 to 8 feet bgs. However, we understand the fill has been in place for several years. In practice, it is relatively difficult to accurately delineate fill soils that have similar visual characteristics to the native soils. Therefore, the recorded fill depths should be considered estimates and may vary somewhat from the actual fill depths.

Compaction records were not available at the time this report was prepared and it is not known whether the existing fill was placed under engineering observation or if field density testing was performed. If compaction records become available, they should be provided to Ninyo & Moore to review and evaluate whether revision of our recommendations is needed.

We understand that about 10 to 12 feet of new fill will be placed for the new building, therefore, within the area of the existing structure, we recommend the upper 4 feet of existing fill be completely removed and proofrolled. After proofrolling, a layer of geogrid (TX160 or equivalent) should be placed on the exposed subgrade and any new fill to raise the grade should be engineered fill and should be placed as outlined in Section 6.2.10. The edges of the excavations should be sloped at 3:1(Horizontal:Vertical) to avoid any abrupt changes in fill thickness.

In pavement areas, existing fill soils at the pavement subgrade elevation should be proofrolled as discussed in Section 6.2.4. Any weak soils observed during the proofrolling process should be removed and replaced with compacted soil as outlined in Section 6.2.10. Additional recommendations for pavement subgrade preparation are provided in Section 6.8.1.

6.2.4 Site Preparation

The site should be prepared by clearing existing vegetation, trees, root balls, grubbing, root raking, asphalt and concrete paving.

Prior to placing any fill, pavement, or flatwork, the exposed subgrade should be evaluated by proofrolling. Proofrolling should be accomplished using a pneumatic-tired roller, dump truck, or similar equipment weighing approximately 20 tons and observed by the Geotechnical Engineer-of-Record or the Engineer's designated representative. Any soft or weak areas observed during the proofrolling process should be removed and replaced with compacted general fill as outlined in Section 6.2.10. In the building pad area, the replacement fill should consist of select, engineered fill or cohesionless soils consistent with the existing subgrade soils.

After the proofrolling process and prior to placing any fill, the exposed subgrade should be scarified to a depth of 8 inches or more and recompacted as recommended in Section 6.2.10.

We understand the site will be raised by about 10 feet in several areas at the site. The fill side slopes should be no steeper than 3:1 (Horizontal:Vertical). In addition, due to the relatively large volume of new fill to be placed, settlement of the fill due to the self-weight of the soil

should be anticipated. Settlement of new fill due to self-weight can be on the order of 1 to 1½ percent of the fill height.

Obstructions that extend below finished grade should be removed and the resulting holes filled with compacted soil. The backfilling of the resulting voids should be placed at 3:1 (Horizontal:Vertical) slopes in order to reduce any abrupt fill changes. The demolition of existing foundation elements, however, should be addressed by the Geotechnical Engineer-of-Record on a case-by-case basis, as discussed in Section 6.2.2 above.

Due to the nature of the surficial soils, traffic of heavy equipment (including heavy compaction equipment) may create pumping and general deterioration of shallow soils. Therefore, some construction difficulties should be anticipated, especially during periods when these soils are saturated.

6.2.5 Subgrade Improvement

As discussed above, a PVR of about 2½ inches was calculated for the conditions observed at this site. In general, soil-related potential seasonal movements of about 1-inch are considered acceptable by structural engineers in the Houston area. As such, soil improvement to reduce the magnitude of potential swell is needed.

We understand the radio and solid transfer buildings will be elevated approximately 10 to 12 feet above existing grade. We recommend fill placed below the building structures consist of select, engineered fill.

Structures constructed at or near the natural grade should be supported on a 3½-foot-thick select, engineered fill pad. Clayey general fill with a PI comparable to that of the native clay is appropriate for fill below the recommended 3½-foot-thick select, engineered fill building pad. The excavated soils may be acceptable for re-use, provided they are free of organic material, debris, or other deleterious materials. Select, engineered fill pads should extend a distance of 5 feet laterally beyond the structures.

6.2.6 Wet Weather Conditions

Earthwork contractors should be made aware of the moisture sensitivity of the near surface clayey soils and potential compaction difficulties. If construction is undertaken during wet weather conditions, the surficial soils may become saturated, soft, and unworkable. Drainage trenches within the soils to be excavated, reworked and/or recompacted may be needed.

Additionally, subgrade treatment techniques, such as chemical (lime) treatment, may be needed to provide a more weather resistant working surface during pad construction.

We recommend that consideration be given to construction during drier months. Alternatively, the Contractor should protect exposed areas once topsoil or existing pavement has been stripped, as well as provide positive drainage during earthwork operations.

6.2.7 Excavations

Our evaluation of the excavation characteristics of the onsite materials is based on the results of our exploratory borings, site observations, and experience with similar materials. Due to the heterogeneous nature of the project area soils, and the relatively wide spacing between our borings, soils different than those encountered in our borings should be anticipated during construction.

In our opinion, excavations at this site may be performed using conventional heavy-duty earthmoving or excavation equipment. Equipment and procedures should be used that do not cause significant disturbance to the excavation bottoms. The bottoms of excavations should expose competent soils and should be dry and free of loose, soft, or disturbed soil. Any soft, wet, weak, or deleterious materials should be overexcavated to expose strong competent soils.

Free water was encountered in each of our borings, except Boring B-9, at about 10 to 16 feet bgs. Relatively shallow groundwater and/or perched water may be encountered by the Contractor during construction, particularly after periods of heavy precipitation. The Contractor should anticipate encountering groundwater during construction that may result in difficulty achieving compaction of the soil, and may also result in subgrade pumping, etc., during earthwork activities. Wet or saturated soils at the excavation bases may soften under the action of light equipment and foot traffic. Drying or overexcavation of these materials may be appropriate prior to filling. If the subgrade becomes disturbed, it should be compacted before placing the backfill material.

Contractors should provide safely sloped excavations or an adequately constructed and braced shoring system in compliance with Occupational Safety and Health Administration (OSHA) Regulations. Based on the soil conditions at the site, we recommend that an OSHA “Type B” soil classification be used for planning purposes for excavations in clays at the site to 20 feet bgs or less. This corresponds to temporary slopes of 1:1 (horizontal: vertical) for excavations that are less than 20 feet deep. However, if groundwater seepage and/or granular soils are encountered, an OSHA Soil “Type C” classification should be used. This corresponds

to temporary slopes of 1.5:1 (horizontal: vertical). Upon excavation, soil classifications should be evaluated in the field by the Contractor's geotechnical consultant in accordance with OSHA regulations. Excavations more than 20 feet deep should be designed by the Contractor's engineer based on a site-specific geotechnical analysis and evaluation of settlement-sensitive features.

Flatter slopes or bracing may be needed if excessive sloughing or raveling is observed. If material is stored or equipment is operated near an excavation, flatter slopes or stronger shoring should be used to resist the extra pressure due to superimposed loads.

6.2.8 Fill Materials

Select, engineered fill should consist of onsite and/or imported soils that exhibit relatively low plasticity indices and very low to low expansive potential. Relatively low plasticity indices are defined as a PI (plasticity index) of 20, or less, as evaluated by ASTM D 4318. We recommend select, engineered fill should have a liquid limit (LL) less than 40 and a PI between 8 and 20.

Suitable fill soils (select fill or general fill) should not include organic material, construction debris, or other non-soil fill materials. Clay lumps and rock particles should not be larger than 6 inches in dimension.

Fill materials in contact with ferrous metals should also have low corrosion potential (minimum resistivity more than 2,000 ohm-cm, chloride content less than 25 parts per million [ppm]). Fill material in contact with concrete should have a soluble sulfate content of less than 0.1 percent. The Geotechnical Engineer-of-Record should evaluate such materials and details of their placement prior to importation.

6.2.9 Re-use of Excavated Materials

Based on laboratory test results and our general observations, many of the existing onsite soils meet the specifications provided in Section 6.2.9 above and will be suitable for re-use as select, engineered fill during construction. Soils that do not meet specifications may be re-used as general fill and trench backfill at the site, provided they are free of deleterious materials.

It should be noted that the re-use of excavated materials as general fill may result in higher plasticity clays being placed near the surface. We recommend that a site-specific geotechnical evaluation be performed for future developments constructed over the fill areas.

6.2.10 Fill Placement and Compaction

Fill soils should be moisture conditioned within the moisture range shown below in Table 2 and mechanically compacted to the percent compaction shown. Fill should generally be placed in 8-inch-thick loose lifts such that each lift is firm and non-yielding under the weight of construction equipment.

Table 2 – Summary of Compaction Recommendations

Description	Percent Compaction[1]	Moisture Content[2]
Select, Engineered Fill[3, 4]	95 or more	-2% to +2%
General Fill – Clay[4]	95 or more	-1% to +3%
Lime Treated Subgrade	95 or more	-1% to +3%

Note:
[1]Percent compaction is the ratio of compacted dry density and the maximum dry density per ASTM D 698.
[2]The range shown refers to the optimum moisture content per ASTM D 698.
[3]Select, engineered fill should have a PI between 8 and 20 and an LL of 40 or less.
[4]Clayey soils used as fill should be processed so that particles or clods are no more than 6 inches in diameter prior to compaction.

6.2.11 Site Drainage

Adequate drainage should be provided to reduce seasonal variations in the moisture content of foundation soils. Pavement and sidewalks within 5 feet of the building should be sloped away from the structure to reduce the potential for water ponding near the foundations. Finished grade within 5 feet of the building should be adjusted to slope away from the structure at a slope of 2 percent, or more. The long-term performance of the foundation system depends, in part, on maintaining positive surface drainage over the life of the structure.

6.3 Foundations

Provided the building pad areas are prepared as recommended in Section 6.2.4, the retaining walls around the radio building may be supported using spread footings, drilled-and-underream piers, or drilled straight-sided shafts.

We recommend the retaining wall between the SWMD building and the detention pond be supported using drilled-and-underreamed piers or straight-sided drilled shafts. We also recommend the truck weight scale, solid waste transfer building, and radio tower building be supported on drilled-and-underreamed piers or drilled straight-sided shafts. The following sections present our foundation recommendations.

6.3.1 Shallow Spread Footings

Shallow spread, strip, and/or combined footings should bear on compacted engineered fill at a depth of 2 feet or more bgs. The footings may be designed using an allowable bearing pressure of 2,000 psf. This bearing pressure is based on a factor of safety of 3. This value may be increased by a factor of $^1/_3$ for total loads, (including wind and seismic). Continuous (strip) footings should have a width of 18 inches or more and isolated spread footings should have a width of 24 inches or more.

The foundations should be reinforced in accordance with the Structural Engineer's recommendations. Foundation excavations should be protected against any significant change in soil moisture content and disturbance by construction activity.

We estimate foundation movements of 1-inch or less may occur. Differential movements are estimated to not exceed half the predicted movement. These settlement estimates are based on the assumption that the foundations act as isolated foundations. To reduce the potential for larger settlements beneath closely spaced footings due to stress overlap, the clear spacing between the foundation elements should be the width or diameter of the largest adjacent foundation or more.

The ultimate resistance of spread or strip footings to uplift forces is limited to the weight of the foundation plus the weight of any soil above the footings. We recommend total unit weights of about 120 pcf for soil and 150 pcf for concrete be used in calculations. The ultimate uplift resistance should be reduced by a factor of safety of 1.2 to calculate the allowable uplift capacity.

Lateral loads transmitted to the foundation will be resisted by soil-concrete friction on the base of the footings. Frictional resistance may be estimated using an allowable coefficient of friction of 0.25. The foundations should preferably be proportioned such that the resultant forces from the loads, including lateral loads, fall within the middle one-third of the footing base.

6.3.1.1 Footing Construction Considerations

The Geotechnical Engineer-of-Record or his representative should monitor foundation excavations to locate any pockets or seams of unsuitable materials (organic material, wet, soft, or loose soil), which might be encountered in excavations for footings. Unsuitable materials encountered at the foundation bearing level should be removed and replaced with select fill as described in Section 6.2.8 or lean concrete (about 1,000 psi strength at 28 days).

The bottom 6 inches of foundation excavations should be performed using a smooth excavator bucket or by hand labor. Sides of excavations may slough to some extent with time. Sloughed soils and other debris in the bottom of the excavation should be removed prior to steel placement. Water should not be allowed to accumulate at the bottom of footing excavations.

Steel should be placed and concrete poured the day of excavation. If for some reason the footings cannot be poured the day of excavation, a seal slab should be placed to protect the exposed foundation soils.

6.3.2 Drilled-and-Underreamed Piers

Due to the relatively high settlement potential of the undocumented fill at the site, we recommend supporting the new SWMD building and the retaining walls between the SWMD building and detention pond on drilled-and-underreamed piers Drilled-and-underreamed piers should bear on stiff, naturally deposited clays at a depth of 10 feet below the existing ground surface (at the time of our study). The piers should be designed as end-bearing units using an allowable bearing pressure of 4,000 psf for dead plus sustained live loads. This value may be increased by a factor of 1/3 for total loads, including wind and seismic. The bottom of the piers should bear at a depth such that the bells are cut from undisturbed, naturally deposited, cohesive soils.

The drilled-and-underreamed piers should be reinforced as designed by the Structural Engineer. Settlement of piers under loading is estimated to be less than about 1-inch.

The clear spacing between edges of adjacent piers should be one underream diameter or more, based on the larger underream. If piers need to be spaced closer than discussed above, due to design and/or construction restraints, Ninyo & Moore should be notified to reevaluate the allowable bearing capacities presented above for the individual piers. Differential settlements and/or eccentric loading conditions may result from piers spaced closer than discussed above. Reductions in load carrying capacities may be needed depending upon individual loading and spacing conditions.

Each pier should be designed with full-length reinforcing steel to resist the uplift pressure (soil-to-pier adhesion) due to potential soil swell along the shaft from post-construction heave and other uplift forces applied by structural loadings. The magnitude of uplift adhesion due to soil swell along the pier shaft cannot be defined precisely and can vary according to the actual in-place moisture content of the soils during construction. We recommend an uplift adhesion

of about 600 psf be used in design, approximated to act over the upper 8 feet of the shaft in contact with clayey soils. The uplift adhesion can be neglected for the portion of the shaft in contact with select fill used to grade the building pad.

Resistance to uplift forces exerted on the drilled piers will be provided by the sustained axial compressive force (dead load) and the allowable uplift resistance provided by the soil located above the underreamed bell. The uplift resistance above the bell is dependent upon depth and shape factors applied to the average shear strength of the overlying soils. One method for estimating the uplift resistance provided by the soil located above the bell is by using the following semi-empirical equations by Turner (1962). The allowable uplift capacity should be calculated using the following equations.

Equation 1, for a D_f/B ratio greater than or equal to 1.5:

$$Q_a = \frac{7.25\ (B^2 - b^2)}{\text{FS}} + \frac{W_f}{1.2}$$

Equation 2, for D_f/B less than 1.5:

$$Q_a = \frac{3.35\ (D_f/\text{B})^2 (B^2 - b^2)}{\text{FS}} + \frac{W_f}{1.2}$$

where:

Q_a = allowable uplift capacity, kips;
D_f = foundation depth below lowest adjacent grade, feet;
B = diameter of underreamed bell, feet;
b = diameter of shaft, feet;
FS = factor of safety (generally 2 for transient loads); and
W_f = weight of foundation, kips.

To resist uplift forces, we recommend the diameter of the underreamed bell should be two to three times the diameter of the shaft.

Lateral loads imposed on pier foundations can be resisted by passive resistance in the surrounding soils. For passive resistance to lateral loads, we recommend a pressure of 150 psf per foot of depth be applied to the face of the shaft, up to a value of 1,500 psf, applied over the projected face of the pier shaft. Due to possible disturbance at the surface, the lateral resistance of the top portion of the pier shafts within 10 feet of finished grade should be neglected.

6.3.2.1 Installation Considerations for Drilled-and-Underreamed Piers

Groundwater was not observed in our borings at the time of drilling. However, perched groundwater may be encountered during construction, particularly after periods of heavy precipitation. As such, groundwater seepage should be anticipated during drilled shaft excavation, particularly during or after periods of precipitation. Submersible pumps, bailing tools, and/or immediate placement of concrete may be sufficient to mitigate light seepage. Ninyo & Moore should be contacted for further review and evaluation if groundwater seepage and/or underream collapse occurs during pier installation.

Temporary steel casing may be needed to reduce sloughing of soils or mitigate groundwater seepage during pier drilling operations. Such casing should be extended below the depth of the sloughing soils before excavation begins and then removed after completion of the pier. As casing is extracted, care should be taken to maintain a positive head of plastic concrete and reduce the potential for intrusion of water seepage. The Contractor should expect the concrete level to change as the casing is removed and be prepared to both clean out the top of the pier and top-off the pier with wet concrete. We recommend a separate bid item be provided for casing on the Contractors' bid schedule.

Some field adjustments may be needed to keep the bottom of the piers above any caving soils and/or groundwater encountered during pier installation. Adjustments in the depths of the piers should be observed in the field by Ninyo & Moore personnel.

6.3.3 Grade Beams

Grade beams may be used to support loads by spanning the drilled-and-underreamed piers. Grade beams should be designed to transfer loads to the piers as a simply supported beam, ignoring any support from the soil between the piers. The depth of exterior and interior grade beams can be varied according to the structural requirements of the floor slab. However, we recommend that exterior grade beams extend 12 inches or more below the lowest adjacent grade.

In general, we do not recommend the use of void boxes below grade beams because of the potential to collect free water within the void space, especially if replacing the excavated subgrade soils with relatively pervious select fill materials. Additionally, backfill soils placed adjacent to grade beams should be compacted as outlined in Section 6.2.10.

6.3.4 Truck Weight Scale

The truck weight scale can be supported using drilled-and-underreamed piers or drilled, straight-sided shafts. The subgrade should be prepared as described in Section 6.2.1 of this report, including the 3½-foot-thick compacted select, engineered fill pad.

6.3.5 Interior Floor Slabs

The design of interior floor slabs is the responsibility of the Structural Engineer. Placement of the reinforcement in the slab is vital for satisfactory performance. For ground supported floor slabs, the floor slab should either be constructed so that it "floats" independent of the foundations or be designed by the Structural Engineer to resist forces caused by differential movement relative to the foundations.

The use of a vapor retarder should be considered beneath interior concrete floor slabs in areas with moisture sensitive flooring. If a vapor retarder is needed, the slab designer and slab contractor should refer to ACI 302 for procedures and cautions about the use and placement of a vapor retarder.

6.3.6 Drilled, Straight-Sided Shafts

Alternatively, the new SWMD building and the retaining walls between the SWMD building and detention pond may be supported on straight-sided drilled shafts. Straight-sided drilled shafts should be designed as friction units proportioned using an allowable unit skin friction of 450 psf in compression. We recommend drilled shafts have a diameter of 24 inches or more. The contribution of skin friction for the upper 10 feet of the newly placed fill should be neglected due to seasonal moisture variation and construction-related disturbance. End bearing should also be neglected.

It should be noted that our borings extended to depths of 20 feet bgs in the structure's area. Ninyo & Moore should be contacted if piers will need to extend beyond these depths.

The overall allowable axial load carrying capacity of a group of drilled shafts may in some cases be less than the sum of the individual allowable capacities. The reduction in individual capacity depends on many factors including the configuration of the group, number of shafts in the group, shaft diameter, the depth of installation, and the spacing. We recommend that drilled shafts (both for new piers and relative to existing piers) be spaced three shaft diameters (center-to-center) or more to reduce substantial axial group effects. If shafts need to be spaced closer, Ninyo & Moore should be contacted to review the new information and evaluate the need for additional recommendations.

Resistance to uplift forces exerted on the drilled shafts will be provided by the sustained compressive axial force (dead load) plus the allowable uplift resistance developed in friction along the shaft length. The frictional resistance provided by the soil depends on the shear strength of the soils adjacent to the shaft below the depth of seasonal moisture variation. The allowable uplift resistance provided by the soils at this site may be estimated using $^2/_3$ of the allowable axial compressive side shear resistance shown on the tables above, for the portion of the shaft extending below a depth of 5 feet.

A detailed settlement analysis was beyond the scope of this study. Based on our experience, we expect settlements to be less than 1-inch under working load conditions for installed individual, isolated drilled shafts designed and constructed in accordance with the recommendations presented herein. However, groups of shafts may settle more than individual shafts subjected to the same load per foundation. Ninyo & Moore can be retained to perform a detailed settlement analysis, if desired.

6.3.6.1 Lateral Load Capacity

Resistance to lateral loads and the expected shaft behavior under the applied loading conditions will depend on subsurface conditions, loading conditions, the shaft diameter, and the engineering properties of the shaft materials. A lateral load analysis was beyond the scope of services for this study. However, input parameters to perform a detailed L-Pile analysis are provided below in Table 3. We recommend that the shaft designer ignore the lateral capacity in the upper 5 feet bgs for drilled shafts. For drilled shafts supporting the side of the structure facing the detention pond, the upper 10 feet bgs should be ignored for lateral capacity.

Table 3 – L-Pile Input Parameters for Drilled Shafts

Depth Below Existing Grade (feet)	Assumed Behavior	γ (pcf)	c (psf)	ϕ (°)	k_s (pci)	k_c (pci)	ε_{50}
5 to 10	Clay Below Water Table	120	1,000	-	-	100	0.01
10 to 30	Clay Below Water Table	120	1,500	0	500	200	0.007

Note:
*The depths shown are relative to the existing grade. The Designer should ignore the lateral resistance of the top 5 feet from the finished grade, except where the side of the building is facing the pond where the designer should ignore the upper 10 feet

6.3.6.2 Groundwater Considerations

Free water was encountered in our borings, except Boring B-9, at about 10 to 16 feet bgs. Relatively shallow groundwater and perched water may be encountered by the Contractor during construction, particularly after periods of heavy precipitation. As such, the Contractor should be prepared for groundwater seepage during drilled shaft excavation. Submersible pumps, bailing tools, and/or immediate placement of concrete may be sufficient to mitigate light seepage.

Temporary steel casing may be needed to reduce sloughing of soils or mitigate groundwater seepage during pier drilling operations. Such casing should be extended below the depth of the sloughing soils before excavation begins and then removed after completion of the pier. As casing is extracted, care should be taken to maintain a positive head of plastic concrete and reduce the potential for intrusion of water seepage. The Contractor should expect the concrete level to change as the casing is removed and be prepared to both clean out the top of the pier and top-off the pier with wet concrete. We recommend a separate bid item be provided for casing on the Contractors' bid schedule.

For slurry construction, a tremie pipe connected either to a hopper or concrete pump should be used to displace the slurry water in the drilled shaft excavation upwards as the concrete is placed. If this method is used, detailed procedures should be submitted by the contractor for review and approval by the geotechnical engineer.

6.3.6.3 Installation Guidelines

Each drilled shaft excavation should be observed by a Ninyo & Moore representative who is familiar with the geotechnical aspects of the soil stratigraphy, the structural configuration, foundation design details and assumptions, prior to placing concrete. This is to observe that:

- The shaft has been excavated to the specified dimensions at the correct depth established by the previously mentioned criteria;
- Drilled shaft excavations are not left open overnight;
- The shaft has been drilled plumb within specified tolerances along its total length;
- The completion of shaft excavation, reinforcing steel and concrete placement is performed in a continuous and effective approach; and

Excessive cuttings, buildup and soft, compressible materials have been removed from the excavation.

6.4 Lateral Earth Pressures for Retaining Walls

The planned retaining walls may be supported on shallow spread footings as described above. The walls should be designed to resist expected lateral earth pressures. The magnitude of lateral earth pressure against site retaining walls is dependent on the method of backfill placement, type of backfill, drainage provisions, and type of wall (i.e. rigid or yielding) after placement of the backfill. Retaining walls that are not restrained from movement at the top may be designed using the "active" equivalent fluid unit weights.

We understand there will be sloped backfill behind retaining walls for this project. Table 4 below presents lateral earth pressures for active and at-rest conditions depending on the sloped backfill.

Table 4 – Lateral Earth Pressures for Retaining Walls

Backfill Material	Backfill Slope (Horizontal:Vertical)	Approximate Dry Unit Weight (pcf)	Condition	Equivalent Fluid Pressure* (pcf)
Onsite Clay Soils or Select, Engineered Fill	Horizontal	120	At-rest (K_o)	70
			Active (K_a)	50
	4:1	120	At-rest (K_o)	85
			Active (K_a)	55
	3:1	120	At-rest (K_o)	90
			Active (K_a)	65

Note:
*The equivalent fluid pressures assume no hydrostatic buildup pressure behind the wall.

These values assume that compaction within about 5 feet of the walls will be accomplished with relatively light compaction equipment and that drainage measures discussed below will be implemented behind the walls such that hydrostatic forces will not develop.

Retaining walls should be designed to resist horizontal surcharge loads due to vertical pressures induced by adjacent light loads, slab, traffic loads, plus any adjacent footing loads. Factors of safety were not applied to the earth pressures presented.

We recommend measures be taken so that moisture does not build up behind the retaining walls. Drainage measures should include free-draining backfill material and perforated drainpipes or weep holes. Drainpipes should outlet away from the structure and retaining walls should be waterproofed. To reduce the potential for water and sulfate/salt-related damage to the retaining walls, particular care should be taken in the selection of the appropriate type of waterproofing material to be utilized and in the application of this material.

Free draining granular fill material should consist of clean, non-plastic, ½- to ¾-inch drain rock with less than 10 percent finer than the No. 200 sieve size. The drain rock and pipe should be wrapped in a geotextile, such as Mirafi 140N or equivalent. Use of a proprietary sheet drain product may also be considered in lieu of drain rock. To reduce surface water seepage into the free draining, granular backfill, the top 1-foot of the backfill should consist of onsite clay soil with a plasticity index 25 or more.

6.5 Exterior Flatwork

It should be noted that ground-supported flatwork such as patios, walkways, ramps, etc. will be subject to potential expansive soil-related movements of up to 2½ inches, as discussed previously. Differential movements should be anticipated where these types of elements abut rigid building foundations. We recommend that flexible joints be provided where such elements abut the building to allow for differential movement at these locations.

6.6 Underground Utilities

Utilities that penetrate through the building or other rigid structures should be designed using flexible fittings and/or sleeves. These design features will help reduce the risk of damage to the utilities if vertical movements in the soil occur. Excavations for underground utilities should be performed as discussed in Section 6.2.7. Utility trenches should be backfilled as described in Section 6.2.10.

To reduce the potential for water infiltration and migration beneath the foundations, utility trenches that penetrate beneath the proposed building should be sealed using a clay “trench plug”. The plug material should consist of clay compacted at or above optimum water content and extend 5 feet or more out from the building perimeter. The clay fill should completely surround the utility line and be compacted as described in Section 6.2.10.

6.7 Detention Pond Recommendations

We understand the detention pond will be at a depth of about 5 feet. Cohesive soils were encountered in the borings performed for this study within the planned pond depths.

A detailed slope stability analysis was beyond the scope of this study. Based on our experience with similar soil conditions within this geologic region, we recommend the following guidelines for the planned detention ponds:

- 3:1 (horizontal to vertical) slopes or flatter should be used for slopes less than 10 feet in height in cohesive soils; 4:1 or flatter slopes should be used where cohesionless soils are encountered;

- The water level should not be allowed to drop quickly after water has remained ponded for an extended period of time (such that the side slopes have become saturated), which would result in a rapid draw-down condition; and

- The condition of side slopes (erosion and/or surface sloughing) should be evaluated and repaired as part of routine maintenance program.

As with any pond construction, exposed cut slopes may need periodic maintenance due to minor sloughing and erosion. To reduce the potential for erosion, we recommend that erosion mitigation measures be placed on the slopes above the normal pool elevation. The establishment of erosion mitigation measures is beneficial for long-term aesthetics, reduces erosion by slowing runoff velocities, and protects soil from raindrop impact.

At a minimum, we recommend slopes be vegetated. Until vegetation can be established, we recommend that temporary erosion mitigation measures be implemented. These temporary measures may include, but are not limited to, straw mulching or matting, and/or straw wattles.

6.8 Parking and Driveway Areas

We understand Portland cement concrete (PCC) pavements are planned for the project parking and driveway areas. A traffic analysis was not available at the time of our evaluation; therefore, a detailed pavement design was not performed. The following recommendations are based on correlations with index properties and our experience. The pavement thickness design is based on an assumed Equivalent Single Axle Load (ESAL) of 13,000,000, based on a 50-year design life per City of Houston (COH) Standard Specifications.

6.8.1 Pavement Subgrade Preparation

After finished subgrade elevation is achieved, the exposed surface of the pavement subgrade soils should be proofrolled in accordance with Section 6.2.4. Any soft or weak areas observed during the proofrolling process should be removed and replaced with well-compacted general fill as outlined in Section 6.2.10.

The subgrade soils should then be chemically treated to a depth of 8 inches. Based on the borings performed for this study, the pavement subgrade will consist primarily of moderate to high-plasticity clays. Chemical treatment for this type of soil should consist of lime treatment.

Lime treatment for cohesive soils should be done in accordance with COH Standard Specifications, Section 02336. The soils should be mixed with a sufficient quantity of hydrated lime to reduce the soil-lime mixture plasticity index to 20 or less. If a PI of 20 is not achievable, sufficient lime should be added until the pH reaches a value of about 12.4 (or lime fixation). The soil and lime should be blended for the lime treatment to be effective. For estimating purposes, we recommend about 6 to 8 percent lime by dry soil weight be assumed.

The above recommendations are for design estimates only. We recommend the actual rate of application for the subgrade lime treatment be determined by laboratory testing during construction.

Additional laboratory testing should be conducted prior to construction to evaluate the site for soluble sulfate content. The soluble sulfate content for the soils should be no more than 0.1 percent by weight.

6.8.2 PCC Pavement Section

We understand there will be a high volume of heavy vehicles throughout the project site. Based on the COH Infrastructure Design Manual, we recommend a pavement section of 10 inches thick or more of PCC overlaying 8 inches of chemically lime treated subgrade as outlined in Section 6.8.1.

Concrete pavements should have longitudinal and transverse joints as designed by the Civil Engineer. We recommend reinforcement for the concrete pavement areas consist of No. 4 reinforcing bars placed 24 inches on-center (each way) in the middle one-third of slab height. The Civil Engineer may decide that additional or reduced reinforcement is needed. Concrete pavement should include crack control, construction, and/or expansion joints as deemed appropriate by the Civil Engineer.

6.9 Concrete

Laboratory chemical tests were not performed to evaluate the sulfate content of the site soils for this project. We assume that the soluble sulfate content at the project site less than 0.2 percent by weight. If desired, laboratory chemical testing can be performed to estimate the sulfate content of the onsite soils.

Based on our experience with similar soil conditions and area practice, we recommend the use of Type II cement for construction of concrete structures at this site. Due to potential uncertainties as

to the use of reclaimed irrigation water, or topsoil that may contain higher sulfate contents, pozzolan or admixtures designed to increase sulfate resistance may be considered.

The Structural Engineer should select the concrete design strength and the water-cement ratio based on the project specific loading conditions. Higher strength concrete may be selected for increased durability and resistance to slab curling and shrinkage cracking. The concrete should have a water-cementitious materials ratio no more than 0.50 by weight for normal weight aggregate concrete.

In order to reduce the potential for shrinkage cracks in the concrete during curing, we recommend that for slabs-on-grade, the concrete be placed with a slump in accordance with Table 6.2.1 of ACI 302.1R, "Guidelines for Floor and Slab Construction." If a higher slump is needed for screening and leveling, a super plasticizer is recommended to achieve the higher slump without changing the recommended water to cement ratio. The slump should be checked periodically at the site prior to concrete placement. We also recommend that crack control joints be provided in slabs in accordance with the recommendations of the structural engineer to reduce the potential for distress due to minor soil movement and concrete shrinkage. We further recommend that concrete cover over reinforcing steel for slabs-on-grade and foundations are in accordance with IBC 1907.7.1. The Structural Engineer should be consulted for additional concrete specifications.

6.10 Pre-Construction Conference

We recommend a pre-construction conference be held. Representatives of the Owner, Civil Engineer, the Geotechnical Consultant, and the Contractor should be in attendance to discuss the project plans and schedule. Our office should be notified if the project description included herein is incorrect, or if the project characteristics are significantly changed.

6.11 Construction Observation and Testing

During construction operations, we recommend a qualified geotechnical consultant perform observation and testing services for the project. These services should be performed to evaluate exposed subgrade conditions, including the extent and depth of overexcavation, to evaluate the suitability of proposed borrow materials for use as fill and to observe placement and test compaction of fill soils. If another geotechnical consultant is selected to perform observation and testing services for the project, we request that the selected consultant provide a letter to the owner, with a copy to Ninyo & Moore, indicating that they fully understand our recommendations and they are in full agreement with the recommendations contained in this report. Qualified subcontractors

utilizing appropriate techniques and construction materials should perform construction of the proposed improvements.

7 LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of mankind at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the Client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the Client is undertaken at said parties' sole risk.

8 REFERENCES

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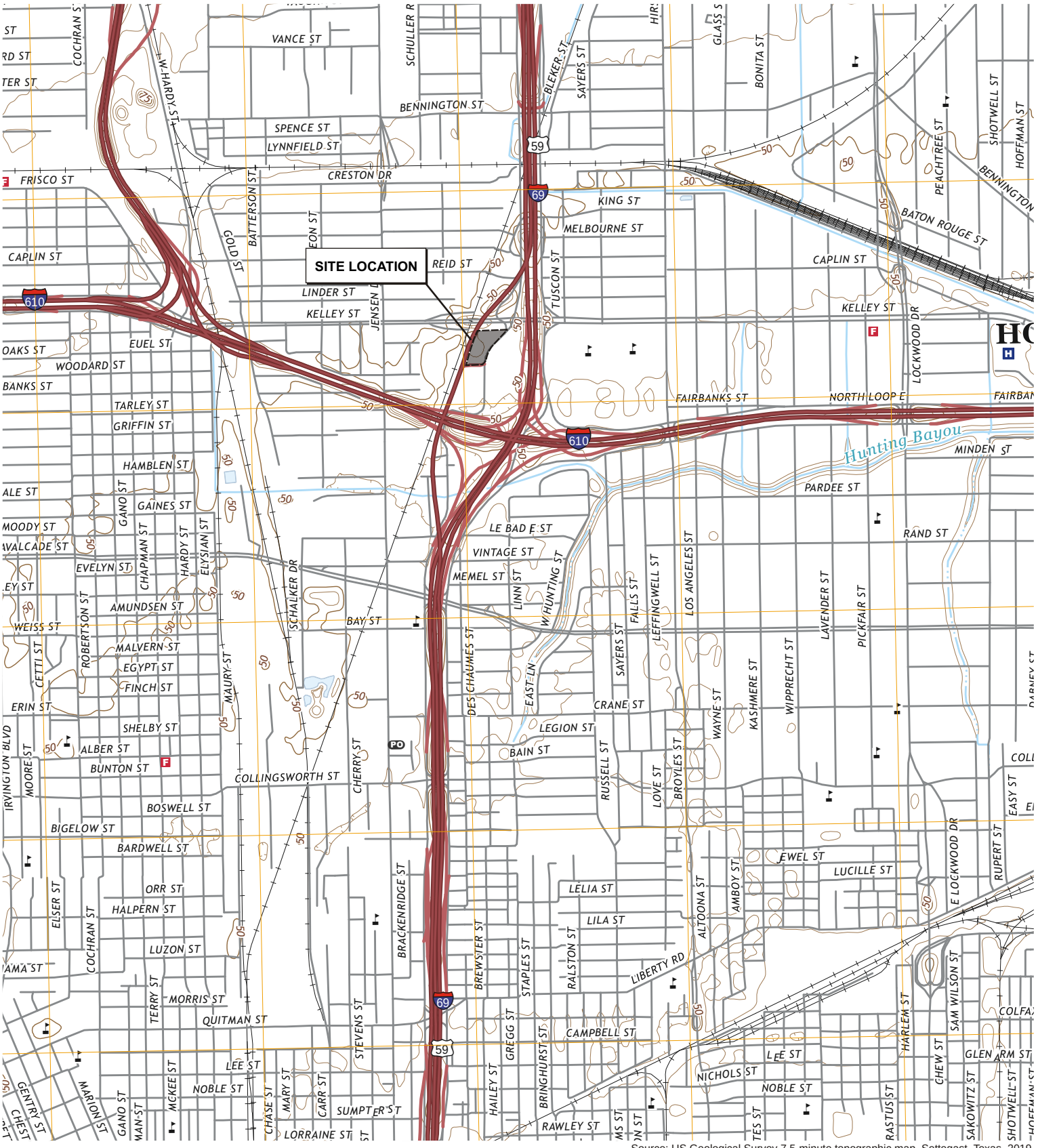
FIGURES



Source: US Geological Survey 7.5-minute topographic map, Settegast, Texas, 2019.

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

FIGURE 1

SITE LOCATION

NEW MULTI-USE SWMD FACILITY
5711 NECHES STREET
HOUSTON, TEXAS

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elt file no: 1099vmap0222

LEGEND

B-9 Boring Location

SOURCE: RDLR ARCHITECTS, INC., 11/29/2021.
NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

FIGURE 2

BORING LOCATIONS

NEW MULTI-USE SWMD FACILITY
5711 NECHES STREET
HOUSTON, TEXAS

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elt file no: 1099blm0222

APPENDIX A

Boring Logs

FIGURE A-1

BORING LOGS

Field Procedure for the Collection of Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using the following method.

Shelby Tube

The Shelby tube is a seamless, thin-walled, steel tube having an external diameter of 3 inches and a length of 30 inches. The tube was connected to the drill rod or a hand tool and pushed into an undisturbed soil mass to obtain a relatively undisturbed sample of soft, cohesive soil in general accordance with ASTM D 1587. When the tube was almost full (to avoid over-penetration), it was withdrawn from the boring. The samples were removed from the sampling tubes in the field, assessed visually, and evaluated for consistency using a pocket penetrometer. A selected portion of each sample was then wrapped in aluminum foil and sealed in a plastic bag for use in future visual assessment and possible testing in our laboratory.

Field Procedure for the Collection of Disturbed Samples

Disturbed soil samples were obtained in the field using the following methods.

The Standard Penetration Test (SPT) Sampler

Disturbed samples of earth materials were obtained by means of a split spoon sampler during Standard Penetration Testing. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of $1^{3}/_{8}$ inches. The sampler was driven into the ground 12 to 18 inches with a 140-pound hammer free-falling from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were removed from the sampler, visually classified, bagged, sealed and transported to the laboratory for testing.

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name [B]
Coarse Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	Cu ≥ 4 and 1 ≤ Cc ≤ 3[D]	GW	Well-graded gravel[E]
			Cu < 4 and/or [1 > Cc > 3][D]	GP	Poorly graded gravel[E]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[E,F,G]
			Fines classify as CL or CH	GC	Clayey gravel[E,F,G]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[H]	Cu ≥ 6 and 1 ≤ Cc ≤ 3[D]	SW	Well-graded sand[I]
			Cu < 6 and/or [1 > Cc > 3][D]	SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[H]	Fines classify as ML or MH	SM	Silty sand[F,G,H]
			Fines classify as CL or CH	SC	Clayey sand[F,G,H]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K,L,M]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay[K,L,M,N] / Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic Silt[K,L,M]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay[K,L,M,P] / Organic silt[K,L,M,Q]
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A]Based on the material passing the 3-in. (75-mm) sieve

[B]If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C]Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D]$Cu = D_{60}/D_{10}$ $Cc = (D_{30})^2 / (D_{10} \times D_{60})$

[E]If soil contains ≥ 15% sand, add "with sand" to group name.

[F]If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[G]If fines are organic, add "with organic fines" to group name.

[H]Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[I]If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J]If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K]If soil contains 15 to <30% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L]If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

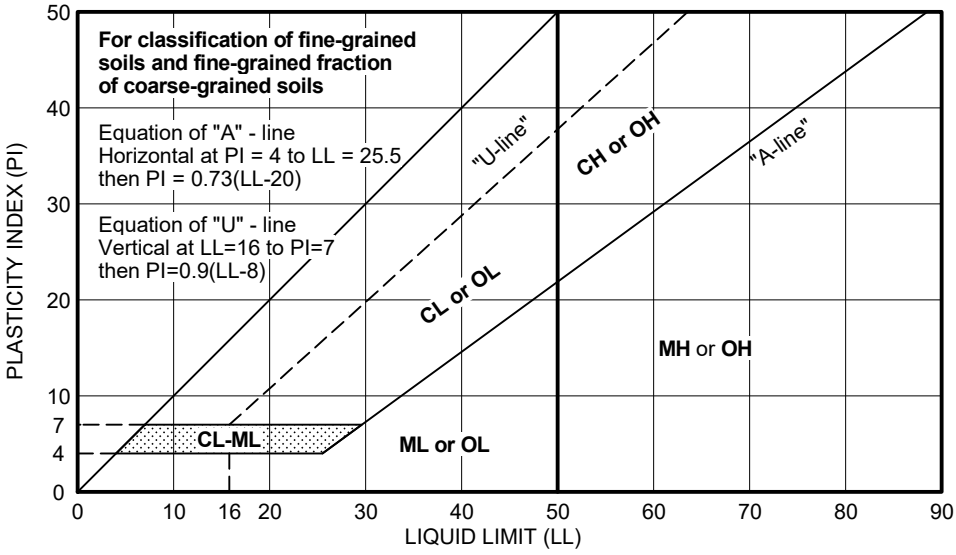
[M]If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N]PI ≥ 4 and plots on or above "A" line.

[O]PI < 4 or plots below "A" line.

[P]PI plots on or above "A" line.

[Q]PI plots below "A" line.



BASED ON TABLE 1 "SOIL CLASSIFICATION CHART" ASTM D 2487-11

FIGURE A-2

SOIL CLASSIFICATION CHART

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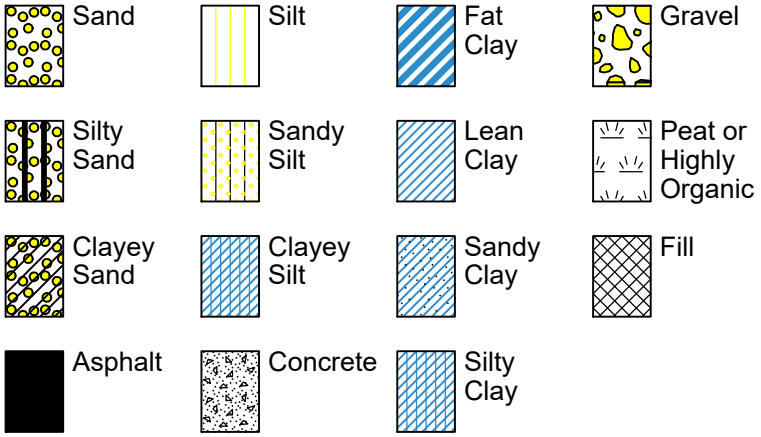
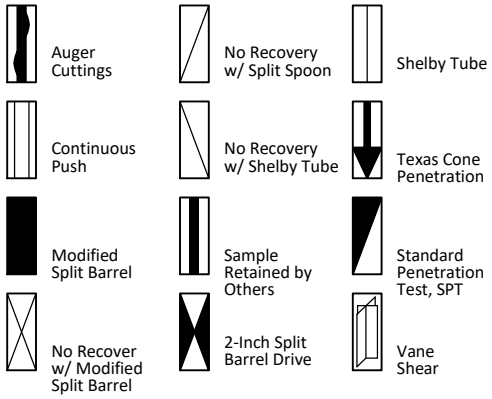
SYMBOLS

SOIL TYPES



SAMPLER TYPES



TERMINOLOGY

Terms used in this report to describe soils with regard to their consistency or conditions are in general accordance with the discussion presented in Article 45 of SOILS MECHANICS IN ENGINEERING PRACTICE, Terzaghi and Peck, John Wiley & Sons, Inc., 1967, using available information from the field and laboratory studies. Terms used for describing soils according to their texture or grain size distribution are in accordance with the UNIFIED SOIL CLASSIFICATION SYSTEM, as described in American Society for Testing and Materials D2487-11 and D2488-09a, Volume 04.08, Soil and Rock; Dimension Stone; Geosynthetics; 2015.

The depths shown on the boring logs are not exact, and have been estimated to the nearest half-foot. Lines delineating subsurface strata on the boring logs are intended to group soils having similar engineering properties and characteristics. They should be considered approximate as the actual transition between soil types (strata) may be gradual.

RELATIVE DENSITY

Cathead Hammer Penetration Resistance Blows per ft	Relative Density	Automatic Hammer Penetration Resistance Blows per ft
0 - 4	Very Loose	0 - 3
5 - 10	Loose	4 - 7
11 - 30	Medium Dense	8 - 20
31 - 50	Dense	21 - 33
> 50	Very Dense	> 33

COHESIVE STRENGTH

Cathead Resistance Blows per ft	Automatic Resistance Blows per ft	Consistency	Cohesion ksf
0 - 2	< 1	Very Soft	0 - 0.25
3 - 4	1 - 3	Soft	0.25 - 0.5
5 - 8	4 - 5	Firm	0.5 - 1.0
9 - 15	6 - 10	Stiff	1.0 - 2.0
16 - 30	11 - 20	Very Stiff	2.0 - 4.0
> 30	> 20	Hard	> 4.0

SOIL STRUCTURE

Slickensided	Having planes of weakness that appear slick and glossy.
Fissured	Containing shrinkage or relief cracks, often filled with fine sand or silt; usually more or less vertical.
Pocket	Inclusion of material of different texture that is smaller than the diameter of the sample.
Parting	Inclusion less than 1/8 inch thick extending through the sample.
Seam	Inclusion 1/8 inch to 3 inches thick extending through the sample.
Layer	Inclusion greater than 3 inches thick extending through the sample.
Laminated	Soil sample composed of alternating partings or seams of different soil type.
Interlayered	Soil sample composed of alternating layers of different soil type.
Intermixed	Soil sample composed of pockets of different soil type and layered or laminated structure is not evident.
Calcareous	Having appreciable quantities of carbonate.
Carbonate	Having more than 50% carbonate content.

DATE DRILLED 1/21/2022 BORING NO. B-1

GROUND ELEVATION ~ 48 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger & Mud Rotary (DAS- ATV)

DRIVE WEIGHT 140 lbs (Cathead) DROP HEIGHT 30 inches

SAMPLED BY DAS LOGGED BY ESL REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						16	39	18	21				2.5	CL	PAVEMENT SECTION: Approximately 7 1/2 inches of Portland concrete cement.
						15							2.25		BEAUMONT FORMATION: Reddish gray, moist, very stiff, sandy lean CLAY; roots; calcareous nodules. Light brown and reddish gray.
						14	44	17	27	52			1.5		Light brown; stiff; frequent calcareous and ferrous nodules.
	▽				109	20					1.6		1.75		Light brown and reddish yellow.
						17	35	17	18				2.0		Light brown and reddish brown; stiff to very stiff.
10						19				61					Light gray and reddish yellow.
					106	23					0.5		1.5	CH	Light brown and reddish yellow, moist, stiff, fat CLAY; sand seams.
	▽			30		24									Reddish brown and light brown; very stiff; slickensided; begin mud rotary drilling.
													3.5		Light brown and reddish yellow.
20													3.75		Reddish brown, light brown, and reddish yellow; few gravel; calcareous nodules.
						23							4.5+		Reddish brown and light brown; hard.
													4.5+		Reddish brown and light gray.
30															Total Depth = 30 feet. Boring was backfilled with bentonite on conclusion of drilling and the pavement was patched with concrete on 1/21/2022.

Note:
Groundwater may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report.

The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A-4

GROUND WATER OBSERVATIONS

▽ First Observed (ft): 16

▼ After Drilling (ft): N/A

▽ After 0.25 Hours (ft): 7.5

BORING LOG

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DATE DRILLED 1/21/2022 BORING NO. B-2

GROUND ELEVATION ~ 48 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger & Mud Rotary (DAS- ATV)

DRIVE WEIGHT 140 lbs (Cathead) DROP HEIGHT 30 inches

SAMPLED BY DAS LOGGED BY ESL REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						36							2.5	CH	FILL: Dark brown, moist, very stiff, fat CLAY; calcareous and ferrous nodules.
						18	36	17	19				1.5	CL	Reddish gray, gray, and light gray, moist, stiff, lean CLAY; calcareous nodules.
						18				18				SM	Light brown, moist, silty SAND.
				3		17	27	18	9	72				CL	BEAUMONT FORMATION: Reddish gray, moist, soft, lean CLAY with sand; calcareous nodules.
					109	20					0.8		2.0	CH	Light brown and reddish yellow, moist, stiff to very stiff, fat CLAY; sand seams; calcareous nodules.
10	▽			21		26									Reddish yellow, light brown and reddish brown; very stiff; begin mud rotary drilling.
													2.25		Few gravel.
						22				21				SM	Reddish yellow and light brown, wet, silty SAND.
						20							3.0	CH	Reddish brown, reddish yellow, and light gray, moist, very stiff, fat CLAY.
													3.0		Yellow brown and light brown.
20															
													4.5+		Reddish brown and light gray; hard.
						19							3.5		Very stiff; gravel.
30															Total Depth = 30 feet. Boring was backfilled with bentonite on 1/22/2022. Note: Groundwater may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A-5

GROUND WATER OBSERVATIONS

▽ First Observed (ft): 12

▼ After Drilling (ft): N/A

▼ After 0.17 Hours (ft): Cave in @ 9 ft

BORING LOG

NEW MULTI-USE SWMD FACILITY
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HOUSTON, TEXAS

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DATE DRILLED 1/26/2022 BORING NO. B-3

GROUND ELEVATION ~ 55 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger & Mud Rotary (DAS- ATV)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY DAS LOGGED BY KJK REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						19	35	18	17	65			2.25	CL	PAVEMENT SECTION: Approximately 7 inches of Portland concrete cement.
															FILL: Grayish brown, moist, very stiff, sandy lean CLAY; roots.
						14	84	23	61				1.25	CH	Grayish brown, moist, stiff, sandy fat CLAY.
						9							1.75	CL	Dark gray and dark brown, moist stiff, sandy lean CLAY; calcareous nodules.
	▽					15							0.75	CL	BEAUMONT FORMATION: Grayish brown, moist, firm, lean CLAY with sand; ferrous nodules.
						15							1.75		Stiff.
10						22	56	18	38	77			0.75	CH	Gray and dark gray, moist, firm, fat CLAY with sand; begin mud rotary drilling.
	▽				113	18					1.8		2.0	CL	Grayish brown and yellowish brown, moist, stiff to very stiff, lean CLAY with sand; ferrous and calcareous nodules.
													2.25	CH	Light gray, yellowish brown, and reddish brown, moist, very stiff, fat CLAY with sand, ferrous nodules.
													2.25		
						22				80			1.75		Stiff.
20															
													2.5		Light gray and light brown; very stiff.
													4.25		Hard.
30															Total Depth = 30 feet. Boring was backfilled with bentonite on conclusion of drilling and the pavement was patched with concrete on 1/26/2022.

Note:
Groundwater may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report.

The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A-6

GROUND WATER OBSERVATIONS

▽ First Observed (ft): 12

▼ After Drilling (ft): N/A

▽ After 0.33 Hours (ft): 8

BORING LOG

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DATE DRILLED 1/26/2022 BORING NO. B-4

GROUND ELEVATION ~ 48 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger & Mud Rotary (DAS- ATV)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY DAS LOGGED BY KJK REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						26								CL	PAVEMENT SECTION: Approximately 1 1/4 inches of HMAC overlaying 6 inches of Portland concrete cement.
						19	36	17	19	64			1.0		FILL: Grayish brown, moist, firm to stiff, sandy lean CLAY; gravel.
						20							1.25		Grayish brown and yellowish brown; stiff.
	▽					25	45	21	24				0.75		Dark gray, grayish brown, and yellowish brown; firm; wood chips.
						21	39	19	20				2.5	CL	BEAUMONT FORMATION: Gray and yellowish brown, moist, very stiff, sandy lean CLAY.
10	▽				116	18	44	16	28	69	1.2		1.75		Reddish brown and gray; stiff; ferrous and calcareous nodules; begin mud rotary drilling.
													2.25		Gray and yellowish brown; very stiff.
						16							2.25		
													3.75	CH	Light gray and yellowish brown, moist, very stiff, fat CLAY.
													3.25		
20															
													4.5+		Reddish brown and light gray; hard.
													4.5+		
30															Total Depth = 30 feet. Boring was backfilled with bentonite on conclusion of drilling and the pavement was patched with cold patch asphaltic concrete on 1/26/2022.

Note:
Groundwater may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report.

The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A-7

BORING LOG

NEW MULTI-USE SWMD FACILITY
5711 NECHES STREET
HOUSTON, TEXAS

701099001 | 3/22

GROUND WATER OBSERVATIONS

▽ First Observed (ft): 10

▼ After Drilling (ft): N/A

▽ After 0.25 Hours (ft): 7.5

Ninyo & Moore
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DATE DRILLED 1/26/2022 BORING NO. B-5

GROUND ELEVATION ~ 47 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger & Mud Rotary (DAS- ATV)

DRIVE WEIGHT 140 lbs (Cathead) DROP HEIGHT 30 inches

SAMPLED BY DAS LOGGED BY KJK REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						21	31	16	15	66				CL	PAVEMENT SECTION: Approximately 1 1/4 inches of HMAC overlaying 6 inches of Portland concrete cement.
					109	21					1.2		1.25		BEAUMONT FORMATION: Dark gray and grayish brown, moist, sandy lean CLAY. Grayish brown; stiff; calcareous and ferrous nodules.
						22	47	17	30				1.5		Grayish brown and yellowish brown.
	▽					20	36	17	19	75			1.25		Decrease in sand content.
					115	15					1.9		2.25		Reddish brown and light gray; very stiff; sand seams; begin mud rotary drilling.
10	▽												4.0		
						15							4.5+		Hard.
				22		27				15				SM	Reddish brown, wet, medium dense, silty SAND.
				10		25								CL	Yellowish brown and light gray, moist, stiff, sandy lean CLAY.
													4.25		Yellowish brown, light brown, and reddish brown; hard.
20															Total Depth = 20 feet. Boring was backfilled with bentonite on conclusion of drilling and the pavement was patched with cold patch asphaltic concrete on 1/26/2022.
															Note: Groundwater may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report.
															The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30															

FIGURE A-8

BORING LOG

GROUND WATER OBSERVATIONS

▽ First Observed (ft): 10

▼ After Drilling (ft): N/A

▽ After 0.25 Hours (ft): 7.5

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Geotechnical & Environmental Sciences Consultants

DATE DRILLED 1/25/2022 BORING NO. B-6

GROUND ELEVATION ~ 47 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (DAS - ATV)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY DAS LOGGED BY KJK REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						14	28	17	11	69			4.5+	CL	PAVEMENT SECTION: 2 inches of HMAC overlaying 5 inches of limestone base.
						19							0.75		FILL: Dark gray and grayish brown, moist, hard, sandy lean CLAY. Firm; gravel.
						12	39	16	23				2.25	CL	BEAUMONT FORMATION: Gray and yellowish brown, moist, very stiff, lean CLAY with sand; calcareous nodules.
					116	13					1.3		1.5		Stiff; ferrous nodules.
	▽					21	38	17	21	77			0.75		Light gray, reddish brown, and yellowish brown; firm; calcareous nodules.
10													1.25		Stiff.
	▽					20							2.5		Reddish brown and light gray; very stiff.
													1.25		Stiff.
													2.25		Yellowish brown and light gray; very stiff.
													4.0		
20															Total Depth = 20 feet. Boring was backfilled with bentonite on conclusion of drilling and the pavement was patched with cold patch asphaltic concrete on 1/25/2022.
															Note: Groundwater may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report.
															The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30															

FIGURE A-9

BORING LOG

GROUND WATER OBSERVATIONS

▽ First Observed (ft): 12

▼ After Drilling (ft): N/A

▽ After 0.25 Hours (ft): 9.25

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DATE DRILLED 1/25/2022 BORING NO. B-7

GROUND ELEVATION ~ 47 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (DAS - ATV)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY DAS LOGGED BY KJK REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0															PAVEMENT SECTION: 2 inches of HMAC overlaying 8 inches of limestone base.
						15							3.25	CL	FILL: Dark gray and grayish brown, moist, very stiff, sandy lean CLAY.
						8	31	17	14	55		0.25	0.75	CL	BEAUMONT FORMATION: Grayish brown, moist, firm, sandy lean CLAY; calcareous nodules.
						20							0.75		Gray and yellowish brown; ferrous nodules.
	▼				106	21	41	16	25		0.3		0.25		Very soft to soft.
						27						0.2	0.5	CH	Gray and yellowish brown, moist, soft to firm, fat CLAY; calcareous and ferrous nodules.
10	▽												3.5	CL	Gray and yellowish brown, moist, very stiff, lean CLAY with sand.
					106	19				75	1.1		1.75		Grayish brown, yellowish brown, and reddish brown; stiff.
					110	21					1.5		1.5		
													3.0		Very stiff.
						17							2.25		Light gray and light brown.
20															Total Depth = 20 feet. Boring was backfilled with bentonite on conclusion of drilling and the pavement was patched with cold patch asphaltic concrete on 1/25/2022.
															Note: Groundwater may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report.
															The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30															

FIGURE A-10

BORING LOG

GROUND WATER OBSERVATIONS

▽ First Observed (ft): 12

▼ After Drilling (ft): N/A

▽ After 0.25 Hours (ft): 8

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DATE DRILLED 1/20/2022 BORING NO. B-8

GROUND ELEVATION ~ 47 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (DAS - ATV)

DRIVE WEIGHT 140 lbs (Cathead) DROP HEIGHT 30 inches

SAMPLED BY DAS LOGGED BY ESL REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0															PAVEMENT SECTION: Approximately 2 inches of HMAC overlaying about 6 inches of aggregate base.
						15							2.0	CL	BEAUMONT FORMATION: Light brown and reddish gray, moist, stiff to very stiff, sandy lean CLAY; calcareous and ferrous nodules.
						14	38	18	20	60			2.0		
	▽					20							2.0		Light brown and reddish yellow; frequent calcareous nodules.
						19	37	18	19				2.0		Sand partings.
						19							2.75		Light brown, reddish brown, and reddish yellow; very stiff.
10						16	31	17	14	74			2.25		Decrease in sand content.
	▽			20											Light gray and reddish yellow.
													2.25		Light gray and reddish yellow, and reddish brown.
													2.5		
				15											Reddish yellow and light brown; stiff.
20															Total Depth = 20 feet. Boring was backfilled with bentonite on conclusion of drilling and the pavement was patched with cold patch asphaltic concrete on 1/20/2022.
															Note: Groundwater may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report.
															The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30															

FIGURE A-11

BORING LOG

GROUND WATER OBSERVATIONS

▽ First Observed (ft): 12

▼ After Drilling (ft): N/A

▽ After 24 Hours (ft): 6

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DATE DRILLED 1/21/2022 BORING NO. B-9

GROUND ELEVATION ~ 47 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (DAS - ATV)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY DAS LOGGED BY ESL REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						22	36	18	18	51			2.75	CL	FILL: Reddish gray and reddish yellow, moist, very stiff, sandy lean CLAY; shells; roots.
						14							3.0		Reddish gray and reddish yellow.
						22	44	16	28	80		0.4	0.75	CL	BEAUMONT FORMATION: Light brown and reddish brown, moist, firm, lean CLAY with sand; roots; calcareous and ferrous nodules.
						25				81		0.4	0.5		Soft to firm.
						27							1.5	CH	Reddish yellow, reddish brown, and light brown, moist, stiff, fat CLAY.
10													3.0		Very stiff; sand seams; gravel.
															Total Depth = 12 feet. Boring was backfilled with bentonite on 1/22/2022. Note: Groundwater, though not encountered, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
20															
30															

FIGURE A-12

BORING LOG

GROUND WATER OBSERVATIONS

▽ First Observed (ft): N/A

▼ After Drilling (ft): N/A

▼ After N/A Hours (ft): N/A

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APPENDIX B

Laboratory Testing

FIGURE B-1

LABORATORY TESTING

Classification

Soils were visually and texturally classified using the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the boring logs in Appendix A and in the following summary tables in Appendix B.

Moisture Content

The moisture content of samples obtained from the exploratory borings was evaluated in general accordance with ASTM D 2216. The test results are presented on the boring logs in Appendix A and the Summary of Laboratory Results, Figure B-4.

No. 200 Sieve Wash

An evaluation of the percentage of particles finer than the No. 200 sieve in selected soil sample was performed in general accordance with ASTM D 1140. The results of the tests are presented on Figure B-2, on the boring logs in Appendix A, and in the Summary of Laboratory Results, Figure B-4.

Atterberg Limits

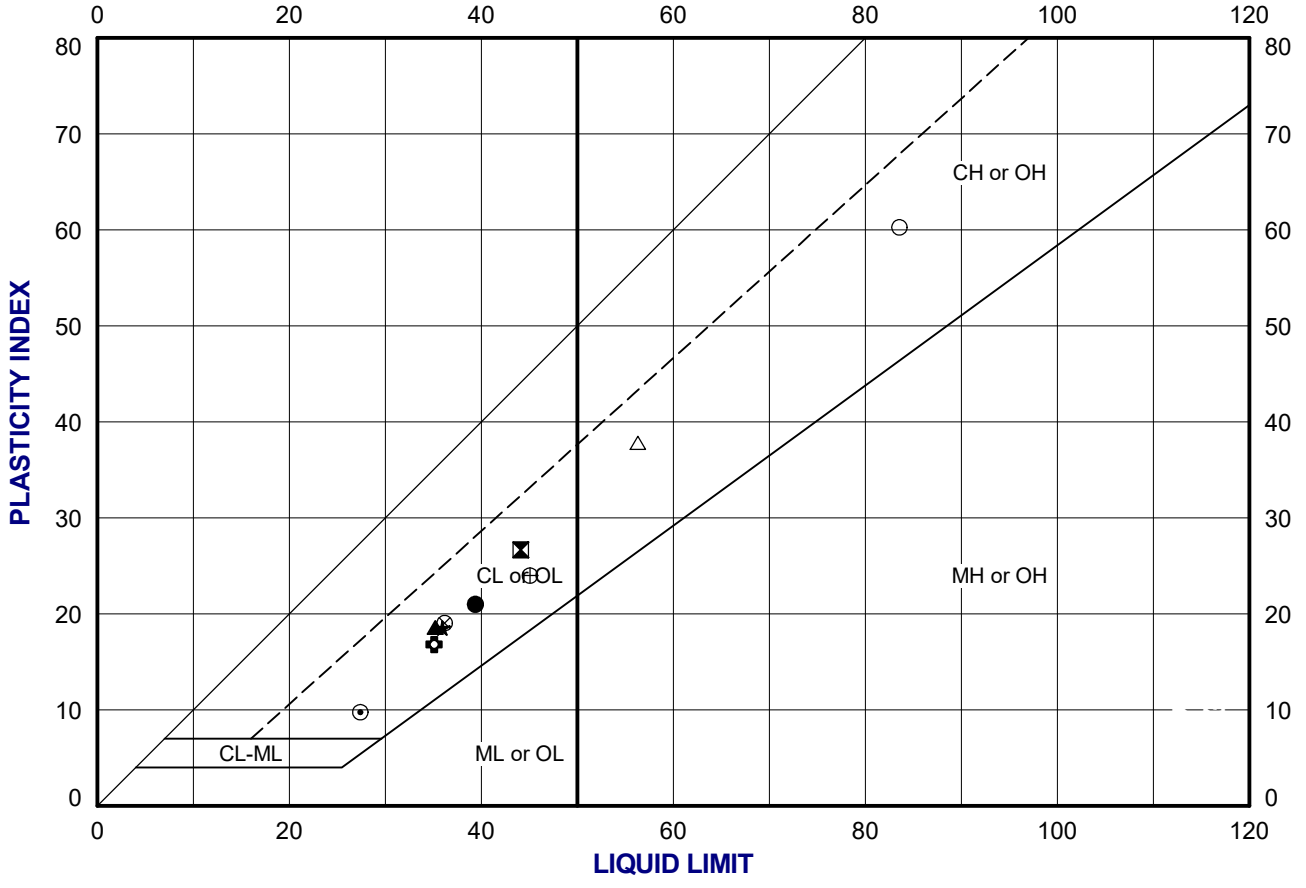
Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318 (Method B). These test results were utilized to evaluate the soil classification in accordance with the Unified Soil Classification System (USCS). The results of these tests are presented on Figure B-3, on the boring logs in Appendix A, and in the Summary of Laboratory Results, Figure B-4.

Compression Tests

Unconfined compression tests were performed on relatively undisturbed samples in general accordance with ASTM D 2166, respectively. The test results are shown on the boring logs in Appendix A and in the Summary of Laboratory Results, Figure B-4.

SAMPLE LOCATION	DEPTH (feet)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	USCS
B-1	4 - 6	Sandy Lean CLAY	84.9	51.6	CL
B-1	10 - 12	Sandy Lean CLAY	100.0	60.5	CL
B-2	4 - 6	Silty SAND	100.0	17.8	SM
B-2	6.5 - 8	Lean CLAY w/ Sand	100.0	71.6	CL
B-2	14 - 16	Silty SAND	100.0	20.9	SM
B-3	0.6 - 2	Sandy Lean CLAY	100.0	65.4	CL
B-3	10 - 12	Fat CLAY w/ Sand	100.0	76.6	CH
B-3	18 - 20	Fat CLAY w/ Sand	100.0	80.3	CH
B-4	2 - 4	Sandy Lean CLAY	100.0	63.8	CL
B-4	10 - 12	Sandy Lean CLAY	100.0	69.3	CL
B-5	0.6 - 2	Sandy Lean CLAY	100.0	65.9	CL
B-5	6 - 8	Lean CLAY w/ Sand	100.0	74.8	CL
B-5	14.5 - 16	Silty SAND	100.0	15.1	SM
B-6	0.6 - 2	Sandy Lean CLAY	100.0	68.6	CL
B-6	8 - 10	Lean CLAY w/ Sand	100.0	77.4	CL
B-7	2 - 4	Sandy Lean CLAY	100.0	55.4	CL
B-7	12 - 14	Lean CLAY w/ Sand	100.0	74.7	CL
B-8	2 - 4	Sandy Lean CLAY	92.1	59.7	CL
B-8	10 - 12	Lean CLAY w/ Sand	92.8	74.4	CL
B-9	0 - 2	Sandy Lean CLAY	100.0	50.6	CL
B-9	4 - 6	Lean CLAY w/ Sand	100.0	79.5	CL
B-9	6 - 8	Lean CLAY w/ Sand	100.0	81.2	CL

SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-1	0.6 - 2	39	18	21	CL	CL
⊠	B-1	4 - 6	44	17	27	CL	CL
▲	B-1	8 - 10	35	17	18	CL	CL
★	B-2	2 - 4	36	17	19	CL	CL
⊙	B-2	6.5 - 8	27	18	9	CL	CL
✿	B-3	0.6 - 2	35	18	17	CL	CL
○	B-3	2 - 4	84	23	61	CH	CH
△	B-3	10 - 12	56	18	38	CH	CH
⊗	B-4	2 - 4	36	17	19	CL	CL
⊕	B-4	6 - 8	45	21	24	CL	CL



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D4318.

FIGURE B-3a

ATTERBERG LIMIT TEST RESULTS

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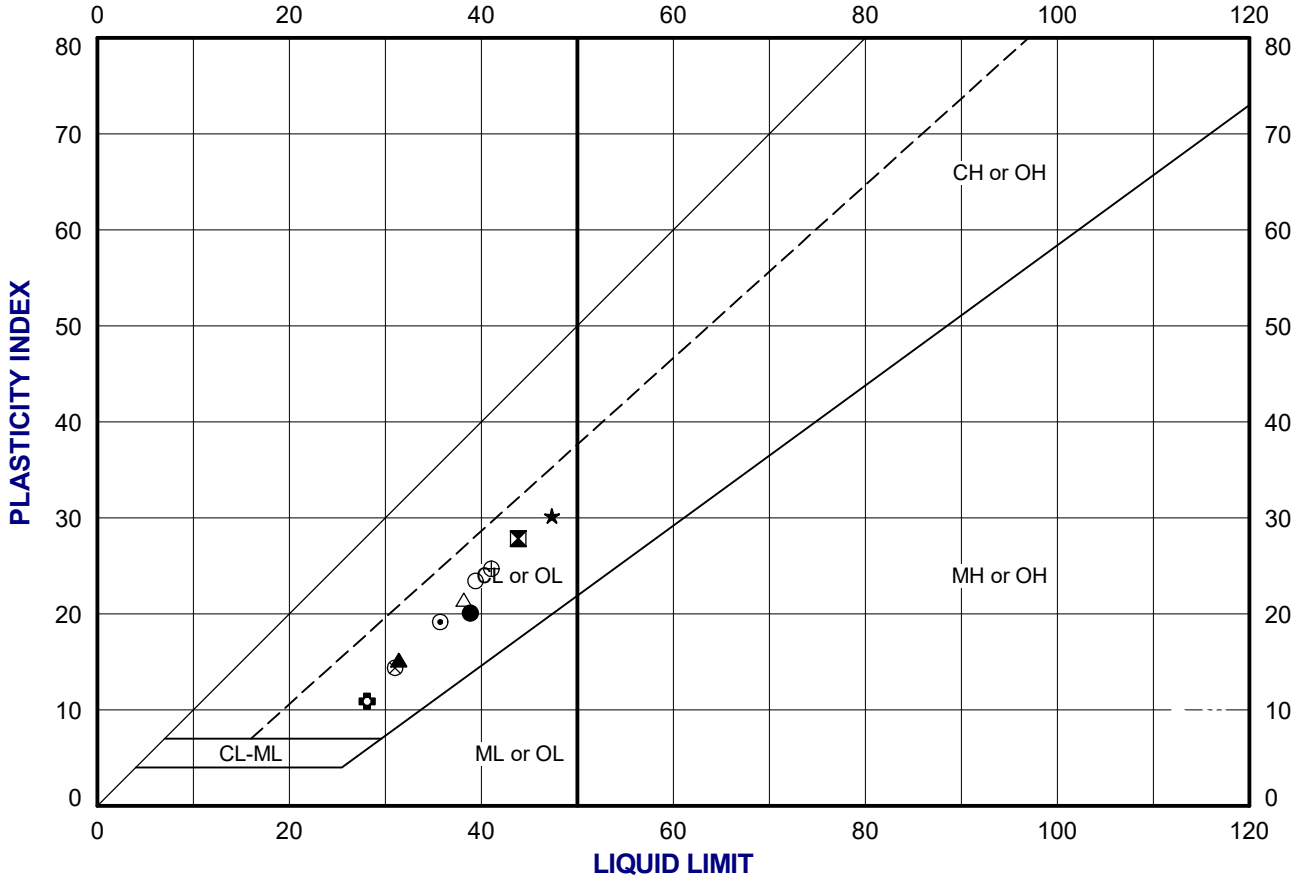
SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-4	8 - 10	39	19	20	CL	CL
⊠	B-4	10 - 12	44	16	28	CL	CL
▲	B-5	0.6 - 2	31	16	15	CL	CL
★	B-5	4 - 6	47	17	30	CL	CL
⊙	B-5	6 - 8	36	17	19	CL	CL
✿	B-6	0.6 - 2	28	17	11	CL	CL
○	B-6	4 - 6	39	16	23	CL	CL
△	B-6	8 - 10	38	17	21	CL	CL
⊗	B-7	2 - 4	31	17	14	CL	CL
⊕	B-7	6 - 8	41	16	25	CL	CL



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D4318.

FIGURE B-3b

ATTERBERG LIMIT TEST RESULTS

NEW MULTI-USE SWMD FACILITY
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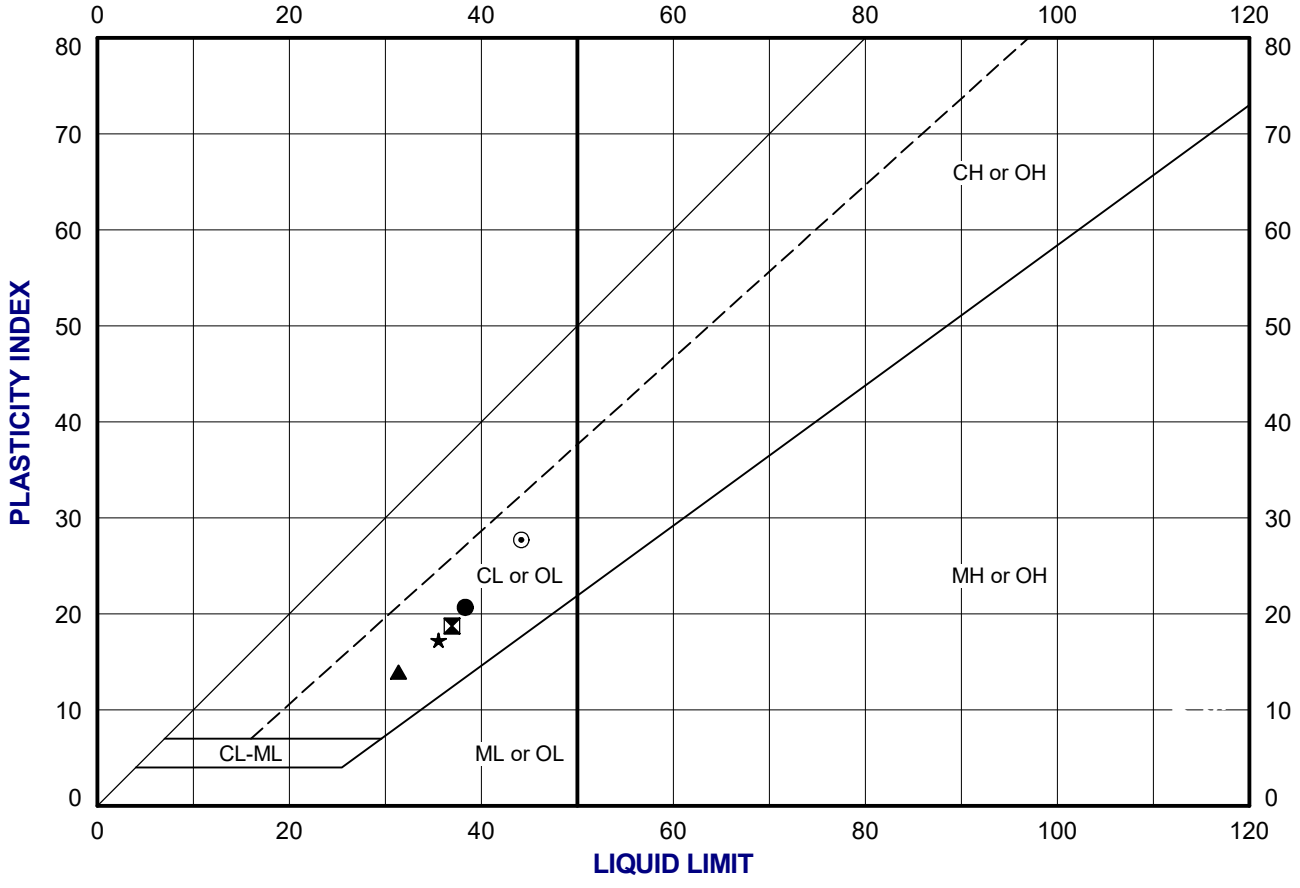
SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-8	2 - 4	38	18	20	CL	CL
⊠	B-8	6 - 8	37	18	19	CL	CL
▲	B-8	10 - 12	31	17	14	CL	CL
★	B-9	0 - 2	36	18	18	CL	CL
⊙	B-9	4 - 6	44	16	28	CL	CL



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D4318.

FIGURE B-3c

ATTERBERG LIMIT TEST RESULTS

NEW MULTI-USE SWMD FACILITY
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Borehole	Depth (feet)	Liquid Limit	Plastic Limit	Plasticity Index	Shear Strength (ksf)	%<#200 Sieve	USCS Group Symbol	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-1	0.6 - 2	39	18	21	2.5[P]		CL	16.0			
B-1	2 - 4				2.25[P]		CL	15.0			
B-1	4 - 6	44	17	27	1.5[P]	51.6	CL	14.0			
B-1	6 - 8				1.6[U]		CL	20.0	108.8		
B-1	8 - 10	35	17	18	2.0[P]		CL	17.0			
B-1	10 - 12					60.5	CL	19.0			
B-1	12 - 14				0.5[U]		CH	23.0	106.0		
B-1	14.5 - 16						CH	24.0			
B-1	16 - 18				3.5[P]		CH				
B-1	18 - 20				3.75[P]		CH				
B-1	23 - 25				4.5+[P]		CH	23.0			
B-1	28 - 30				4.5+[P]		CH				
B-2	0 - 1				2.5[P]		CH	36.0			
B-2	2 - 4	36	17	19	1.5[P]		CL	18.0			
B-2	4 - 6					17.8	SM	18.0			
B-2	6.5 - 8	27	18	9		71.6	CL	17.0			
B-2	8 - 10				0.8[U]		CH	20.0	109.5		
B-2	10.5 - 12						CH	26.0			
B-2	12 - 14				2.25[P]		CH				
B-2	14 - 16					20.9	SM	22.0			
B-2	16 - 18				3.0[P]		CH	20.0			
B-2	18 - 20				3.0[P]		CH				
B-2	23 - 25				4.5+[P]		CH				
B-2	28 - 30				3.5[P]		CH	19.0			
B-3	0.6 - 2	35	18	17	2.25[P]	65.4	CL	19.0			

U = Unconfined Compression; Q = Unconsolidated-Undrained Triaxial; T = Torvane; P = Pocket Penetrometer

FIGURE B-4a

SUMMARY OF LABORATORY RESULTS

NEW MULTI-USE SWMD FACILITY
5711 NECHES STREET
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Borehole	Depth (feet)	Liquid Limit	Plastic Limit	Plasticity Index	Shear Strength (ksf)	%<#200 Sieve	USCS Group Symbol	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-3	2 - 4	84	23	61	1.25[P]		CH	14.0			
B-3	4 - 6				1.75[P]		CL	9.0			
B-3	6 - 8				0.75[P]		CL	15.0			
B-3	8 - 10				1.75[P]		CL	15.0			
B-3	10 - 12	56	18	38	0.75[P]	76.6	CH	22.0			
B-3	12 - 14				1.8[U]		CL	18.0	113.2		
B-3	14 - 16				2.25[P]		CH				
B-3	16 - 18				2.25[P]		CH				
B-3	18 - 20				1.75[P]	80.3	CH	22.0			
B-3	23 - 25				2.5[P]		CH				
B-3	28 - 30				4.25[P]		CH				
B-4	0.6 - 2						CL	26.0			
B-4	2 - 4	36	17	19	1.0[P]	63.8	CL	19.0			
B-4	4 - 6				1.25[P]		CL	20.0			
B-4	6 - 8	45	21	24	0.75[P]		CL	25.0			
B-4	8 - 10	39	19	20	2.5[P]		CL	21.0			
B-4	10 - 12	44	16	28	1.2[U]	69.3	CL	18.0	116.0		
B-4	12 - 14				2.25[P]		CL				
B-4	14 - 16				2.25[P]		CL	16.0			
B-4	16 - 18				3.75[P]		CH				
B-4	18 - 20				3.25[P]		CH				
B-4	23 - 25				4.5+[P]		CH				
B-4	28 - 30				4.5+[P]		CH				
B-5	0.6 - 2	31	16	15		65.9	CL	21.0			
B-5	2 - 4				1.2[U]		CL	21.0	108.7		

U = Unconfined Compression; Q = Unconsolidated-Undrained Triaxial; T = Torvane; P = Pocket Penetrometer

FIGURE B-4b

SUMMARY OF LABORATORY RESULTS

NEW MULTI-USE SWMD FACILITY
5711 NECHES STREET
HOUSTON, TEXAS

Borehole	Depth (feet)	Liquid Limit	Plastic Limit	Plasticity Index	Shear Strength (ksf)	%<#200 Sieve	USCS Group Symbol	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-5	4 - 6	47	17	30	1.5[P]		CL	22.0			
B-5	6 - 8	36	17	19	1.25[P]	74.8	CL	20.0			
B-5	8 - 10				1.9[U]		CL	15.0	115.3		
B-5	10 - 12				4.0[P]		CL				
B-5	12 - 14				4.5+[P]		CL	15.0			
B-5	14.5 - 16					15.1	SM	27.0			
B-5	16.5 - 18						CL	25.0			
B-5	18 - 20				4.25[P]		CL				
B-6	0.6 - 2	28	17	11	4.5+[P]	68.6	CL	14.0			
B-6	2 - 4				0.75[P]		CL	19.0			
B-6	4 - 6	39	16	23	2.25[P]		CL	12.0			
B-6	6 - 8				1.3[U]		CL	13.0	115.6		
B-6	8 - 10	38	17	21	0.75[P]	77.4	CL	21.0			
B-6	10 - 12				1.25[P]		CL				
B-6	12 - 14				2.5[P]		CL	20.0			
B-6	14 - 16				1.25[P]		CL				
B-6	16 - 18				2.25[P]		CL				
B-6	18 - 20				4.0[P]		CL				
B-7	0.8 - 2				3.25[P]		CL	15.0			
B-7	2 - 4	31	17	14	0.5[T]	55.4	CL	8.0			
B-7	4 - 6				0.75[P]		CL	20.0			
B-7	6 - 8	41	16	25	0.3[U]		CL	21.0	106.0		
B-7	8 - 10				0.4[T]		CH	27.0			
B-7	10 - 12				3.5[P]		CL				
B-7	12 - 14				1.1[U]	74.7	CL	19.0	106.0		

U = Unconfined Compression; Q = Unconsolidated-Undrained Triaxial; T = Torvane; P = Pocket Penetrometer

FIGURE B-4c

SUMMARY OF LABORATORY RESULTS

NEW MULTI-USE SWMD FACILITY
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HOUSTON, TEXAS

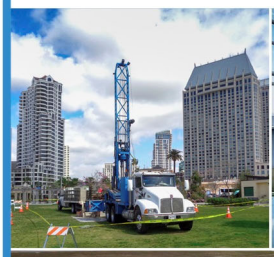
Borehole	Depth (feet)	Liquid Limit	Plastic Limit	Plasticity Index	Shear Strength (ksf)	%<#200 Sieve	USCS Group Symbol	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-7	14 - 16				1.5[U]		CL	21.0	109.7		
B-7	16 - 18				3.0[P]		CL				
B-7	18 - 20				2.25[P]		CL	17.0			
B-8	0.7 - 2				2.0[P]		CL	15.0			
B-8	2 - 4	38	18	20	2.0[P]	59.7	CL	14.0			
B-8	4 - 6				2.0[P]		CL	20.0			
B-8	6 - 8	37	18	19	2.0[P]		CL	19.0			
B-8	8 - 10				2.75[P]		CL	19.0			
B-8	10 - 12	31	17	14	2.25[P]	74.4	CL	16.0			
B-8	14 - 16				2.25[P]		CL				
B-8	16 - 18				2.5[P]		CL				
B-9	0 - 2	36	18	18	2.75[P]	50.6	CL	22.0			
B-9	2 - 4				3.0[P]		CL	14.0			
B-9	4 - 6	44	16	28	0.8[T]	79.5	CL	22.0			
B-9	6 - 8				0.8[T]	81.2	CL	25.0			
B-9	8 - 10				1.5[P]		CH	27.0			
B-9	10 - 12				3.0[P]		CH				

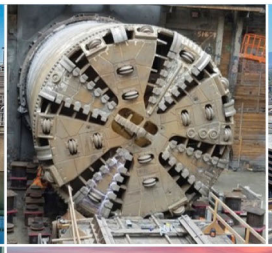
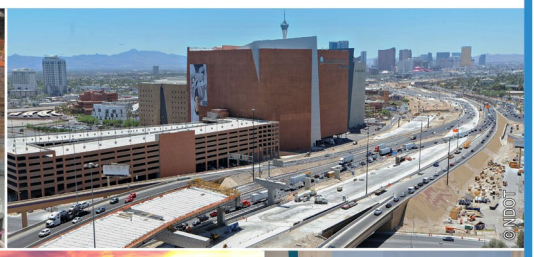
U = Unconfined Compression; Q = Unconsolidated-Undrained Triaxial; T = Torvane; P = Pocket Penetrometer

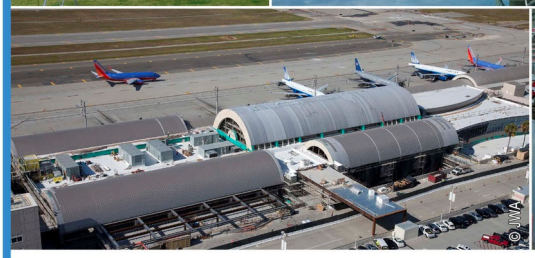
FIGURE B-4d

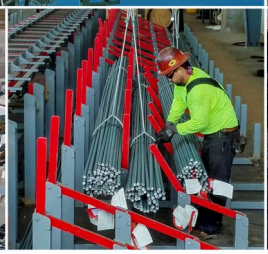
SUMMARY OF LABORATORY RESULTS

NEW MULTI-USE SWMD FACILITY
5711 NECHES STREET
HOUSTON, TEXAS





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ninyoandmoore.com

Ninyo & Moore

Geotechnical & Environmental Sciences Consultants

Attachment II–10 Wetlands & Endangered Species Report

November 16, 2021

City of Houston
Public Works, Transportation & Drainage Operations
611 Walker Street
Houston, TX 77002

Re: City of Houston Northeast Transfer Station
Federally Listed Species Habitat Assessment and Wetland Determination Report
5711 Neches Street, Houston, Harris County, Texas

At the request of the City of Houston, Tetra Tech, Inc. (Tetra Tech) conducted desktop evaluations and an in-field pedestrian survey for potential regulated wetlands and waterbodies and habitat for federally listed threatened and endangered (T&E) species with potential to occur in the vicinity of the proposed Northeast Transfer Station Project (Project) in Harris County, Texas (TX) (see Site Location Map, Figure 1). The purpose of this assessment is to document compliance with Section 7 and Section 10 of the Endangered Species Act (ESA) and Section 404/10 of the Clean Water Act (CWA).

Existing Environmental Conditions

Prior to the onsite evaluation, Tetra Tech consulted available aerial imagery and readily available on-line resources to assess existing environmental conditions within and surrounding the Project area. During the field survey conducted on September 24th, 2021, a Tetra Tech biologist conducted a vegetation/habitat and land use characterization survey as well as a wetland and waterbody determination survey within the Project area. A walkover survey of the Project area was conducted by completing transects around the Project site, collecting habitat data that included vegetative cover type, presence of wetlands or waterbodies, and general land use.

The entirety of the Project area is developed land, bounded by Interstate 69 to the west and Neches Street to the east. Project site contains what appears to be a radio tower, two commercial buildings, and concrete or gravel parking areas for garbage trucks and other similar vehicles. Small patches of maintained lawn are the only vegetated areas within the Project site. No avian stick nests, bird rookeries, or obvious animal burrows were identified within the Project area during the in-field survey conducted in September 2021. Suitable wildlife habitat was not observed within the Project boundaries. No wetlands and/or waterbodies were observed within the Project site during the field investigation.

Surface Water and Wetlands

Section 404 of the Clean Water Act

Section 404 of the Clean Water Act (CWA) requires that regulated dredge and/or fill activities in federally-jurisdictional WUS be approved/permitted by the USACE. Because potential federally-jurisdictional waters of the United States (WUS) are not anticipated to be impacted by the Project, the Project **would not require** permit coverage pursuant to Section 404 of the CWA.

Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act (RHA) of 1899 (33 United States Code [USC] 401 et seq.) requires that regulated activities conducted below the ordinary high water mark elevation of navigable WUS be approved/permitted by the USACE, including any structure, obstruction, or alteration above, across, or below a federally-designated navigable WUS. Navigable WUS are those waters of the US that are subject to the ebb and flow of the tide shoreward to the OHWM or mean high water mark and/or are presently used, or have been used in the past or may be susceptible to use to transport interstate or foreign commerce. Because no federally-designated navigable WUS will be crossed by the Project, **a Section 10 of the RHA Permit will not be required**.

Protected Species

Section 7 of the ESA Applicability

Pursuant to Section 7(a)(2) of the ESA, a federal agency shall insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat via consultation with the United States Fish and Wildlife Service (USFWS). If federal funding or direct federal action is involved in Project development, compliance with Section 7 of the ESA would be required.

Section 10 of the ESA Applicability

Pursuant to Section 9(a)(1)(B) of the ESA, it is unlawful for any "person" (i.e., company) subject to the jurisdiction of the United States to "take" any federally-listed fish or wildlife species within the United States, except under USFWS permit issued pursuant to Section 10 of the ESA. Even if no federal agency has overarching jurisdiction or responsibility to ensure Project-wide compliance pursuant to Section 7 of the ESA, the Project would still be subject to compliance pursuant to Section 10 of the ESA.

ESA Impact Assessment

Review of the IPaC website (USFWS 2021b) indicates that six federally listed endangered, threatened, proposed, or candidate species are known to potentially occur in Harris County and should be considered part of this baseline environmental assessment for the Project. The six species include: west Indian manatee (*Trichechus manatus*), eastern black rail (*Laterallus jamaicensis ssp. jamaicensis*), piping plover (*Charadrius melodus*), and red knot (*Calidris canutus rufus*), all listed as threatened, as well as Texas prairie dawn-flower (*Hymenoxys texana*) listed as endangered, and monarch butterfly (*Danaus plexippus*) listed as a candidate species. **Habitat for these species is not present within Project area**.

Impact Assessment Summary

No wetlands and/or waterbodies subject to CWA regulations were identified during the field investigation. In addition, Project activities are anticipated to have "no effect" on threatened or endangered species, as habitat within the Project area is not present for listed species with the potential to occur within Harris County. Additionally, no listed species or their sign (e.g., nests, tracks, scat, and burrows) were identified within the Project area.

If you have any questions or require additional information, please contact Jason Speights via e-mail at jason.speights@tetratech.com or via phone at 832-251-6024 with any questions regarding this request.

Sincerely,

Project Manager

References

Endangered Species Act of 1973 (16 U.S.C. §§1531-1544, 87 Stat. 884). 1973 and as amended. Available at: www.fws.gov/laws/lawsdigest/esact.html. Accessed September 2021.

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USFWS. 2021c. National Wetlands Mapper. Available at: http://www.fws.gov/wetlands/Data/Mapper.html. Accessed September 2021.

United States Geological Survey (USGS). 2021a. USGS 7.5 Minute Quadrangles/DRG (Digital Raster Graphic). DRG used: (Settegast, TX 2019). Available at: http://www.metzgerwillard.us/quads/quads.html. Accessed September 2021.

USGS. 2021b. National Hydrography Dataset (NHD) v2.2. Harris County, Texas. Available at: https://gdg.sc.egov.usda.gov. Accessed September 2021.

TETRA TECH

Photographic Record				
Photographer	Regina Sammon		**Project:**	Neches Transfer Station
Photo No.:	1		**Photo No.:**	2
Location:	Neches Street		**Location:**	Neches Street
Description:	Project site for transfer station, facing west		**Description:**	Project site for transfer station, facing northwest
				
Photo No.:	3		**Photo No.:**	4
Location:	Neches Street		**Location:**	Neches Street
Description:	Project site for transfer station, facing southwest		**Description:**	Project site for transfer station, facing west
				

TETRA TECH

Photographic Record				
Photographer	Regina Sammon		**Project:**	Neches Transfer Station
Photo No.:	5		**Photo No.:**	6
Location:	Neches Street		**Location:**	Neches Street
Description:	Directly east of Project site		**Description:**	Directly southeast of Project site

Photo No.:			**Photo No.:**	
Location:			**Location:**	
Description:			**Description:**	

TETRA TECH

Figures

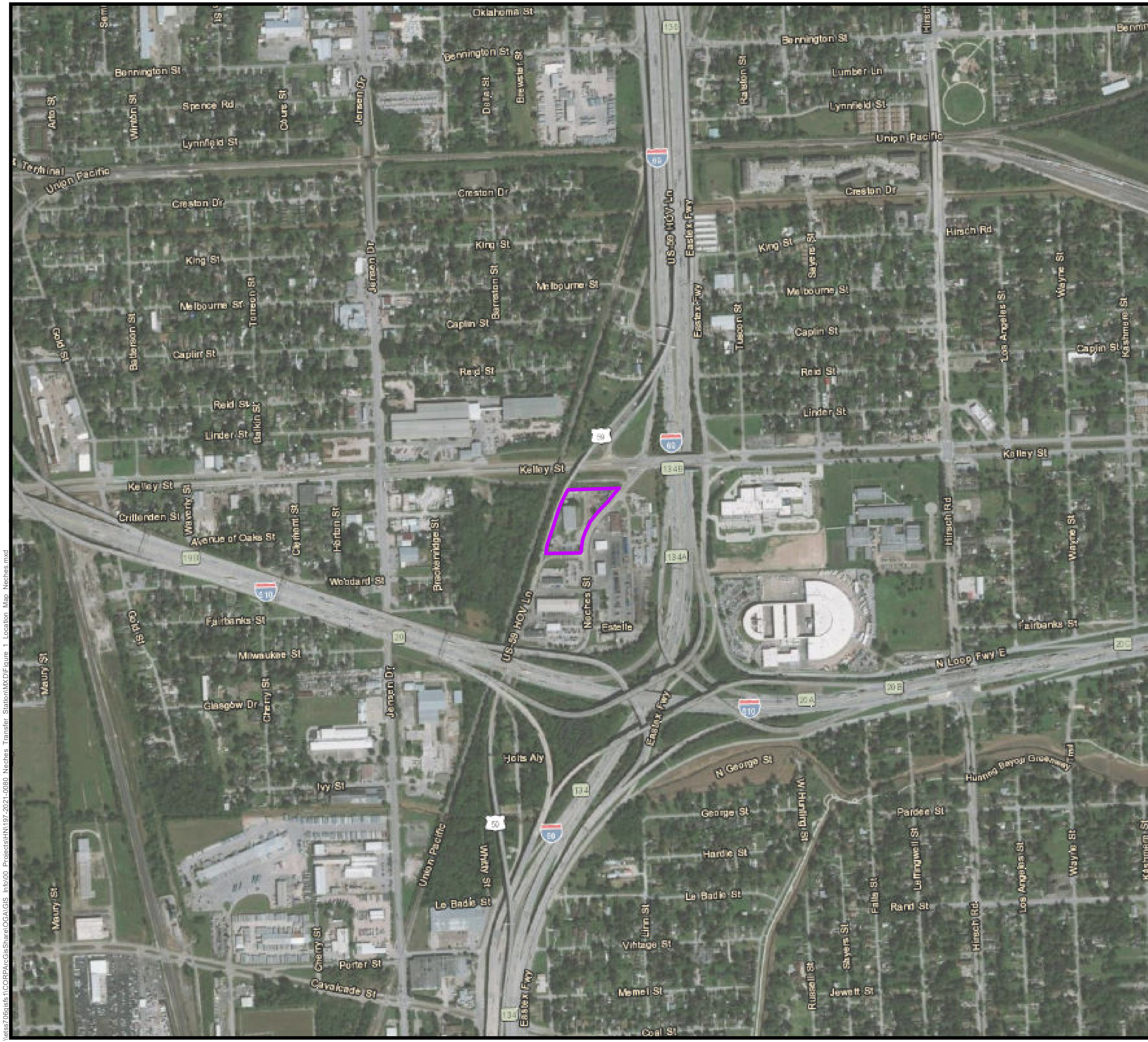


FIGURE 1.

SITE LOCATION MAP FOR THE NORTHEAST TRANSFER STATION

HARRIS COUNTY, TEXAS

LEGEND

Neches Transfer Station

N

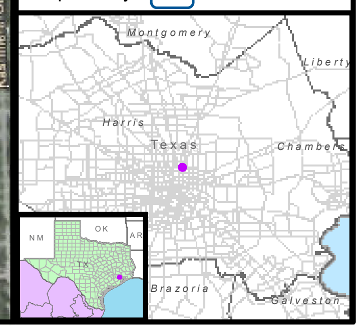
SCALE: 1 Inch = 1,000 Feet

Feet 0 500 1,000

Sheet 1 of 1

Date: November 2021
Project: 197-2021-0080

Prepared By: TETRA TECH



\\tetsv706\gis\s1\CORP\ArcGis\Share\OGA\GIS_Info\00_Projects\HN\197-2021-0080_Neches_Transfer_Station\MXD\Figure_1_Location_Map_Neches.mxd

Drawn By: stephanie.aselage

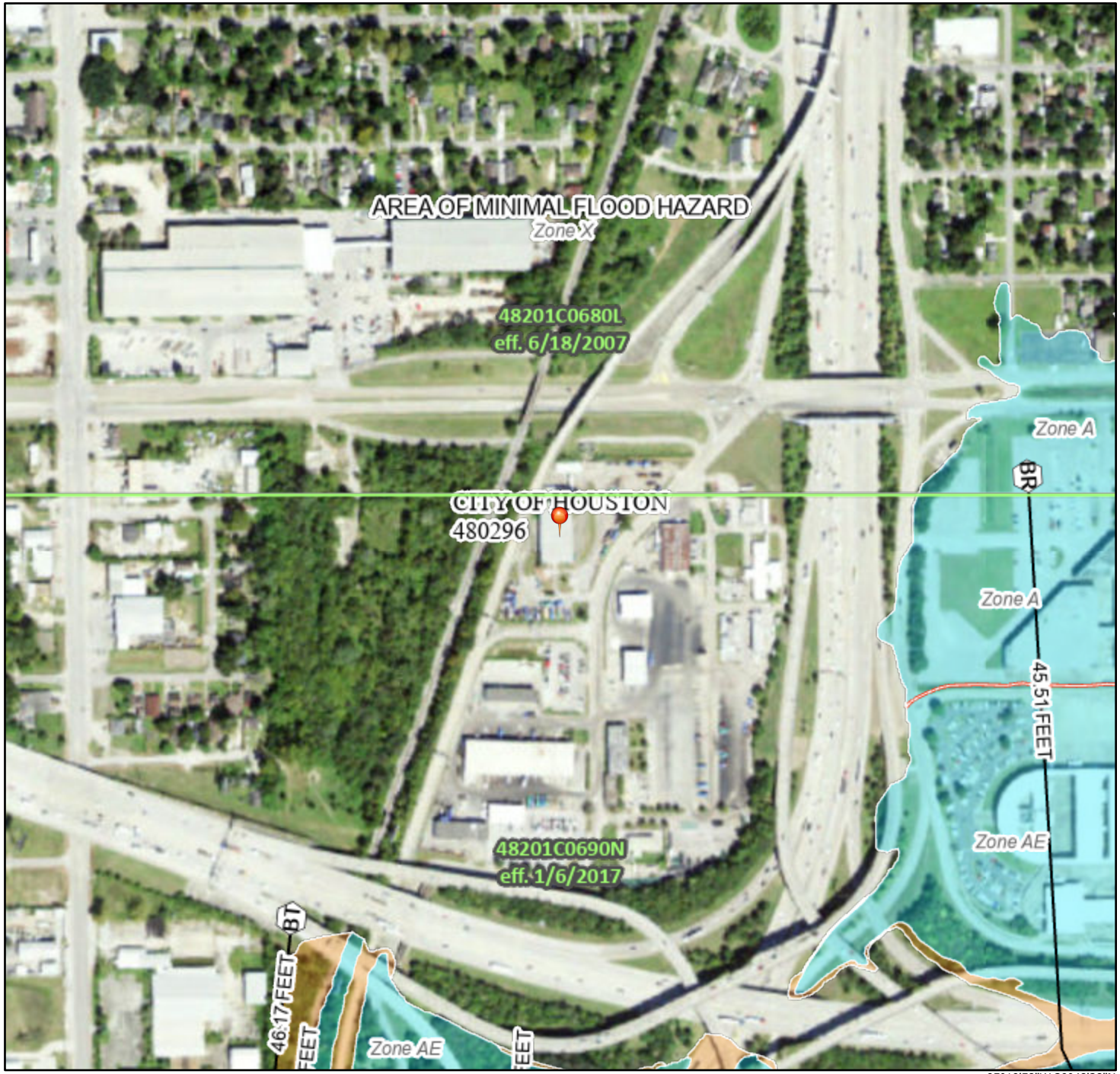
Source: Aerial - Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, 2016; Soils - USDA-NRCS, 2016.

Attachment II–11 Floodplain Map

National Flood Hazard Layer FIRMette

FEMA

95°20'35"W 29°48'59"N



95°19'58"W 29°48'28"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/2/2022 at 5:00 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.