CAPITAL IMPROVEMENT FUNDING AGREEMENT

This Capital Improvement Funding Agreement ("Agreement") by and between the of Seguin, Texas, a Texas home rule municipality **("City")**, and Springs Hill Special Utility District ("**Utility**"), each acting by and through their duly authorized representatives and governing bodies, shall be effective on the date of approval and execution by and on behalf of the **City ("Effective Date")**.

WHEREAS, both City and Utility are currently making Water Utility improvements along and/or near West Kingsbury Street in Seguin, Texas;

WHEREAS, the City, in collaboration with the Seguin Economic Development Corporation, has negotiated and acquired sufficient Permanent Utility Easement area along a portion of West Kingsbury Street to accommodate placement of both the City's water utility line and the Utility's water utility line;

WHEREAS, the City has offered, and Utility has accepted, an opportunity to share the City's easement area along property owned by Seguin Independent School District as depicted on **Exhibit "A"** (herein referred to as the "**Project**"), which is incorporated herein for all purposes.

WHEREAS, the City has offered to construct both the City's water utility line and the Utility's water utility line for the length of the Project;

WHEREAS, the **Utility** will participate in the costs of constructing and installing certain facilities within the Project as set forth in this Agreement.

WHEREAS, beyond the limits of the Project, both Parties will continue their responsibilities for their respective projects, providing connections to their respective utilities at either limit of the Project.

NOW, THEREFORE, BE IT AGREED, by the City and the Utility:

I. Definitions

When used in this Agreement, capitalized terms not otherwise defined shall have the meanings set forth in the preamble above, and the definitions below:

1.01 "Agreement" shall refer to this Agreement between City and Utility.

1.02 "**Existing Waterline Improvements**" means all existing water distribution line improvements and related facilities, equipment and appurtenances owned and operated by Utility within the Project Area but on the opposite side of West Kingsbury Street, which will be remain in place in accordance with the terms and conditions of this Agreement.

1.03 "**Party**" or "**Parties**" means Utility and/or the City, individually or collectively, as applicable.

1.04 "**Project Area**" means the area in which the Project will be undertaken, which is more particularly depicted in **Exhibit "A"**.

1.05 **"Project Costs"** or **"Total Project Costs"** means the costs and expenses incurred by the City in relation to constructing the Project, which is inclusive of Utility Waterline Costs, as defined below. The estimated Total Project Costs for the Project are attached hereto as **Exhibit B** and incorporated herein.

1.06 "**Easement(s)**" means the twenty-five (25) foot wide permanent utility easement, along with a twenty (20) foot temporary construction easements, acquired by City at the City's sole cost and expense in or near the Project Area, which is attached hereto as **Exhibit E**.

1.07 "**Utility Waterline Costs**" means all costs and expenses associated with installation of Utility's water utility line (the "Utility Waterline") within the Project Area. An Estimate of Utility Waterline Costs is attached hereto as **Exhibit C** and incorporated herein. The estimates cited in Exhibit B are estimates only, and not necessarily an accurate estimate of final Utility Waterline Costs.

1.08 **"Utility Waterline Design**" means the engineered plans designed for Utility in connection with its waterline utility within the Project Area. Utility Waterline Design was designed and approved by Utility's engineer, after which is was delivered to City for use during the construction phase of the Project.

II. Cost of Design and Reimbursement of Utility Waterline Construction Costs

2.01. **Costs of Design**. Each Party has borne its own costs of Utility Waterline design, which has been substantially completed by each Party's design engineer. Utility's design engineer shall approve and stamp final design plans, and Utility shall deliver such plans to City prior to the commencement of construction on the Project.

2.02 Reimbursement of Utility Waterline Costs.

(a) City hereby agrees to construct the Project in its entirety, including construction and installation of Utlity's water line.

(b) Utility agrees to reimburse for its portion of the Total Project Costs, consisting of any direct or indirect costs ascribable to Utility Waterline Costs, the estimate of which is reflected in **Exhibit C**.

(c) City agrees to track Project Costs by accumulating actual direct and related indirect costs in accordance with a work order accounting procedure established by City, along with actual direct and related indirect costs in accordance with established accounting protocols.

(d) City shall invoice Utility for Utility Waterline Costs on a monthly basis, after City has paid said costs as a part of Total Project Costs. Utility agrees to reimbursement City for Utility Waterline Costs within thirty (30) days of receiving an invoice.

(e) The City will, upon satisfactory completion of the Project, perform a final walk-through of the Project with Utility and, after the final walk-through, shall send a final invoice, truing up and

finalizing any reimbursable Utility Waterline Costs, after which Utility shall make final payment totaling the full reimbursement amount for all Utility Waterline Costs.

III. Project-Related Terms

3.01 Inspections.

(a) During construction, City shall provide Utility an opportunity to perform perioidic walk-throughs of the Project. City shall ensure that Utility is present for any on-site inspections of the Utility Waterline. Even if the Project improvements are being inspected and approved by City agents or third parties, Utility shall have the right to provide final approval of any periodic inspections associated with the Utility Waterline specifically. For the purposes of inspections under this Article III, Utility designates the following point of contact:

_____.

(b) The Parties agree that Utility has not been and will not be responsible for acquiring any easements or rights of way for the Project. Utility's Existing Waterline Improvements lie outside the easement(s) acquired for the Project by the City. The easement(s) acquired by the City include terms that allow for the installation of improvements by third-party utilities, which is the means by which Utility is locating its Utility Waterline within the limits of the Project Area. The City agrees to provide Utility with a copy of its Permanent Utility Easement and any Temporary Construction Easements for the Project prior to commencement of construction. Utility agrees that it will adhere to any and all terms and conditions in the Project Easements.

3.02 Project Plans. The Parties agree that the Utility Waterline improvements will be built according to the plans and specifications, stamped and provided by Utility's engineer, which will be substantially in the form of the plans attached hereto as **Exhibit D**. The Parties recognize that modifications must sometimes occur due to site conditions or other factors encountered during construction. If such modifications are needed, City will communicate those modifications to Utility by or before the time they are being implemented.

V. The Agreement

5.01 This agreement in its entirety consists of the following:

1. This Agreement, including all recitals, which the Parties agree are true and correct;
2. Depiction of Project (Exhibit "A");
3. Estimated Total Project Costs (Exhibit "B");
4. Estimate Utility Waterline Costs (Exhibit "C");
5. Utility Waterline Plans and Specifications (Exhibit "D");

All attachments are included herein as if fully set forth. In the event it is determined that a substantial change from the statement of work contained in this agreement is required, reimbursement therefore shall be limited to costs covered by a modification or amendment of this agreement or a written change or extra work order approved by the City and Utility.

VI. Miscellaneous Terms

6.01 Delay. The completion date for the Project may be extended for delays caused by events outside City's control, including an event of "Force Majeure," which shall include a strike, war or act of war (whether an actual declaration of war is made or not), insurrection, riot, act of public enemy, accident, fire, flood or other act of God, sabotage, or other events, or any other event in which City has exercised all due care in the prevention thereof so that the causes or other events are beyond the control and without the fault or negligence of City.

6.02 Audit. Utility shall have a right to audit Total Project Costs as a means of determining the validity of Utility Waterline Costs by giving the City advanced written request for audit five (5) or more days prior to conducting the audity. City shall either provide electronic copies of relevant audit materials or provide physical copies of relevant audit materials and a means for reviewing those materials during regular business hours at City offices.

6.03 Compliance. All conduct under this agreement, including not limited to the adjustment, removal and relocation of the facility, the development and reimbursement of cost, any environmental requirements, and retention of records has been in accordance with all applicable federal and state laws, rules and regulations, including, without limitation (but only to the extent applicable to the Project), the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act, 42 U.S.C.§§ 4601, et seq., the National Environmental Policy Action, 42 U.S.C. §§ 4231, et seq., the Buy America provisions of 23 U.S.C. §§ 313 and 23 CFR 635.410, the Utility Relocations, Adjustment, and Reimbursement provision of 23 CFR 645, Subpart A, and with the Utility Accommodation provision of 23 CFR 645, Subpart B.

6.04 Termination. This agreement is subject to cancellation by the Utility at any time up to the date that work under this agreement has commenced. If the Utility terminates the Agreement after City has incurred Utility Waterline Costs, the Utility will still be liable for reimbursement to City for all such costs incurred by the City up to the day that City is notified of the cancellation. Upon presentment of an invoice by City for such costs, the Utility agrees to promptly pay the costs.

6.05 Contacts. The Parties agree that, for the purposes of Notice under this contract, and for the purposes of invoicing and payment, the following Contacts shall be utilized:

FOR CITY:

Seguin, TX 78155

WITH COPY TO:

Mark Kennedy
City Attorney
205 N. River St.
Seguin, TX 78155

FOR UTILITY:

Spring Hill SUD c/o Mike Andrews
550 S. St. Hwy 123 Bypass
Seguin, TX 78155

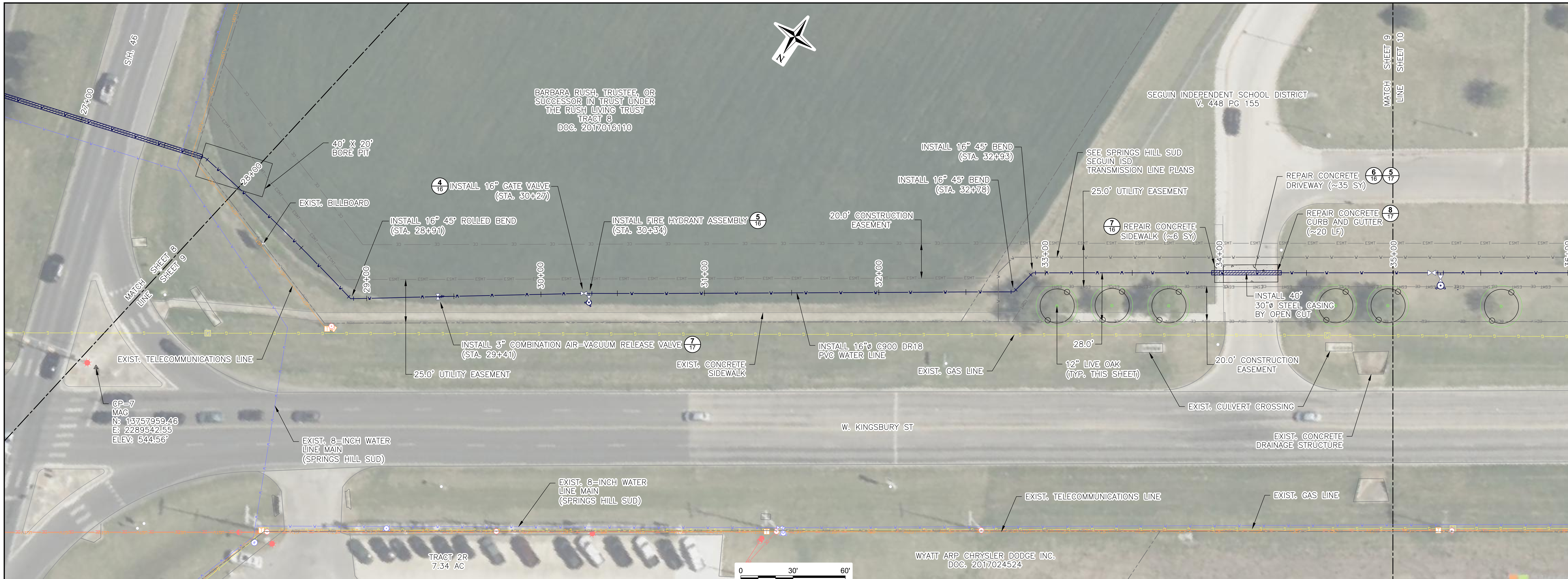
6.06 Assignment. A certified copy of the Easement in which the Utility Waterline will be placed is attached hereto as **Exhibit E** and incorporated herein by reference. On or before the date the City completes the Utility Waterline, the City shall execute a perpetual, non-exclusive assignment of rights and obligations in the Easement to the Utility, the form of which shall substantially comply with the draft Assignment Letter contained in **Exhibit F**.

(SIGNATURES FOLLOW IN THE NEXT PAGE)

The Parties hereby agree to the terms and conditions of the above Agreement, as evidenced by their duly-authorized signatures, below.

UTILITY	CITY
Springs Hill S. Le. D.	
BY:	Steve Parker
Its: General Mgr	City Manager

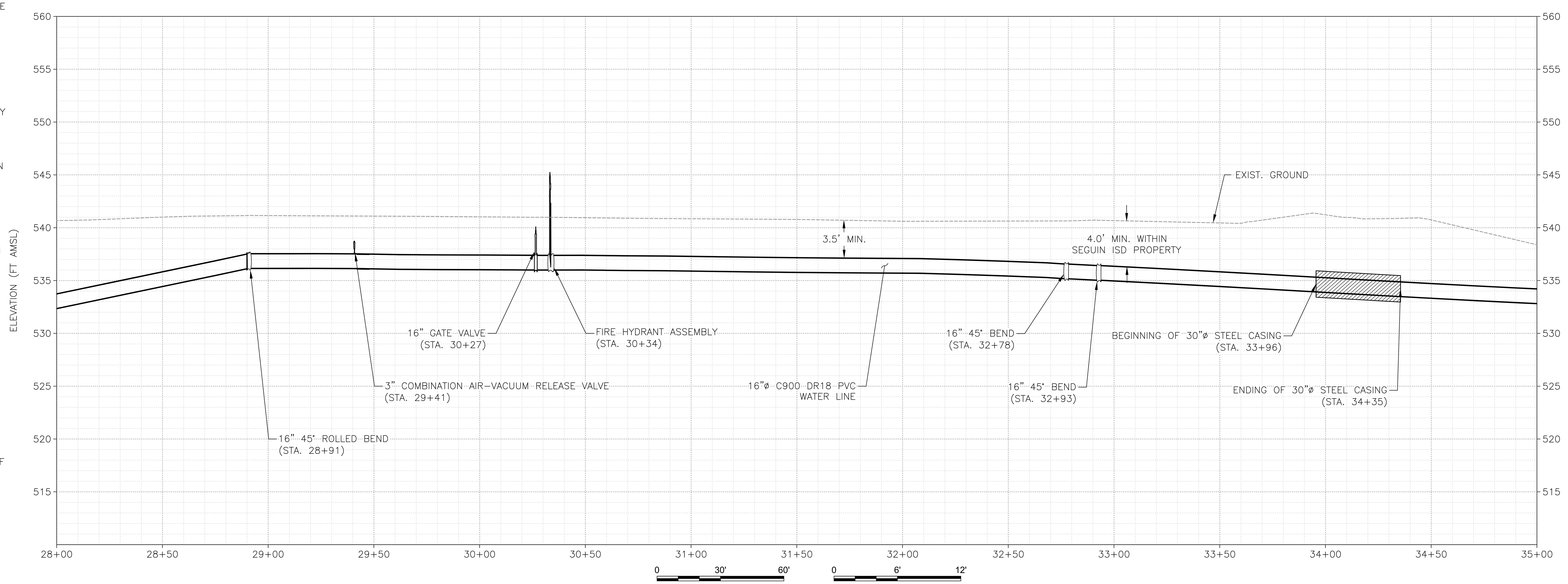
ATTEST: _____
Kristin Mueller
City Secretary



NOTES:

CONTRACTOR IS RESPONSIBLE FOR WORK IN FRONT OF SEGUIN ISD:

1. CONTRACTOR SHALL SUBMIT A PHASING PLAN FOR WORK PERFORMED ON THE SEGUIN ISD TRACT. PHASING PLAN SHALL OUTLINE HOW ACCESS TO THE PROPERTY WILL BE MAINTAINED DURING CONSTRUCTION.
2. ALL WORK IN ASPHALT AND/OR CONCRETE PAVEMENT ON THE SEGUIN ISD PROPERTY MUST BE COMPLETED MONDAY–FRIDAY BETWEEN THE HOURS OF 10 PM AND 5 AM.
3. CONTRACTOR SHALL GIVE TWO WEEKS NOTICE TO ENGINEER PRIOR TO EACH DRIVEWAY CLOSURE.
4. NO OPEN TRENCHES ARE ALLOWED WHEN WORKERS ARE NOT PRESENT.
5. CONTRACTOR SHALL INSTALL TEMPORARY CONSTRUCTION FENCING AROUND WORK AREA AT CONTRACTORS EXPENSE.
6. TRENCH UNDER SEGUIN ISD DRIVEWAYS SHALL BE BACKFILLED WITH FLOWABLE FILL PER DETAIL 6 SHEET 17.
7. CONTRACTOR SHALL MAINTAIN ACCESS TO SEGUIN ISD TRACT AT ALL TIMES.
8. DRIVABLE SURFACE TO BE RESTORED AT THE END OF EACH SHIFT.
9. CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS IMPACTED BY CONSTRUCTION ACTIVITIES TO PRE-EXISTING OR BETTER AFTER CONSTRUCTION.



ISSUE FOR BID

REV.	DATE	DESCRIPTION	BY	CHK'D
1	12/18/2024	ISSUE FOR BID	JDM	HC
		REVISIONS		

12/18/2024
STATE OF TEXAS — HENRY L. CRIPPEN — 141188 — LICENSED PROFESSIONAL ENGINEER

DRAWN BY: JDM
DESIGNED BY: HC
CHECKED BY: HC
SCALE: AS SHOWN
DATE: 12/18/2024
PR. NO: 0090G-001-001
FILE: 90G-P1-TWL_PLANPROFILE

Trihydro CORPORATION
Texas Engineering Firm F-131
Texas Survey Firm 10194320
New Braunfels: 1672 Independence Drive, Suite 315, New Braunfels, Texas 78132, (P) 830.626.3588 (F) 830.626.3544
Austin: 5508 W Highway 290, Suite 201, Austin, Texas 78735, (P) 512.442.3008 (F) 512.448.7811
www.trihydro.com

PLAN AND PROFILE STA. 28+00 TO 35+00

IH-10 AND FM 464 WATER LINE EXTENSION
SEGUIN ECONOMIC DEVELOPMENT CORPORATION
SEGUIN, TEXAS

SHEET **9**
9 OF 19
REV: **1**

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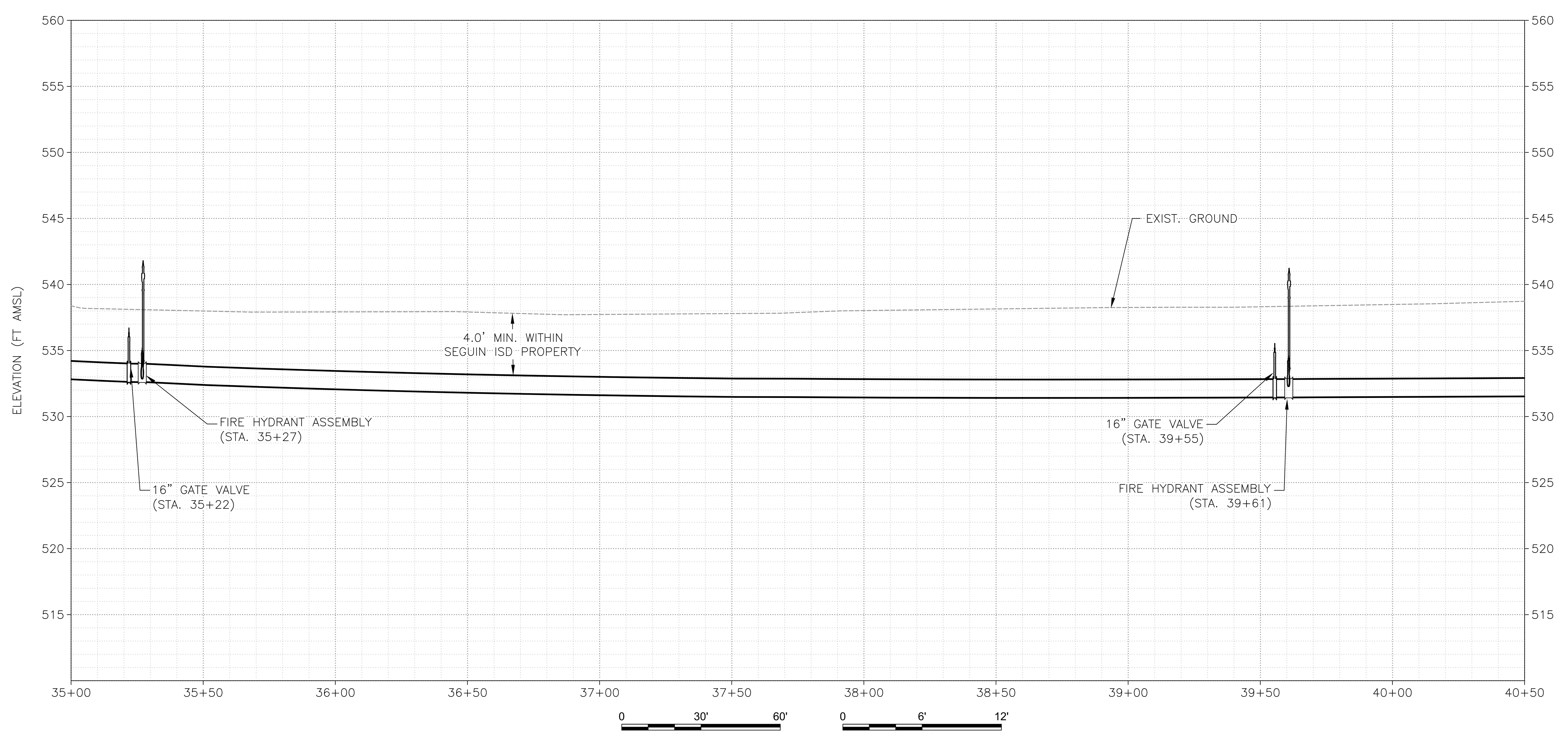

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1	12/18/2024	ISSUE FOR BID	JDM	HC

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12/18/2024
STATE OF TEXAS
HENRY L. CRIPPEN
141188
LICENSED PROFESSIONAL ENGINEER

DRAWN BY: JDM
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CHECKED BY: HC
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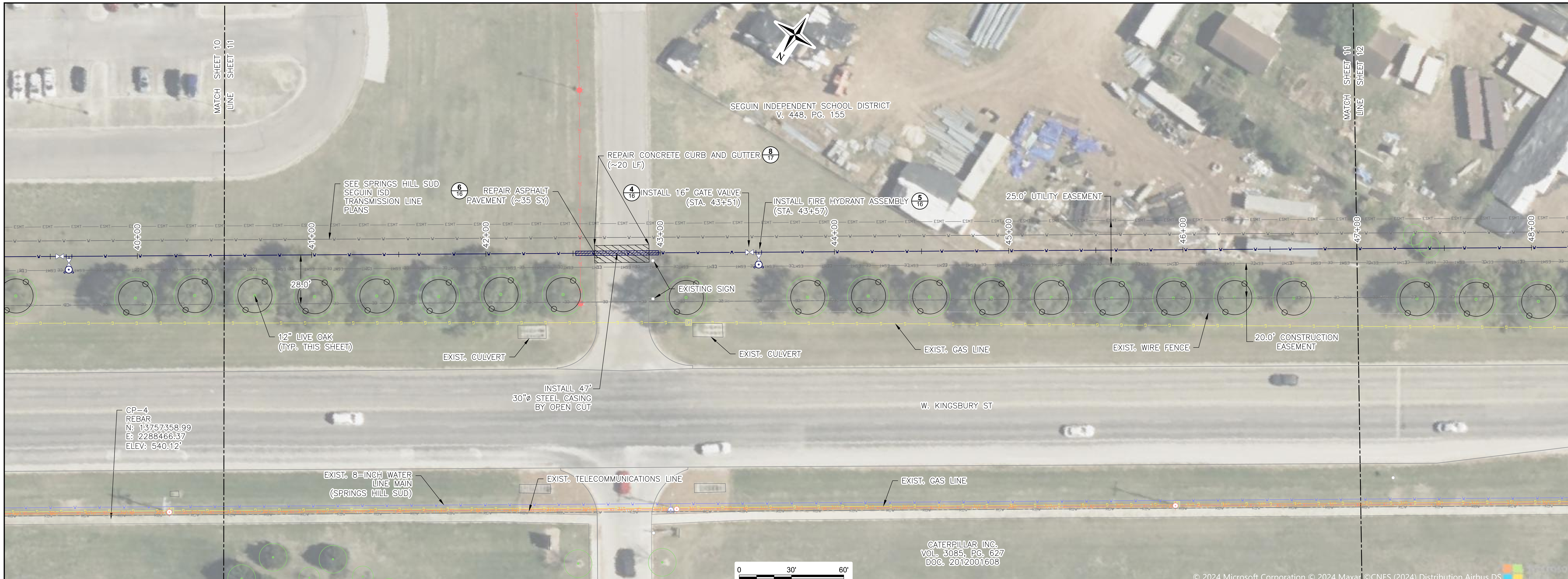
DATE: 12/18/2024
PR. NO:0090G-001-001
FILE: 90G-P121WL_PLAN&PROFILE

Trihydro CORPORATION
Texas Engineering Firm F-131
Texas Survey Firm 10194320
New Braunfels
1672 Independence Drive, Suite 315
New Braunfels, Texas 78132
(P) 830/626.3588 (F) 830/626.3544
Austin
5508 W Highway 290, Suite 201
Austin, Texas 78735
(P) 512/442.3008 (F) 512/448.7811
www.trihydro.com

PLAN AND PROFILE STA. 35+00 TO 40+50

IH-10 AND FM 464 WATER LINE EXTENSION
SEGUIN ECONOMIC DEVELOPMENT CORPORATION
SEGUIN, TEXAS



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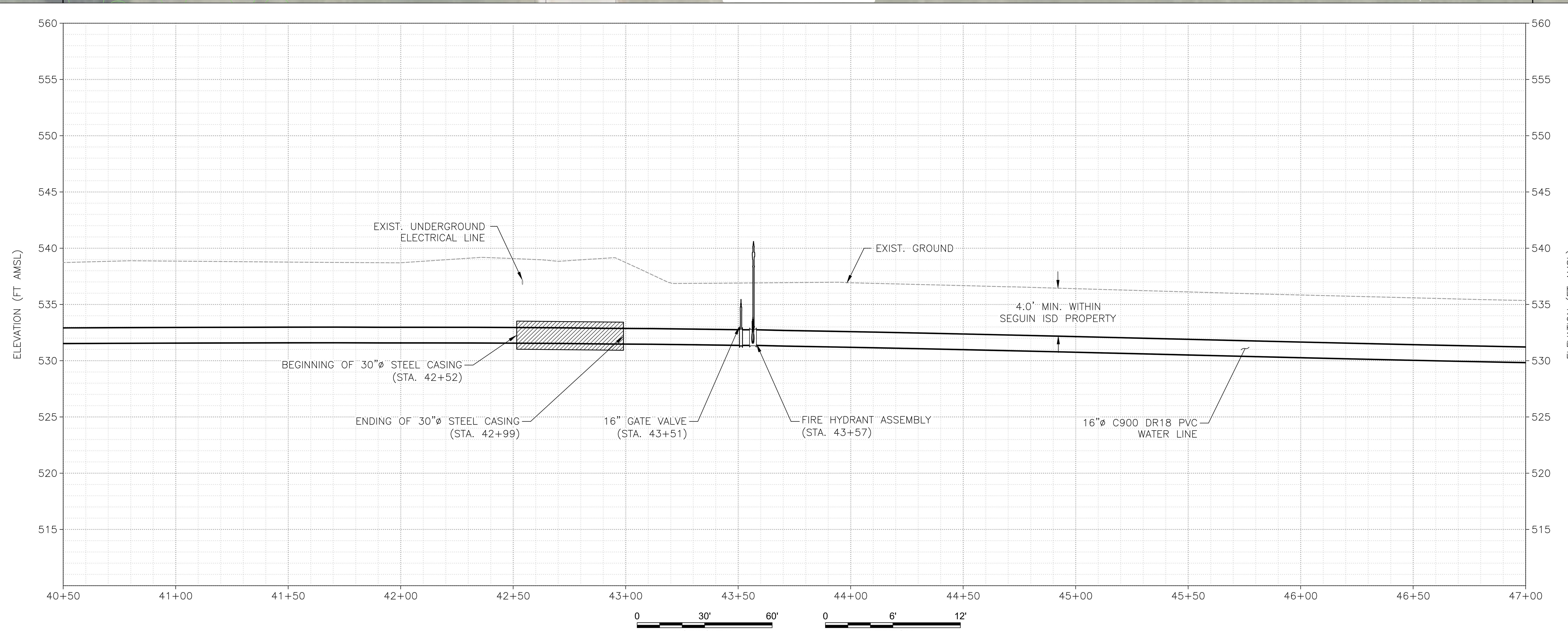

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REVISIONS

12/18/2024
STATE OF TEXAS
HENRY L. CRIPPEN
141188
LICENSED PROFESSIONAL ENGINEER

DRAWN BY: JDM
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CHECKED BY: HC
SCALE: AS SHOWN
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PR. NO: 0090G-001-001

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Texas Engineering Firm F-131
Texas Survey Firm 10194320
New Braunfels: 1672 Independence Drive, Suite 315, New Braunfels, Texas 78132
Austin: 5508 W Highway 290, Suite 201, Austin, Texas 78735
www.trihydro.com

PLAN AND PROFILE STA. 40+50 TO 47+00

IH-10 AND FM 464 WATER LINE EXTENSION
SEGUIN ECONOMIC DEVELOPMENT CORPORATION
SEGUIN, TEXAS

SHEET
11
11 OF 19

REV: **1**

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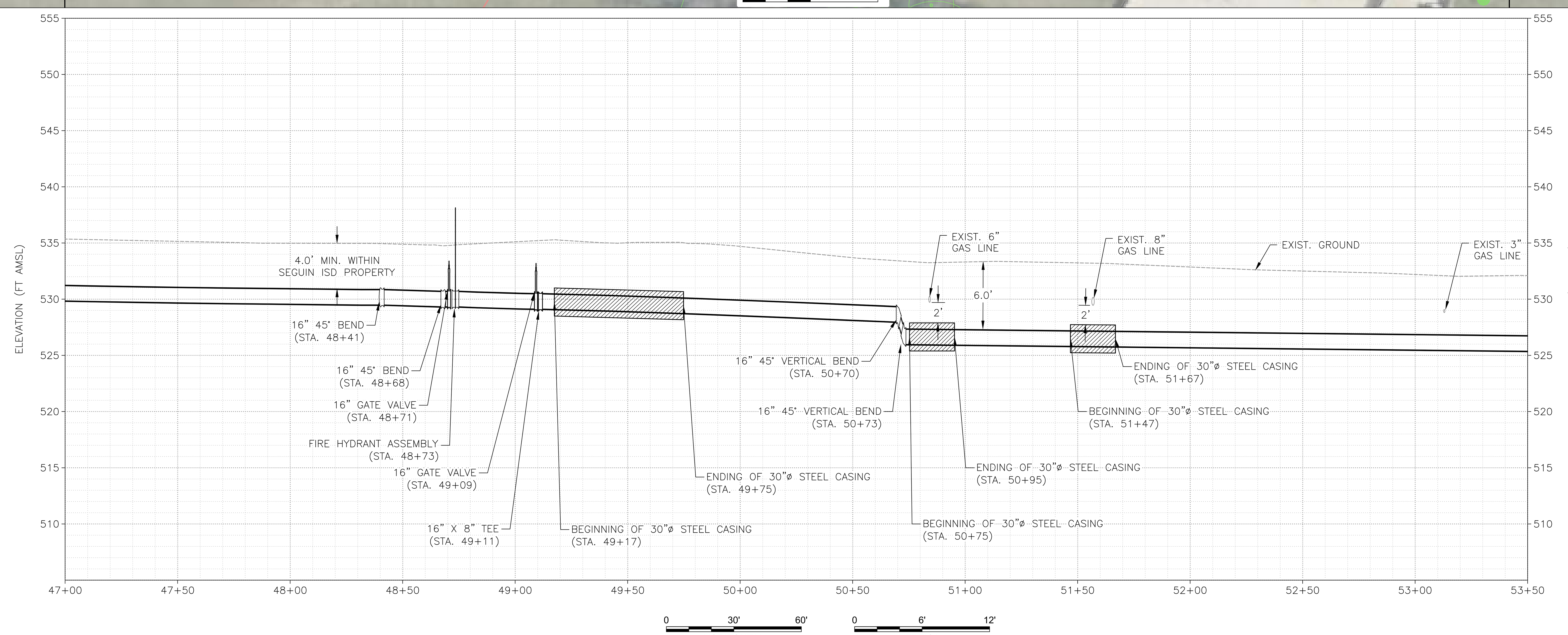

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12/18/2024
STATE OF TEXAS
HENRY L. CRIPPEN
141188
LICENSED PROFESSIONAL ENGINEER

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PLAN AND PROFILE STA. 47+00 TO 53+50

IH-10 AND FM 464 WATER LINE EXTENSION
SEGUIN ECONOMIC DEVELOPMENT CORPORATION
SEGUIN, TEXAS

SHEET
12
12 OF 19
REV: 1

SEDC IH-10 AND FM 464 WATER LINE EXTENSION PROJECT

ENGINEERING OPINION OF PROBABLE COSTS DATE 12/31/2024

TOTAL ESTIMATED QUANTITIES					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
1	BONDING, MOBILIZATION, AND INSURANCE	LS	1	$ 319,970.35	$ 319,970.35
2	ENVIRONMENTAL PROTECTION/ STORMWATER POLLUTION PREVENTION PLAN (SWPPP)	LS	1	$ 24,540.00	$ 24,540.00
3	SITE PREPARATION	LS	1	$ 29,000.00	$ 29,000.00
4	BARRICADES, SIGNS, AND TRAFFIC HANDLING	LS	1	$ 11,300.00	$ 11,300.00
5	TRENCH AND EXCAVATION SAFETY PROTECTION	LF	6,135	$ 3.00	$ 18,405.00
6	PRESSURE TEST WATER TRANSMISSON MAIN	LS	1	$ 13,488.00	$ 13,488.00
7	DISINFECT WATER TRANSMISSION MAIN	LS	1	$ 6,744.00	$ 6,744.00
8	16-INCH DR18 C900 PVC	LF	6,549	$ 122.00	$ 798,978.00
9	8-INCH DR18 C900 PVC	LF	195	$ 69.00	$ 13,455.00
10	FIRE HYDRANT ASSEMBLY	EA	10	$ 8,141.00	$ 81,410.00
11	16-INCH GATE VALVE	EA	14	$ 11,250.00	$ 157,500.00
12	8-INCH GATE VALVE	EA	1	$ 2,420.00	$ 2,420.00
13	2-INCH AUTOMATIC FLUSH VALVE ASSEMBLY	EA	1	$ 3,500.00	$ 3,500.00
14	DUCTILE IRON FITTINGS	TON	3.73	$ 22,200.00	$ 82,861.50
15	30-INCH STEEL CASING BY BORE	LF	609	$ 785.00	$ 478,065.00
16	30-INCH STEEL CASING BY OPEN CUT	LF	184	$ 490.00	$ 90,160.00
17	24-INCH STEEL CASING BY OPEN CUT	LF	60	$ 400.00	$ 24,000.00
18	CONNECT TO EXISTING 16-INCH WATER LINE	EA	1	$ 8,590.00	$ 8,590.00
19	CONNECT TO EXISTING 8-INCH WATER LINE	EA	1	$ 6,080.00	$ 6,080.00
20	REMOVE MONUMENT SIGN	EA	2	$ 5,000.00	$ 10,000.00
21	REPLACE MONUMENT SIGN	LS	1	$ 10,000.00	$ 10,000.00
22	REPAIR WIRE FENCE	LF	24	$ 20.00	$ 480.00
23	REPAIR ASPHALT PAVEMENT	SY	294	$ 93.00	$ 27,342.00
24	REPAIR CONCRETE DRIVEWAY	SY	35	$ 205.00	$ 7,175.00
25	REPAIR GRAVEL DRIVEWAY	SY	321	$ 100.00	$ 32,100.00
26	REPAIR CONCRETE SIDEWALK	SY	63	$ 115.00	$ 7,245.00
27	REPAIR CONCRETE CURB AND GUTTER	LF	164	$ 125.00	$ 20,500.00
28	3-INCH COMBINATION AIR-VACUUM RELEASE VALVE	EA	3	$ 19,510.00	$ 58,530.00
29	REVEGETATION	AC	2.32	$ 4,000.00	$ 9,267.17
30	SPRINGS HILL SUD SEGUIN ISD TRANSMISSION LINE	LS	1	$ 554,160.00	$ 554,160.00
31	BID ALLOWANCE	ALW	1	$ 100,000.00	$ 100,000.00

TOTAL CONSTRUCTION ITEMS			$ 3,007,266.02
CONTINGENCY	10%		$ 300,726.60
TOTAL CONSTRUCTION COSTS			**$ 3,307,992.62**

MALONE ★ WHEELER
SINCE INC. 1995
CIVIL ENGINEERING ★ DEVELOPMENT CONSULTING ★ PROJECT MANAGEMENT

SPRINGS HILL SPECIAL UTILITY DISTRICT

SEGUIN ISD TRANSMISSION LINE

CITY OF SEGUIN

WATER LINE A BID TAB

ITEM NO.	SPEC NO.	DESCRIPTION	UNIT	QUANTITY	PRICE PER UNIT	AMOUNT
		GENERAL				
WLA-1	01 22 10	Mobilization	LS	1	$ 82,000.00	$ 82,000.00
WLA-2	EC-3	Silt Fence	LF	1,800	$ 3.50	$ 6,300.00
WLA-3	31 25 00	Inlet Protection	LF	175	$ 12.00	$ 2,100.00
WLA-4	EC-1	Stabilized Construction Entrance	EA	1	$ 5,000.00	$ 5,000.00
WLA-5	02910	Miscellaneous Work & Cleanup	LS	1	$ 10,000.00	$ 10,000.00
WLA-6	02490	Loaming & Hydroseeding	SY	2,442	$ 1.50	$ 3,663.00
WLA-7	31 11 00	Right-of-Way Clearing & Grading	AC	0.5	$ 5,000.00	$ 2,500.00
WLA-8	31 23 33	Trench Excavation Safety Protection	LF	1,758	$ 5.00	$ 8,790.00
WLA-9	03000	Remove & Replace Concrete Sidewalks and Driveways	SY	43	$ 150.00	$ 6,450.00
WLA-10	03200	Remove & Replace Asphalt Sidewalks and Driveways	SY	94	$ 100.00	$ 9,400.00
WLA-11	03000	Remove & Replace Curb & Gutter	LF	50	$ 40.00	$ 2,000.00
WLA-12	02080	Traffic Control	LS	1	$ 5,000.00	$ 5,000.00
WLA-13	33 05 05	Pipe Water Main (16")(PVC)(C-900) (Open Trench Installation)	LF	1,758	$ 160.00	$ 281,280.00
WLA-14	33 05 05	Steel Casing (Open Cut)(30")	LF	144	$ 500.00	$ 72,000.00
WLA-15	WA-19	16" Gate Valve	EA	3	$ 7,500.00	$ 22,500.00
WLA-16	33 05 05	16" D.I. Fittings	TON	1.88	$ 8,000.00	$ 15,040.00
WLA-17	WA-9	2" Air Release Valve (Complete)	EA	1	$ 5,000.00	$ 5,000.00
WLA-18	33 05 05.31	Hydrostatic Testing	LS	1	$ 2,500.00	$ 2,500.00
WLA-19	WA-47	2" Temporary Blow Off	EA	2	$ 5,000.00	$ 10,000.00
WLA-20	WA-34	Detection Wire & Tape	LF	1,758	$ 1.50	$ 2,637.00
					TOTAL WATER LINE A	**$554,160.00**

CONSTRUCTION PLANS

FOR

SHSUD SEGUIN ISD TRANSMISSION LINE
CITY OF SEGUIN,
GUADALUPE COUNTY, TEXAS

JAMES INOCENCIO
REGISTERED PROFESSIONAL ENGINEER NO. 143607
MALONE/WHEELER INC.
5113 SOUTHWEST PKWY.,
SUITE 260
AUSTIN, TEXAS, 78735
OFFICE: 512-899-0601
FAX: 512-899-0655

DATE

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF JAMES INOCENCIO, P.E. 143607, ON 11/25/2024. IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

SPRINGS HILL WATER SPECIAL UTILITY DISTRICT

DATE

SHEET INDEX

SITE ADDRESS:
W. KINGSBURY ST
SEGUIN, TEXAS 78155

WATERSHED:
ALLIGATOR CREEK - GERONIMO CREEK - GUADALUPE RIVER

WATER/WASTEWATER PROVIDER:
SPRINGS HILL SPECIAL UTILITY DISTRICT
5510 S. HWY 123 BYPASS
SEGUIN, TEXAS 78155

NO.	REVISION DESCRIPTION	REVISE (R), ADD (A), VOID (V) - SHEET #	TOTAL # SHEETS

ENGINEER:
CONTACT: JAMES INOCENCIO, P.E.

MALONE★WHEELER
SINCE INC. 1995

CIVIL ENGINEERING ★ DEVELOPMENT CONSULTING ★ PROJECT MANAGEMENT

5113 Southwest Pkwy, Suite 260
Austin, Texas 78735
Phone: (512) 899-0601 Fax: (512) 899-0655
Firm Registration No. F-786

811
Know what's **below**.
Call before you dig.

WARNING !!!!
CONTRACTOR TO FIELD VERIFY ALL EXIST. UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION.

GUADALUPE COUNTY

SHSUD SEGUIN ISD TRANSMISSION LINE CONSTRUCTION PLANS

SEGUIN, TEXAS

F:\Springs Hill WSC\Projects\22-047-AUS-SH46 River Bore\Drawings\Plansets\SCHOOL\01 COVER.dwg, 1

SHSUD GENERAL NOTES:

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THE PROJECT SHALL BE APPROVED BY SHSUD AND COMPLY WITH ALL APPLICABLE STANDARDS AND REGULATIONS.
2. CONTRACTOR SHALL NOT PROCEED WITH ANY WORK UNTIL WRITTEN APPROVAL IS OBTAINED FROM SHSUD. WORK COMPLETED BY THE CONTRACTOR, WHICH HAS NOT RECEIVED AN APPROVAL WILL BE SUBJECT TO REMOVAL AND REPLACEMENT BY AND AT THE EXPENSE OF THE CONTRACTOR AT THE PREROGATIVE OF SHSUD.
3. THE DEVELOPER DEDICATES THE WATER MAINS UPON COMPLETION BY THE DEVELOPER AND ACCEPTANCE BY SHSUD. SHSUD WILL OWN AND MAINTAIN SAID WATER MAINS WHICH ARE LOCATED WITHIN SAID SUBDIVISION (AS APPLICABLE).
4. CONTRACTOR AGREES TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNERS AND THE ENGINEER AND HIS EMPLOYEES, PARTNERS OFFICERS, DIRECTORS, OR CONSULTANTS HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF THE WORK ON THIS PROJECT, EXCEPTING FROM LIABILITY ARISING FROM SOLE NEGLIGENCE OF THE OWNER OR ENGINEER, ENGINEER'S DIRECTORS, OFFICERS, EMPLOYEES, OR CONSULTANTS.
5. CONTRACTOR AND / OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ITS ORIGINAL OR BETTER CONDITION, ANY DAMAGES DONE TO EXISTING FENCES, CURBS, STREETS, DRIVEWAYS, LANDSCAPING AND STRUCTURES, AND EXISTING UTILITIES (NOT ADJUSTED ON PLANS). COST OF RESTORATIONS, IF ANY, SHALL BE THE CONTRACTOR'S ENTIRE EXPENSE.
7. THE CONTRACTOR SHALL AVOID CUTTING ROOTS LARGER THAN ONE INCH IN DIAMETER WHEN EXCAVATING NEAR EXISTING TREES. EXCAVATION IN VICINITY OF TREES SHALL PROCEED WITH CAUTION.
8. CONTRACTOR SHALL PROCURE ALL PERMITS AND LICENSES, PAY ALL CHARGES, FEES AND TAXES AND GIVE ALL NOTICES NECESSARY AND INCIDENTAL TO THE DUE AND LAWFUL PROSECUTION OF THE WORK.
9. NO EXTRA PAYMENT SHALL BE ALLOWED FOR WORK CALLED FOR ON THE PLANS BUT NOT INCLUDED ON THE BID SCHEDULE. THIS INCIDENTAL WORK WILL BE REQUIRED AND SHALL BE INCLUDED UNDER THE PAY ITEM TO WHICH IT RELATES.
10. CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL WASTE MATERIALS UPON PROJECT COMPLETION. THE CONTRACTOR SHALL NOT PERMANENTLY PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN DEVELOPMENT PERMIT.
11. THE CONTRACTOR SHALL NOT PLACE ANY MATERIALS ON THE RECHARGE ZONE OF THE EDWARDS AQUIFER WITHOUT AN APPROVED WATER POLLUTION ABATEMENT PLAN FROM THE TCEQ 31 TAC 313.4 AND 31 TAC 313.9.
12. BARRICADES AND WARNING SIGNS SHALL CONFORM TO THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND SHALL BE LOCATED TO PROVIDE MAXIMUM PROTECTION TO THE PUBLIC AS WELL AS CONSTRUCTION PERSONNEL AND EQUIPMENT WHILE ALWAYS PROVIDING CONTINUOUS TRAFFIC FLOW DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL DEVICES DURING CONSTRUCTION.
13. CONTRACTOR IS REQUIRED TO VERIFY PROJECT ELEVATIONS. THE TERM "MATCH EXISTING" SHALL BE UNDERSTOOD TO SIGNIFY BOTH HORIZONTAL AND VERTICAL ALIGNMENT.
14. THE LOCATION OF UTILITIES, EITHER UNDERGROUND OR OVERHEAD, SHOWN WITHIN THE RIGHT OF WAY ARE APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR BEFORE BEGINNING CONSTRUCTION OPERATIONS.
15. OSHA REGULATIONS PROHIBIT OPERATIONS THAT WILL BRING PERSONS OR EQUIPMENT WITHIN 10 FEET OF AN ENERGIZED LINE. WHERE WORKMEN AND/OR EQUIPMENT HAVE TO WORK CLOSE TO AN ENERGIZED ELECTRICAL LINE, THE CONTRACTOR SHALL NOTIFY THE ELECTRICAL POWER COMPANY INVOLVED AND MAKE WHATEVER ADJUSTMENTS NECESSARY TO ENSURE THE SAFETY OF THOSE WORKMEN.
16. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION. UTILITY COMPANIES ARE ALSO PREVIOUSLY MENTIONED IN "UTILITY COMPANY NOTIFICATION".
17. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192 (8), GAS COMPANIES MUST ALWAYS MAINTAIN ACCESS TO GAS VALVES. THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.
18. THE CONTRACTOR IS FULLY RESPONSIBLE FOR THE TRAFFIC CONTROL AND WILL BE RESPONSIBLE FOR FURNISHING ALL TRAFFIC CONTROL DEVICES, AND FLAGGERS. THE CONSTRUCTION METHODS SHALL BE CONDUCTED TO PROVIDE THE LEAST POSSIBLE INTERFERENCE TO TRAFFIC TO ALWAYS PERMIT THE CONTINUOUS MOVEMENT OF THE TRAFFIC IN ONE DIRECTION. THE CONTRACTOR SHALL CLEAN UP AND REMOVE FROM THE WORK AREA ANY LOOSE MATERIAL RESULTING FROM CONTRACT OPERATIONS AT THE END OF EACH WORKDAY.
19. PRIOR TO ORDERING MATERIALS TO BE USED IN CONSTRUCTION, CONTRACTOR SHALL PROVIDE SHWSC WITH FOUR (4) COPIES OF THE SOURCE, TYPE, GRADATION, MATERIAL SPECIFICATION DATA AND / OR SHOP DRAWINGS, AS APPLICABLE, TO SATISFY THE REQUIREMENTS OF THE FOLLOWING ITEMS AND ALL MATERIAL ITEMS REFERRED TO IN THESE LISTED ITEMS: A. WATER MAINS AND SERVICES
20. NO METER BOXES, VALVES, TO BE SET IN DRIVEWAYS OR SIDEWALKS. ANY METER BOXES SET IN THESE AREAS WILL BE RELOCATED AT CONTRACTOR'S AND/OR DEVELOPER'S EXPENSE.
21. WHERE THE MINIMUM 9-FOOT SEPARATION DISTANCE BETWEEN SEWER LINES AND WATER LINES / MAINS CANNOT BE MAINTAINED, THE INSTALLATION OF WATER LINES SHALL BE IN STRICT ACCORDANCE WITH TCEQ.
22. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S IMPLEMENTATION OF THE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.
23. UTILITY TRENCH COMPACTION WITH STREET RIGHT-OF-WAY.

A. ALL UTILITY TRENCH COMPACTION TEST WITHIN THE STREET PAVEMENT SECTION SHALL BE THE RESPONSIBILITY OF THE DEVELOPER'S GEO-TECHNICAL ENGINEER.
B. FILL MATERIAL SHALL BE PLACED IN UNIFORM LAYERS NOT TO EXCEED TWELVE INCHES (12") LOOSE.
C. EACH LAYER OF MATERIAL SHALL BE COMPACTED AS SPECIFIED AND TESTED FOR DENSITY AND MOISTURE IN ACCORDANCE WITH TEST METHODS TEX-113-E, TEX-114-E, TEX-115-E.
D. THE NUMBER AND LOCATION OF REQUIRED TESTS SHALL BE DETERMINED BY THE GEO-TECHNICAL ENGINEER AND APPROVED BY SHWSC.
E. UPON COMPLETION OF TESTING THE GEO-TECHNICAL ENGINEER SHALL PROVIDE SHWSC INSPECTOR WITH ALL TESTING DOCUMENTATION AND A CERTIFICATION STATING THAT THE PLACEMENT OF FILL MATERIAL HAS BEEN COMPLETED IN ACCORDANCE WITH THE PLANS.

24. A HYDROSTATIC TEST SHALL BE PERFORMED AFTER SERVICES ARE CONNECTED AND FINAL GRADING AND PLACEMENT ARE COMPLETE.

TCEQ WATER DISTRIBUTION SYSTEM GENERAL CONSTRUCTION NOTES

1. THIS WATER DISTRIBUTION SYSTEM MUST BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS 30 TEXAS ADMINISTRATIVE CODE (TAC) CHAPTER 290 SUBCHAPTER D. WHEN CONFLICTS ARE NOTED WITH LOCAL STANDARDS, THE MORE STRINGENT REQUIREMENT SHALL BE APPLIED. AT A MINIMUM, CONSTRUCTION FOR PUBLIC WATER SYSTEMS MUST ALWAYS MEET TCEQ'S "RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS."
2. ALL NEWLY INSTALLED PIPES AND RELATED PRODUCTS MUST CONFORM TO AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)/NSF INTERNATIONAL STANDARD 61 AND MUST BE CERTIFIED BY AN ORGANIZATION ACCREDITED BY ANSI [§290.44(A)(1)].
3. PLASTIC PIPE FOR USE IN PUBLIC WATER SYSTEMS MUST BEAR THE NSF INTERNATIONAL SEAL OF APPROVAL (NSF-PW) AND HAVE AN ASTM DESIGN PRESSURE RATING OF AT LEAST 150 PSI OR A STANDARD DIMENSION RATIO OF 26 OR LESS [§290.44(A)(2)].
4. NO PIPE WHICH HAS BEEN USED FOR ANY PURPOSE OTHER THAN THE CONVEYANCE OF DRINKING WATER SHALL BE ACCEPTED OR RELOCATED FOR USE IN ANY PUBLIC DRINKING WATER SUPPLY [§290.44(A)(3)].
5. ALL WATER LINE CROSSINGS OF WASTEWATER MAINS SHALL BE PERPENDICULAR [§290.44(E)(4)(B)].
6. WATER TRANSMISSION AND DISTRIBUTION LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. HOWEVER, THE TOP OF THE WATER LINE MUST BE LOCATED BELOW THE FROST LINE AND IN NO CASE SHALL THE TOP OF THE WATER LINE BE LESS THAN 24 INCHES BELOW GROUND SURFACE [§290.44(A)(4)].
7. THE MAXIMUM ALLOWABLE LEAD CONTENT OF PIPES, PIPE FITTINGS, PLUMBING FITTINGS, AND FIXTURES IS 0.25 PERCENT [§290.44(B)].
8. THE CONTRACTOR SHALL INSTALL APPROPRIATE AIR RELEASE DEVICES WITH VENT OPENINGS TO THE ATMOSPHERE COVERED WITH 16-MESH OR FINER, CORROSION RESISTANT SCREENING MATERIAL OR AN ACCEPTABLE EQUIVALENT [§290.44(D)(1)].
9. THE CONTRACTOR SHALL NOT PLACE THE PIPE IN WATER OR WHERE IT CAN BE FLOODED WITH WATER OR SEWAGE DURING ITS STORAGE OR INSTALLATION [§290.44(F)(1)].
10. WHEN WATERLINES ARE LAID UNDER ANY FLOWING OR INTERMITTENT STREAM OR SEMI-PERMANENT BODY OF WATER THE WATERLINE SHALL BE INSTALLED IN A SEPARATE WATERTIGHT PIPE ENCASEMENT. VALVES MUST BE PROVIDED ON EACH SIDE OF THE CROSSING WITH FACILITIES TO ALLOW THE UNDERWATER PORTION OF THE SYSTEM TO BE ISOLATED AND TESTED [§290.44(F)(2)].
11. PURSUANT TO 30 TAC §290.44(A)(5), THE HYDROSTATIC LEAKAGE RATE SHALL NOT EXCEED THE AMOUNT ALLOWED OR RECOMMENDED BY THE MOST CURRENT AWWA FORMULAS FOR PVC PIPE, CAST IRON AND DUCTILE IRON PIPE. INCLUDE THE FORMULAS IN THE NOTES ON THE PLANS.

O THE HYDROSTATIC LEAKAGE RATE FOR POLYVINYL CHLORIDE (PVC) PIPE AND APPURTENANCES SHALL NOT EXCEED THE AMOUNT ALLOWED OR RECOMMENDED BY FORMULAS IN AMERICA WATER WORKS ASSOCIATION (AWWA) C-605 AS REQUIRED IN 30 TAC §290.44(A)(5). PLEASE ENSURE THAT THE FORMULA FOR THIS CALCULATION IS CORRECT AND MOST CURRENT FORMULA IS IN USE;

Q=(LD*(P)^0.5)/(148000)

WHERE:
- Q = THE QUANTITY OF MAKEUP WATER IN GALLONS PER HOUR,
- L = THE LENGTH OF THE PIPE SECTION BEING TESTED, IN FEET,
- D = THE NOMINAL DIAMETER OF THE PIPE IN INCHES, AND
- P = THE AVERAGE TEST PRESSURE DURING THE HYDROSTATIC TEST IN POUNDS PER SQUARE INCH (PSI).

O THE HYDROSTATIC LEAKAGE RATE FOR DUCTILE IRON (DI) PIPE AND APPURTENANCES SHALL NOT EXCEED THE AMOUNT ALLOWED OR RECOMMENDED BY FORMULAS IN AMERICA WATER WORKS ASSOCIATION (AWWA) C-600 AS REQUIRED IN 30 TAC §290.44(A)(5). PLEASE ENSURE THAT THE FORMULA FOR THIS CALCULATION IS CORRECT AND MOST CURRENT FORMULA IS IN USE;

L=(SD*(P)^0.5)/(148000)

WHERE:
- L = THE QUANTITY OF MAKEUP WATER IN GALLONS PER HOUR,
- S = THE LENGTH OF THE PIPE SECTION BEING TESTED, IN FEET,
- D = THE NOMINAL DIAMETER OF THE PIPE IN INCHES, AND
- P = THE AVERAGE TEST PRESSURE DURING THE HYDROSTATIC TEST IN POUNDS PER SQUARE INCH (PSI).

12. THE CONTRACTOR SHALL MAINTAIN A MINIMUM SEPARATION DISTANCE IN ALL DIRECTIONS OF NINE FEET BETWEEN THE PROPOSED WATERLINE AND WASTEWATER COLLECTION FACILITIES INCLUDING MANHOLES. IF THIS DISTANCE CANNOT BE MAINTAINED, THE CONTRACTOR MUST IMMEDIATELY NOTIFY THE PROJECT ENGINEER FOR FURTHER DIRECTION. SEPARATION DISTANCES, INSTALLATION METHODS, AND MATERIALS UTILIZED MUST MEET §290.44(E)(1)-(4).
13. THE SEPARATION DISTANCE FROM A POTABLE WATERLINE TO A WASTEWATER MAIN OR LATERAL, MANHOLE OR CLEANOUT SHALL BE A MINIMUM OF NINE FEET. WHERE THE NINE-FOOT SEPARATION DISTANCE CANNOT BE ACHIEVED, THE POTABLE WATERLINE SHALL BE ENCASED IN A JOINT OF AT LEAST 150 PSI PRESSURE CLASS PIPE AT LEAST 18 FEET LONG AND TWO NOMINAL SIZES LARGER THAN THE NEW CONVEYANCE. THE SPACE AROUND THE CARRIER PIPE SHALL BE SUPPORTED AT FIVE-FOOT INTERVALS WITH SPACERS OR BE FILLED TO THE SPRINGLINE WITH WASHED SAND. THE ENCASEMENT PIPE SHALL BE CENTERED ON THE CROSSING AND BOTH ENDS SEALED WITH CEMENT GROUT OR MANUFACTURED SEALANT [§290.44(E)(5)].
14. FIRE HYDRANTS SHALL NOT BE INSTALLED WITHIN NINE FEET VERTICALLY OR HORIZONTALLY OF ANY WASTEWATER LINE, WASTEWATER LATERAL, OR WASTEWATER SERVICE LINE REGARDLESS OF CONSTRUCTION [§290.44(E)(6)].
15. SUCTION MAINS TO PUMPING EQUIPMENT SHALL NOT CROSS WASTEWATER MAINS, WASTEWATER LATERALS, OR WASTEWATER SERVICE LINES. RAW WATER SUPPLY LINES SHALL NOT BE INSTALLED WITHIN FIVE FEET OF ANY TILE OR CONCRETE WASTEWATER MAIN, WASTEWATER LATERAL, OR WASTEWATER SERVICE LINE [§290.44(E)(7)].
16. WATERLINES SHALL NOT BE INSTALLED CLOSER THAN TEN FEET TO SEPTIC TANK DRAINFIELDS [§290.44(E)(8)].
17. THE CONTRACTOR SHALL DISINFECT THE NEW WATERLINES IN ACCORDANCE WITH AWWA STANDARD C-651-14 OR MOST RECENT, THEN FLUSH AND SAMPLE THE LINES BEFORE BEING PLACED INTO SERVICE. SAMPLES SHALL BE COLLECTED FOR MICROBIOLOGICAL ANALYSIS TO CHECK THE EFFECTIVENESS OF THE DISINFECTION PROCEDURE WHICH SHALL BE REPEATED IF CONTAMINATION PERSISTS. A MINIMUM OF ONE SAMPLE FOR EACH 1,000 FEET OF COMPLETED WATERLINE WILL BE REQUIRED OR AT THE NEXT AVAILABLE SAMPLING POINT BEYOND 1,000 FEET AS DESIGNATED BY THE DESIGN ENGINEER [§290.44(F)(3)].
18. DECHLORINATION OF DISINFECTING WATER SHALL BE IN STRICT ACCORDANCE WITH CURRENT AWWA STANDARD C655-09 OR MOST RECENT.

NOTE: CONTOURS ARE DERIVED FROM LIDAR DATA. LOCATIONS OF EXISTING FEATURES ARE APPROXIMATE. PROPOSED PIEPER RD IMPROVEMENT DATA IS SOURCED FROM HMT ENGINEERING (TBFE FIRM F-10961)

WARNING !!!!
CONTRACTOR TO FIELD VERIFY ALL EXIST. UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION.

NO.	DATE	REVISION	BY

SHSUD SEGUIN ISD
GUADALUPE COUNTY

GENERAL NOTES

MALONE★WHEELER SINCE INC. 1995
CIVIL ENGINEERING ★ DEVELOPMENT CONSULTING ★ PROJECT MANAGEMENT
5113 Southwest Pkwy, Suite 260
Austin, Texas 78735
Phone: (512) 899-0601 Fax: (512) 899-0655
Firm Registration No. F-786

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF JAMES INOCENCIO, P.E. 143607, ON 11/21/2024. IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

DESIGN BY :	MB
CHECKED BY :	NR
APPROVED BY :	DL
DATE :	12/30/2024

SHEET 02
OF 07

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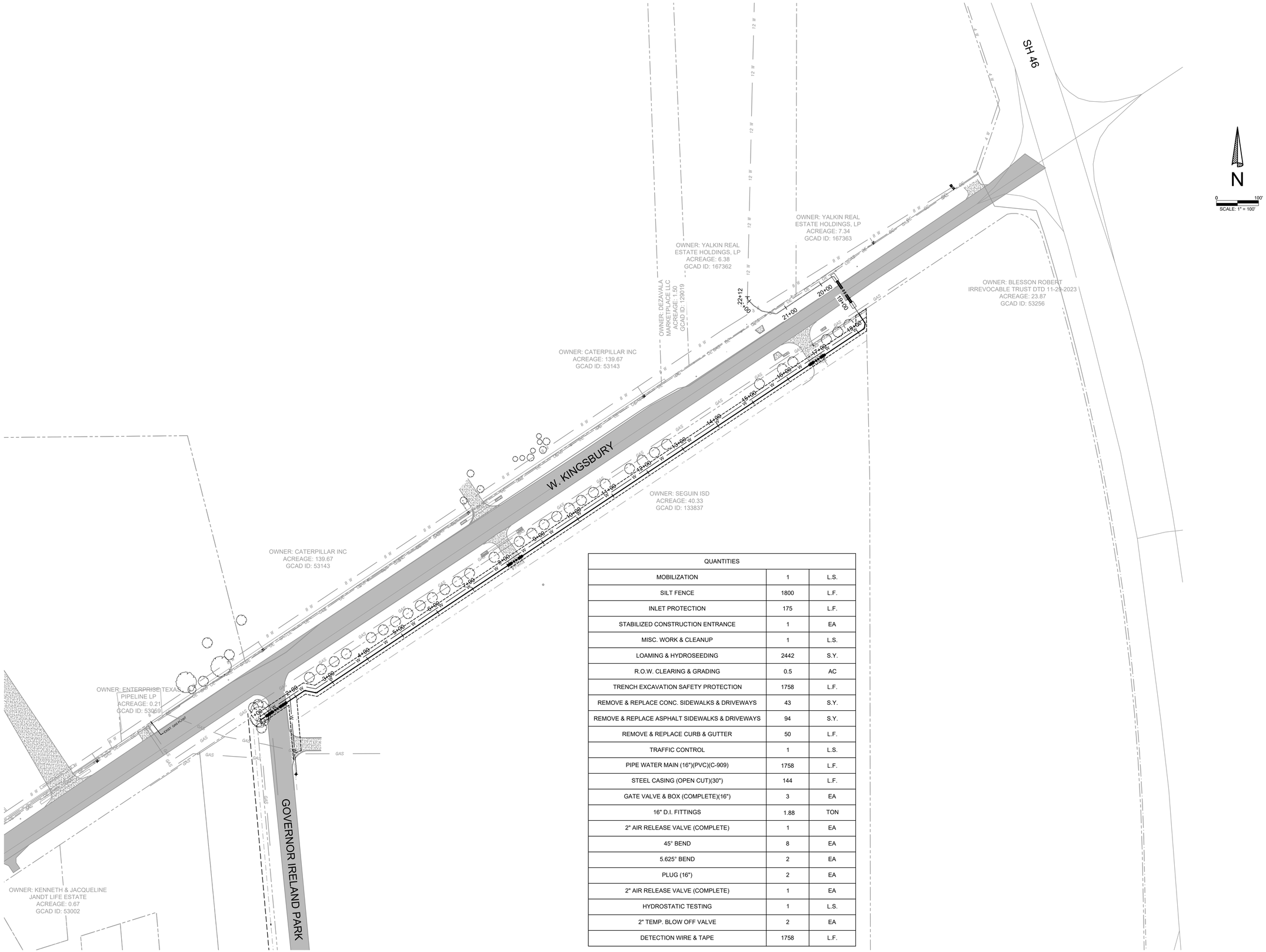

QUANTITIES		
MOBILIZATION	1	L.S.
SILT FENCE	1800	L.F.
INLET PROTECTION	175	L.F.
STABILIZED CONSTRUCTION ENTRANCE	1	EA
MISC. WORK & CLEANUP	1	L.S.
LOAMING & HYDROSEEDING	2442	S.Y.
R.O.W. CLEARING & GRADING	0.5	AC
TRENCH EXCAVATION SAFETY PROTECTION	1758	L.F.
REMOVE & REPLACE CONC. SIDEWALKS & DRIVEWAYS	43	S.Y.
REMOVE & REPLACE ASPHALT SIDEWALKS & DRIVEWAYS	94	S.Y.
REMOVE & REPLACE CURB & GUTTER	50	L.F.
TRAFFIC CONTROL	1	L.S.
PIPE WATER MAIN (16")(PVC)(C-909)	1758	L.F.
STEEL CASING (OPEN CUT)(30")	144	L.F.
GATE VALVE & BOX (COMPLETE)(16")	3	EA
16" D.I. FITTINGS	1.88	TON
2" AIR RELEASE VALVE (COMPLETE)	1	EA
45° BEND	8	EA
5.625° BEND	2	EA
PLUG (16")	2	EA
2" AIR RELEASE VALVE (COMPLETE)	1	EA
HYDROSTATIC TESTING	1	L.S.
2" TEMP. BLOW OFF VALVE	2	EA
DETECTION WIRE & TAPE	1758	L.F.

NO.	DATE	REVISION	BY

SHSUD SEGUIN ISD
GUADALUPE COUNTY

OVERALL WATER PLAN AND OVERALL QUANTITIES

MALONE★WHEELER INC.
SINCE 1995
CIVIL ENGINEERING ★ DEVELOPMENT CONSULTING ★ PROJECT MANAGEMENT
5113 Southwest Pkwy, Suite 260
Austin, Texas 78735
Phone: (512) 899-4601 Fax: (512) 899-0655
Firm Registration No. F-786

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CHECKED BY :	NR
APPROVED BY :	DL
DATE :	12/30/2024

SHEET 03
OF 07

F:\SPRINGS HILL WSC\PROJECTS\22-047-AUS-SH46 RIVER BORE\DRAWINGS\PLANSET\SCHOOL\03 OVERALL WATER PLAN.DWG, 12/30/2024, RYAN HICKS

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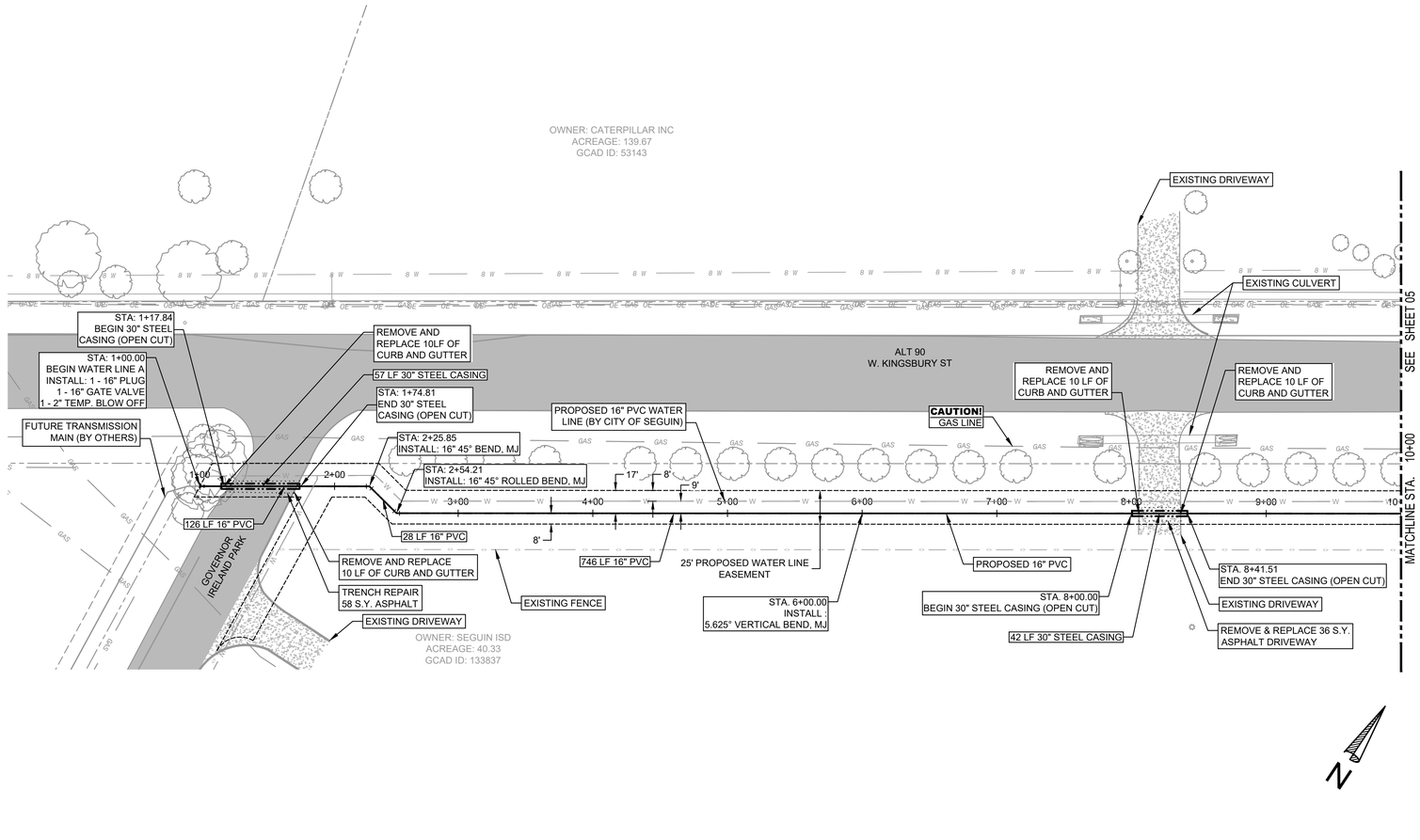


LEGEND

- PROPERTY BOUNDARY
- EXIST. WATER LINE
- EXIST. WATER SERVICE
- EXIST. EDGE OF PAVEMENT
- EXIST. GRAVEL DRIVEWAY
- EXIST. FIRE HYDRANT
- EXIST. OVERHEAD ELECTRIC
- EXIST. LIGHT POLE
- EXIST. TREE
- EXIST. CONTOUR (MAJOR)
- EXIST. CONTOUR (MINOR)
- CENTERLINE OF CREEK
- REGULATORY FLOODWAY
- EXIST. FENCE
- EXIST. GATE VALVE
- PROP. GATE VALVE
- PROP. WATER LINE
- PROP. FIRE HYDRANT
- PROP. AIR RELEASE VALVE
- PROP. STEEL ENCASEMENT

SHSUD NOTES:

1. ANY EASEMENT DESIGNATED AS A SHSUD UTILITY EASEMENT SHALL REMAIN OPEN FOR ACCESS AT ALL TIMES AND SHALL NOT BE WITHIN A FENCED AREA.
2. ALL SHSUD EASEMENTS ARE FOR CONSTRUCTION, MAINTENANCE (INCLUDING BUT NOT LIMITED TO REMOVAL OF TREES AND OTHER OBSTRUCTIONS), READING OF METERS AND REPAIR OF ANY SHSUD FACILITY LOCATED WITHIN SAID EASEMENT.
3. REPAIR AND POSSIBLE RECONSTRUCTION OF PUBLIC ROADWAYS DAMAGES BY UTILITY CONSTRUCTION MAY BE REQUIRED COST FOR ANY RECONSTRUCTION OR REPAIR WILL BE AT THE DEVELOPER'S EXPENSE.
4. ALL VALVES, HYDRANTS, CLEAN OUTS OR OTHER UTILITY APPURTENANCES SHALL CONSTRUCTION OUTSIDE THE LIMITS OF DRIVEWAY APRONS, CURB AND GUTTER, AND SIDEWALKS.
5. WATER MAIN SHALL HAVE A MINIMUM OF 48 INCHES OF COVER.
6. PERMANENT TIE-INS TO IN-SERVICE MAINS SHALL ONLY BE CONSTRUCTED FOLLOWING FLUSHING, DISINFECTION, TESTING, AND APPROVAL BY SHSUD. TEMPORARY CONNECTIONS FOR FILLING, FLUSHING, AND TESTING MUST BE EQUIPPED WITH SHSUD-PROVIDED BACKFLOW PREVENTION TO MAINTAIN CROSS-CONNECTION CONTROL.
7. A HYDROSTATIC TEST SHALL BE PERFORMED AFTER SERVICES ARE CONNECTED AND FINAL GRADING AND PLACEMENT ARE COMPLETE.
8. WATER SERVICE LINE CROSSINGS OF CURBS SHALL BE INDICATED BY A "W" STAMPED IN THE FACE OF THE CURB DURING CONCRETE PLACEMENT WITH A TOOL INTENDED FOR THE PURPOSE. VALVE CROSSINGS OF CURBS SHALL BE INDICATED BY A "V" STAMPED IN THE FACE OF THE CURB DURING CONCRETE PLACEMENT WITH A TOOL INTENDED FOR THE PURPOSE. LETTERING SHALL BE 4 INCHES IN HEIGHT AND HAVE BEVELED EDGES TO PREVENT CHIPPING OR SPRAWLING OVER TIME.

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

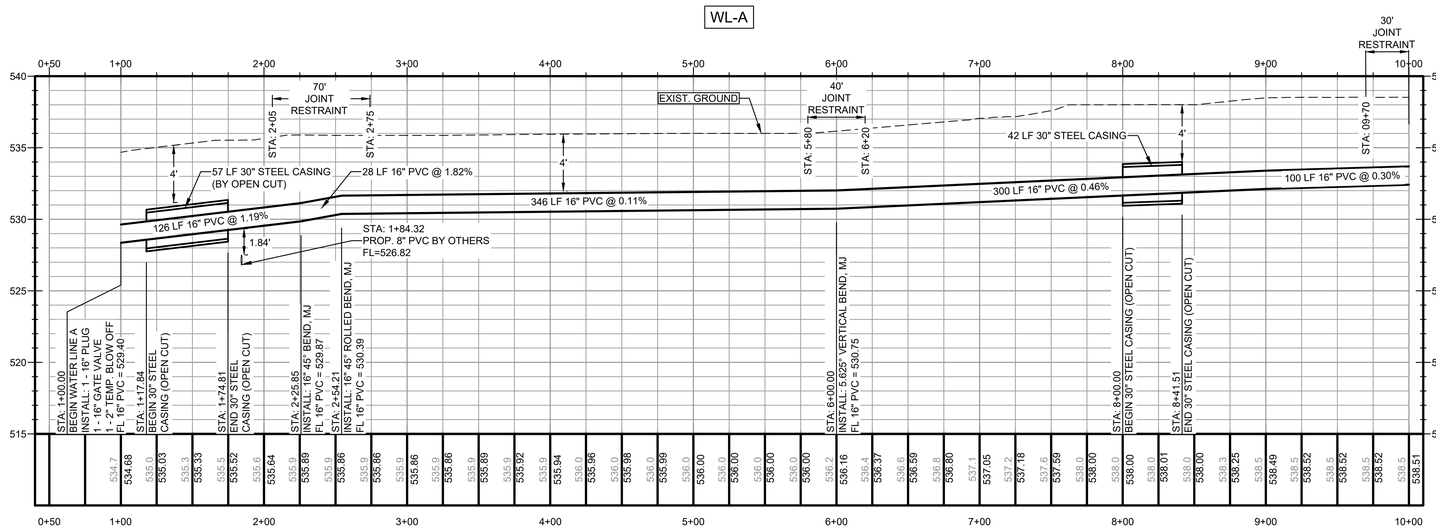
CAUTION!!:

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

SEGUIN ISD NOTES:

CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING FOR WORK IN FRONT OF SEGUIN ISD:

1. DRIVEWAY OPEN CUT WORK MUST BE PERFORMED ON NIGHTS AND/OR WEEKENDS.
2. DRIVEWAY OPEN CUTS MUST BE PERFORMED ONE AT A TIME.
3. CONTRACTOR SHALL GIVE TWO WEEKS NOTICE TO CITY OF SEGUIN PRIOR TO EACH DRIVEWAY OPEN CUT WORK.
4. NO OPEN TRENCHES ARE ALLOWED WHEN WORKERS ARE PRESENT.
5. CONTRACTOR SHALL INSTALL TEMPORARY CONSTRUCTION FENCING AROUND WORK AREA.
6. ALL DRIVEWAYS WILL USE FLOWABLE FILL AS BACKFILL.



WARNING !!!!

CONTRACTOR TO FIELD VERIFY ALL EXIST, UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION.

ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM.
GUADALUPE COUNTY
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SCALE:
1" = 50' HORIZ.
1" = 5' VERT.

PROFILE LEGEND:
EXIST GND
PROPOSED WL

NO.	DATE	REVISION	BY

SHSUD SEGUIN ISD
GUADALUPE COUNTY

WLA STA 1+00 TO STA 10+00

MALONE★WHEELER INC. SINCE 1995
CIVIL ENGINEERING ★ DEVELOPMENT CONSULTING ★ PROJECT MANAGEMENT
5113 Southwest Pkwy, Suite 260
Austin, Texas 78735
Phone: (512) 899-0601 Fax: (512) 899-0655
Firm Registration No. F-786

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DESIGN BY :	MB
CHECKED BY :	NR
APPROVED BY :	DL
DATE :	12/30/2024

SHEET 04
OF 07

F:\SPRINGS HILL WSC\PROJECTS\22-047-AUS-SH46 RIVER BORE\DRAWINGS\PLANSET\SCHOOL\05 WLA STA 1+00 TO END.DWG, 12/30/2024, RYAN HICKS

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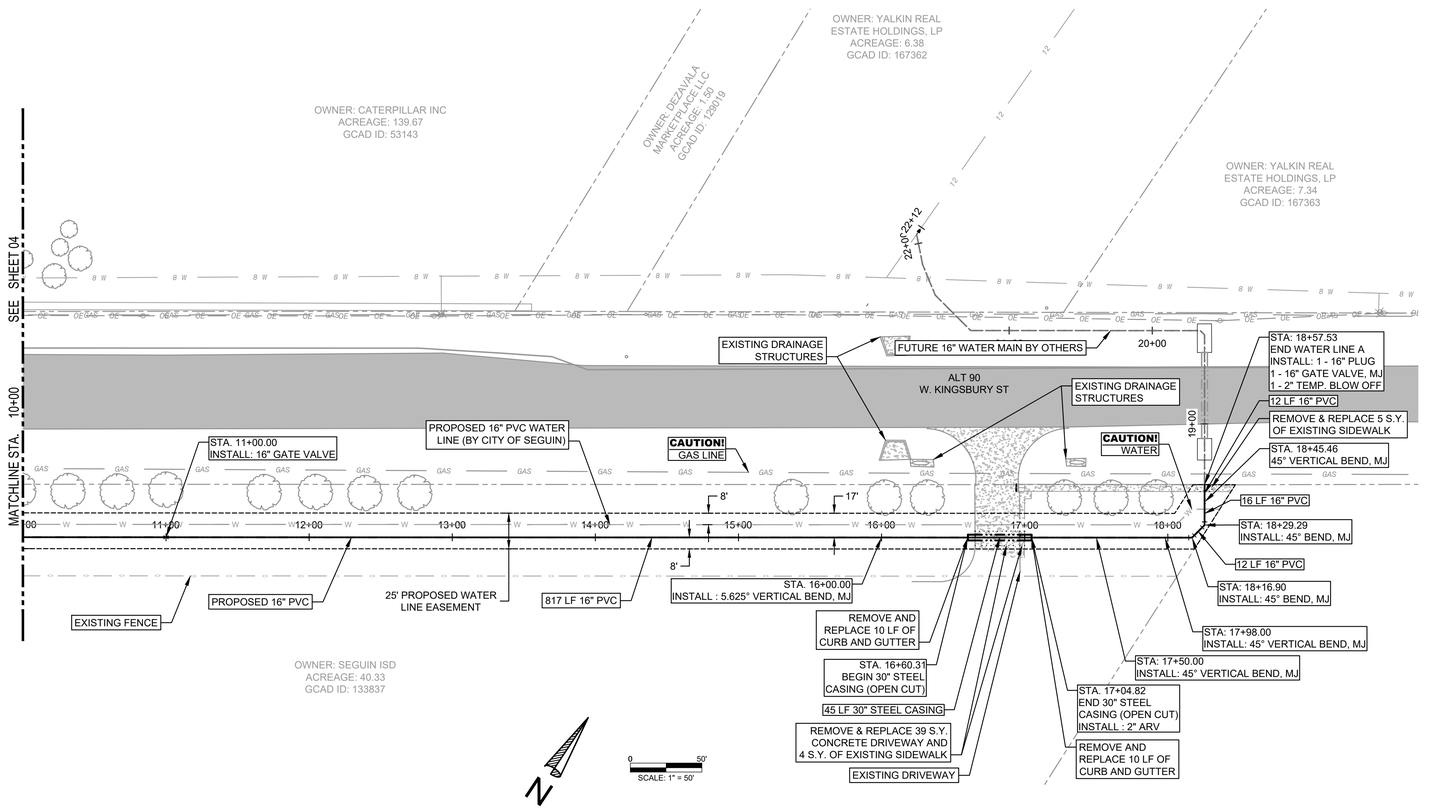


LEGEND

- PROPERTY BOUNDARY
- EXIST. WATER LINE
- EXIST. WATER SERVICE
- EXIST. EDGE OF PAVEMENT
- EXIST. GRAVEL DRIVEWAY
- EXIST. FIRE HYDRANT
- EXIST. OVERHEAD ELECTRIC
- EXIST. LIGHT POLE
- EXIST. TREE
- EXIST. CONTOUR (MAJOR)
- EXIST. CONTOUR (MINOR)
- CENTERLINE OF CREEK
- REGULATORY FLOODWAY
- EXIST. FENCE
- EXIST. GATE VALVE
- PROP. GATE VALVE
- PROP. WATER LINE
- PROP. FIRE HYDRANT
- PROP. AIR RELEASE VALVE
- PROP. STEEL ENCASEMENT

SHSUD NOTES:

1. ANY EASEMENT DESIGNATED AS A SHSUD UTILITY EASEMENT SHALL REMAIN OPEN FOR ACCESS AT ALL TIMES AND SHALL NOT BE WITHIN A FENCED AREA.
2. ALL SHSUD EASEMENTS ARE FOR CONSTRUCTION, MAINTENANCE (INCLUDING BUT NOT LIMITED TO REMOVAL OF TREES AND OTHER OBSTRUCTIONS), READING OF METERS AND REPAIR OF ANY SHSUD FACILITY LOCATED WITHIN SAID EASEMENT.
3. REPAIR AND POSSIBLE RECONSTRUCTION OF PUBLIC ROADWAYS DAMAGES BY UTILITY CONSTRUCTION MAY BE REQUIRED COST FOR ANY RECONSTRUCTION OR REPAIR WILL BE AT THE DEVELOPER'S EXPENSE.
4. ALL VALVES, HYDRANTS, CLEAN OUTS OR OTHER UTILITY APPURTENANCES SHALL CONSTRUCTION OUTSIDE THE LIMITS OF DRIVEWAY APRONS, CURB AND GUTTER, AND SIDEWALKS.
5. WATER MAIN SHALL HAVE A MINIMUM OF 48 INCHES OF COVER.
6. PERMANENT TIE-INS TO IN-SERVICE MAINS SHALL ONLY BE CONSTRUCTED FOLLOWING FLUSHING, DISINFECTION, TESTING, AND APPROVAL BY SHSUD. TEMPORARY CONNECTIONS FOR FILLING, FLUSHING, AND TESTING MUST BE EQUIPPED WITH SHSUD-PROVIDED BACKFLOW PREVENTION TO MAINTAIN CROSS-CONNECTION CONTROL.
7. A HYDROSTATIC TEST SHALL BE PERFORMED AFTER SERVICES ARE CONNECTED AND FINAL GRADING AND PLACEMENT ARE COMPLETE.
8. WATER SERVICE LINE CROSSINGS OF CURBS SHALL BE INDICATED BY A "W" STAMPED IN THE FACE OF THE CURB DURING CONCRETE PLACEMENT WITH A TOOL INTENDED FOR THE PURPOSE. VALVE CROSSINGS OF CURBS SHALL BE INDICATED BY A "V" STAMPED IN THE FACE OF THE CURB DURING CONCRETE PLACEMENT WITH A TOOL INTENDED FOR THE PURPOSE. LETTERING SHALL BE 4 INCHES IN HEIGHT AND HAVE BEVELED EDGES TO PREVENT CHIPPING OR SPRAWLING OVER TIME.

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN QRDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

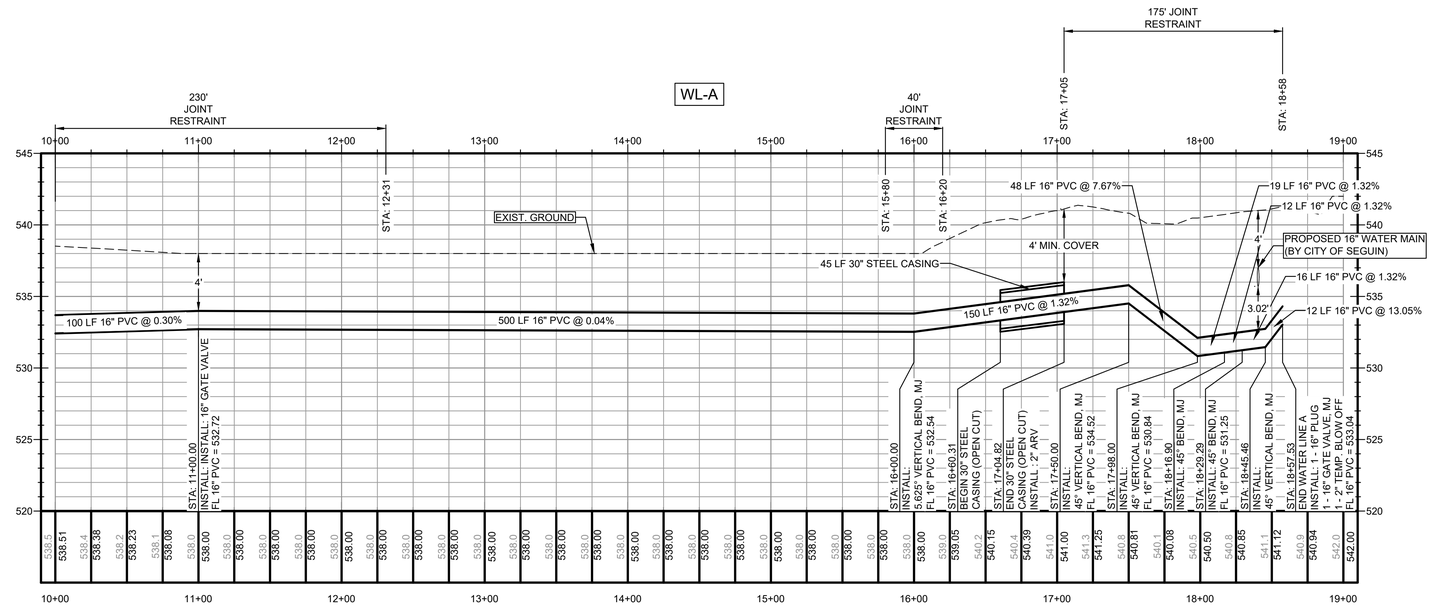
CAUTION!!:

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

SEGUIN ISD NOTES:

CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING FOR WORK IN FRONT OF SEGUIN ISD:

1. DRIVEWAY OPEN CUT WORK MUST BE PERFORMED ON NIGHTS AND/OR WEEKENDS.
2. DRIVEWAY OPEN CUTS MUST BE PERFORMED ONE AT A TIME.
3. CONTRACTOR SHALL GIVE TWO WEEKS NOTICE TO CITY OF SEGUIN PRIOR TO EACH DRIVEWAY OPEN CUT WORK.
4. NO OPEN TRENCHES ARE ALLOWED WHEN WORKERS ARE PRESENT.
5. CONTRACTOR SHALL INSTALL TEMPORARY CONSTRUCTION FENCING AROUND WORK AREA.
6. ALL DRIVEWAYS WILL USE FLOWABLE FILL AS BACKFILL.



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APPROVED BY : DL
DATE : 12/30/2024

SHEET 05
OF 07

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SINCE 1995
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NO. | DATE | REVISION | BY

SHSUD SEGUIN ISD
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WLA STA 10+00 TO END

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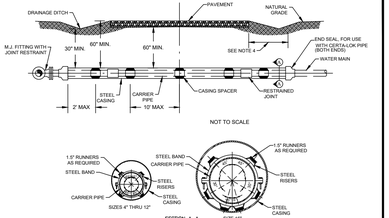


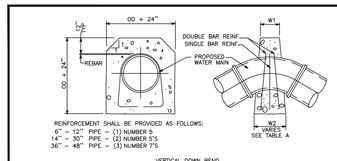
NOT TO SCALE

CARRIER PIPE			STEEL CASING					CASING SPACERS	
NOMINAL SIZE (IN)	PIPE OUTSIDE DIAMETER (IN)	RESTRAINT OUTSIDE DIAMETER	MIN. NOMINAL SIZE(IN)	OUTSIDE DIAMETER (IN)	INSIDE DIAMETER (IN)	WALL THICKNESS	WEIGHT CLASS	BAND WIDTH	No. OF SPACERS PER JOINT
4	4.80	9.25	16	16	17.25	0.375	STANDARD	8"	2 TOP, 2 BOTTOM
6	6.90	11.25	16	16	17.25	0.375	STANDARD	8"	2 TOP, 2 BOTTOM
8	9.05	13.75	20	20	21.25	0.375	STANDARD	8"	2 TOP, 2 BOTTOM
12	13.20	18.90	24	24	23.24	0.375	STANDARD	8"	2 TOP, 2 BOTTOM
16	17.40	25.51	30	30	29.25	0.375	STANDARD	8"	2 TOP, 4 BOTTOM

NOTES:

1. CARRIER PIPE SIZES ARE BASED ON CERTA-LOK C900/RJ FOR 4" TO 12" PIPE DIAMETER AND CERTA-LOK C905/RJ FOR 14" TO 24" PIPE DIAMETER.
2. STEEL CASING SHALL BE STANDARD WEIGHT OR HEAVIER PIPE CONFORMING TO ASTM A-36, ASTM A-568, ASTM A-135, ASTM A-139 OR OTHER ACCEPTABLE STANDARD SPECIFICATION. PIPE SHALL BE COATED AND LINED IN ACCORDANCE WITH AWWA C-210 OR APPROVED EQUAL. PIPE JOINTS SHALL BE WELDED IN ACCORDANCE WITH AWWA C-206. STEEL CASING SHALL BE NEW OR USED IN GOOD CONDITION ACCEPTABLE TO SPRINGS HILL SPECIAL UTILITY DISTRICT AND TO THE ROADWAY AUTHORITY.
3. SUBSEQUENT CASING SPACERS ARE REQUIRED FOR 4" TO 14" PIPE SIZES TO BE AT 10 FEET APART AND FOR 16" TO 30" PIPE SIZES TO BE AT 8 FEET APART WITHIN THE CASING WITH AT LEAST 3 SPACERS PER JOINT ON PIPE. ONE CASING SPACER SHALL BE REPLACED WITHIN 2 FEET OF ENDS OF CASING FOR ALL PIPE SIZES.
4. CASING PIPE SHALL EXTEND A MINIMUM OF 10 FT. PAST EDGE OF PAVEMENT ALONG TXDOT ROADWAYS AND A MINIMUM OF 5 FT. PAST EDGE OF PAVEMENT ALONG ALL OTHER ROADWAYS UNLESS OTHERWISE DIRECTED BY ENGINEER OR REGULATORY AUTHORITY.
5. CASING SPACERS SHALL BE MADE FROM T-304 STEEL OF A MINIMUM 14 GAUGE THICKNESS.
6. CASING SPACERS SHALL HAVE A SYNTHETIC RUBBER OR PVC LINER TO INSULATE THE PIPELINE FROM THE SPACER.
7. CASING SPACERS SHALL HAVE A 1.5" WIDE GLASS REINFORCED PLASTIC OR UHMW POLYMER RUNNERS TO INSULATE THE SPACER FROM THE CASING

SPRINGS HILL SPECIAL UTILITY DISTRICT	CASING DETAIL		
	DATE: 03/03/2010	REVISIONS: 11/18/2024	STANDARD NO. WA-1



REINFORCEMENT SHALL BE PROVIDED AS FOLLOWS:
6" – 12" PIPE = (1) NUMBER 5
14" – 30" PIPE = (2) NUMBER 5'S
36" – 48" PIPE = (3) NUMBER 7'S

VERTICAL DOWN BEND

TABLE A
UPWARD THRUST GRAVITY BLOCKS

PIPE DIA.	MIN. TOP WIDTH W1	ANGLE (degrees)	BOTTOM WIDTH W2 (in)
6"	6"	0–5	NOTE 2
		5–15	24
		15–25	48
		← 25	NOTE 1
8"	6"	0–5	NOTE 2
		5–9	30
		9–15	36
		← 15	NOTE 1
12"	6"	0–5	NOTE 2
		5–15	48
		← 15	NOTE 1
16"	12"	0–5	NOTE 2
		5–10	60
		10–15	96
		← 15	NOTE 1
24" THRU 36"		← 5.0	NOTE 1
42" THRU 48"		← 3.0	NOTE 1

NOTES:

1. FOR ANGLES GREATER THAN THOSE INDICATED RESTRAINT JOINTS SHALL BE INSTALLED
2. FOR JOINT DEFLECTIONS LESS THAN 5 DEGREES, NO HORIZONTAL OR VERTICAL THRUST RESTRAINT IS REQUIRED FOR PIPES LESS THAN 42" IN DIAMETER.

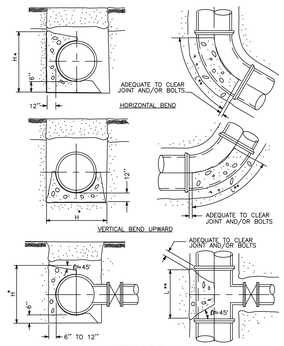
THRUST BLOCK DESIGN AS FOLLOWS
A. PRESSURE OF 150 P.S.I. (ACTUAL IF HIGHER) + 50 % SURGE ALLOWANCE
B. MAXIMM SOIL BEARING SEE TABLE BELOW

SOIL TYPES	PRESSURE
LOOSE OR SPONGY SOIL	1500 Lb/Sq.Ft.
UNDISTURBED SOIL, CALICHE	2000 Lb/Sq.Ft.
LIMESTONE ROCK	4000 Lb/Sq.Ft.

NOTES:

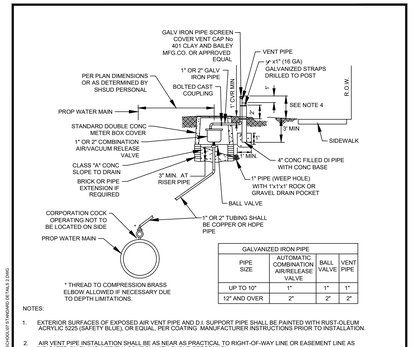
1. THE EARTH BEARING SURFACE SHALL BE UNDISTURBED MATERIAL, IF NOT POSSIBLE, THE FILL BETWEEN THE BEARING SURFACE AND THE UNDISTURBED SOIL MUST BE COMPACTED TO TO A MINIMUM OF 90% STANDARD PROCTOR DENSITY.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL ADEQUATE THRUST BLOCKING. THE CONTRACTOR SHALL MAKE THE DETERMINATION IN THE FIELD AS TO TYPE OF SOIL AND USE THE "THRUST BLOCKING DESIGN" TO ADJUST THE AMOUNTS OF THRUST BLOCKING REQUIRED AT EACH PLACE OF USE.
3. ALL FITTINGS SHALL BE BLOCKED REGARDLESS OF THE ANGLE OF DIRECTION.
4. ALL JOINTS WITHIN 30' OF BEND MUST BE RESTRAINED.

SPRINGS HILL SPECIAL UTILITY DISTRICT	THRUST BLOCK DETAILS SHT 1 OF 2		
	DATE: 03/03/2010	REVISIONS: 11/18/2024	STANDARD NO. WA-6



* THE DIMENSION FOR "H" MUST BE GREATER THAN DIAMETER OF THE PIPE
** LENGTH "L" ALONG THE BEND MUST BE GREATER THAN "H" AND LESS THAN 2 TIMES "H"

SPRINGS HILL SPECIAL UTILITY DISTRICT	THRUST BLOCK DETAILS SHT 2 OF 2		
	DATE: 03/03/2010	REVISIONS: 11/18/2024	STANDARD NO. WA-6



GALVANIZED IRON PIPE			
PIPE SIZE:	AUTOMATIC COMBINATION AIR/RELEASE VALVE	BALL VALVE	VENT PIPE
UP TO 10"	1"	1"	1"
12" AND OVER	2"	2"	2"

NOTES:

1. EXTERIOR SURFACES OF EXPOSED AIR VENT PIPE AND D.I. SUPPORT PIPE SHALL BE PAINTED WITH RUST-OLEUM ACRYLIC 5225 (SAFETY BLUE) OR EQUAL, PER COATING MANUFACTURER INSTRUCTIONS PRIOR TO INSTALLATION.
2. AIR VENT PIPE INSTALLATION SHALL BE AS NEAR AS PRACTICAL TO RIGHT-OF-WAY LINE OR EASEMENT LINE AS INDICATED ON PLANS (VERIFY LOCATION WITH SHSUD PERSONNEL
3. CONCRETE METER BOX PENETRATION SHALL BE CORE BIT DRILLED. VOID SHALL BE FILLED BY PRESS-SEAL GASKET CORP. PSX RESILIENT CONNECTOR MEETING ASTM C923 OR APPROVED EQUAL
4. IN UNDEVELOPED AND DEVELOPED AREAS, THE AIR RELEASE SHALL BE 5 FEET IN HEIGHT SUPPORTED BY 4" STEEL PIPE WHICH HAS BEEN PAINTED BLUE AND FILLED WITH CONCRETE. IN DEVELOPED AREAS THE AIR RELEASE SHALL BE 8" TO 12" IN HEIGHT AND LOCATED NOT TO CONFLICT WITH SIDEWALK.
5. AUTOMATIC COMBINATION AIR/VACUUM VALVE SHALL BE INSTALLED IN A MANNER WHICH WILL ALLOW REMOVAL OF ASSEMBLY WITHOUT REMOVAL OF THE CONCRETE METER BOX.
6. NO VALVES SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, DRIVEWAYS, OR ROADWAYS. S.H.S.U.D. WILL NOT BE RESPONSIBLE FOR ANY DAMAGES TO CONCRETE OR PAVED AREAS IF DEVELOPER DOES NOT COMPLY.

SPRINGS HILL SPECIAL UTILITY DISTRICT	1" OR 2" VENTED AUTOMATIC COMBINATION AIR/VACUUM RELEASE VALVE		
	DATE: 06/15/2010	REVISIONS: 11/18/2024	STANDARD NO. WA-9

NOTES:

1. THE EXISTING PAVING SURFACE SHALL BE SAW CUT IN A STRAIGHT LINE, A MINIMUM OF 12 INCHES WIDER THAN THE UNDISTURBED SIDES OF THE TRENCH, SYMMETRICAL ABOUT THE CENTERLINE OF THE EXCAVATION.
2. ANY CONCRETE PAVING SHALL BE CUT 6 INCHES WIDER THAN THE UNDISTURBED SIDES OF THE EXCAVATION.
3. IF EXCAVATION AREA IS OPEN FOR TEMPORARY PUBLIC USE, THE SURFACE SHALL BE MAINTAINED LEVEL WITH ADJACENT RIDING SURFACE WITH COLD MIX OR TEMPORARY HOT MIX ASPHALTIC CONCRETE.
4. ROAD BASE AND SURFACE MATERIALS IN THE TRENCH CUT SHALL BE REPLACED IN KIND, OF EQUAL THICKNESS, OR WITH MINIMUM BASE THICKNESS OF 10 INCHES WHICHEVER IS GREATER.
5. ALL DAMAGED AREAS OF PAVEMENT OUTSIDE THE TRENCH CUT AREA SHALL BE REMOVED AND REPLACED WITH MINIMUM OF 8 INCHES OF BASE OR MATCH EXISTING, WHICHEVER IS GREATER.
6. SURFACE PAVEMENT SHALL BE OF THE KIND AND THICKNESS AS EXISTING, OR MINIMUM 2 INCHES, WHICHEVER IS GREATER.
7. ALL WATER LINES SHALL HAVE A MINIMUM PRESSURE CLASS OF 200 PSI.

SPRINGS HILL SPECIAL UTILITY DISTRICT	TRENCH WITH PAVED SURFACE		
	DATE: 07/26/2010	REVISIONS: 11/18/2024	STANDARD NO. WA-4

NOTES:

1. ALL WATER LINES SHALL HAVE A MINIMUM PRESSURE CLASS OF 200 P.S.I.
2. BEDDING AND BACKFILL SHALL BE COMPACTED TO 90% STANDARD PROCTOR

SPRINGS HILL SPECIAL UTILITY DISTRICT	TRENCH WITH UNFINISHED SURFACE		
	DATE: 03/03/2010	REVISIONS: 11/18/2024	STANDARD NO. WA-5

NOTES:

1. T.C.E.Q. RULES AND REGULATIONS ON SANITARY SEWER, STORM SEWER AND WATER MAIN CROSSINGS AND SEPARATIONS SHALL BE STRICTLY ENFORCED, 30 TAC CHAPTER 290, SUBCHAPTER D.
2. ALL OTHER UTILITIES TO MAINTAIN 5 FOOT SEPARATION FROM WATER MAINS AND SERVICES, GAS, ELECTRIC, CABLE (ETC.) TO BE LOCATED OPPOSITE SIDES OF PROPERTY.
3. UTILITY CROSSINGS SEPARATED BY LESS THAN 18 INCHES, PIPES SHALL BE ENCASED WITH 6 INCHES OF CONCRETE ALL AROUND AND CENTERED TO CROSSING FOR A MINIMUM LENGTH OF 20 FEET TOTAL.
4. SPECIFICATIONS, BEDDING MATERIAL MUST BE APPROVED BY AUTHORIZED S.H.S.U.D. PERSONNEL, BEFORE START OF JOB.
5. AT ANY CREEK CROSSING THE MAIN SHALL BE STEEL ENCASED AND/OR 6" CONCRETE ENCASEMENT TO WITHIN 10 FEET OUTSIDE OF CREEK OR DRAINAGE DITCH AREA.

SPRINGS HILL SPECIAL UTILITY DISTRICT	UTILITY CROSSING		
	DATE: 06/15/2010	REVISIONS: 11/18/2024	STANDARD NO. WA-7

NOTES:

1. WELD SOCKET 3/8" X 2" DEEP TO 1" (SCH. 40) ROUND STEM EXTENSION. FITTED ON OPERATING NUT, SCH. 80 FOR LENGTHS OVER 10'.
2. STANDARD VALVE CASTING RING AND METAL LID IN UNPAVED AREAS.
3. NUT AT TOP OF VALVE EXTENSION ROD SHALL BE SQUARE 2" LONG WELDED TO TOP OF ROD.
4. VALVE EXTENSIONS ARE REQUIRED ON ALL VALVES THAT EXCEED 3 FEET DEEP FROM FINISHED GRADE. VALVE EXTENSIONS SHALL BE PLACED SUCH THAT THE EXTENSION NUT IS BETWEEN 18 TO 24 INCHES FROM FINISHED GRADE.
5. NO VALVES SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, DRIVEWAYS, OR ROADWAYS. S.H.S.U.D. WILL NOT BE RESPONSIBLE FOR ANY DAMAGES TO CONCRETE OR PAVED AREAS IF DEVELOPER DOES NOT COMPLY.

SPRINGS HILL SPECIAL UTILITY DISTRICT	4" TO 24" VERTICAL GATE VALVE WITH BOX ASSEMBLY		
	DATE: 06/15/2010	REVISIONS: 11/18/2024	STANDARD NO. WA-19

NO.	DATE	REVISION	BY

SHSUD SEGUIN ISD
GUADALUPE COUNTY

STANDARD DETAILS

MALONE★WHEELER INC. SINCE 1995
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SHEET 06
OF 07

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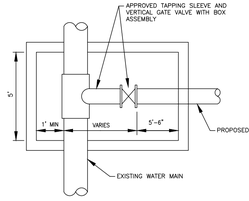


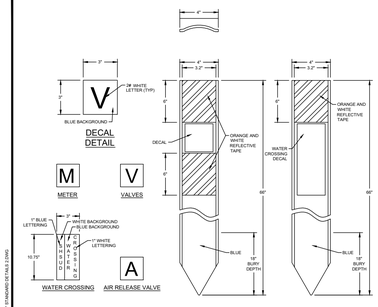
NOTE:

1. NO SIZE ON SIZE ALLOWED, MAKE WET CONNECTION.

SPRINGS HILL SPECIAL UTILITY DISTRICT

MINIMUM EXCAVATION CLEARANCE FOR INSTALLATION OF PRESSURE TAP DETAIL

DATE:	REVISIONS:	STANDARD NO.
07/26/2010	11/18/2024	WA-32



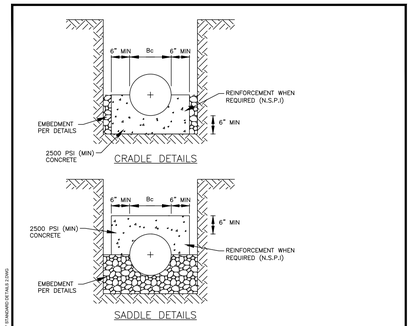
NOTES:

1. MARKERS SHALL BE 66" COMPOSITE POSTS SIMILAR TO RHINO FIBERCURVE COMPOSITE MARKER POST.
2. MARKERS SHALL BE PLACED AT ALL GATE VALVES, FLUSHING VALVES, & AIR RELEASE VALVES PER ITEM DETAIL.
3. MARKERS SHALL BE PLACED AT WATER METERS AS SPECIFIED ON PLANS.
4. PIPELINE MARKERS SHALL BE PLACED ON R.O.W./FENCE LINE AT ALL ROAD CROSSINGS.

SPRINGS HILL SPECIAL UTILITY DISTRICT

WATER LINE MARKER

DATE:	REVISIONS:	STANDARD NO.
07/26/2010	08/05/2021	WA-34



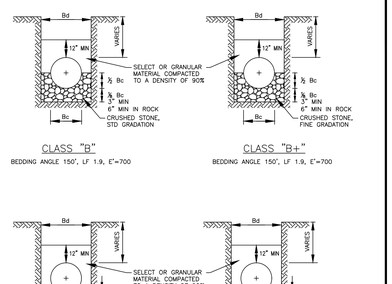
NOTES:

1. ENCASEMENT MAY BE PLACED TO FULL TRENCH WIDTH. (N.S.P.I)
2. USE COLLAR DETAILS FOR FULL LENGTH CONCRETE ENCASEMENT AS SHOWN ON PLANS.

SPRINGS HILL SPECIAL UTILITY DISTRICT

ENCASEMENT

DATE:	REVISIONS:	STANDARD NO.
08/12/2010	11/18/2024	WA-40



SPRINGS HILL SPECIAL UTILITY DISTRICT

EMBEDMENT
SHT 1 OF 3

DATE:	REVISIONS:	STANDARD NO.
08/12/2010	11/18/2024	WA-41

EMBEDMENT FOR WATER LINES						
TYPE OF PIPE	IN EARTH			IN ROCK		
	0'-8"	8'-16"	>16'	0'-8"	8'-16"	>16'
18" AND SMALLER DUCTILE IRON WATER LINE	D+	C	C	D+	C	B
18" AND LARGER DUCTILE IRON WATER LINE	D+	B	B	D+	B	B
ALL PVC WATER LINE	C+	B+	B+	C+	B+	B+
24" & 30" RCCP	D+	B	B	D+	B	B

NOTES:

1. PIPE EMBEDMENT SHALL CONFORM TO DETAILS SHOWN HEREIN.
2. SECONDARY BACKFILL SHALL EXTEND FROM ABOVE THE EMBEDMENT TO BELOW THE PAVEMENT REPAIR SECTION WITHIN PAVEMENT AREA AND TO BELOW THE TOPSOIL SECTION OUTSIDE PAVEMENT AREAS.
3. SECONDARY BACKFILL SHALL CONSIST OF SELECT MATERIAL INCLUDING GRAVEL, FINE ROCK CUTTINGS, SAND, SANDY LOAM, OR LOAM FREE FROM EXCESSIVE CLAY. ROCK CUTTINGS SHALL HAVE NO DIMENSION GREATER THAN TWO INCHES. TRENCH CUTTINGS MAY BE UTILIZED AS SELECT MATERIAL PROVIDED THE CONDITIONS OF THIS PARAGRAPH ARE MET.
4. SECONDARY BACKFILL SHALL BE MECHANICALLY COMPACTED TO 95% STANDARD PROCTOR DENSITY WITHIN PAVEMENT AREAS AND TO 90% STANDARD PROCTOR DENSITY OUTSIDE PAVEMENT AREAS.

SPRINGS HILL SPECIAL UTILITY DISTRICT

EMBEDMENT
SHT 2 OF 3

DATE:	REVISIONS:	STANDARD NO.
08/12/2010	11/18/2024	WA 41

EMBEDMENT DIMENSIONS			
PIPE DIAMETER (INCHES)	KIND OF PIPE	EXTERNAL DIAMETER Bc (INCHES)	TRENCH WIDTH Bd (INCHES)
6	PVC WATER	6.90	24
6	DI WATER	6.90	24
8	PVC WATER	9.05	25
8	DI WATER	9.05	25
8	PVC	8.40	25
12	PVC WATER	13.20	29
12	DI WATER	13.20	29
12	PVC	12.40	29
16	DI WATER	17.40	33
16	PVC WATER	17.40	33
18	DI WATER	19.50	36
18	PVC WATER	19.50	36
20	DI WATER	21.60	38
20	PVC WATER	21.60	38
24	PVC WATER	25.80	42
24	DI WATER	25.80	42
24	RCCP WATER	30.00	48
30	PVC WATER	32.00	48
30	DI WATER	32.00	48
30	RCCP WATER	32.00	48

NOTES:

1. RCCP = REINFORCED CONCRETE CYLINDER PIPE.
2. EMBEDMENT DIMENSION FOR HDPE PIPE SHALL BE IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATIONS.

SPRINGS HILL SPECIAL UTILITY DISTRICT

EMBEDMENT
SHT 3 OF 3

DATE:	REVISIONS:	STANDARD NO.
08/12/2010	11/18/2024	WA 41

NOTES:

1. MATERIAL SHALL BE GRAY CAST IRON, ASTM A48, GRADE 30B.
2. THE MANUFACTURER'S IDENTIFICATION, CASTING NUMBER, AND THE COUNTRY WHERE CAST, SHALL BE DISTINCTLY CAST ONTO EACH LID.
3. DRAFT AND SHRINKAGE ALLOWANCE SHALL BE IN ACCORDANCE WITH NORMAL FOUNDRY PRACTICE.
4. FINISH BY REMOVING FINS AND FLASHING; PAINT WITH BLACK ASPHALT COATING,
5. WEIGHT: APPROXIMATELY 17 LBS.

SPRINGS HILL SPECIAL UTILITY DISTRICT

VALVE BOX CASTING COLLAR
(NOT IN PAVEMENT)

DATE:	REVISIONS:	STANDARD NO.
07/26/2010	11/18/2024	WA 42

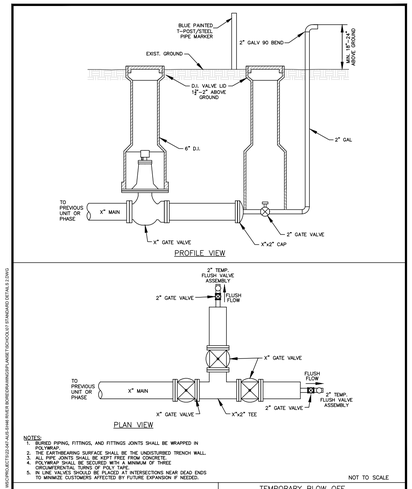
NOTES:

1. MATERIAL SHALL BE GRAY CAST IRON, ASTM A48, GRADE 30B.
2. TYPICAL FILLET IS 3/16" RADIUS.
3. LETTERING SHALL BE 1 1/2" HEIGHT AND LOCATED AS SHOWN.
4. THIS LID FITS INSIDE 6" I.D. PIPE.
5. THE MANUFACTURER'S IDENTIFICATION, CASTING NUMBER, AND THE COUNTRY WHERE CAST, SHALL BE DISTINCTLY CAST ONTO EACH LID.
6. DRAFT AND SHRINKAGE ALLOWANCE SHALL BE IN ACCORDANCE WITH NORMAL FOUNDRY PRACTICE.
7. FINISH BY REMOVING FINS AND FLASHING; PAINT WITH BLACK ASPHALT COATING,
8. WEIGHT: APPROXIMATELY 13 LBS.

SPRINGS HILL SPECIAL UTILITY DISTRICT

VALVE BOX CASTING LID
(NOT IN PAVEMENT)

DATE:	REVISIONS:	STANDARD NO.
07/26/2010	11/18/2024	WA 44



NOTES:

1. BURIED PIPING, FITTINGS, AND FITTINGS JOINTS SHALL BE WRAPPED IN POLYWRAP.
2. THE EARTHBEARING SURFACE SHALL BE THE UNDISTURBED TRENCH WALL.
3. ALL PIPE JOINTS SHALL BE KEPT FREE FROM CONCRETE.
4. ALL PIPE JOINTS SHALL BE WRAPPED A MINIMUM OF THREE CIRCUMFERENTIAL TURNS OF POLY TAPE.
5. IN LINE VALVES SHOULD BE PLACED AT INTERSECTIONS NEAR DEAD ENDS TO MINIMIZE CUSTOMERS AFFECTED BY FUTURE EXPANSION IF NEEDED.

NOT TO SCALE

SPRINGS HILL SPECIAL UTILITY DISTRICT

TEMPORARY BLOW OFF
12-INCH OR LARGER

DATE:	REVISIONS:	STANDARD NO.
10/21/2021	11/18/2024	WA-47

NO.	DATE	REVISION	BY

SHSUD SEGUIN ISD
GUADALUPE COUNTY

STANDARD DETAILS

MALONE★WHEELER INC. SINCE 1995
CIVIL ENGINEERING ★ DEVELOPMENT CONSULTING ★ PROJECT MANAGEMENT
5113 Southwest Pkwy, Suite 260
Austin, Texas 78735
Phone: (512) 899-0601 Fax: (512) 899-0655
Firm Registration No. F-786

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF JAMES INOCENCIO, P.E. 143607, ON 11/21/2024. IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

DESIGN BY :	MB
CHECKED BY :	NR
APPROVED BY :	DL
DATE :	12/30/2024

SHEET 07
OF 07

F:\SPRINGS HILL WSC\PROJECTS\22-047-AUS-SH46 RIVER BORE\DRAWINGS\PLANSET\SCHOOL\07 STANDARD DETAILS 2.DWG, 12/30/2024, RYAN HICKS

F:\Springs Hill WSC\Projects\22-047-AUS-SH46 River Bore\Drawings\PlansetSCHOOL\07 STANDARD DETAILS 2.dwg, 1

Project Manual

for

Springs Hill Special Utility District

Seguin ISD Transmission Line

December 2024

Prepared for:

Springs Hill Special Utility District
5510 South Highway 123 Bypass
Seguin, TX 78155

Prepared by:

Malone/Wheeler, Inc.
TBPE No. F-786
5113 Southwest Parkway, Suite 260
Austin, Texas 78735

MALONE ★ WHEELER
SINCE INC. 1995
CIVIL ENGINEERING ★ DEVELOPMENT CONSULTING ★ PROJECT MANAGEMENT

Table of Contents

*NOTE: UNLESS OTHERWISE NOTED ON PLANS OR BID DOCUMENTS, CONTRACTOR MUST CONFORM TO SHSUD SPECIFICATIONS AND DETAILS FOUND ONLINE HERE:
HTTPS://SPRINGSHILL.ORG/ALL-FORMS-AND-REPORTS

MEASURMENT AND PAYMENT

1.01 GENERAL

A. It is the intent of the Contract Documents that the aggregate amount of unit prices of Work actually installed shall cover all Work required by the Contract Documents, in place, complete, and ready for use.

B. Prices in the Contract Documents include all compensation for full completion of all Work items in place, and include providing all labor, materials, tools, equipment, services, supplies, incidentals, and all necessary operations.

C. Work to protect items to remain by installation of temporary construction, including posting of warning signs, placement of protective fencing, barriers, barricades and covers, and restoration of damaged items to remain, will be considered incidental to the various pay items and no separate payment for this work will be made.

D. Work necessary to haul materials from original positions to points of disposition, including excavation of earth materials and utilization in construction or other disposition, will be considered incidental to the various pay items and no separate payment for this Work will be made.

E. Work necessary to provide property drainage during construction, including temporary construction and maintenance of ditches, culverts, and drainage ways, will be considered incidental to the various pay items and no separate payment for this Work will be made.

F. No costs in connection with Work required by the Contract Documents for proper and successful completion of the Contract will be paid outside of or in addition to prices named in the Contract Documents.

G. Work not specifically set forth in the Contract Documents as pay items shall be considered subsidiary obligations of Contractor and costs shall be included in prices named in the Contract Documents.

1.02 UNIT PRICE DESCRIPTIONS

A. **Mobilization** will be paid for at the unit contract price, per lump sum, which shall be considered full compensation for establishment of the requisite bonds, insurance, documentation, etc. necessary for the project to proceed in accordance with the Contract Documents as well as the readying and/or movement of equipment, personnel, material, supplies, etc. to the project site and the establishment of office and other facilities necessary prior to beginning the work.

B. **Silt Fence** will be paid for at the unit contract price, per linear foot, placed at locations shown on the construction plans and/or as approved by Owner/Engineer, which price shall be considered full compensation for furnishing all materials, labor, tools,

equipment and incidentals necessary for a complete installation to provide effective erosion control. This item includes maintenance of the erosion controls for the duration of the contract as well as removal and disposal upon project completion.

C. **Inlet Protection** will be paid for at the unit contract price, per each, placed at locations shown on the construction plans and/or as approved by Owner/Engineer, which price shall be considered full compensation for furnishing all materials, labor, tools, equipment, and incidentals necessary for a complete installation to provide effective inlet protection. This item includes maintenance of the erosion controls for the duration of the contract as well as removal and disposal upon project completion.

D. **Stabilized Construction Entrance** will be paid for at the unit contract price, per each, which price shall be considered full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work. This item includes maintenance and adjustment and/or replacement, as required, and removal and disposal at the end of the project. Note that the stabilized construction entrance may be placed at the location shown in the Plans or at an alternate location as directed by the Engineer.

E. **Miscellaneous Work and Cleanup** will be paid for at the unit contract price, per lump sum, which price shall be considered full compensation for furnishing all materials, labor, tools, equipment, and incidentals necessary for a complete restoration of the site to pre-project or finished grades conditions to comply with engineering regulations. Unit price shall include, but is not limited to, crossing and relocating existing utilities, restoration of driveways, fences and curbing, easement and right-of-way restoration, and other necessary work to place the site in acceptable condition following the conclusion of the work.

F. **Loaming and Hydroseeding** will be paid for at the unit contract price, per square yard, placed at locations shown on the construction plans and/or as approved by Owner/Engineer, which price shall be considered full compensation for furnishing all materials, labor, tools, equipment, and incidentals necessary for a complete installation to provide effective loaming and hydroseeding including but not limited to erosion control and topsoil, grading, application of fertilizer, hydraulically applying seed and mulch or sod, and maintaining all areas.

G. **Right-of-Way Clearing & Grading** will be paid for at the unit contract price, per acre, as approved by Owner/Engineer, which price shall be considered full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary for right-of-way clearing and grading.

H. **Trench Excavation Safety Protection** will be paid for at the unit contract price, per linear foot, which price shall be considered full compensation for furnishing all required personnel, equipment, tools, materials, supplies, and incidentals necessary to provide the trench safety protection, trenching and backfilling. Unit price shall include locating and marking existing on-site utilities for identification of crossings, placing and removing all shoring, sheeting or bracing, dewatering or temporary

diversion and proper recapture and transportation of water, and jacking and jack removal.

I. **Asphalt Demolition** will be paid for at the unit contract price, per square yard, which price shall be considered full compensation for removing and property disposing of existing asphalt driveway, including all materials, equipment, tools, labor, hauling, disposal, coordination, and incidentals.

J. **Asphalt Pavement Restoration** will be paid for at the unit contract price, per square yard, which price shall be considered full compensation for placement and finishing of hot-mix asphalt pavement, specifically as it applies to restoration following utility installation, including all materials, equipment, tools, labor, coordination, and incidentals.

K. **Concrete Demolition** will be paid for at the unit contract price, per square yard, which price shall be considered full compensation for removing and property disposing of existing concrete driveway, including all materials, equipment, tools, labor, hauling, disposal, coordination, and incidentals.

L. **Concrete** will be paid for at the unit contract price, per square yard, which price shall be considered full compensation for all footings, slabs, floors, walls, beams, supports, walks, pedestals, curbs, vaults, complete with metal reinforcement, installation and removal of all formwork, supports, coats and soakings, screens and levels required, installation of all inserts, grounds, dowels, blocks, sleeves, anchors and safety treads as shown, placement and finishing of concrete, including all materials, equipment, tools, labor, coordination, and incidentals.

M. **Traffic Control** will be paid at the unit contract price, per lump sum, as approved by Owner/Engineer, which shall be considered full compensation for maintenance of traffic, all materials, labor, tools, equipment, and incidentals necessary, in conformance with the current edition of the Texas Manual of Uniform Traffic Confrol Devices for Streets and highways and as indicated by the Engineer, including any traffic control plans required beyond what is provided.

N. **16" PVC Pipe** will be paid for at the unit contract price, per linear foot, of the pipe size indicated placed at locations shown on the construction plans and/or as approved by Owner/Engineer, which price shall be considered full compensation for furnishing all materials, labor, tools, equipment, and incidentals necessary to provide a complete and functioning pipeline in conformance with the plans and specifications. Unit price shall include all miscellaneous PVC fittings associated with pipe connections, pipe bends and deflections, reducers, and ball valves, where shown on the plans, directed by Engineer, or required in accordance with the pipe manufactures installation guidelines. Unit price shall include locating existing on-site utilities for tie-ins, coordinating with the water treatment plant operator to minimize the duration for any system outages, excavation, dewatering, bedding and backfill, pipe wrap, testing, and cleanup, complete and in place.

O. **30" Steel Encasement** will be paid for at the unit contract price, per linear foot, of the size indicated, placed at locations shown on the construction plans and/or as approved by Owner/Engineer, which price shall be considered full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary for a complete and functioning pipeline installation in conformance with the plans and specifications. Unit price shall include open trench installation.

P. **16" Gate Valve** will be paid for at the unit contract price, per each, placed at locations shown on the construction plans and/or as approved by Owner/Engineer, which price shall be considered full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary for a complete installation. This item shall include valve, any and all boxes and covers, excavation, embedment, backfill, testing and cleanup, complete in place.

Q. **16" D.I. Fittings** will be paid for at the unit contract price, per ton, placed at locations shown on the construction plans and/or as approved by Owner/Engineer, which price shall be considered full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary for a complete installation. This item shall include excavation, embedment, restraint, backfill, testing and cleanup, complete in place.

R. **2" ARV** will be paid for at the unit contract price, per each, placed at locations shown on the construction plans and/or as approved by Owner/Engineer, which price shall be considered full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary for a complete installation. This item shall include valve, any and all boxes and covers, excavation, embedment, backfill, testing and cleanup, complete in place.

S. **2" Temporary Blow-Off Valve** will be paid for at the unit contract price, per each, placed at locations shown on the construction plans and/or as approved by Owner/Engineer, which price shall be considered full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary for a complete installation. This item shall include valve, any and all boxes and covers, excavation, embedment, backfill, testing and cleanup, complete in place.

T. **Detection Wire and Tape** will be paid for at the unit contract price, per linear foot, placed at locations shown on the construction plans and/or as approved by Owner/Engineer, which price shall be considered full compensation for furnishing all materials, labor, tools, equipment, and incidentals necessary for a complete and functional installation.

SECTION 02080
BARRICADES, SIGNS, AND TRAFFIC HANDLING

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment required to provide traffic control in conformance with the current edition of the Texas Manual of Uniform Traffic Control Devices for Streets and Highways and as indicated by the Engineer.

PART 2 PRODUCTS

2.01 SIGNS

A. Sign Plates – 0.080-in thickness Alodine finished Federal Specification 6061-T6 aluminum.

B. Sign Posts – 1.25 ounces per square foot hot dipped galvanized welded steel tubing ASTM A513, outer diameter 2.375-in, wall thickness 0.065-in, 1.60 pounds per foot, or 4-in X 4-in treated lumber.

C. Hardware – Aluminum alloy ASTM A 444 sign hardware for clamp casting or stainless steel with galvanized or electroplated cold rolled steel U bolts, bolts, washers and nuts.

2.02 SIGN PLATE MESSAGE AND SIZE

Sign Designation	Size
CW20-1D	48-in X 48-in
CW20-4D	48-in X 48-in
CW20-7aD	48-in X 48-in
G20-2	60-in X 24-in

2.03 LUMBER

A. Rails shall be new, unweathered S4S grade #2 fir or yellow pine of the size indicated.

B. Posts, of the size indicated, shall be pressure treated with pentachlorophenol.

PART 3 EXECUTION

3.01 CONSTRUCTION METHODS

A. Prior to commencing construction, suitable barricades, signs, and traffic handling devices shall be installed to protect workers and the public.

B. The Contractor shall be responsible for installing all markers, signs and barricades conforming to the Texas Manual on Uniform Traffic Control Devices and/or as indicated. If in the opinion of the Engineer, additional markers, signs, or barricades are needed in the interest of safety, the Contractor will install as required.

3.02 MAINTENANCE

It shall be the Contractor's responsibility to maintain, clean, move, and replace if necessary, barricades, signs, and traffic handling devices during the time required for construction of the Project. When no longer needed, all temporary barricades, signs, and traffic handling devices shall be removed, and the area restored to its original condition unless specified by the Engineer.

END OF SECTION 02080

SECTION 02490
LOAMING AND HYDROSEEDING

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required for loaming and hydroseeding including; provide erosion control and place topsoil, finish grading, application of fertilizer, hydraulically applying seed and mulch or sod, and maintaining all seeded areas as specified herein.

1.02 SUBMITTALS

Samples of all materials shall be submitted for inspection and acceptance upon Engineer's and/or Owner's request.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil shall be fertile, friable, natural topsoil typical of the locality and shall be obtained from a well-drained site free of flooding. It shall be without admixture of subsoil or slag and free of stones, lumps, plants or their roots, sticks, clay, peat, and other extraneous matter and shall not be delivered to the site or used while in a frozen or muddy condition. Topsoil as delivered to the site or stockpiled shall have pH between 6.0 and 7.0 and shall contain not less than 3 percent organic matter, as determined by loss of ignition of moisture-free samples dried at 100 degrees Celsius. The topsoil shall meet the following mechanical analysis:

	Percentage Finer
1-in screed opening	100
No. 10 mesh	95-100
No. 270 mesh	35-75
0.002 mm*	5-25

*Clay size fraction determined by pipette or hydrometer analysis.

A minimum ten days prior to topsoil placement, a one-pint sample of topsoil material shall be delivered to the Owner for testing and approval. Based on tests performed by the Engineer and/or Owner, the topsoil shall be identified as acceptable, acceptable with certain fertilizer and limestone applications, or unacceptable. If the topsoil is found acceptable the fertilizer and lime requirements will be as specified or as recommended by the Engineer and/or Owner. If the topsoil is found unacceptable, the Contractor shall be responsible for identifying an acceptable source of topsoil and shall incur all expenses associated with testing of additional samples. All topsoil incorporated into the site work shall match the sample provided to the Engineer for testing. Topsoil stockpiled under other sections of the Contract Documents may be used subject to the testing and approval outlined above. The Contractor will be responsible for screening stockpiled topsoil and providing additional topsoil as required at his/her own expense.

B. Fertilizer shall be commercial mixed free granules or pelleted fertilizer, 10-20-10 (N-P205-K20) grade for lawn and naturalized areas. Fertilizer shall be delivered to the site in original unopened containers, each showing the manufacturer's guaranteed analysis confirming to applicable state fertilizer laws. At least 40 percent of the nitrogen in the fertilizer used shall be in slowly available (organic) form.

C. Lime shall be ground limestone containing not less than 85 percent calcium and magnesium carbonates and be ground to such fineness that at least 50 percent shall pass a 100-mesh sieve, and at least 90 percent shall pass a 20-mesh sieve.

D. Seed shall be labeled in accordance with USDA Rules and Regulations under the Federal Seed Act and applicable State seed laws. Seed shall be furnished in sealed bags or containers bearing the date of the last germination, which date shall be within a period of 6 months prior to commencement of planting operations. Seed shall be from same as previous year's crop; each variety of seed shall have a purity of not less than 85 percent, a percentage of germination not less than 90 percent, shall have a weed content of not more than 1 percent, and contain no noxious weeds. The seeding shall be applied over areas disturbed by construction as follows:

1. Broad Cast Seeding

    a. From September 15 to March 1, seeding shall be with a combination of two pounds per 1,000 square feet of unhulled Bermuda and seven pounds per square feet of winter rye with a purity of 95 percent with 90 percent germination.

    b. From March 2 to September 14, seeding shall be with hulled Bermuda at a rate of two pounds per 1,000 square feet with a purity of 95 percent and 85 percent germination.

2. Hydromulch Seeding

    a. From September 15 to March 1, seeding shall be with a combination of one pound per 1,000 square feet of unhulled Bermuda and seven pounds per 1,000 square feet of winter rye with a purity of 95 percent with 90 percent germination.

    b. From March 2 to September 14, seeding shall be with hulled Bermuda at a rate of one pound per 1,000 square feet with a purity of 95 percent and 85 percent germination.

E. The seed shall be furnished and delivered premixed in the proportions specified above. A manufacturer's certificate of compliance to the specified mixes shall be submitted for each seed type. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates.

F. Seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis.

G. Landscaped areas determined by the Engineer to be revegetated shall be sodded with Bermuda grass.

H. Mulch shall be a specially processed cellulose fiber containing no growth or germination-inhibiting factors. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous slurry. When sprayed on the ground, the material shall allow absorption and percolation of moisture. Each package of the cellulose fiber shall be marked by the manufacturer to show the air-dry weight content and not contain in excess of 10 percent moisture.

PART 3 EXECUTION

3.01 APPLICATION

A. Unless otherwise shown on the Plans, topsoil shall be placed to a minimum compacted depth of 6-in on all parts of the site not covered with structures, pavement, or existing woodland.

B. For broad cast seeded area:

1. Fertilizer shall be pelleted or granular slow release with an analysis of 10-20-10 to be applied once at planting and once during the period of establishment at a rate of one pound per 1,000 square feet or as determined by the soil test.

2. Seed shall be applied at the rate of five pounds per 1,000 square feet.

3. Fiber mulch shall be applied at the rate of forty-five pounds per 1,000 square feet.

C. For hydromulch seeded area:

1. Fertilizer shall be water soluble fertilizer with an analysis of 10-20-10 at the rate of 1.5 pounds per 1,000 square feet.

2. Mulch type used shall be hay, straw, or mulch applied at a rate of 45 pounds per 1,000 square feet, with soil tackifier at a rate of 1.4 pounds per 1,000 square feet.

3. Fiber mulch shall be applied at the rate of forty-five pounds per 1,000 square feet.

D. After the topsoil is placed and before it is raked to true lines and rolled, limestone shall be spread evenly over the loam surface and thoroughly incorporated by heavy raking to at least one half the depth of topsoil.

E. The application of fertilizer may be performed hydraulically in one operation with hydroseeding and fiber mulching. The Contractor is responsible for cleaning all structures and paved areas of unwanted deposits of the hydroseeded mixture.

3.02 INSTALLATION

A. Previously established grades, as shown on Plans shall be maintained in a true and even condition.

B. Subgrade shall be prepared by tilling prior to topsoil placement to obtain a more satisfactory bond between the two layers. Tillage operations shall be across the slope.

Tillage shall not take place on slopes steeper than 2 horizontal to 1 vertical or where tillage equipment cannot be operated. Tillage shall be accomplished by disking or harrowing to a depth of 9-in parallel to contours. Tillage shall not be performed when the subgrade is frozen, excessively wet, extremely dry, or in other conditions which would not permit tillage. The subgrade shall be raked and all rubbish, sticks, roots and stones larger than 2-in shall be removed. Subgrade surfaces shall be raked or otherwise loosened immediately prior to being covered with loam.

C. Topsoil shall be placed over approved areas to a depth sufficiently greater than required so that after natural settlement and light rolling, the complete work will conform to the lines, grades and elevations indicated. No loam shall be spread in water or while frozen or muddy.

D. After topsoil has been spread, it shall be carefully prepared by scarifying or harrowing and hand raking. All stiff clods, lumps, roots, litter and other foreign material shall be removed from the loamed area and disposed of by the Contractor. The areas shall also be free of smaller stones in excessive quantities, as determined by the Engineer. The entire surface shall then be rolled with a hand roller weighing not more than 100 pounds per foot of width. During the rolling, all depressions caused by settlement of rolling shall be filled with additional loam and the surface shall be regraded and rolled until a smooth and even finished grade is created.

E. Seeding, sodding, mulching and conditioning shall only be performed during those periods that are normal for such work as determined by the weather and locally accepted practice, or approved by the Engineer. The Contractor shall not hydroseed during high winds.

F. Schedules for seeding and fertilizing must be submitted to the Engineer for approval prior to the work. Seeding as specified herein shall be accomplished from March 1st to June 1st. Seeding during the period from October 1st to March 1st shall only be undertaken after approval by the Engineer. Seeding during the period from June 1st to October 1st shall only be performed if irrigation is provided.

G. Seeding or sodding shall be done within ten days following soil preparation. Seed shall be applied hydraulically at the rates and percentages indicated. Spraying equipment and mixtures shall be so designed that when the mixture is sprayed over an area, the grass seed and mulch shall be equal in quality to the specified rates. Prior to the start of work, the Contractor shall furnish the Engineer with a certified statement as to the number of pounds of materials to be used per 100 gallons of water. This statement shall also specify the number of square feet of seeding that can be covered with the quantity of solution in the Contractor's hydroseeder. Upon completion of seeding operations, the Contractor shall furnish the Engineer with a certified statement on the actual quantity of solution applied.

H. In order to prevent unnecessary erosion, the Contractor shall carry out seeding and mulching as soon as they have satisfactorily completed that unit or portion of the project.

I. When topsoil and seed cannot be applied to newly graded areas because of season or weather conditions, and will remain exposed for more than 30 days, the Contractor shall protect those areas against erosion and washouts by whatever means necessary. This includes methods such as straw applied with a tar tack, wood chips, or by other measures as approved by the Engineer. Prior to application of topsoil, any such materials applied for

erosion control shall be thoroughly incorporated into the subgrade by disking. Fertilizer shall be applied prior to spreading of topsoil.

J. On slopes, the Contractor shall provide measures to prevent washouts by an approved method. Any washout which occurs shall be regraded and reseeded at the Contractor's expense until vegetation is established.

3.03 MAINTENANCE AND PROVISIONAL ACCEPTANCE

A. The Contractor shall keep all seeded areas watered and mowed, if necessary, and reseed all seeded areas as necessary until a good, healthy, uniform growth is established and provisionally accepted by the Engineer.

B. The Engineer and/or Owner will inspect all work for provisional acceptance at the end of the ten-week maintenance period. The Contractor shall request inspection a minimum of ten days prior to the anticipated inspection date. The maintenance period must occur during the growing season between March 15th and October 1st and shall include a minimum of three mowings.

C. A satisfactory stand will be defined as a section of turf of 10,000 square feet or larger that has:

1. No bare spots larger than three square feet.

2. No more than ten percent of total area with bare spots larger than one square foot.

3. Not more than fifteen percent of total area with bare spots larger than 6-in square.

D. After the inspection has occurred but prior to provisional acceptance, a soil test shall be performed to determine if additional soil fertilization should occur. If necessary, additional fertilizer not to exceed 30 lbs per 1,000 square feet of 20-10-10 shall be applied as directed by the Engineer.

E. The Contractor shall furnish full and complete written instructions for maintenance of the seeded areas to the Owner at the time of provisional acceptance.

F. The inspection by the Engineer and/or Owner will determine whether maintenance shall continue in any area or manner.

G. After all necessary corrective work and clean-up has been completed, and maintenance instructions have been received by the Owner, the Engineer and/or Owner will certify in writing the provisional acceptance of the lawn areas. The Contractor's responsibility for maintenance of lawns, or parts of lawns shall cease on receipt of provisional acceptance.

3.04 GUARANTEE PERIOD AND FINAL ACCEPTANCE

A. All seeded areas shall be guaranteed by the Contractor for not less than one full year from the time of provisional acceptance.

B. At the end of the guarantee period, inspection will be made by the Engineer and/or Owner upon written request submitted by the Contractor at least ten days before the anticipated

date. Seeded areas not demonstrating satisfactory stands as outlined above, as determined by the Engineer and/or Owner, shall be renovated, reseeded and maintained meeting all requirements as specified herein.

C. After all necessary corrective work has been completed, the Engineer and/or Owner shall certify in writing the final acceptance of the seeded areas.

END OF SECTION 02490

SECTION 02901
MISCELLANEOUS WORK AND CLEANUP

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to do the miscellaneous work not specified in other sections but necessary for the proper completion of the work as shown on the Plans.

B. When applicable, the Contractor will perform the work in accordance with other sections of this Specification. When no applicable Specification exists, the Contractor shall perform the work in accordance with the best modern practice and/or as directed by the Engineer and/or Owner.

C. The work of this section includes, but is not limited to, the following:

1. Crossing and Relocating Existing Utilities

2. Restoring of Driveways, Fences, and Curbing

3. Site Cleaning

4. Restoring Easements and Rights-of-Way

1.02 CROSSING AND RELOCATING EXISTING UTILITIES

A. This item includes any extra work required in crossing culverts, water courses including streams and drainage ditches, drains, gas lines, water lines and water services and other utilities. This work shall include but is not limited to the following: bracing, hand excavation, and backfill (except screened gravel) or any other work required for crossing the utility or obstruction not included for payment in other items of this Specification. Notification of utility companies shall be the Contractor's responsibility.

B. In locations where existing utilities cannot be crossed without interfering with the construction of the work as shown on the Plans, the Contractor shall coordinate with the utility owner for the relocation of the utility.

C. At pipe crossings and where designated by the Engineer, the Contractor shall furnish and place crushed stone bedding to support the existing pipe the entire exposed length. The bedding shall extend to the mid-diameter of the pipe crossed.

1.03 RESTORING OF DRIVEWAYS AND FENCES

A. Existing driveways disturbed by the water line construction shall be replaced. Gravel dirt roads and drives shall be replaced and regraded. Notice shall be required at least five days prior to disturbance of driveway access and temporary access shall be provided.

B. Fences shall be protected from damage under this item. If damaged, fences shall be replaced in condition equal to condition prior to being damaged.

1.04 CLEANING UP

The Contractor shall remove all construction material, excess excavation, buildings, equipment and other debris remaining on the job as a result of construction operations and shall restore the site of the work to a neat and orderly condition.

1.05 RESTORING EASEMENTS AND RIGHTS-OF-WAYS

A. The Contractor shall be responsible for all damage to private property due to the Work. He shall protect from damage of all walls, fences, cultivated shrubbery and vegetables, trees, pavement, and underground facilities such as water pipes, septic systems, leach fields, and utilities.

B. Existing lawns damaged by construction shall be replaced. The Contractor may cut and replace the lawn, or he may restore the areas with an equivalent depth and quality of loam, seeded and fertilized as specified in Section 02490, Loaming and Hydroseeding. These areas shall be maintained and reseeded, if necessary, until all work under the Contract has been completed and accepted. The Contractor shall perform any additional work required to restore easements to their original condition.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 03000
CONCRETE

PART 1 GENERAL

1.01 GENERAL

A. Concrete consisting of Portland cement, concrete aggregate, sand and water will be designated by the symbol consisting of two numbers. The first number will be the number of sacks of cement per cubic yard, and the last number the compressive strength at 28 days expressed in pounds per square inch. A sack of cement shall be defined as 94 pounds. The concrete shall be 6.0-4000 unless otherwise specified. Compressive strength tests where otherwise specified herein, shall be performed in accordance with ASTM C-39.

B. The Contractor shall be responsible for providing the mix design to the Engineer for approval.

1.02 SCOPE

This section of the Specifications shall include all labor and materials to construct all concrete work as shown on the Plans, herein specified, or both including the following:

A. All footings, slabs, floors, walls, beams, supports, walks, pedestals, curbs, vaults, and other concrete items, complete with metal reinforcement.

B. All formwork, formwork supports, formwork coatings and soaking, screens and levels required, and formwork removal.

C. Installing all inserts, grounds, dowels, blocks, sleeves and anchors, and safety treads as shown and/or specified in this or other sections.

PART 2 PRODUCTS

2.01 PORTLAND CEMENT

A. All cement to be used or furnished shall be Type I, Portland cement, conforming to ASTM C-150 unless otherwise specified. The Contractor shall furnish a certificate of compliance signed by the manufacturer identifying the cement and stating that the cement delivered conforms to ASTM C-150.

B. Whenever suitable facilities are available for handling and weighing bulk cement, such facilities shall be used. Otherwise, the cement shall be delivered in original unopened sacks that have been filled by the manufacturer. They shall be plainly marked with the manufacturer's name or brand and cement type. Each sack shall contain 94 pounds of cement.

C. Cement shall be stored in such a manner as to permit ready access for the purpose of inspection and sampling, and suitable protected against contamination or moisture. Should any cement show evidence of contamination, or be otherwise unsuitable, it shall not be used.

D. All Portland cement used in concrete for any individual structure shall be of the same brand and type unless otherwise approved by the Engineer.

2.02 AGGREGATES

A. Aggregates shall be sand and concrete aggregates conforming to the requirements prescribed in ASTM C-33 coarse aggregate gradation size number 467 and shall be approved by the Engineer prior to use.

B. Methods of handling materials resulting in segregation, degradation or the combining of materials, which result in any stockpile failing to meet specifications, shall not be permitted.

C. Aggregates which are found to have a silica-released alkali-reduced ratio greater than one, when tested in accordance with ASTM C289, may be used only when approved by the Engineer and provided low-alkali cement is used.

2.03 WATER

A. Water used for concrete shall be clear and free from oil, vegetable matter and other deleterious substances. Water shall not contain an amount of impurities that will cause a change in the time of setting of Portland cement or more than 25 percent nor a reduction in the compressive strength of mortar at fourteen days of more than 5% compared to results obtained with distilled water.

B. In conventionally reinforced concrete work, water shall not contain more than 1,000 ppm of chloride calculated as Cl, or more than 1,000 ppm of sulfates calculated as SO_4.

C. In non-reinforced concrete work, water shall not contain more than 2,000 ppm of chloride calculated as Cl, no more than 1,500 ppm of sulfate calculated as SO_4.

2.04 ADMIXTURES

A. Air entrainment shall be required on exposed plant walls or as directed by the Engineer. The air content shall not be less than 3% nor more than 6%. Admixtures shall conform to ASTM C-260. Test shall be conducted in accordance with C-231, 233 or 173. Water reducer-set retarder shall be 75 degrees F. or more per ASTM C-494.

B. No other admixtures of any type shall be used unless authorized by the Engineer. When an admixture is permitted or specified, it shall be measured accurately into each batch or load in liquid form by a mechanical dispensing device and method approved by the Engineer.

2.05 PROPORTIONING

A. Aggregates and cement shall be proportioned by weight.

B. Proportioning shall consist of combining the aggregates, each stored in a separate bin in the various gradations prescribed, with cement and water. Weigh hoppers shall be charged from bins located directly over them or from conveyor belts. When conveyor belts are used, separate belts shall be provided for each size aggregate. There shall be an approved moisture meter installed to indicate the moisture in the sand.

C. Bulk cement shall be weighed in an individual hopper and shall be kept separate from the aggregate until the batch ingredients are discharge into the mixer drum. The cement hopper shall be attached to a separate scale for individual weighing.

D. The amount of water to be added to the mixture shall be measured and discharged rapidly into the mixing drum through a valve with a positive cut-off. When water is measured by weight, it shall be weighed on a separate scale.

E. All weighing or metering devices, except moisture meters, used for proportioning materials shall be accurate to within one percent. They shall be sealed and certified by the recognized, legal Sealer of Weights and Measures. These certifications shall be dated within the past 12 months and shall be renewed whenever required by the Engineer. The moisture meter shall be accurate to within ½ of the one percent moisture. Whenever portable bunkers are set up at a new location, the scale assemblies shall be inspected and certified regardless of the date of scales were last tested.

F. Scales utilized in proportioning shall be either springless dial or multiple beam type. Scale graduations shall be no greater than the following:

Aggregate Scales	25 lbs.
Cement Scales	5 lbs.
Water Scales	5 lbs.

G. All scales shall be of such size and so arranged that they may be read easily from the operator's platform. If a multiple beam type scale is used, the scale shall be provided with an indicator operated by the main beam, which will give positive visible evidence of over or under weight. The indicator shall be so designed that it will operate during the addition of the last 400 pounds of any weighing. The other travel of the indicator hand shall be at least one-third of the loading travel. Indicators shall be enclosed against moisture and dust.

H. Weighing equipment shall be insulated against vibration and movement of the other operating equipment in the plant. When the entire plant is running, the scale reading at cut-off shall not vary from the weight designated by the Engineer by more than one percent (1%) for cement, one percent for the total aggregate in any batch.

2.06 MIXING

A. Machine mixing will be required in all cases other than those in which it would obviously prove to be impractical, in which event hand mixing will be permitted. Mixing shall be commenced as soon as possible after the cement is placed in contact with the aggregates, but at no time shall the intervening period exceed 30 minutes.

B. All concrete mixers shall be of such design and construction and so operated as to provide thoroughly and properly mixed concrete in which the ingredients are uniformly distributed. Mixers shall be maintained in proper and serviceable working condition, and any part or portion thereof that is out of order or becomes worn to such extent as to detrimentally affect the quality of mixing, shall be promptly repaired or replaced.

2.07 CONCRETE CONSISTENCY

A. The amount of water added at the mixer shall be regulated to take into account the free water in the aggregates. Free water is defined as the total water minus the water absorbed by the aggregate in a saturated surface-dry condition.

B. The amount of water used in the mixture shall not exceed the minimum amount necessary to permit practical placement and consolidation of the concrete, and shall be that required to produce concrete with a slump within the range shown as nominal in the following table:

Type of Work	**Nominal Slump (inches)**	**Maximum Slump (inches)**
Concrete Pavement	0-2	4
Non-reinforced Concrete	0-3	4
Reinforced Concrete Structures		
Heavy Sections	0-3	7
Thin Sections & Columns	0-4	7
Concrete Place Under Water	6-8	9

C. The concrete used in the work shall not have a slump greater that shown as maximum above, nor a free water content reading more than 312 pounds per cubic yard of concrete.

D. When adverse or difficult conditions affect the placement of concrete, the Engineer may authorize a greater slump to be used, provided both the water and cement are increased. Water shall be added at a ration not to exceed 30 pounds per sack of added cement per cubic yard of concrete, and such additional water and cement shall be at the Contractor's expense.

E. The consistency of concrete shall be determined in accordance with ASTM C-143.

F. If slump tests of individual samples taken at approximately the ¼ and ¾ points of the discharge differ by more than two inches; the mixer will not be accepted for further use until the condition is corrected.

2.08 TRANSIT MIXERS

A. The type, capacity, and manner of operation of the mixing and transporting equipment for ready-mix concrete shall conform to the current ASTM C-94 standards; "Standards for Operation of Truck Mixers and Agitators of the National Ready-Mixed Concrete Association" and the "Truck Mixer and Agitators Standards of the Truck Mixer Manufacturers Bureau." Transit mix concrete trucks shall be equipped with an automatic device for recording the number of revolutions of the drum during the mixing period. Each mixer and agitator shall have attached thereto in a prominent place, a metal plate or plates, installed by the manufacturer on which is plainly marked the capacity of the drum in terms of the volume of mixed concrete and the speed of rotation for the agitating and mixing speeds of the mixing drum or blades.

B. Each mixer shall have an identification number painted on the truck in such a location that it can be easily read from the batching platform.

C. The total volume of materials introduced into the mixer shall not exceed the manufacturer's guaranteed mixing capacity. If the concrete so mixed does not meet the uniformity requirements of this subsection, the amount of materials charged into the mixer shall be reduced.

D. The drum of the mixer shall be completely emptied of any previously mixed load. The proper proportions of aggregate, cement, and water for each load of concrete shall be placed in the mixer and shall be mixed for not less than 70, or more than the speed designated by the manufacturer of the equipment as mixing speed. Additional revolutions of the drum shall be at the speed designated by the manufacturer of the equipment as agitating speed. The revolving of the drum shall be continuous until the concrete is completely emptied from the drum.

E. When concrete is being placed for concrete structures, all wash water shall be emptied from the mixer before any portion of the succeeding load is placed therein. For all other work, the mixer shall be empty or may carry 10 gallons of water in the drum. Adequate control of ready-mixed concrete in the drum will sometimes require that additional water be added and mixed into the batch at the point of discharge. Water so added shall be mixed 3 minutes. Water shall not be added to the load during transit.

F. The total elapsed time between the addition of water at the batch plant and discharging the completed mix shall not exceed 90 minutes. Under conditions contributing to quick setting, the total elapse time permitted may be reduced by the Engineer.

G. The Engineer shall be provided with a legible certified weighmaster's certificate, which shall contain the following information:

1. Name of vendor
2. Name of contractor
3. Number of cubic yards in the load
4. Actual weights of cement and of each size of aggregate
5. Amount of water added at the plant
6. Amount of water in the aggregate
7. Brand and type of cement
8. Brand and amount of admixture
9. Time and date of batching

H. Space shall be provided on the certificates so that the amount of water added on the job may be indicated.

2.09 HAND MIXING

Hand mixed concrete shall be mixed on a watertight platform or in a mortar box in batches not to exceed 1/3 cubic yard each. The aggregates shall first be spread in a uniform layer over which the required quantity of cement shall be evenly distributed. The entire batch shall be turned with shovels until the ingredients are thoroughly blended before adding the water. After adding the proper amount of water, the batch shall again be turned with shovels until a uniform consistency is obtained. Methods of hand mixing which allow the loss of mixing water will not be permitted.

2.10 TRANSPORTING BATCHED MATERIALS AND MIXED CONCRETE

The compartments of trucks or other equipment used for the purpose of transporting proportioned dry aggregate and cement, or mixed concrete, shall be suitably constructed to adequately protect and prevent loss or leakage of the contents during charging, transit or discharging.

2.11 MEMBRANE BARRIER

Provide a polyethylene sheeting that is at least 6 mils thick and free from visible defects as a bond breaker at the interface of the flexible base and new concrete pavement.

2.12 FLY ASH

This specification covers the general and specific requirements for two (2) classes of fly ash. Classification will be based on chemical composition. Both classes of fly ash shall meet all requirements of the chemical and physical requirements for each class as shown in ASTM C 618 and the following tables.

Chemical Requirements	
Item	**Both Classes**
Calcium Oxide (CaO), Variation in percentage points of CaO from the average of the last 10 samples (or less provided 10 have not been tested) shall not exceed plus or minus	4.0
Magnesium Oxide (MgO), maximum, percent NOTE: When the autoclave expansion or contraction limit is not exceeded, a MgO content above five (5) percent may be acceptable.	5.0
Available Alkalis, as Na2O, maximum percent (when used in conjunction with reactive or potentially reactive aggregates)	1.5
Moisture Content, maximum, percent	2.0
Loss on Ignition, maximum, percent*	3.0
*Exception will be taken to Note A under ASTM C 618, Table 1 (Allowance of 12% LOI for class F fly ash). All fly ash will meet specification requirement stated in this table.	

Physical Requirements	
Item	**Both Classes**
Fineness, retained on the No. 325 (45µm) sieve	30.0 max.
Variation in percentage points retained on the No. 325 (45µm) sieve from the average of the last 10 samples (or less provided 10 have not been tested) shall not exceed plus or minus	5.0
Increase of drying shrinkage of mortar bars at 28 days, maximum, percent	0.03
Reactivity with cement alkalies, mortar expansion at 14 days, maximum, percent	0.02
Specific Gravity, maximum variation from average percent	5.0

A. Drying shrinkage shall be tested according to ASTM C 157.

B. Alkali reactivity shall be tested according to ASTM C 441.

C. Specific gravity shall be tested according to ASTM C 188.

D. All other physical requirements shall be tested according to ASTM C 311.

2.13. FIBER-REINFORCED CONCRETE FOR COLD JOINTS

The fiber-reinforced concrete made according to this Section must meet the requirements listed in Table 1. The qualification can be based on either of the test methods allowed in Table 1 (ASTM C1609 or Tex-475-A).

Material Requirements			
Property	**Test Method**	**Specimen Age**	**Requirement**
Minimum Equivalent Flexural Strength Ratio RDT,150 or Minimum Equivalent Tensile Strength Ratio	ASTM C1609 or Tex-475-A	7 days	21% or 19%
Minimum Residual Strength at Net Deflection of L/150 $fD150$ or Minimum Residual Strength @δ=0.1	ASTM C1609 or Tex-475-A		110 psi or 31 psi

PART 3 EXECUTION

3.01 CONCRETE CONSTRUCTION

A. General

1. Concrete chambers, vaults, walls, structural slabs, footings, foundations and similar structures shall be constructed in conformity with the plans and this sub-section. Concrete shall conform to the requirements herein.

2. Safe and suitable ladders shall be provided to permit access to all portions of the work.

B. Subgrade for Concrete Structures

1. Earth subgrade upon which concrete is placed shall be firm and free from water. Groundwater shall be kept below subgrade until the concrete has set. When the subgrade is dry earth, it shall be thoroughly dampened with water to ensure that no moisture will be absorbed from the fresh concrete.

2. When the design details for the project provide for the construction of filter or drain material consisting of gravel (or combination of gravel and sand), which material will be subgrade for concrete, the placing of steel reinforcement and placement of concrete shall follow the installation of the filter or drain material as closely as practical. The filter or drain material shall be kept de-watered to the extent necessary to prevent any portion of concrete materials being deposited in water.

3. When the concrete is to be deposited on rock, the rock shall be fully uncovered, cleaned, and its surface shall be removed to a depth sufficient to expose sound rock. Bedrock shall be roughly leveled off or cut to approximately horizontal and vertical steps. Seams in the rock shall be grouted under pressure or otherwise treated as the Engineer may direct.

C. Forms

1. Forms shall be of suitable material and of a type, size, shape, quality, and strength to ensure construction as designed. The forms shall be true to line and grade, mortar tight, and sufficiently rigid to resist deflection during placing of the concrete. The responsibility for their adequacy shall rest with the Contractor. All dirt, chips, sawdust, nails and other foreign matter shall be completely removed from forms before any concrete is deposited therein. The surfaces of forms shall be smooth and free from irregularities, dents, sags and holes that would deface the finished surfaces. Forms previously used shall be thoroughly cleaned of all dirt, mortar and foreign matter before being re-used.

2. Before concrete is placed in forms, all inside surfaces of the forms shall be thoroughly treated with releasing agent as specified herein. Care shall be exercised that no releasing agent is deposited on previously placed concrete.

3. Forms for all surfaces that will not completely be enclosed or hidden below the permanent surface or the ground shall be made of surfaced lumber, or material which will provide a surface at least equal to surfaced lumber or plywood. Any lumber or material, which becomes badly checked or warped, prior to placing concrete, shall not be used.

4. Plywood shall be placed with the grain of the outer plies in the direction of the longest span. Where plywood is attached directly to the studs or joists, the panels shall be not less than ⅝-inch-thick, and the studs and joists shall be spaced not more than 12 inches, center to center. Plywood less than ⅝-inch-thick, otherwise conforming to the requirements specified herein, may be used with a continuous

backing of ¾ -inch sheeting. All form panels shall be placed in a neat symmetrical pattern with the horizontal joists level and continuous. All joints shall be filled with an approved quick-setting compound and finished flush with the interior of the form.

5. Wooden forms for copings and curbs shall have a thickness of not less than 1⅝ inches and a width of not less than the full depth of coping or curbs.

6. No forms shall be removed until approval of Engineer is obtained. Forms shall be stripped after the required time and projecting wire snapped off. Removal shall not proceed faster than the required finishing procedure can be completed.

7. Forms shall remain in place a minimum of 24 hours and be removed only after Engineer's approval.

D. Placing Concrete, General

1. Chutes used in conveying concrete shall be sloped to permit concrete of the consistency required to flow without segregation. Where necessary to prevent segregation, chutes shall be provided with baffle boards or a reversed section at the outlet.
2. Where a sequence for placing concrete is shown on the plans, no deviation will be permitted unless approved by in writing by the Engineer.

3. Before depositing concrete, all debris, spreaders, etc., shall be removed from the space to be occupied by the concrete and forms shall be thoroughly wetted. All freestanding water shall be removed. Reinforcing steel and form shall be free of scale, oil firm, hardened concrete. Formwork shall have specified coatings.

4. Concrete shall be deposited as rapidly and as near as practicable in its final position and shall not be caused to flow in a manner to permit or cause segregation. Runaways shall be provided so that wheelbarrows or buggies containing concrete will not run over reinforcing steel or planks resting on steel. Just before placing new concrete on old concrete walls, a modified grout consisting of the same mix as the concrete minus one-half of the coarse aggregates shall be deposited to a depth of six inches before placing the regular concrete mix. Concrete shall be worked and vibrated mechanically with suitable appliances until it closes snugly against all surfaces and is in perfect and complete contact with all embedded reinforcement and other metals.

E. Notification

The Contractor shall give the Engineer written notice of at least 24-hours in advance of placing concrete in any part of the work so that the Engineer may make final inspection of the preparations of the locations for such placing. No concrete shall be placed except in the presence of the Engineer.

3.02 DEFECTIVE WORK

If the defective work is judged by the Engineer to be major in character or concrete does not conform with lines shown on drawings, the Contractor will be required to replace the work or repair it in a manner satisfactory to the Engineer at the Contractor's expense.

3.03 TESTS

A. General

Testing Laboratory fees will be at the expense of the Contractor. The Contractor shall cooperate and allow three test cylinders to be taken for each day's pour of concrete or each 150 cubic yards, whichever is greater. The inspection of the work and the certification of the Testing Laboratory or any other body shall not relieve the Contractor of obligation to fulfill his contract as specified, and defective work shall be replaced and unsuitable materials may be rejected, notwithstanding that such defective work or unsuitable materials may have been overlooked by the Engineer and the Testing Laboratory.

B. Aggregates

Aggregates shall be tested before the concrete mix is established and, whenever the source of an aggregate is changed for testing, a 10-pound sample of fine aggregate and a 10-pound sample of each average quality and grading of the aggregate in question, shall be delivered to the Testing Laboratory in sufficient time to avoid delay in the work.

C. Cylinders

One set of three test cylinders shall be made for each day's placement of 150 cubic yards or less of each class of concrete. All testing shall be in accordance to ASTM latest revisions of standard at time of bidding.

D. Strength

Should the strength of the concrete, as shown by the test specimens, fall below the specified value, the Engineer shall have the right to require additional curing of those portions of the structure represented by control specimens which failed to show the required strength. In the event that such additional curing does not give the strength required, the Engineer shall have the right to require strengthening or replacement of those portions of the structures, which fail to develop the required strengths. All extra work done as a result of any low strengths of the control specimens shall be perform at the expense of the Contractor.

END OF SECTION 03000

SECTION 03200
ASPHALT PAVEMENT RESTORATION

PART 1 GENERAL

1.01 DESCRIPTION

This section specifies the placing and furnishing of hot-mix asphalt pavement specifically as it applies to restoration after utility trenching.

1.02 SUBMITTALS

The Contractor shall submit to the Engineer, the mix design and product data of all materials for inspection and acceptance.

1.03 REFERENCE STANDARDS

A. Texas Department of Transportation (TxDOT)

1. TxDOT's Standard Specification's Item 340

PART 2 PRODUCTS

2.01 MATERIALS

A. Hot Mix Asphaltic Concrete Surface Course shall be plant mixed, hot laid Type D (Fine Graded Surface Course) 3.0 compacted inches thick, meeting the master specification requirements of TxDOT's Standard Specification's Item 340, and specific criteria for the job mix. The mix shall be designed for a stability of at least 40 when compacted to between 92 and 97 percent of the maximum theoretical density as measured by ASTM D2041.

B. Crushed Limestone Base shall be composed of crushed limestone. The Crushed Limestone shall meet the requirements of TxDOT's Standard Specifications, Item 247, Grade 1, Type A.

C. Primer: MC-30 Medium curing, liquid asphalt meeting TxDOT's Item 300 for Medium Curing Cutback asphalt. CONTRACTOR shall apply at the rate of 0.2 gal./sq. yd. to seal base and at a rate of 0.05 gal./sq. yd. to "seal" to concrete surface of gutter and other concrete surfaces.

D. Tack Coat: If required, MC-30 Medium curing, liquid asphalt meeting TxDOT's Item 300 for Medium Curing Cutback asphalt. CONTRACTOR shall apply at the rate of 0.05 gal./sq. yd. to "bond" to a previous asphaltic surface.

PART 3 EXECUTION

3.01 INSTALLATION

A. Include a tack coat when the binder course has been used as a temporary construction road or when presence of organic material prevents proper adhesion of finish course. Thoroughly sweep and clean or power wash before applying the tack coat.

B. Mixtures delivered to the site will be inspected and shall not possess signs of segregation of ingredients or surface crust. The temperature of the mix delivered to the spreader will be a minimum 250° F. Mixtures stored for any length of time in an asphalt storage silo will not be allowed to be placed on site.

C. The mixture will be thoroughly compacted using a mechanical drum roller, of sufficient capacity to accomplish the compaction, making a minimum of four (4) passes in each direction over the newly placed hot asphalt mat or until satisfied by the engineer in charge that it has been thoroughly compacted. All material placed shall receive final compaction before nightfall of the day placed, unless artificial light, satisfactory to the engineer, is provided. No mixture will be placed on wet or frozen surfaces or when wind conditions are such that rapid cooling will prevent satisfactory compaction. Mixtures will be placed as follows:

1. The density of all compacted completed paving will be 98% of the density obtained from laboratory compaction of a mixture composed of the same materials in like proportions. The Contractor will be responsible for providing a testing laboratory experienced in these testing procedures and will provide copies of all lab and field test results to all concerned.

3.02 CONSTRUCTION

A. All streets, sidewalks, gutters, and curbs damaged by the contractor's operations shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of operations.

B. Temporary paving will be placed in accordance with the requirements stated above and will be allowed to "weather" over the winter before final, permanent paving is placed. In any case, all structures located within the pavement area, i.e. rims, covers, gate boxes, etc, previously raised will be protected by "ramping up" with a layer of asphalt around each structure.

C. Prior to placement of final paving, the existing pavement will be inspected and any and all areas that have settled or are in need of repair, will be addressed under the supervision of the Engineer and to his overall satisfaction. All loose or damaged material in the existing pavement shall be removed and a leveling course shall be installed at depths and locations as directed by the Engineer to fill existing holes and depressions, or to improve roadway crowns.

D. All surfaces to receive final, new permanent paving shall be dry and thoroughly cleaned of foreign or loose material. A compatible prime or tack coat shall be applied, depending on the condition of the existing surface. All castings and edgestones shall be protected from the tack
E. coat.

F. Where curbing is present, the new pavement shall be planned so that the curb reveal will be the same prior to and following the placement of permanent paving.

G. Survey existing curbing to document in the Contract Documents the condition before any work begins. Curbing to be reset shall be carefully removed and stored. Any curbing damaged by the Contractor or lost due to his negligence shall be replaced at his expense.

H. The contractor shall maintain pavement placed by him under his contract for a period of one year and shall promptly fill all depressions and holes that may occur with similar materials to keep the pavement in a safe and satisfactory condition for traffic.

END OF SECTION 03200

SITE CLEARING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals necessary to complete all clearing, grubbing and disposal of cleared materials as shown on the Drawings and specified herein.

1.02 RELATED WORK

A. Division 01 – General Requirements

B. Division 31 – Earthwork

1.03 SUBMITTALS

A. Submittals shall be made in accordance with the requirements of Section 013300 – Submittal Procedures.

B. Submit drawings clearly showing areas of clearing and stripping within project limits. Plan should also show any trees that are to be protected from clearing activities.

C. A Demolition Plan shall be submitted for any structures requiring demolition. The Demolition Plan should include information on special handling and disposal procedures.

1.04 DEFINITIONS

A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead or decaying; topsoil.

B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.

C. Grubbing: Removal of vegetation and other organic matter including stumps and roots greater than 2 inches caliper to a depth of 6 inches below subgrade.

D. Scalping: Removal of sod without removing more than 3 inches of topsoil.

E. Stripping: Removal of topsoil remaining after applicable scalping is completed.

F. Project Limits: Areas, as shown or specified, within which work is to be performed.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Clear, grub, and strip all areas within the clearing limits indicated on the Drawings.

B. Do not injure or deface vegetation that is not designated for removal.

C. Prior to the start of clearing, the Contractor is to review easement agreements to verify if there are any special provisions required.

3.02 SCHEDULING AND SEQUENCING

A. Prepare site only after adequate erosion and sediment controls are in place. Limit areas exposed to erosion during installation of temporary erosion and sediment controls.

3.03 LIMITS

A. Clearing, grubbing and stripping limits shall be as shown on the drawings.

B. Remove rubbish, trash, and junk from entire area within Project limits.

3.04 CLEARING

A. Clear areas within limits specified herein and shown on the Drawings.

B. Cut stumps not designated for grubbing flush with ground surface.

C. Cut off shrubs, brush, weeds, and grasses to within 2 inches of ground surface.

D. Any equipment, including chain saws, used to cut or plow trees or shrubs shall be disinfected after cutting/plowing each tree or shrub.

3.05 GRUBBING

A. Grub areas within the clearing limit as shown on the Drawings.

3.06 SCALPING

A. Do not remove sod until after clearing and grubbing is completed and resulting debris is removed.

B. Scalp areas within limits specified or shown.

3.07 STRIPPING

A. Do not remove topsoil until scalping is completed.

B. Strip all areas within the clearing limit indicated on the Drawings. Do not remove subsoil with topsoil.

C. Stockpile stripping meeting requirements for topsoil, separately from other excavated material.

3.08 DISPOSAL

A. Clearing and Grubbing Debris:

1. Dispose of debris offsite.

2. Burning is not permitted.

3. Dispose of unburned and noncombustible debris offsite.

4. Woody debris may be chipped. Chips may be sold to Contractor's benefit or used for landscaping onsite as mulch or uniformly mixed with topsoil, provided the resulting mix will be fertile and not support combustion. Maximum dimensions of chipped material used onsite shall be 1/4 inch by 2 inches. Dispose of chips that are unsalable or unsuitable for landscaping or other uses with unchipped debris.

5. Debris, tree trunks, roots, stumps and objectionable material shall be disposed offsite to locations that are approved by federal, state and local authorities, and that will not be visible from Project site.

6. Disposal of materials in streams shall not be permitted. No material shall be piled in streams and channels or in areas where it might be washed away by floods.

B. Stockpile topsoil in sufficient quantity to meet Project needs. Stockpile excess stripping material in an onsite location approved by the Engineer. All excess topsoil at the end of the project shall be disposed of offsite at the expense of the Contractor.

END OF SECTION

SECTION 31 23 00

EXCAVATION AND FILL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required, and perform all operations in connection with the excavation and grading for all structures; excavation and placement and compaction of suitable material for the construction of the required embankments; dewatering and other drainage work as necessary for construction; place and compact backfill around completed structures; all fill required for completion of the work; vapor barrier membranes under slabs on grade; and dispose of unsuitable, waste, and surplus excavated materials complete as shown on the Drawings and as specified herein.

B. Provide the services of a licensed Professional Engineer registered in the State of Texas to prepare temporary excavation support system designs and submittals.

C. Furnish and install temporary excavation support and safety systems, including sheeting, shoring and bracing, to ensure the safety of personnel and protect adjacent structures, piping, etc., and meet appropriate requirements established in the Occupational Safety and Health Administration (OSHA) Safety and Health Regulations, Part 1926, Subpart P - Excavations, Trenching and Shoring, State of Texas, and other applicable regulations. Where conflict between OSHA, State of Texas, and other applicable regulations exists, the most stringent requirements shall apply.

D. Excavation shall include the removal of all earth, rock, and materials of any nature, including water, to the extent necessary to install the structures and embankments in conformance with the lines and grades shown on the Drawings and as specified.

E. Backfill shall include the refilling and consolidation of the fill in excavations up to the existing ground surface or finished grade as shown on the Drawings. The backfill from the trench bottom to above the top of the pipes and conduit when laid to the grade including the bedding layer sustaining the pipeline, as shown on the Drawings is termed "embedment". Backfill above the embedment is termed "final backfill".

F. Refer to Item No. 804, Excavation, Trenching, and Backfill for installation of transmission piping, utilities, and electrical conduit/ductbanks.

G. Waste material disposal consists of trees, stumps, logs, brush, roots, grass, vegetation, humus, rubbish, large rocks exceeding a dimension of six inches (6") in any direction, demolished equipment not retained by the Contractor, and other objectionable matter from operations such as clearing and grubbing, demolition, excavation, and grading.

1.02 RELATED WORK

A. Division 01 – General Requirements

B. Division 31 – Earthwork

1.03 SUBMITTALS

A. Submit the following in accordance with the requirements in Section 01 33 00 – Submittal Procedures:

1. Submit testing laboratory reports, as specified or required, to show compliance with specifications for material from off-site locations. The specified tests shall be performed by a certified independent testing laboratory retained and paid by the Contractor.

2. Submit details of excavation plans designed and prepared by a licensed Professional Engineer, who is registered in the State of Texas and has experience in soils engineering, for all structure excavation. The plans shall include details of any proposed shoring systems, systems to protect existing facilities, slope stability monitoring, and the Contractor's means and methods for controlling groundwater. The plans shall be submitted to the Engineer for record purposes prior to proceeding with any excavation work.

3. Submit details of temporary excavation support system plans for all trench excavations, where an existing structure or utility falls within a 2 horizontal to 1 vertical (2:1) slope from the bottom of the excavation, or where considerations dictate a plan. The plans shall be developed by the Contractor's licensed Professional Engineer, who is registered in the State of Texas and has experience in trench safety analysis. The plans shall be submitted to the Owner's Representative for record purposes prior to proceeding with any excavation work.

1.04 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials

1. AASHTO T-180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop

B. American National Standards Institute/American Society for Testing and Materials (ANSI/ASTM) latest version.

1. ASTM C33 - Standard Specification for Concrete Aggregate.

2. ASTM C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.

3. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregate.

4. ASTM C150 - Standard Specification for Portland Cement.

5. ASTM D75 - Sampling Aggregates.

6. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft^3 (600 kN-mm/m^3))

7. ASTM D1557 - Standard Test Methods for Laboratory Compacion Characteristics of Soil Using Modified Effort (56,00 ft-lb/ft^3 (2,700 kN-m/m^3))

8. ASTM D2922 - Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

9. ASTM D4253 - Maximum Index Density of Soils Using a Vibratory Table

10. ASTM D4254 - Minimum Index Density of Soils and Calculation of Relative Density.

11. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

C. ASTM E1745 – Standard Specification for Plastic Water Vapor Retarders Used in Contract with Soil or Granular Fill Under Concrete Slabs.

D. Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (2014) - Texas, Department of Transportation (TXDOT).

E. Manual of Water Supply Practices - Concrete Pressure Pipe - American Water Works Association (AWWA) M9.

F. Where reference is made to one of the preceding standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. All field testing and inspection services will be provided by the Contractor's independent testing laboratory. The cost of such work, unless specifically stated otherwise, will be paid by the Contractor. Testing methods shall comply with the latest applicable ASTM Standards.

B. Materials shall be tested and observed as described in the following paragraphs. Allow free access to the work for selection of materials and observation.

1. At all structures, prior to placement of bedding material, concrete working mats, crushed stone base, or concrete fill, the geotechnical engineer shall observe the prepared subgrade to confirm its suitability for supporting the work to be placed thereon. Such observation shall include visual review, and in-place soil density tests as required.

2. Before and during placement of fill and backfill, the soils testing laboratory shall provide at least one density and moisture content test for each 232 m^2 (2,500 ft^2) of surface area for each compacted lift of fill.

C. Test pits for the purpose of locating underground utilities or structures in advance of the construction excavated by the Contractor shall be backfilled immediately after the desired information has been obtained and shall be performed in a manner consistent with trench backfill requirements. The backfilled surface shall be restored and maintained in a manner consistent with the original conditions.

1.06 CONTRACTOR'S RESPONSIBILITY

A. The Contractor shall be responsible for design and implementation of adequate support, safety, dewatering, and drainage systems and for all loss or damage resulting from partial or complete failure of protective measures.

B. The Contractor shall be responsible for dewatering of seepage and leakage past any existing valve, wall, or gate.

C. The Contractor shall protect the existing utilities during excavation work including that of test pits. The Contractor shall be fully responsible for any and all damages, which might be occasioned by the Contractor's failure to protect the existing utilities.

D. Unless otherwise specified, the Contractor is responsible for removal and disposal of waste material in accordance with applicable regulations.

E. Any submittals required for trench safety plan, dewatering and drainage plans, and similar temporary facilities, will be for reference purposes only and maintained for record purposes in the Owner's Representative files. Submittal of these items will not relieve the Contractor of any responsibility for the adequacy of support, safety, dewatering, and drainage systems.

1.07 PROTECTION OF FACILITIES

A. Before the start of earthwork operations, adequately protect utilities, trees, shrubs, and other permanent objects. Repair costs resulting from damage to permanent facilities due to negligence or lack of adequate protection will be charged to the Contractor.

B. Provide surface drainage during the period of construction to protect the work and to avoid nuisance to adjoining property.

C. The Contractor shall conduct operations in such fashion that trucks and other vehicles do not create a dirt nuisance in the streets. The truck beds shall be sufficiently tight, and shall be loaded in such a manner that objectionable materials will not be spilled onto the streets. Any dirt, mud, or other materials that are spilled onto the streets or deposited onto the streets by the tires of vehicles shall be promptly cleared away by the Contractor.

1.08 INSPECTION OF EXCAVATIONS

A. Do not place reinforcing steel or concrete in the excavation prior to inspection unless the Engineer's Representative has given approval to proceed without inspection.

1.09 DEFINITIONS

A. Common Fill: Refer to backfill placed outside the compacted select fill zone.

B. Compaction (or Relative Compaction): Refer to in-place dry density of soil expressed as a percentage of the maximum dry density of the same material.

C. Embankment: Refer to fill surrounding structures, which is placed during mass earthwork operations.

D. In-the Dry: No freestanding water or seepage entering the excavation. Soil conditions such that the in-place moisture content of the soil is sufficiently dry for fill placement on firm material as approved by the Owners Representative.

E. Maximum Dry Density (or Density): Refer to the maximum density defined by ASTM D698, unless otherwise specified. Determination of the density of backfill in-place shall be in accordance with the requirements of ASTM D2922. Density test intervals are defined in paragraph 3.07 of this Specification.

F. Optimum Moisture Content: The moisture density relationship appropriate to the specified level of compaction. It is determined by laboratory tests in accordance with the procedures specified in ASTM D698.

G. Select Fill: Refer to compacted fill placed under slabs or placed as backfill immediately outside the exterior of structure walls.

H. Structure: Refer to all buildings, wet wells, manholes, and below grade vaults. Stormwater structures and duct banks are not considered structures in these Specifications.

I. Trench: Refer to any excavation whose bottom width is less than twice the total depth of the excavation or whose depth is greater than five feet (5') for any structures and/or underground pipes and duct banks.

PART 2 PRODUCTS

2.01 MATERIALS

A. Crushed Rock

1. Crushed rock shall consist of sound and durable particles free from injurious amounts of salt, alkali, vegetable matter, or other material either free or as adherent coating. Its quality shall be reasonably uniform throughout.

2. 2. Gradation shall meet the following requirements for percentage by weight when tested in accordance with ASTM C136:

a. Standard Crushed Rock

Passing 38.1 mm (1-1/2") sieve	100%
Passing 25.4 mm (1") sieve	95-100%
Passing 12.7 mm (1/2") sieve	25-60%
Passing No. 4 sieve	0-10%
Passing No. 8 sieve	0-5%

b. Fine Crushed Rock

Passing 12.7 mm (1/2") sieve	100%
Passing 9.53 mm (3/8") sieve	95-100%
Passing No. 4 sieve	40-65%
Passing No. 8 sieve	0-10%

c. Coarse Crushed Rock

Passing 38.1 mm (1-1/2") sieve	100%
Retained on 19.1 mm (3/4") sieve	100%

B. Gravel

1. Gravel shall consist of uncrushed stones and shall not have by weight more than one percent organic matter, clays, or loam and not more than five percent by weight of any, one or combination of slate, shale, schist, or soft particles of sandstone.

2. Gradation shall meet the following requirements for percentage by weight when tested in accordance with ASTM C136:

Passing 38.1 mm (1-1/2") sieve	100%
Retained on 19.1 mm (3/4") sieve	95%

C. Sand For Embedment

1. Sand shall consist of clean, hard, durable, uncoated grains, free from lumps, and organic material.

2. Gradation shall meet the following requirements for percentage by weight when tested in accordance with ASTM C136:

Passing No. 4 sieve	80-100%
Passing No. 8 sieve	65-100%
Passing No. 16 sieve	40-80%
Passing No. 50 sieve	7-40%
Passing No. 100 sieve	2-20%
Passing No. 200 sieve	0-10%

D. Granular Material

1. Granular material shall be free flowing, such as sand or hydraulically graded crushed stone fines, or mixed sand and gravel. Material shall have no more than 10 percent fines and shall be free from lumps, stones over two inches in diameter, and organic matter.

E. Select Material

1. Structure: Where select material is shown or specified, use an approved material, free of organic matter and foreign substances, obtained from an approved off-site source. The material shall be gravel, fine rock cuttings, sand, or loam free from excessive clay. Rock cuttings shall have no dimension greater than (2"). The material shall have a plasticity index (PI) between 4 and 12 and a maximum liquid limit of less than 35 as determined by ASTM D4318. The material shall retain a minimum of 50 percent on the No. 200 sieve. Prior to bringing any of the proposed material to the site, submit, for review by the Owner's Representative, an analysis of the proposed material, including a moisture-density relationship curve prepared in accordance with ASTM D698 by a certified independent testing laboratory employed and paid by the Contractor.

2. Material for Basin Embankments: All material used in the construction of the embankment surrounding the structures and any other embankment fill areas shall be comprised of on-site lean to fat clays free of organic material and debris.

F. Concrete For Embedment and Encasement

1. Concrete for embedment and encasement shall be Class "B" concrete with a minimum compressive strength of 3,000 psi at 28 days. Dry mix will not be permitted. The concrete cushion portion of the embedment or encasement shall be mixed to give a slump of not more than one-inch (1"). Concrete for the sides and top, if specified, shall be mixed to obtain a slump of not less than one-inch (1") nor more than three inches (3"), and shall be placed after the concrete used for cushion portion of the embedment or encasement sets up.

G. Vapor Barrier Membrane

1. Polyethylene sheeting conforming to Polyethylene sheeting conforming to ASTM E1745 – Standard Specification for Plastic Water Vapor Retarders Used in Contract with Soil or Granular Fill Under Concrete Slabs, not less than 6-mil nominal thickness.

H. Filter Material

1. Where indicated on the Drawings or required in the work, use a mixture of coarse aggregate or fine aggregate for filter material. Proportion the mixture with two parts coarse aggregate to one part fine aggregate by volume.

2. Coarse aggregate shall consist of gravel, crushed gravel or crushed stone and shall have a gradation limit of three-quarter-inch (3/4") to No. 4 complying with ASTM C33 (Type 7).

3. Fine aggregate shall consist of natural sand and shall comply with the requirements of ASTM C33 for fine aggregate.

I. Stockpiled Topsoil for Finish Grading

1. Natural friable soil of region, free from lumps, clay, toxic substances, roots, debris, vegetation, stones over one-inch (1") in maximum dimension, and containing no salt or alkali.

J. Materials And Equipment for Dewatering and Drainage

1. Select materials and equipment as appropriate for the intended use.

PART 3 EXECUTION

3.01 PREPARATION

A. Test Pits:

1. Perform exploratory excavation work (test pits) to verify the location of underground utilities and structures and to check for unknown utilities and structures, prior to commencing excavation work.

2. Backfill test pits as soon as the desired information has been obtained. Backfilled surface shall be stabilized in accordance with approved erosion and sedimentation control plans.

3.02 EXCAVATION SUPPORT SYSTEMS

A. Protection of the excavation against caving or settling of the banks shall be the sole responsibility of the Contractor. The Contractor shall protect the sides of the excavation by sheeting and bracing as may be necessary. No actions or instructions by the Owner's Representative shall be regarded as the responsibility for security of the surrounding areas. Furnish, put in place, and maintain sheeting and bracing required to support the sides of the excavation and prevent loss of ground which could damage or delay the work or endanger workers, adjacent structures or vehicular traffic. If the Owner's Representative is of the opinion that at any points sufficient or proper supports have not been provided, he may order additional supports put in, and compliance with such order shall not relieve or release the Contractor from the responsibility for the sufficiency of such supports.

B. Sheeting, Shoring and Bracing:

1. Provide sheeting, shoring, and bracing of excavations at locations shown on the Drawings and where required to properly and safely complete the work. Construct sheeting, shoring, and bracing to prevent the excavation from extending beyond specified or indicated limits, to protect adjacent structures or improvements and to protect workmen and the public. The design of sheeting, shoring, and bracing shall be the responsibility of the Contractor.

2. Care shall be taken to prevent voids outside the sheeting. If voids are formed, they shall immediately be filled and compacted.

3. After completion of the structure, all sheeting, shoring, and bracing shall be removed unless approval has been granted by the Owner's Representative, in writing, to leave any or all of

it in place. The sheeting, shoring, and bracing shall be removed as excavations are backfilled in a manner that will prevent injurious caving of the excavation or damage to the structure.

4. Voids left or caused by removal of sheeting shall immediately be filled with suitable material and compacted.

C. Sheeting and bracing not left in place shall be carefully removed in such manner as not to endanger the construction or other existing structures, utilities, or property. Voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, by watering or otherwise as may be directed.

D. The right of the Owner's Representative to order sheeting and bracing left in place shall not be construed as creating any obligation to issue such orders. If the Owner's Representative does not issue such orders, this shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.

3.03 EXCAVATION

A. General:

1. Excavation work shall be unclassified and includes removal of all types of materials encountered without exception. Make excavations to lines and grades indicated on the Drawings. Complete excavations within the tolerances specified.

2. Excavations for structures shall be suitably wide for construction of the structures, including excavation supports, dewatering and drainage systems, and working clearances.

3. Excavation shall be performed in-the-dry, and shall be accomplished by methods which preserve the undisturbed state of subgrade soils. Drainage and dewatering systems shall be in place and operational prior to beginning excavation work. In no case shall the earth be plowed, scraped, or excavated by any means that would disturb the finished subgrade. Hand excavation of the final three inches (3") to six inches (6") inches may be required to obtain a satisfactory, undisturbed subgrade. Subgrade soils which become soft, loose, "quick", or otherwise unsatisfactory for support of structures as a result of inadequate excavation, dewatering, or other construction methods shall be removed and replaced with lean concrete fill at no additional cost to the Owner.

4. When excavations have reached the required subgrade, including any allowances for working mats or base materials, but before the placement of working mats, base materials or embankment materials, notify the soils testing laboratory to verify the suitability of the existing subgrade soils for the anticipated foundation and structural loadings. If the existing subgrade soils are determined to be unsuitable, direction will be provided by the Owner's Representative regarding removal and replacement with suitable materials.

5. Over-excavation beyond the limits and depths required by the Contract Documents shall be replaced by lean concrete or other material acceptable to the Owner's Representative. Such replacement shall be at no additional cost to the Owner.

B. Structures:

1. Wherever practicable, cut all footing excavations to neat lines with a tolerance of minus one-inch (-1") to 0-inch (0"), and place concrete to bear against earth sides. Where beams are shown to be monolithic with slabs on ground, shape soil to the profile shown. Excavate a sufficient distance from walls, shafts, or similar elements of structures to allow for placing and removing forms and for inspection.

2. Excavate to the elevations shown on the drawings forming a level undisturbed surface free of mud or other soft material. When the bottom of the excavation, at the elevation shown, is not within the foundation bearing material shown on the drawings or is unsuitable for foundation bearing, notify the Owner's Representative. Remove all pockets of soft or otherwise unstable soils and replace with concrete or with suitable well-compacted soil as directed by the Owner's Representative.

3. Protect all open excavations from rainfall or excessive drying so as to maintain the foundation subgrade in a satisfactory, undisturbed condition. Keep excavations reasonably free of water at all times and completely free of water during placement of concrete. Soils below foundation, which become soft, loose or otherwise unsatisfactory for dewatering or other construction methods shall be removed and replaced with satisfactory material.

4. For footings, founded on rock, hard shale or similar material, remove all material. Clean and cut to a firm surface either level, stepped or serrated as shown on the drawings. Clean out seams and fill with concrete at the time footing concrete is placed.

C. Embankments:

1. After clearing and grubbing and before placing any fill, proof roll the foundation with a loaded tandum-axel dump truck weighing at least 25 tons to locate any soft or unstable zones. Any unstable soils should be over excavated and replaced with an approved low volume changes soil as approved.

2. Prior to any filling operations, samples of the proposed borrow and on-site materials proposed for use in the embankments should be obtained for laboratory moisture-density testing. The tests will provide a basis for evaluation of field compaction by in-place density tests during fill operations to evaluate that proper levels of compaction, including dry unit weight and moisture content, are being obtained.

3.04 SLABS ON GRADE

A. Slabs at Grade:

1. Subgrade. Scarify to a depth of six inches (6") below the cleared depth. Adjust moisture content within a range of optimum to optimum + 4 percentage points and recompact

within a range of 95 to 100 percent maximum density as determined by ASTM D 698. The recompacted subgrade shall be proof-rolled with a pneumatic tired roller in order to detect any soft areas. Soft or wet areas will require removal and replacement with select material of at least (12") compacted thickness (2 lifts). Depressions from stump removal shall be cleaned of all organic matter and filled with select material.

2. Fill. Upon completion of subgrade preparation, place select material in uniform layers of loose material, six inches (6") in depth, within the moisture and density range specified in 1. above. Previous lifts and/or subgrade should be protected from moisture loss.

3. Final Grade. Conform to lines and grades shown on the drawings.

B. Slabs Below Grade: Excavate to (12") above final sub-grade. In order to preserve the in situ moisture of the subgrade, do not excavate the final (12") until prior to the floor slab construction or seal slab, where specified. If the soil at the time of final exposure and concrete placement is not within zero to four percent above optimum moisture content as determined by the Owner's Representative testing laboratory, the top (6") shall be recompacted at the proper moisture level. Soft and wet areas not achieving compaction will require removal and replacement with select material of at least (12") compacted thickness (2 lifts).

C. Compaction:

1. The subgrade and fill material shall be compacted to a minimum of 95 percent and maximum of 100 percent of maximum density at 0 to 4% above optimum moisture as determined by ASTM D698. The methods used to secure the specified compaction and moisture content shall be the Contractor's responsibility. Wet soils shall be worked by plowing, disking, or scarifying and air drying as required to reduce the moisture content to optimum levels.

2. The compacting equipment and method of compaction shall be such that uniform density will be obtained over the entire area and depth of material being compacted. All fill materials deposited in place by scrapers, dump trucks, drag lines or similar equipment shall be thoroughly broken up before being spread into uniform layers.

3. Moisten layers between lifts to achieve bonding.

4. Field density tests shall be performed at a rate of 1 test per each 500 cubic yards of material placed with a minimum of three tests per lift.

D. Vapor Barrier Membrane:

1. As soon as practical after final grading, while the base material is still at its optimum moisture content, install a vapor barrier membrane over the prepared surface at all locations. Provide membrane in the widest practical seamless widths.

2. Lay the membrane material continuous with the joints lapped (6") in the direction of the concrete placement. Carefully fit the membrane tight around all penetrations.

3. Before placing concrete, patch all holes and tears in membrane with patches cemented in place with adhesive. Seal around penetrations for conduit, piping, etc., with cold mastic.

E. Mud slabs (lean concrete seal slabs) shall be placed after final grading or within 4 hours of the removal of the last (12") of an excavation, while the base material is at its optimum moisture content, at locations indicated in Paragraph 3.06.B of this Specification.

3.05 EMBANKMENTS

A. After performing the proofroll on the subgrade, scarify the exposed subgrade to a depth of 8 inches. Adjust the scarified soil to a workable moisture content that is above its optimum value to not more than 4 percent above optimum, as determined by test method ASTM D-698. Compact the soil to at least 95 percent of its maximum dry density.

B. Compaction:

1. Place loose fill in 9 inches or less thickness. The subgrade and fill material shall be compacted to a minimum of 95 percent and maximum of 100 percent of maximum density at 0 to 4% above optimum moisture as determined by ASTM D698. The methods used to secure the specified compaction and moisture content shall be the Contractor's responsibility. Wet soils shall be worked by plowing, disking, or scarifying and air drying as required to reduce the moisture content to optimum levels.

2. The compacting equipment and method of compaction shall be such that uniform density will be obtained over the entire area and depth of material being compacted. All fill materials deposited in place by scrapers, dump trucks, drag lines or similar equipment shall be thoroughly broken up before being spread into uniform layers.

3. Moisten layers between lifts to achieve bonding.

4. Field density tests shall be performed at a rate of 1 test per each 500 cubic yards of material placed with a minimum of three tests per lift.

3.06 FINAL BACKFILL PROCEDURES

A. Backfill at Structure:

1. Complete backfill to the surface of natural ground or to the lines and grades shown on the drawings. Use select material except where special materials are shown on the drawings or specified for all structural excavation. Deposit backfill in uniform layers and compact each layer as specified.

2. Place backfill as promptly as practicable after completion of each structure or portion of a structure. The bottom 1/4 of wall height may be backfilled when the walls attain 75 percent of the specified 28-day compressive strength. The remaining wall height may be backfilled when the specified 28-day compressive strength is attained. Remove concrete forms before starting backfill and remove shoring and bracing as the work progresses.

Take care to prevent any wedging action of backfill against the structure. Step-cut the slopes at 0.91 m (3') intervals bounding the excavation as required to prevent wedging.

B. Compacting Backfill: Place material in uniform layers of prescribed maximum thickness and wet or dry the material to 0 to 4 percent above optimum moisture content. Compact with power-driven hand tampers to the prescribed density.

1. Regular and Select Material. Place in (6") maximum layers, loose measure. Compact to at least 95 percent of maximum soil density as determined by ASTM D 698.

2. Sand and Filter Material. Place in (6") maximum layers, loose measure. Compact to not less than 70 percent of maximum soil density as determined by ASTM 4253 and 4254.

3. On-Site Soil for Use as Backfill: On-site soil that is used as backfill shall be compacted to between 92 and 97 percent of the maximum dry density as determined by the Standard Proctor test, ASTM D 698. In conjunction with the compacting operations, this fill material shall be brought to between two percent below and three percent above the optimum moisture content (-2 to +3).

C. Protection: Guard rails, curbing, signs, lighting, and fencing etc., in the vicinity of the Contractor's operations shall be adequately protected, and if necessary removed and restored after backfilling. Curbing, fencing, or guard rails which are damaged during construction shall be replaced with material fully equal to that existing prior to construction.

3.07 EXCAVATED MATERIALS

A. Excavated material to be used for backfilling and finish grading shall be placed adjacent to the work, without excessive surcharge on the trench bank and separate from stockpiled topsoil and grass. Material shall not obstruct free access to valves and hydrants and not obstruct the operation of other contractors working at the site. Obstructing traffic with excavated material will not be allowed.

B. Excess material and material which is unsuitable for backfilling shall be removed from the site by the Contractor.

C. Should conditions make it impracticable or unsafe to stack material adjacent to the trench, the material shall be hauled and stored at a location provided by the Contractor at no additional cost to the Owner.

END OF SECTION

SECTION 31 23 33
TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This **WORK** shall consist of all labor, equipment, and materials necessary for excavation, trenching, and backfilling for utility lines and other related WORK.

1.02 RELATED SECTIONS

1) The following is a list of SPECIFICATIONS which may be related to this section:

   a. Section 01 57 19, Temporary Environmental Controls

   b. Section 31 23 00, Excavation and Fill.

   c. Section 31 25 00, Erosion and Sedimentation Control.

1.03 REFERENCES

A. The following is a list of standards which may be referenced in this section:

   1. ASTM International (ASTM):

      a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3)).

      b. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

   2. Colorado Department of Transportation (CDOT).

   3. Occupational Safety and Health Administration (OSHA).

1.04 SUBMITTALS

A. Submit certification that bedding and pipe zone material meets SPECIFICATION.

PART 2 PRODUCTS

2.01 MATERIAL

A. Muck Excavation:

   1. Muck excavation shall also include the replacement of excavated muck with uniformly graded rock ranging from three-quarter (3/4) inch to one and one-half (1-1/2) inches or as required by ENGINEER.

2. ENGINEER shall determine which type of aggregate or other material shall be used after observing the specific site conditions.

B. Bedding and Pipe Zone Materials:

1. Well-Graded Sand:

Sieve Size	Total Percent Passing by Weight
3/8-inch	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	2-10

2. Squeegee Sand:

Sieve Size	Total Percent Passing by Weight
3/8 - inch	100
No. 200	0-5

3. CDOT #67:

Sieve Size	Total Percent Passing by Weight
1 inch	100
¾ - inch	90-100
3/8 - inch	20-55
No. 4	0-10
No. 8	0-5

a. It shall be the responsibility of **CONTRACTOR** to locate material meeting the **SPECIFICATIONS**, to test its ability to consolidate to at least seventy-five percent (75%) relative density, and to secure approval of ENGINEER before such material is delivered to the **PROJECT**.

b. Relative density shall be determined as stipulated in ASTM D4253.

A. Backfill:

1. Use only backfill for trenches which is free from rocks, large roots, other vegetation or organic matter, and frozen material.

2. No rocks greater than three (3) inches in diameter shall be allowed.

B. Cut-Off Walls:

1. Clay Cut-Off Walls: More than fifty percent (50%) shall pass a No. 200 Sieve. The plasticity index shall be greater than twelve (12).

2. Controlled Low Strength Material Backfill: (Flo-Fill, See Section 31 23 23, Flowable Fill).

PART 3 EXECUTION

3.01 GENERAL

A. The following procedures shall be followed by **CONTRACTOR** in sequencing the WORK:

1. No more than one hundred fifty (150) feet of trench shall be left open at any time.

2. The entire trench shall be backfilled to within fifty (50) feet of the open trench upon conclusion of each day's **WORK**.

3. The trench shall not be backfilled until the pipe installation is found acceptable by ENGINEER.

4. Trench shall be backfilled within one hundred (100) feet of the pipe installation at all times.

5. Clean-up shall be maintained within four hundred (400) feet of the trench excavation.

B. Prior to placement in the trench, all pipes, fittings, and appurtenances shall be cleaned and examined for defects by CONTRACTOR.

1. If found defective, **CONTRACTOR** shall reject the defective pipe, fitting, or appurtenance.

2. **CONTRACTOR** shall advise **ENGINEER** of all defective materials.

C. Surplus Excavation:

1. All surplus excavation shall be placed, in an orderly manner.

2. If material is stockpiled on private property, written permission shall be obtained from the property owner and provided to ENGINEER.

3.02 BSTRUCTIONS AND DISPOSAL OF WASTE MATERIAL

A. **CONTRACTOR** shall remove obstructions that do not require replacement from within the trench or adjacent areas such as tree roots, stumps, abandoned piling, buildings and concrete structures, frozen material, logs, and debris of all types without additional compensation.

B. **ENGINEER** may, if requested, make changes in the trench alignment to avoid major obstructions, if such alignment changes can be made within the **WORK** limits without adversely affecting the intended function of the facility.

C. Excavated materials unsuitable for backfill or not required for backfill shall be disposed of in accordance with local regulations.

3.03 RENCH EXCAVATION

A. All existing asphalt or concrete surfacing shall be saw cut vertically in a straight line, and removed from the job site prior to starting the trench excavation. This material shall not be used in any fill or backfill.

B. Clearance:

1. The trench shall be excavated so that a minimum clearance of six (6) inches is maintained on each side of the pipe for proper placement and densification of the bedding or backfill material.

2. The maximum clearance measured at the spring line of the pipe shall be eighteen (18) inches regardless of the type of pipe, type of soil, depth of excavation, or the method of densifying the bedding and backfill.

3. Except as otherwise dictated by construction conditions, the excavation shall be of such dimensions as to allow for the proper pipe installation and to permit the construction of the necessary pipe connections.

4. Care shall be taken to ensure that the excavation does not extend below established grades.

a. If the excavation is made below such grades, the excess excavation shall be filled in with sand or graded gravel deposited in horizontal layers not more than six (6) inches in thickness after being compacted and shall be moistened as required to within two percent (2%) of the optimum moisture content required for compaction of that soil. After being conditioned to have the required moisture content, the layers shall be compacted to the required density.

b. **CONTRACTOR** shall stockpile excavated materials in a safe manner. Stockpiles shall be graded for proper drainage.

c. **CONTRACTOR** shall place and grade the trench base to the proper grade ahead of pipe laying. The invert of the trench shall be compacted to provide a firm unyielding support along entire pipe length.

d. Surplus excavation shall be disposed of by **CONTRACTOR** at **CONTRACTOR's** expense.

3.04 PROTECTION

A. Sheeting and Shoring:

1. **CONTRACTOR** shall protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent any excessive widening or sloughing of the trench which may be detrimental to human safety, to the pipe or appurtenances being installed, or to existing facilities or structures.

2. The latest requirements of OSHA shall be complied with at all times including trenching and confined space entry requirements.

3. **CONTRACTOR** shall be responsible for underpinning adjacent structures which may be damaged by excavation WORK, including service utilities and pipe chases.

B. Weather and Frost:

1. **CONTRACTOR** shall protect bottom of excavations and soil adjacent to and beneath foundations from frost.

2. Do not place backfill, fill, or embankment on frozen surfaces.

3. Do not place frozen materials, snow, or ice in backfill, fill, or embankments.

4. Do not deposit, tamp, roll, or otherwise mechanically compact backfill in water.

C. Drainage and Groundwater:

1. The excavation shall be graded to prevent surface water runoff into trench or excavation.

2. Maintain excavations and trenches free from water during construction.

3. Remove water encountered in trenches to the extent necessary to provide a firm subgrade, to permit joints to be made in the dry, and to prevent the entrance of water into the pipeline.

4. Divert surface runoff and use sumps, gravel blankets, well points, drain lines, or other means necessary to accomplish the above.

5. Maintain the excavation or trench free from water until the structure, or pipe to be installed therein, is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.

6. Prevent water from entering into previously constructed pipe.

7. Do not use the pipe under construction for dewatering.

3.05 FOUNDATIONS ON UNSTABLE SOILS

A. If the bottom of the excavation is soft or unstable, and in the opinion of **ENGINEER**, cannot satisfactorily support the pipe or structure, a further depth and width shall be excavated and refilled to six (6) inches below grade with rock or other approved material, uniformly graded between three-quarter (3/4) inch and one and one-half (1-1/2) inches to provide a firm foundation for the pipe or structure. From six (6) inches below grade to grade, the appropriate bedding material shall be placed to provide support for the pipe or structure.

3.06 PIPE BEDDING

A. After completion of the trench excavation and proper preparation of the foundation, six (6) inches of bedding material shall be placed on the trench bottom for support under the pipe.

B. Bell holes shall be dug deep enough to provide a minimum of two (2) inches of clearance between the bell and the bedding material.

C. All pipes shall be installed in such a manner as to ensure full support of the pipe barrel over its entire length.

D. After the pipe is adjusted for line and grade and the joint is made, the bedding material shall be carefully placed and tamped under the haunches of the pipe.

E. For all types of pipe, the limits of bedding shall be as shown on the trench section details on the DRAWINGS.

F. Bedding shall be compacted to seventy five percent (75%) relative density in accordance with ASTM D4253. Care shall be exercised to ensure sufficient tamping under the pipe to achieve uniform support.

3.07 BACKFILL AND COMPACTION

A. All muck excavation, bedding, and pipe zone material shall be imported unless otherwise designated by OWNER's geotechnical engineer.

B. Pipe:

1. The pipe trench shall be backfilled to the limits as shown on the DRAWINGS.

2. The backfill in all areas shall be compacted by vibrating, tamping, or a combination thereof to seventy five percent (75%) relative density for sand material as determined by the relative density of cohesionless soils test, ASTM D4253, or to ninety five percent (95%) of the Maximum Standard Proctor Density for cohesive soils as determined by ASTM D698.

3. All backfill shall be brought up to equal height along each side of the pipe in such a manner as to avoid displacement.

4. Bedding shall be distributed in 6-inch (6") maximum lifts over the full width of the trench.

5. Wet, soft or frozen material, asphalt chunks, or other deleterious substances shall not be used for backfill.

6. If the excavated material is not suitable for backfill, as determined by ENGINEER, suitable material shall be hauled in and utilized and the rejected material hauled away and disposed of.

7. Backfilling shall be conducted at all times in a manner to prevent damage to the pipe or its coating and shall be kept as close to the pipe laying operation as practical.

8. Backfilling procedures shall conform to the additional requirements, if any, of appropriate agencies or private right-of-way agreements.

C. Unsurfaced Areas: All surface cuts shall be, as a minimum, restored to a condition equal to that prior to construction.

D. Surfaced Areas:

1. All surface cuts shall be, as a minimum, restored to a condition equal to that prior to construction.

2. All gravel or paved streets shall be restored in accordance with the regulations and requirements of the agency having control or jurisdiction over the street, roadway, or right-of-way.

E. Grassed or Landscaped Areas:

1. In landscaped or agricultural areas, topsoil, to a depth of twelve (12) inches, shall be removed from the area of general disturbance and stockpiled.

2. After installation of all pipelines, appurtenances and structures and completion of all backfill and compaction, the stockpiled topsoil shall be redistributed evenly over all disturbed areas.

3. Care should be taken to conform to the original ground contour or final grading plans.

3.08 FIELD QUALITY CONTROL

A. In-place moisture density tests will be performed to ensure trench backfill complies with specified requirements. The following minimum tests will be performed.

1. Trench Bedding: One per two hundred (1 per 200) feet.

2. Backfill: One per two hundred (1 per 200) feet.

B. Backfill Compaction Tests:

1. Backfill compaction tests will be performed until compaction meets or exceeds requirements.

2. The cost of "passing" tests will be paid by OWNER.

3. Costs associated with "failing" tests shall be paid by CONTRACTOR.

C. Pipe bedding will be tested prior to placement of backfill.

D. Testing of all bedding and backfill material will be done in compliance with Occupational Safety & Health Administration (OSHA) – Excavations.

3.09 RESTORATION

A. Scarify surface, reshape, and compact to required density completed or partially completed areas of WORK disturbed by subsequent construction operations or by adverse weather.

B. Maintain and correct backfill, fill, and embankment settlement and make necessary repairs to pavement structures, seeding, and sodding which may be damaged as a result of settlement for the guarantee period.

C. Such maintenance and correction may be performed by subcontract.

D. Upon completion of the WORK, all plants, rubbish, unused materials, concrete forms, and other like material shall be removed from the job site.

E. The site shall be left in a state of order and cleanliness.

END OF SECTION

SECTION 31 25 00
EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 SUMMARY

a. Section Includes:

i. Implementation of the project's Storm Water Pollution Prevention Plan (SWPPP) and installation, maintenance, removal of erosion and sediment controls devices, and establishment of final stabilization.

b. B. Deviations from this City of Austin Standard Specification
   i. None.

c. C. Related Specification Sections include, but are not necessarily limited to:
   i. Division 0 – Bidding Requirements, Contract Forms and Conditions of the Contract

   ii. Division 1 – General Requirements

1.02 PRICE AND PAYMENT PROCEDURES

a. Measurement and Payment

i. Storm Water Pollution Prevention Plan <1 acre

1. Measurement

a. This Item is considered subsidiary to the various Items bid.

2. Payment

a. The work performed and the materials furnished in accordance with this Item are subsidiary to the structure or Items being bid and no other compensation will be allowed.

ii. Storm Water Pollution Prevention Plan ≥ 1 acre

1. Measurement for this Item shall be by lump sum.

2. Payment

a. The work performed and the materials furnished in accordance with this Item shall be paid for at the lump sum price bid for "SWPPP ≥ 1 acre".

3. The price bid shall include:

a. Preparation of SWPPP

b. Implementation

c. Permitting fees

d. Installation

e. Maintenance

f. Removal

g. Obtaining and/or complying with grading and/or fill permits, if required

h. Final stabilization

1.03 REFERENCES

a. Reference Standards

i. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification, unless a date is specifically cited

b. ASTM Standard:

i. ASTM D3786, Standard Test Method for Bursting Strength of Textile

ii. Fabrics—Diaphragm Bursting Strength Tester Method

iii. ASTM D4632, Standard Test Method for Grab Breaking Load and Elongation

iv. of Geotextiles

v. ASTM D4751, Standard Test Method for Determining Apparent Opening Size

vi. of a Geotextile

vii. ASTM D4833, Standard Test Method for Index Puncture Resistance of

viii. Geomembranes and Related Products

c. Texas Commission on Environmental Quality (TCEQ) TPDES General Permit No. TXR150000

d. TxDOT Departmental Material Specifications (DMS)

i. DMS-6230 "Temporary Sediment Control Fence Fabric"

1.04 SUBMITTALS

a. Storm Water Pollution Prevention Plan (SWPPP)

b. TCEQ Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity under the TPDES General Permit

c. Construction Site Notice

d. TCEQ Notice of Termination (NOT) for Storm Water Discharges Associated with Construction Activity under the TPDES General Permit

e. Notice of Change (if applicable)

f. Grading and/or fill permit, if required

END OF SECTION

BURIED PIPING INSTALLATION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to install and test all buried piping, fittings, and specials. The Work includes the following:

1. All types and sizes of buried piping, except where buried piping installations are specified under other Sections or other contracts.

2. Unless otherwise shown or specified, this Section includes all buried piping Work required, beginning at the outside face of structures or structure foundations, including piping beneath structures, and extending away from structures.

3. Work on or affecting existing buried piping.

4. Installation of all jointing and gasket materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, cathodic protection, and other Work required for a complete, buried piping installation.

5. Supports, restraints, and thrust blocks.

6. Pipe encasements, with the exception of piping embedded in concrete within a structure or foundation.

7. Field quality control, including testing.

8. Cleaning and disinfecting.

9. Incorporation of valves, meters, and special items shown or specified into piping systems in accordance with the Contract Documents and as required.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before buried piping Work.

2. Coordinate with appropriate piping Sections of Division 40, Process Integration.

1.02 RELATED WORK

A. Section 31 71 19, Tunnel Excavation by Tunnel Boring Machine.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:

a. Laying schedules for concrete pipe and piping with restrained joints.

b. Details of piping, specials, joints, harnessing and thrust blocks, and connections to piping, structures, equipment, and appurtenances.

2. Product Data:

a. Manufacturer's literature and specifications, as applicable, for products specified in this Section.

3. Testing Procedures:

a. Submit proposed testing procedures, methods, apparatus, and sequencing. Obtain Engineer's approval prior to commencing testing.

B. Informational Submittals:

1. Certificates:

a. Certificate signed by manufacturer of each product certifying that product conforms to applicable referenced standards.

2. Field Quality Control Submittals:

a. Results of each specified field quality control test.

C. Closeout Submittals:

1. Record Documentation:

a. Maintain accurate and up-to-date record documents showing modifications made in the field, in accordance with approved submittals, and other Contract modifications relative to buried piping Work. Submittal shall show actual location of all piping Work and appurtenances at same scale as the Drawings.

b. Show piping with elevations referenced to Project datum and dimensions from permanent structures. For each horizontal bend in piping, include dimensions to at least three permanent structures, when possible. For straight runs of piping provide offset dimensions as required to document piping location.

c. Include profile drawings with buried piping record documents when the Contract Documents include piping profile drawings.

1.04 REFERENCE STANDARDS

A. ASTM C924, Practice for Testing Concrete Pipe Sewer Lines by Low- Pressure Test Method.

B. ASTM D2321, Practice for Underground Installation of Thermoplastic Pipe for Sewers and other Gravity-Flow Applications.

C. ASTM D2774, Practice for Underground Installation of Thermoplastic Pressure Piping.

D. ASTM F1417, Test Method for Installation Acceptance of Plastic Gravity Sewer Lines using Low-Pressure Air.

E. 14. ANSI/AWWA C105, Polyethylene Encasement for Ductile-Iron Pipe Systems.

F. ANSI/AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

G. ANSI/AWWA C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.

H. ANSI/AWWA C605, Underground Installation of Polyvinyl Chloride **[PVC]** Pressure Pipe and Fittings for Water.

I. ANSI/AWWA C606, Grooved and Shouldered Joints.

J. ANSI/AWWA C651, Disinfecting Water Mains.

K. AWWA M23, PVC Pipe - Design and Installation.

L. AWWA M41, Ductile-Iron Pipe and Fittings.

M. ASCE 37, Design and Construction of Sanitary and Storm Sewers.

N. American Concrete Pipe Association, Concrete Pipe Handbook.

O. Chlorine Institute, Inc., Piping Systems for Dry Chlorine, Pamphlet No. 6.

P. NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements and recommendations of authorities having jurisdiction over the Work.

B. Obtain required permits for Work in roads, rights-of-way, railroads, and other areas of the Work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

2. Upon delivery inspect pipe and appurtenances for cracking, gouging, chipping, denting, and other damage and immediately remove from Site and replace with acceptable material.

B. Storage:

1. Store materials to allow convenient access for inspection and identification. Store material off ground using pallets, platforms, or other supports. Protect packaged materials from corrosion and deterioration.

2. Pipe and fittings other than PVC and CPVC may be stored outdoors without cover. Cover PVC and CPVC pipe and fittings stored outdoors.

C. Handling:

1. Handle pipe, fittings, specials, and accessories carefully in accordance with pipe manufacturer's recommendations. Do not drop or roll material off trucks. Do not drop, roll or skid piping.

2. Avoid unnecessary handling of pipe.

3. Keep pipe interiors free from dirt and foreign matter.

4. Protect interior linings and exterior coatings of pipe and fittings from damage. Replace pipe and fittings with damaged lining regardless of cause of damage.

PART 2 PRODUCTS

2.01 MATERIALS

A. Piping materials are specified in the Contract Drawings.

B. General:

1. Manufacturer shall cast or paint on each length of pipe and each fitting pipe material, diameter, and pressure or thickness class.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:

1. Install piping as shown, specified, and as recommended by pipe and fittings manufacturer.

2. In event of conflict between manufacturer's recommendations and the Contract Documents, request interpretation from Engineer before proceeding.

3. Engineer will observe excavations and bedding prior to laying pipe by Contractor. Notify Engineer in advance of excavating, bedding, pipe laying, and backfilling operations.

4. Minimum cover over buried piping shall be 5 feet, unless otherwise shown or approved by Engineer.

5. Earthwork is specified in Item No. 804, Excavation, Trenching, and Backfill.

6. Excavation in excess of that required or shown, and that is not authorized by Engineer shall be filled at Contractor's expense with drainage fill furnished, placed, and compacted in accordance with Section 31 23 00, Excavation and Fill.

7. Comply with NFPA 24 for "Outside Protection", where applicable to water piping systems used for fire protection.

B. Separation of Sewers and Potable Water Piping:

1. Horizontal Separation:

a. Where possible, existing and proposed potable water mains and service lines, and sanitary, combined, and storm sewers shall be separated horizontally by clear distance of at least ten feet.

b. If local conditions preclude the specified clear horizontal separation, installation will be allowed if potable water main is in separate trench or on undisturbed earth shelf on one side of sewer and with bottom of potable water main at least 18 inches above top of sewer.

2. Exception:

a. Where it is not possible to provide minimum horizontal separation described above, construct potable water main of cement-lined ductile iron pipe with restrained push-on joint or restrained mechanical joint pipe complying with public water supply design standards of authority having jurisdiction. Hydrostatically test water main and sewer as specified in this Section prior to backfilling. Hydrostatic test pressure at crossing shall be at least 150 psi.

3. Vertical Separation:

a. Provide minimum vertical distance of 18 inches between outside of potable water main and outside of sewer when sewer crosses over potable water main.

b. Center a section of potable water main pipe at least 17.5 feet long over sewer so that sewer joints are equidistant from potable water main joints.

c. Provide adequate structural support where potable water main crosses under sewer. At minimum, provide compacted select backfill for ten feet on each side of crossing.

d. Exceptions:

1) Where it is not possible to provide minimum vertical separation described above, construct potable water main of cement-lined ductile iron pipe with restrained push-on joint or restrained mechanical joint pipe. Hydrostatically test water main and sewer as specified in this Section, prior to backfilling. Hydrostatic test pressure at crossing shall be at least 150 psi.

2) Encase either potable water main or sewer in watertight carrier pipe extending ten feet on each side of crossing, measured perpendicular to potable water main.

C. Plugs:

1. Temporarily plug installed pipe at end of each day of work or other interruption of pipe installation to prevent entry of animals, liquids, and persons into pipe, and entrance or insertion of deleterious materials into pipe.

2. Install standard plugs in bells at dead ends, tees, and crosses. Cap spigot and plain ends.

3. Fully secure and block plugs, caps, and bulkheads installed for testing to withstand specified test pressure.

4. Where plugging is required for phasing of the Work or subsequent connection of piping, install watertight, permanent type plugs, caps, or bulkhead acceptable to Engineer.

D. Bedding Pipe: Bed pipe as specified and in accordance with details on the Drawings.

1. Trench excavation and backfill, and bedding materials shall conform to Section 31 23 05, Excavation and Fill, as applicable.

2. Where Engineer deems existing bedding material unsuitable, remove and replace existing bedding with approved granular material furnished, placed, and compacted in accordance with Section 31 23 05, Excavation and Fill. Payment for additional excavation and providing granular material will be made under the unit price payment items in the Contract.

3. Where pipe is installed in rock excavation, provide minimum of three inches of granular bedding material underneath pipe smaller than four-inch nominal diameter, and minimum of six inches of granular bedding material underneath pipes four-inch nominal diameter and larger.

4. Excavate trenches below bottom of pipe by amount shown and indicated in the Contract Documents. Remove loose and unsuitable material from bottom of trench.

5. Carefully and thoroughly compact pipe bedding with handheld pneumatic compactors.

6. Do not lay pipe until Engineer approves bedding condition.

7. Do not bring pipe into position until preceding length of pipe has been bedded and secured in its final position.

E. Laying Pipe:

1. Conform to manufacturer's instructions and requirements of standards and manuals listed below, as applicable:

   a. Ductile Iron Pipe: ANSI/AWWA C600, ANSI/AWWA C105, AWWA M41.

   b. Concrete Pipe: AWWA M9.

   c. Steel Pipe: ANSI/AWWA C206, AWWA M11.

   d. Thermoplastic Pipe: ASTM D2321, ASTM D2774, ANSI/AWWA C605, AWWA M23, AWWA M45, AWWA, M55.

   e. \

2. Install pipe accurately to line and grade shown and indicated in the Contract Documents, unless otherwise approved by Engineer. Remove and reinstall pipes that are not installed correctly.

3. Slope piping uniformly between elevations shown.

4. Keep groundwater level in trench at least 24 inches below bottom of pipe before laying pipe. Do not lay pipe in water. Maintain dry trench conditions until jointing and backfilling are complete. Keep clean and protect interiors of pipe, fittings, valves, and appurtenances.

5. Start laying pipe at lowest point and proceed towards higher elevations, unless otherwise approved by Engineer.

6. Place bell and spigot-type pipe so that bells face the direction of laying, unless otherwise approved by Engineer.

7. Place concrete pipe containing elliptical reinforcement with minor axis of reinforcement in vertical position.

8. Excavate around joints in bedding and lay pipe so that pipe barrel bears uniformly on trench bottom.

9. Deflections at joints shall not exceed 75 percent of amount allowed by pipe manufacturer, unless otherwise approved by Engineer.

10. For PVC and CPVC piping with solvent welded joints, 2.5-inch diameter and smaller, and copper tubing, snake piping in trench to compensate for thermal expansion and contraction.

11. Carefully examine pipe, fittings, valves, and specials for cracks, damage, and other defects while suspended above trench before installation. Immediately remove defective materials from the Site and replace with acceptable products.

12. Inspect interior of all pipe, fittings, valves, and specials and completely remove all dirt, gravel, sand, debris, and other foreign material from pipe interior and joint recesses before pipe and appurtenances are moved into excavation. Bell and spigot-type mating surfaces shall be thoroughly wire brushed, and wiped clean and dry immediately before pipe is laid.

13. Field cut pipe, where required, with machine specially designed for cutting the type of pipe being installed. Make cuts carefully, without damage to pipe, coating or lining, and with smooth end at right angles to axis of pipe. Cut ends on push-on joint type pipe shall be tapered and sharp edges filed off smooth. Do not flame-cut pipe.

14. Do not place blocking under pipe, unless specifically approved by Engineer for special conditions.

15. Touch up protective coatings in manner satisfactory to Engineer prior to backfilling.

16. Notify Engineer in advance of backfilling operations.

17. On steep slopes, take measures acceptable to Engineer to prevent movement of pipe during installation.

18. Thrust Restraint: Where required, provide thrust restraint conforming to Article 3.02 of this Section.

19. Exercise care to avoid flotation when installing pipe in cast-in-place concrete, and in locations with high groundwater.

F. Jointing Pipe:

1. Ductile Iron Mechanical Joint Pipe:

a. Immediately before making joint, wipe clean the socket, plain end, and adjacent areas. Taper cut ends and file off sharp edges to provide smooth surface.

b. Lubricate plain ends and gasket with soapy water or manufacturer's recommended pipe lubricant, in accordance with ANSI/AWWA C111, just prior to slipping gasket onto plain end of the joint assembly.

c. Place gland on plain end with lip extension toward the plain end, followed by gasket with narrow edge of gasket toward plain end.

d. Insert plain end of pipe into socket and press gasket firmly and evenly into gasket recess. Keep joint straight during assembly.

e. Push gland toward socket and center gland around pipe with gland lip against gasket.

f. Insert bolts and hand-tighten nuts.

g. If deflection is required, make deflection after joint assembly and prior to tightening bolts. Alternately tighten bolts approximately 180 degrees apart to seat gasket evenly. Bolt torque shall be as follows:

Pipe Diameter (inches)	Bolt Diameter (inches)	Range of Torque (ft-lbs)
3	5/8	45 to 60
4 to 24	3/4	75 to 90
30 to 36	1	100 to 120
42 to 48	1.25	120 to 150

h. Bolts and nuts, except those of stainless steel, shall be coated with two coats, minimum dry film thickness of eight mils each, of high build solids epoxy or bituminous coating manufactured by Tnemec, or equal.

2. Ductile Iron Push-On Joint Pipe:

a. Prior to assembling joints, thoroughly clean with wire brush the last eight inches of exterior surface of spigot and interior surface of bell, except where joints are lined or coated with a protective lining or coating.

b. Wipe clean rubber gaskets and flex gaskets until resilient. Conform to manufacturer's instructions for procedures to ensure gasket resiliency when assembling joints in cold weather.

c. Insert gasket into joint recess and smooth out entire circumference of gasket to remove bulges and to prevent interference with proper entry of spigot of entering pipe.

d. Immediately prior to joint assembly, apply thin film of pipe manufacturer's recommended lubricant to surface of gasket that will come in contact with entering spigot end of pipe, or apply a thin film of lubricant to outside of spigot of entering pipe.

e. For assembly, center spigot in pipe bell and push pipe forward until spigot just makes contact with rubber gasket. After gasket is compressed and before pipe is pushed or pulled in the rest of the way, carefully check gasket for proper position around the full circumference of joint. Final assembly shall be made by forcing spigot end of entering pipe past gasket until spigot makes contact with base of the bell. When more than a reasonable amount of force is required to assemble the joint, remove spigot end of pipe to verify proper positioning of gasket. Do not use gaskets that have been scored or otherwise damaged.

f. Maintain an adequate supply of gaskets and joint lubricant at the Site when pipe jointing operations are in progress.

3. Ductile Iron Proprietary Joints:

a. Install pipe that utilizes proprietary joints for restraint or other such joints, in accordance with manufacturer's instructions.

4. Thermoplastic Pipe Joints:

a. Solvent Cement Welded Joints:

1) Bevel pipe ends and remove all burrs before making joints. Clean pipe and fittings thoroughly. Do not attempt to make solvent cement joints if temperature is below 40 degrees F. Do not make solvent cement welded joints in wet conditions.

2) Use solvent cement supplied or recommended by pipe manufacturer.

3) Apply joint primer and solvent cement and assemble joints in accordance with recommendations and instructions of manufacturer of joint materials and pipe manufacturer.

4) Take appropriate safety precautions when using joint primers and solvent cements. Allow air to circulate freely through pipelines to allow solvent vapors to escape. Slowly admit water when flushing or filling pipelines to prevent compression of gases within pipes.

b. Bell and Spigot Joints:

1) Bevel pipe ends, remove all burrs, and provide a reference mark at correct distance from pipe end before making joints.

2) Clean spigot end and bell thoroughly before making the joint. Insert O-ring gasket while ensuring that gasket is properly oriented. Lubricate spigot with manufacturer's recommended lubricant. Do not lubricate bell and O-ring. Insert spigot end of pipe carefully into bell until reference mark on spigot is flush with bell.

5. Mechanical Coupling Joints:

a. Mechanical couplings include: sleeve-type flexible couplings, split flexible couplings, ANSI/AWWA C606 grooved or shouldered end couplings, plasticized PVC couplings, and other mechanical couplings.

b. Prior to installing and assembling mechanical couplings, thoroughly clean joint ends with wire brush to remove foreign matter.

c. For mechanical couplings that incorporate gaskets, after cleaning apply lubricant to rubber gasket or inside of coupling housing and to joint ends. After lubrication, install gasket around joint end of previously installed piece and

mate joint end of subsequent piece to installed piece. Position gasket and place coupling housing around gasket and over grooved or shouldered joint ends. Insert bolts and install nuts tightly by hand. Tighten bolts uniformly to produce an equal pressure on all parts of housing. When housing clamps meet metal to metal, joint is complete and further tightening is not required.

d. For plasticized PVC couplings, loosen the stainless steel clamping bands and remove clamps from coupling. Slide coupling over plain ends of pipes to be joined without using lubricants. Place clamps over each end of coupling at grooved section and tighten with torque wrench to torque recommended by manufacturer.

G. Backfilling:

1. Place backfill as Work progresses. Backfill by hand and use powertampers until pipe is covered by at least one foot of backfill.

H. Connections to Valves and Hydrants:

1. Install valves and hydrants as shown and indicated in the Contract Documents.

2. Provide suitable adapters when valves or hydrants and piping have different joint types.

3. Provide thrust restraint at all hydrants and at valves located at pipeline terminations.

I. Transitions from One Type of Pipe to Another:

1. Provide necessary adapters, specials, and connection pieces required when connecting different types and sizes of pipe or connecting pipe made by different manufacturers.

J. Closures:

1. Provide closure pieces shown or required to complete the Work.

3.02 THRUST RESTRAINT

A. Provide thrust restraint on pressure piping systems where shown or indicated in the Contract Documents.

B. Thrust restraint may be accomplished by using restrained pipe joints orconcrete thrust blocks. Thrust restraints shall be designed for axial thrust exerted by test pressure as required by the Owner.

C. Place concrete thrust blocks against undisturbed soil. Where undisturbed soil does not exist, or for projects where the Site consists of backfill material, thrust restraint shall be provided by restrained pipe joints.

D. Restrained Pipe Joints:

1. Pipe joints shall be restrained by means suitable for the type of pipe being installed.

a. Ductile Iron, Push-on Joints and Mechanical Joints: Restrain with proprietary restrained joint system; lugs and tie rods; or other joint restraint systems approved by Engineer.

b. Thermoplastic Joints: Where bell and spigot-type or other non-restrained joints are utilized, provide tie rods across joint or other suitable joint restraint system, subject to the approval of Engineer.

c. Prestressed Concrete Cylinder Pipe Joints: Restrain utilizing clamp type restrained joint, snap ring-type restrained joint, or by welding. Concrete pipe requiring restraint shall have sufficient longitudinal steel reinforcement provided to handle thrust forces at maximum design stress of 12,500 psi. Longitudinal thrust forces must be transmitted directly to steel joint bands using welded connections sufficient to carry stresses involved. No allowance for the concrete to handle tensile forces is allowed. Thrust restraint shall be in accordance with ANSI/AWWA Manual M9.

d. Joints for Concrete Pipe Other than Prestressed Concrete Cylinder Pipe: Restrain joints utilizing clamp type restrained joint or snap ring-type restrained joint.

E. Concrete Thrust Blocks:

1. Provide concrete thrust blocks on pressure piping at changes in alignment of 15 degrees or more, at tees, plugs and caps, and where shown or indicated in the Contract Documents. Construct thrust blocks of Class B concrete.

2. Install thrust blocks against undisturbed soil. Place concrete so that pipe and fitting joints are accessible for repair.

3. Concrete thrust block size shall be as shown on the Drawings or as approved by Engineer.

3.03 WORK AFFECTING EXISTING PIPING

A. Location of Existing Underground Facilities:

1. Locations of existing Underground Facilities shown on the Drawings should be considered approximate.

2. Determine the true location of existing Underground Facilities to which connections are to be made, crossed, and that could be disturbed, and determine location of Underground Facilities that could be disturbed during excavation and backfilling operations, or that may be affected by the Work.

3.04 FIELD QUALITY CONTROL

A. General:

1. Test all piping in this Section.

2. When authorities having jurisdiction are to witness tests, notify Engineer and authorities having jurisdiction in writing at least 48 hours in advance of testing.

3. Conduct all tests in presence of Engineer.

4. Remove or protect pipeline-mounted devices that could be damaged by testing.

5. Provide all apparatus and services required for testing, including:

   a. Test pumps, compressors, hoses, calibrated gages, meters, test containers, valves, fittings, and temporary pumping systems required to maintain Owner's operations.

   b. Temporary bulkheads, bracing, blocking, and thrust restraints.

6. Provide air if an air test is required, power if pumping is required, and gases if gases are required.

7. Unless otherwise specified, Owner will provide fluid required for hydrostatic testing. Contractor shall provide means to convey fluid for hydrostatic testing into piping being tested. Contractor shall provide fluid for other types of testing required.

8. Repair observed leaks and repair pipe that fails to meet acceptance criteria. Retest after repair.

9. Unless otherwise specified, testing shall include existing piping systems that connect with new piping system. Test existing pipe to nearest valve. Piping not installed by Contractor and that fails the test shall be repaired upon authorization of Owner. Unless otherwise included in the Work, repair of existing piping or Underground Facilities will be paid as extra Work.

B. Testing:

1. Unless otherwise specified, required test pressures are at lowest elevation of pipeline segment being tested.

2. Test Pressure:

   a. Test pressure as required by the Owner based on maximum anticipated sustained operating pressure and methods described in applicable ANSI/AWWA manual or standard that applies to the piping system.

3. Hydrostatic Testing:

   a. Preparation for Testing:

1) For thermoplastic pipe, follow procedures described in Section 7 of ANSI/AWWA Standard C605.

2) For other piping follow procedures described in ANSI/AWWA Manual M9, except that minimum wetting period required immediately prior to testing for asbestos cement pipe shall be 24 hours rather than the 48 hours prescribed for concrete pipe. Wetting period is not required for pipe that is not cement mortar-lined.

4. Test Procedure:

   a. Fill pipeline slowly to minimize air entrapment and surge pressures. Fill rate shall not exceed one foot of pipe length per second in pipe being tested.

   b. Expel air from pipe as required. Obtain approval of Engineer prior to tapping pipe for expelling air.

   c. Examine exposed joints and valves and make repairs to eliminate visible leakage.

   d. After specified wetting period, add fluid as required to pressurize line to required test pressure. Maintain test pressure for a stabilization period of ten minutes before beginning test.

   e. Timed test period shall not begin until after pipe has been filled, exposed to required wetting period, air has been expelled, and pressure stabilized.

   f. Timed Test Period: After stabilization period, maintain test pressure for at least two hours. During timed testing period, add fluid as required to maintain pressure within five psig of required test pressure. Test pressure shall then remain steady for one hour, indicating no leakage.

   g. Pump from test container to maintain test pressure. Measure volume of fluid pumped from test container and record on test report. Record pressure at test pump at 15 minute intervals for duration of test.

5. Allowable Leakage Rates: Leakage is defined as the quantity of fluid supplied to pipe segment being tested to maintain pressure within five psi of test pressure during timed test period. Allowable leakage rates for piping are:

   a. Rates based on formula or table in ANSI/AWWA Manual M41:

      1) Metal pipe joined with rubber gaskets as sealing members, including the following joint types:

      2) Bell and spigot and push-on joints.

      3) Mechanical joints.

      4) Bolted sleeve type couplings.

5) Grooved and shouldered couplings.

b. Rates based on make-up allowance in ANSI/AWWA Manual M9:

6) Prestressed concrete cylinder pipe and other types of concrete pipe joined with O-ring rubber gasket sealing members.

c. Rates based on formula or table in ANSI/AWWA C605:

7) Plastic pipe joined with O-ring gasket sealing members.

C. Vertical Deflection Test for Thermoplastic, FRP, and HDPE Pipe:

1. Conduct vertical deflection test at least thirty days after backfill has been placed.

2. Manually pull pin-type vertical gauge mounted on sled through pipe. Gauge shall be manufactured by Quality Test Products, or equal. Set gauge so that sled will stop if vertical deflection of pipe exceeds five percent. Excavate and re-install piping that fails deflection test, and retest.

3. Use rigid ball or mandrel for deflection test, which shall have diameter of at least 95 percent of base inside diameter or average inside diameter of piping, depending on which is specified in applicable ASTM standard, including appendix, to which pipe is manufactured. Perform test without mechanical pulling devices. Re-install and retest pipe segments that exceed deflection of five percent.

3.05 CLEANING AND DISINFECTION

A. Cleaning, General: Clean pipe systems as follows:

1. Thoroughly clean all piping, including flushing with water, dry air, or inert gas as required, in manner approved by Engineer, prior to placing in service.

2. Flush chlorine solution and sodium hypochlorite piping with water.

3. Piping 24-inch diameter and larger shall be inspected from inside and debris, dirt and foreign matter removed.

4. For piping that requires disinfection and has not been kept clean during storage or installation, swab each section individually before installation with five percent sodium hypochlorite solution.

B. Disinfection:

1. Disinfect all potable and finished water piping.

2. Suggested procedure for accomplishing complete and satisfactory disinfection is specified below.

a. Prior to disinfection, clean piping as specified and flush thoroughly.

b. Conform to procedures described in ANSI/AWWA C651. Use continuous feed method of disinfecting, unless alternative method is acceptable to Engineer.

3. Water for initial flushing, testing, and disinfection will be furnished by Owner. Contractor shall provide all temporary piping, hose, valves, appurtenances, and services required. Cost of water required for redisinfection will be paid by Contractor to Owner at water utility's standard rates.

4. Chlorine shall be provided by Contractor.

5. Bacteriologic tests will be performed by Owner. Certified test laboratory report will be provided to Contractor, if requested.

6. Chlorine concentration in water entering the piping shall be between 50 and 100 ppm, such that minimum residual concentration of 25 mg/L remains after24-hour retention period. Disinfect piping and all related components. Repeat as necessary to provide complete disinfection.

7. After required retention period, flush chlorinated water to closed drain line, unless otherwise acceptable to Engineer. Properly dispose of chlorinated water in accordance with Laws and Regulations. Do not discharge chlorinated water to storm sewers, ditches, or overland.

END OF SECTION

HYDROSTATIC TESTING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This Section specifies the general requirements for testing the various piping systems shown on the Construction Plans and specified elsewhere in these Specifications.

1.02 SUBMITTALS

A. Test Records:

1. Records shall be maintained of all tests performed.

2. Test records shall include:

a. Date of Testing

b. Identification of Piping Tested

c. Test Fluid

d. Test Pressure

e. Signatures of Contractor and Engineer

3. If leaks are found, they shall be noted, on the record. After correction, retesting as specified for original test.

4. Records of test shall be maintained by the Contractor and furnished to the Engineer.

B. Valves specified to be manufactured in accordance with AWWA and/or other standards must be submitted with an appropriate affidavit of compliance.

C. Operation and Maintenance Manuals: Operating and maintenance instructions shall be furnished as provided in Section 01 78 23 Operation and Maintenance Data. The instructions shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, and other information required to instruct operating and maintenance personnel unfamiliar with such equipment.

1.03 REFERENCE STANDARDS

A. American Water Works Association (AWWA) C600-93 Section 4 Hydrostatic Testing

1.04 QUALITY ASSURANCE

A. Hydrostatic tests consisting of pressure tests and leakage tests shall be conducted on all newly-installed water distribution system pressure pipes and appurtenances. The tests shall

be in accordance with the provisions listed in this specification and with the provisions of AWWA C600 or M23 as applicable.

PART 2 PRODUCTS

2.01 TEST FLUIDS

A. Hydrostatic Test: Water should be used as the test fluid whenever possible. In those systems where water cannot be used the test fluid may be either the one to be used in the system or the one agreed upon by the Engineer and the Contractor.

B. Service Pressure Test: The fluid for which the system is designed shall be the test fluid.

C. Pneumatic Test: Compressed air shall normally be used. Other gases may be used when specified or directed by the Engineer. Test pressures shall be 110% of the anticipated maximum operating pressure, but not exceeding 100 psig, and not less than 5 psig at the highest point in the system.

2.02 TEST EQUIPMENT

A. Hydrostatic Test:

1. Water - Of sufficient capacity to deliver the required test pressure.

2. Strainer - On inlet side of the pump to prevent foreign matter from entering the system.

3. Valves - Shall be provided on the suction and discharge side of the pump.

4. Heater - To allow heating of the test fluid when elevated temperatures are required for test.

5. Relief Valve - Set at a pressure to relieve at 20 to 25% above the required test pressure.

6. Pressure Gage(s) - Capable of reaching 50% over the test pressure. These should be located at the pump discharge and any other place deemed convenient by the Contractor.

7. Pressure gages and relief valves shall be checked for accuracy before use in test procedures.

B. Service Pressure Test:

1. A pressure gage capable of registering 25 psi over the design pressure shall be installed down-stream from the supply shut-off valve if one is not included in the system

C. Pneumatic Test:

1. Building supply air to deliver the required test pressure if available, or provide a compressor capable of the required test pressure.

2. Valves shall be provided on the discharge side of the pump.

3. Relief valve to relieve at 10 to 15% over the test pressure.

4. Pressure gage(s) capable of reaching 50% over the test pressure. A gage shall be located on the pump discharge and other location as required.

PART 3 EXECUTION

3.01 HYDROSTATIC TEST

A. This test Specification shall be used to hydrostatically test piping systems for structural integrity and leaks. The test shall be performed at ambient temperature unless otherwise specified.

B. A hydrostatic test shall be performed after services are connected and final grading and placement are complete.

C. Preparation For Test:

1. Determine the fluid to be used for the test, and, if other than ambient temperature is required, what the test temperature will be.

2. When a fluid other than water is used for a test, the equipment used for the test shall be of a material compatible with the test fluid. Normally this would be equal to the piping material.

3. Vents shall be provided at the high points of the system and drains provided where means of venting or draining do not exist.

4. Remove or block off, all relief valves, rupture discs, alarms, control instruments, etc. that shall not be subjected to the test pressure.

5. All discs, balls, or pistons from check valves shall be removed if they interfere with filling of the system. Open all valves between inlet and outlet of the section to be tested.

6. Connect pump and provide temporary closures for all of the external openings in the system. Use caution to ensure that the closures are properly designed and strong enough to withstand the test pressure.

7. All joints, including welds, are to be left un-insulated and exposed for examination during test.

8. A joint previously tested in accordance with this specification may be covered or insulated.

9. Piping designed for vapor or gas shall be provided with additional temporary supports, if necessary, to support the weight of the test liquid.

10. Expansion joints shall be provided with temporary restraint for additional pressure under test or shall be isolated from the test.

11. Flanged joints, where blanks are inserted to isolate equipment during the test, need not be tested.

D. Unless otherwise noted, joints for items shall be made up utilizing the same procedures as specified under the applicable-type connecting pipe system.

E. Test Procedures:

1. Allow the test fluid to enter the system. Open vents to allow displacement of all entrapped air. For all pipelines exceeding 500-ft in length, the maximum rate of filling shall be limited to that which produces a maximum nominal flow velocity of one foot per second in the pipe to be tested.

2. Close vents and restrict personnel in the test area to those involved in the test.

3. Raise the pressure slowly with the pump until the predetermined test pressure is reached. Maintain pressure for duration of time specified in System Specification Section, keeping personnel at a safe distance.

4. Reduce the pressure about 20% and hold it at that point while the entire system is carefully inspected for leaks, cracks, or other signs of defects.

5. If defects are found, the pressure shall be released, the system drained, the defects corrected and the test repeated.

6. After a satisfactory test has been completed, the line shall be drained.

F. Flushing:

1. Lines tested with water shall be completely drained.

2. Lines shall be flushed, after test.

3.02 SERVICE PRESSURE TEST

A. This test Specification shall be used to test piping systems using service pressure and the fluid for which the system is used. It shall not be used to test piping systems conveying combustible or flammable liquids or systems that comply with ANSI B31 codes. Insulated lines shall have all joints left exposed until completion of the test.

B. The test pressure shall be equal to the maximum pressure that the line will be subjected to under normal operating conditions as determined by the Engineer.

C. Test Procedures:

1. Liquids

a. See that all personnel, not involved in the test, vacate the area.

b. Allow the system fluid to enter the system slowly while venting the air at the extreme far and uppermost points. For all pipelines exceeding 500-ft in length, the maximum rate of filling shall be limited to that which produces a maximum nominal flow velocity of one foot per second in the pipe to be tested.

c. When the system is full and all air is vented, close the vents.

d. Allow the pressure in the system to build up to the full line pressure.

e. Inspect entire system for leaks.

2. Gas or Vapor (Including Compressed Air and Steam)

a. See that all personnel not involved in the test vacate the area.

b. In systems that do not have a pressure gage near the main shut-off valve, a gage shall be installed.

c. Allow the system fluid to enter the system slowly until the full operating pressure is reached.

d. Shut off main supply valve. Observe the gage for 15 minutes. The pressure gage shall not drop during this time.

e. If the gage drops, indicating the presence of leaks, the systems shall be inspected visually and, if necessary, with soap suds or commercially available leak detectors to locate the leak(s).

3. If leaks are found, the lines shall be relieved of pressure, purged if necessary and repaired. Tests shall be repeated for repaired sections.

3.03 PNEUMATIC TEST

A. This procedure for a pneumatic test of piping systems shall be used when directed by the Engineer when water, or other liquid, cannot be introduced into the line, or as a supplement to a hydrostatic test. It shall not be used to test non-metallic (plastic) pipe.

B. Safety:

1. All pneumatic tests shall be done under the supervision of Contractor and in the presence of the Engineer.

2. New Construction: The Engineer's permission shall be secured before testing.

3. Renovation Projects: The Owner representative and the Engineer must be informed and their permission secured before testing.

4. Only those people actively participating in the test shall be allowed in the test area.

5. Safety glasses and hard-hats must be worn.

C. Test Procedures:

1. Increase the pressure in the line gradually, in steps, to the specified pressure. Checks shall be made at 25 psig and at 5 psig intervals until the test pressure is reached using sound, soap solution or a drop in indicated pressure.

2. When the specified pressure for the test is reached, shut off the valve in the supply line from the pump.

3. Maintain the test pressure long enough to visually inspect all joints or a minimum of 10 minutes. There shall be no drop in the test pressure in this time.

4. Leaks shall be repaired and the line retested. All leaks shall be noted on the Test Record form.

5. After satisfactory completion of the test, vent the line and allow it to return to atmospheric pressure. Connection can then be made to the supply line.

END OF SECTION

<DATE>

Mike Andrews, General Manager
Springs Hill Special Utility District
5510 S. ST HWY 123 bypass
Seguin, TX 78155
Via email at mandrews@springshill.org

RE: Non-Exclusive Assignment of Easement Rights and Obligations

Dear Mr. Andrews:

Pursuant to the Capital Improvement Funding Agreement executed between the City of Seguin ("City") and Springs Hill Special Utility District ("SHSUD") on or about _____ ___, 2025, I am writing to provide SHSUD with the City's assignment of rights and obligations in the Public Utility Easement located on the northern end of Seguin Independent School District's property identified in Guadalupe Central Appraisal District's records as Parcel #133837, which was recorded in the Official Public Records of Guadalupe County as Document Number _____.

This Assignment of rights and obligations in the above-referenced Public Utility Easement shall be perpetual and non-exclusive. Since the assignment is non-exclusive, it may be necessary for SHSUD to coordinate with other utility providers prior to conducting any work or maintenance within the easement area. The City will maintain a record of any and all utilities within the easement area, so please contact City of Seguin Utilities at least five (5) business days prior to performing any work or maintenance within the easement area.

Please sign below indicating your acceptance of this Assignment and the terms and conditions associated with the underlying Public Utility Easement.

If you need any clarification regarding this assignment or the terms of the underlying Public Utility Easement, please do not hesitate to contact me.

Sincerely,

Mark D. Kennedy
City Attorney