



**Multiple Sewershed Package 8 – Replacement
Solicitation Number: CO-00291-SM
Job No.: 17-4560**

**ADDENDUM 2
August 22, 2019**

To Bidder of Record:

This addendum, applicable to work referenced above, is an amendment to the bid proposal, plans and specifications and as such will be a part of and included in the Contract Documents. Acknowledge receipt of this addendum by entering the Addendum number and issue date on the space provided in submitted copies of the bid proposal.

RESPONSES TO QUESTIONS

No written questions, regarding this solicitation were asked prior to the deadline of 4:00 p.m. on August 19, 2019.

CHANGES TO THE SPECIFICATIONS

1. Remove the "General Wage Decision for Building Type: Number TX190231 01/18/2019 TX231" in its entirety and replace with the revised version "General Wage Decision for Building Type: Number TX20190231 08/02/2019" attached to this addendum.
2. Remove the "Invitation to Bidders" in its entirety and replace with the revised version attached to this addendum. All references to microtunneling have been removed from the "Invitation to Bidders" (guided boring is the specified trenchless method to be used where indicated on the plans).
3. Remove the "Bid Proposal Form", Pages BP-2 and BP-3, and replace with the revised Pages BP-2 and BP-3 attached to this addendum. The following changes have been made:
 - Item 45 Description has been revised to read "12" CARRIER PIPE – PVC SDR 26 ASTM D2241 (RESTRAINED)".
 - Item 46 Description has been revised to read "30" STEEL CASING"
 - Item 53 Description has been revised to read "CROSSINGS BY GUIDED BORING – 30" DIAMETER".
4. Remove the "Statement of Bidder's Experience" in its entirety and replace with the revised version attached to this addendum. All references to microtunneling have been removed from the revised "Statement of Bidder's Experience" (guided boring is the specified trenchless method to be used where indicated on the plans). This revised "Statement of Bidder's Experience" should be used by bidders when submitting a bid for this project.
5. Remove the "Special Conditions" in its entirety and replace with the revised version attached to this addendum. All references to microtunneling have been removed from the "Special Conditions" (guided boring is the specified trenchless method to be used where indicated on the plans). Revisions to Section 2.1 Performance Time, and Section 2.2 Permits have also been incorporated.
6. Remove Special Specification "Section 02300 Crossings by Guided Boring or Microtunneling" in its entirety and replace with the revised Special Specification "Section 02300 Crossings by Guided Boring" attached to this addendum. All references and sections pertaining to microtunneling have been removed (guided boring is the specified trenchless method to be used where indicated on the plans). Minimum steel casing pipe size for the guided auger boring at the Morningview/IH 10 location has also been increased to 30" diameter.
7. Remove Special Specification "Section 02310 Jacking and Receiving Pits" in its entirety and replace with the revised version attached to this addendum. All references pertaining to microtunneling have been removed (guided boring is the specified trenchless method to be used where indicated on the plans).
8. Remove Special Specification "Section 02311 Tunnel Grout" in its entirety and replace with the revised version attached to this addendum. All references and sections pertaining to microtunneling have been removed (guided boring is the specified trenchless method to be used where indicated on the plans).

CHANGES TO THE PLANS

1. Plan sheet 3 (Sheet G-03, General Notes) - Replace sheet dated 8/6/19 with attached sheet dated 8/22/19.
2. Plan sheet 5 (Sheet G-05, Symbols, Abbreviations & Quantity Summary) - Replace sheet dated 8/6/19 with attached sheet dated 8/22/19.
3. Plan sheet 7 (G-07, Overall Project Layout Segment 1050244 Morningview/IH10) - Replace sheet dated 8/6/19 with attached sheet dated 8/22/19.
4. Plan sheet 35 (C-11, Segment 1050244 Jose Lopez Freeway (I-10) Crossing North from Morningview Drive Plan and Profile Sta. 10+00 to Sta 15+00) – Replace sheet dated 8/6/19 with attached sheet dated 8/22/19.
5. Plan sheet 36 (C-12, Segment 1050244 Jose Lopez Freeway (I-10) West Side South of Dorie St. Plan and Profile Sta. 10+00 to Sta 12+50) - Replace sheet dated 8/6/19 with attached sheet dated 8/22/19.
6. Plan sheet 29 (TCP-08, Phase 2 Traffic Control Plan 1 of 3 Segment 1052244 IH 10 East & MLK Dr.) - Replace sheet dated 8/1/19 with attached sheet dated 8/20/19.

CLARIFICATIONS

1. References to the microtunneling construction method are being removed from contract documents. Bidders should base their bids on guided auger boring as specified in contract documents revised per this addendum.
2. Minimum steel casing pipe size for the guided auger boring at the Morningview/IH 10 location has been increased to 30" diameter.
3. Geotechnical investigation report is available by request from SAWS, for reference only.

END OF ADDENDUM

This Addendum, including these two (2) pages, is fifty six (58) pages with attachments in its entirety.

Attachments:

General Wage Decision for Building Type: Number TX20190231 08/02/2019

Invitation to Bidders

Bid Proposal Form (Pages BP-2 and BP-3)

Statement of Bidder's Experience

Special Conditions

Section 02300 Crossings by Guided Boring

Section 02310 Jacking and Receiving Pits

Section 02311 Tunnel Grout

Sheet G-03, General Notes (plan sheet 3 of 61)

Sheet G-05, Symbols, Abbreviations & Quantity Summary (plan sheet 5 of 61)

Sheet G-07, Overall Project Layout Segment 1050244 Morningview/IH10 (plan sheet 7 of 61)

Sheet C-11, Segment 1050244 Jose Lopez Freeway (I-10) Crossing North from Morningview Drive Plan and Profile Sta. 10+00 to Sta 15+00 (plan sheet 35 of 61)

Sheet C-12, Segment 1050244 Jose Lopez Freeway (I-10) West Side South of Dorie St. Plan and Profile Sta. 10+00 to Sta 12+50 (plan sheet 36 of 61)

Sheet TCP-08, Phase 2 Traffic Control Plan 1 of 3 Segment 1052244 IH 10 East & MLK Dr. (plan sheet 29 of 61)


Jeffrey E. Reck, P.E.
Arcadis US, Inc.
TBPE Firm No. F-533



8-22-19

"General Decision Number: TX20190231 08/02/2019

Superseded General Decision Number: TX20180280

State: Texas

Construction Type: Building

County: Bexar County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.60 for calendar year 2019 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.60 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2019. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the

Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/04/2019
1	01/18/2019
2	08/02/2019

ASBE0087-014 01/01/2018

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (Duct, Pipe and Mechanical System Insulation).....	\$ 22.72	10.02

BOIL0074-003 01/01/2017

	Rates	Fringes
BOILERMAKER.....	\$ 28.00	22.35

* ELEC0060-003 06/01/2019

	Rates	Fringes
ELECTRICIAN (Communication Technician Only).....	\$ 22.55	9%+5.45

* ELEC0060-004 07/01/2019

	Rates	Fringes
ELECTRICIAN (Excludes Low		

Voltage Wiring).....\$ 28.60 20%+5.45

ELEV0081-001 01/01/2019

 Rates Fringes

ELEVATOR MECHANIC.....\$ 40.57 33.705

FOOTNOTES:

A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.

B. Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; Christmas Day; and Veterans Day.

ENGI0450-002 04/01/2014

 Rates Fringes

POWER EQUIPMENT OPERATOR

 Cranes.....\$ 34.85 9.85

IRON0066-013 09/01/2018

 Rates Fringes

IRONWORKER, STRUCTURAL.....\$ 22.05 6.73

IRON0084-011 06/01/2018

 Rates Fringes

IRONWORKER, ORNAMENTAL.....\$ 23.77 7.12

* PLUM0142-009 07/01/2017

	Rates	Fringes
HVAC MECHANIC (HVAC Electrical Temperature Control Installation Only).....	\$ 30.25	13.36
HVAC MECHANIC (HVAC Unit Installation Only).....	\$ 30.25	13.36
PIPEFITTER (Including HVAC Pipe Installation).....	\$ 30.25	13.36
PLUMBER (Excludes HVAC Pipe Installation).....	\$ 30.25	13.36

SFTX0669-002 04/01/2017

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers).....	\$ 29.03	15.84

* SHEE0067-004 06/01/2019

	Rates	Fringes
Sheet metal worker Excludes HVAC Duct Installation.....	\$ 26.81	16.80
HVAC Duct Installation Only.	\$ 26.81	16.80

SUTX2014-006 07/21/2014

	Rates	Fringes
BRICKLAYER.....	\$ 22.15	0.00
CARPENTER (Acoustical Ceiling		

Installation Only).....\$ 17.83	0.00
CARPENTER (Form Work Only).....\$ 13.63	0.00
CARPENTER, Excludes Acoustical Ceiling Installation, Drywall Hanging, Form Work, and Metal Stud Installation.....\$ 16.86	4.17
CAULKER.....\$ 15.00	0.00
CEMENT MASON/CONCRETE FINISHER...\$ 22.27	5.30
DRYWALL FINISHER/TAPER.....\$ 13.81	0.00
DRYWALL HANGER AND METAL STUD INSTALLER.....\$ 15.18	0.00
ELECTRICIAN (Low Voltage Wiring Only).....\$ 20.39	3.04
IRONWORKER, REINFORCING.....\$ 12.27	0.00
LABORER: Common or General.....\$ 10.75	0.00
LABORER: Mason Tender - Brick...\$ 11.88	0.00
LABORER: Mason Tender - Cement/Concrete.....\$ 12.00	0.00
LABORER: Pipelayer.....\$ 11.00	0.00
LABORER: Roof Tearoff.....\$ 11.28	0.00
LABORER: Landscape and Irrigation.....\$ 8.00	0.00

OPERATOR:		
Backhoe/Excavator/Trackhoe.....	\$ 15.98	0.00
OPERATOR: Bobcat/Skid		
Steer/Skid Loader.....	\$ 14.00	0.00
OPERATOR: Bulldozer.....	\$ 14.00	0.00
OPERATOR: Drill.....	\$ 14.50	0.00
OPERATOR: Forklift.....	\$ 12.50	0.00
OPERATOR: Grader/Blade.....	\$ 23.00	5.07
OPERATOR: Loader.....	\$ 12.79	0.00
OPERATOR: Mechanic.....	\$ 18.75	5.12
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 16.03	0.00
OPERATOR: Roller.....	\$ 12.00	0.00
PAINTER (Brush, Roller and Spray), Excludes Drywall Finishing/Taping.....	\$ 13.07	0.00
ROOFER.....	\$ 12.00	0.00
TILE FINISHER.....	\$ 11.32	0.00
TILE SETTER.....	\$ 14.94	0.00
TRUCK DRIVER: Dump Truck.....	\$ 12.39	1.18
TRUCK DRIVER: Flatbed Truck.....	\$ 19.65	8.57

TRUCK DRIVER: Semi-Trailer

Truck.....\$ 12.50 0.00

TRUCK DRIVER: Water Truck.....\$ 12.00 4.11

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that

classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

INVITATION TO BIDDERS

Solicitation No. CO-00291-SM

Sealed bids are requested by the San Antonio Water System for the construction of approximately 2,494 linear feet of 8-inch, 10-inch, and 12-inch diameter sanitary sewer mains using open cut and guided boring methods, including sanitary sewer service lateral replacement, and replacement or rehabilitation of associated manholes for the **Multiple Sewershed Package 8 Replacement Project**, SAWS Job No. **17-4560**.

To view additional project information, as well as obtain the plans and specifications for this project, visit our website located at www.saws.org and click on the Business Center. Then select Bidder, Consultant, and Vendor Registration, which is located on the left-hand side of the screen. Select the Register Now button and proceed with registration.

For difficulties downloading plans and specifications, contact the Contracting Department at 210-233-3341.

A **non-mandatory** pre-bid meeting will be held at **10:00 AM (CT) on August 14, 2019** at the San Antonio Water System's Customer Center Building, 1st floor, Conference Room CR-C145, 2800 U.S. Hwy 281 North, San Antonio, Texas.

For questions regarding this solicitation, technical questions or additional information, please contact Stella Manzello, Contract Administrator, in writing via email to: stella.manzello@saws.org or by fax to (210) 233-3460 until **4:00 PM (CT) on August 19, 2019**. Answers to the questions will be posted to the web site by **10:00 AM (CT) on August 22, 2019** as a separate document or included as part of an addendum. Please be advised that Bidders are prohibited from communicating with any other SAWS staff, the Consultant, the Developer, or City of San Antonio officials regarding this IFB up until the contract is awarded as outlined in the Instructions to Bidders.

Sealed bids will be received by Counter Services in the Customer Service office across from the Guard Station, 2800 U.S. Hwy 281 North, Customer Center Building, San Antonio, Texas 78212, **until 10:00 AM (CT), August 30, 2019**. Bids will then be publicly opened and read aloud by Contract Administration in CR-C137, Customer Center Building, 2800 U.S. Hwy 281 North, San Antonio, Texas. Each bid must be accompanied by a cashier's check, certified check, or bid bond in an amount not less than five percent of the total bid price.

ITEM	SPEC NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	103.1	REMOVE CONCRETE CURB	LF	50	\$	\$
2	103.3	REMOVE CONCRETE SIDEWALKS & DRIVEWAYS	SF	120	\$	\$
3	202.1	PRIME COAT (0.2 gal/sq yd)	GAL	2120	\$	\$
4	203.1	TACK COAT (0.10 gal/sq yd)	GAL	1060	\$	\$
5	205.2	HOT MIX ASPHALTIC PAVEMENT, TYPE B (10" COMP.DEPTH)	SY	899	\$	\$
6	205.2	HOT MIX ASPHALTIC PAVEMENT, TYPE B (12" COMP. DEPTH)	SY	33	\$	\$
7	205.3	HOT MIX ASPHALTIC PAVEMENT, TYPE C (3" COMP. DEPTH)	SY	443	\$	\$
8	205.4	HOT MIX ASPHALTIC PAVEMENT, TYPE D (2" COMP. DEPTH)	SY	5763	\$	\$
9	205.4	HOT MIX ASPHALTIC PAVEMENT, TYPE D (3" COMP. DEPTH)	SY	2198	\$	\$
10	208.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVEMENT (2" DEPTH)	SY	5763	\$	\$
11	209.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVEMENT (3" DEPTH)	SY	2641	\$	\$
12	TXDOT 401	FLOWABLE BACKFILL	CY	124	\$	\$
13	500.1	CONCRETE CURB & GUTTER	LF	50	\$	\$
14	502.1	CONCRETE SIDEWALKS	SY	13	\$	\$
15	503.1	PORTLAND CEMENT CONCRETE DRIVEWAYS	SY	350	\$	\$
16	506	CONCRETE RETAINING WALL	CY	6	\$	\$
17	509.1	METAL BEAM GUARD RAIL	LF	30	\$	\$
18	515.1	TOPSOIL (4")	CY	11	\$	\$
19	516.1	SODDING	SY	103	\$	\$
20	SS 518.2	TREE PROTECTION - LEVEL IIB	EA	3	\$	\$
21	530.7	BARRICADES, SIGNS, AND TRAFFIC HANDLING - CALHOUN	LS	1	\$	\$
22	530.7	BARRICADES, SIGNS, AND TRAFFIC HANDLING - MLK DRIVE	LS	1	\$	\$
23	530.7	BARRICADES, SIGNS, AND TRAFFIC HANDLING - MORNINGVIEW	LS	1	\$	\$
24	535.1	4 INCH WIDE YELLOW LINE	LF	554	\$	\$
25	535.2	4 INCH WIDE WHITE LINE	LF	554	\$	\$
26	540.7	TEMPORARY CONSTRUCTION PERIMETER FENCE (INSTALL/REMOVE)	LF	320	\$	\$
27	550	TRENCH EXCAVATION SAFETY PROTECTION	LF	2180	\$	\$
28	848	8" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (6'-10')	LF	98	\$	\$
29	848	8" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (10'-14')	LF	452	\$	\$
30	848	8" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (>14')	LF	350	\$	\$
31	848	10" ASTM D2241 SDR 26 160 PSI PVC SAN. SEWER LINE (10'-14')	LF	150	\$	\$
32	848	10" ASTM D2241 SDR 26 160 PSI PVC SAN. SEWER LINE (14'-20')	LF	31	\$	\$
33	848	12" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (0'-6')	LF	300	\$	\$
34	848	12" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (6'-10')	LF	633	\$	\$
35	848	12" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (10'-14')	LF	20	\$	\$
36	848	12" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (14'-18')	LF	59	\$	\$
37	848	12" ASTM D2241 SDR 26 160 PSI PVC SAN. SEWER LINE (10'-14')	LF	87	\$	\$
38	852	STANDARD PRECAST 4' DIAMETER MANHOLE (0'-6')	EA	8	\$	\$
39	852	CAST-IN PLACE CONCRETE 4' DIAMETER STANDARD MANHOLE (PERMANENT DOG HOUSE)	EA	1	\$	\$
40	852	STANDARD EXTRA DEPTH MANHOLES (>6')	VF	67	\$	\$
41	852	STD DROP MANHOLE 4' DIAMETER (0'-6')	EA	4	\$	\$
42	854	SANITARY SEWER LATERALS - ASTM D2241 (160 PSI)	LF	1200	\$	\$
43	854	TWO-WAY SANITARY SEWER CLEAN-OUT	EA	40	\$	\$
44	855	RECONSTRUCTION OF EXISTING MANHOLE	EA	1	\$	\$
45	856	12" CARRIER PIPE - PVC SDR 26 ASTM D2241 (RESTRAINED)	LF	314	\$	\$
46	856	30" STEEL CASING	LF	314	\$	\$
47	858	CONCRETE ENCASEMENT, CRADLES, SADDLES, AND COLLARS	CY	40	\$	\$
48	860	VERTICAL STACKS	VF	118	\$	\$
49	864-S1	BYPASS PUMPING (SMALL DIAMETER SANITARY SEWERS) - CALHOUN	LS	1	\$	\$
50	864-S1	BYPASS PUMPING (SMALL DIAMETER SANITARY SEWERS) - MLK DRIVE	LS	1	\$	\$
51	864-S1	BYPASS PUMPING (SMALL DIAMETER SANITARY SEWERS) - MORNINGVIEW	LS	1	\$	\$
52	866	SEWER MAIN POST TELEVISION INSPECTION (8" THROUGH 15" DIA.)	LF	2494	\$	\$
53	SS 2300	CROSSINGS BY GUIDED BORING - 30" DIAMETER	LF	314	\$	\$
54	3300	SANITARY SEWER PRIVATE LATERALS (4"-6")	LF	600	\$	\$
55	SS 7185	ABANDONMENT OF SANITARY SEWER MAIN (8" DIA)	LF	502	\$	\$
56	SS 7185	ABANDONMENT OF SANITARY SEWER MAIN (10" DIA)	LF	450	\$	\$
57	SS 7185	ABANDONMENT OF SANITARY SEWER MAIN (12" DIA)	LF	312	\$	\$
58	SS 7185	ABANDONMENT OF SANITARY SEWER MANHOLE	EA	1	\$	\$
SUBTOTAL (ITEMS 1 - 58)					\$	\$

ITEM	SPEC NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
59	100	Mobilization and Demobilization; Max of 10% of Line Items 1 - 58	LS	1	\$	
60	101	Preparing Right of Way; Max 5% of Line Items 1 - 58	LS	1	\$	

Mobilization and Preparing of Right of Way shall be limited to the maximum percentage shown. If the percentage exceeds the allowable maximum stated for mobilization and/or preparation of Right of Way, SAWS reserves the right to cap the amount at the percentages shown and adjust the extensions of the bid items accordingly.

TOTAL BID PRICE (ITEMS 1 - 58 AND 59-60)					\$	
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STATEMENT OF BIDDER'S EXPERIENCE

**Multiple Sewershed Package 8 Replacement
SAWS Job No. 17-4560
SAWS Solicitation No. CO-00291-SM**

A. Please complete **all** the fields below.

If all fields are not completed, the Bid may be at risk of being rejected due to non-responsiveness. It is not acceptable to indicated "See attached".

Project A-1 is to have been completed by the Bidder.

- Project A-1 demonstrates construction of a minimum of 1,000 LF by open cut construction for sanitary sewer mains 8-inches in diameter or greater.
- Project A-1 shall be a different project than Project A-2 listed.
- Project A-1 shall have been completed between 2014 and 2019.

Project A-1 Description

Name of Project: _____ Location: _____

Scope of work: _____

Pipe Size(s): _____ Pipe Length(s): _____

Owner Contact's Name: _____ Owner Contact's Title: _____

Owner Contact's Phone Number(s): _____

Project Bid Amount: _____ Project Final Amount: _____

Project Start Date: _____ Project End Date: _____

Additional Information: _____

A. Please complete **all** the fields below.

If all fields are not completed, the Bid may be at risk of being rejected due to non-responsiveness. It is not acceptable to indicated "See attached".

Project A-2 is to have been completed by the Bidder.

- Project A-2 demonstrates construction of a minimum of 1,000 LF by open cut construction for sanitary sewer mains 8-inches in diameter or greater.
- Project A-2 demonstrates construction by open cut within TxDOT or CoSA ROW.
- Project A-2 shall be a different project than Project A-1.
- Project A-2 shall have been completed between 2014 and 2019.

Project A-2 Description

Name of Project: _____ Location: _____

Scope of work: _____

Pipe Size(s): _____ Pipe Length(s): _____

Owner Contact's Name: _____ Owner Contact's Title: _____

Owner Contact's Phone Number(s): _____

Project Bid Amount: _____ Project Final Amount: _____

Project Start Date: _____ Project End Date: _____

Additional Information: _____

A. Please complete **all** the fields below.

If all fields are not completed, the Bid may be at risk of being rejected due to non-responsiveness. It is not acceptable to indicated "See attached".

Project A-3 is to have been completed by the Bidder.

- Project A-3 demonstrates experience with gravity sewer main construction that included locating, protecting and working around a high number of existing utilities.
- Project A-3 demonstrates construction of a minimum of 500 LF by open cut method.
- Project A-3 shall have been completed between 2014 and 2019.
- Project A-3 may be the same as Project A-1, Project A-2, or Project A-4 listed, if project meets all the experience requirements required.

Project A-3 Description

Name of Project: _____ Location: _____

Scope of work: _____

Pipe Size(s): _____ Pipe Length(s): _____

Owner Contact's Name: _____ Owner Contact's Title: _____

Owner Contact's Phone Number(s): _____

Project Bid Amount: _____ Project Final Amount: _____

Project Start Date: _____ Project End Date: _____

Additional Information: _____

A. Please complete **all** the fields below.

If all fields are not completed, the Bid may be at risk of being rejected due to non-responsiveness. It is not acceptable to indicated "See attached".

Project A-4 is to have been completed by the Bidder or Bidder's Subcontractor.

- Project A-4 demonstrates experience with guided bore construction methods of sanitary sewer pipe.
- Project A-4 demonstrates construction of a minimum 300 LF of sanitary sewer pipe of 24-inch casing pipe or greater installed using guided bore construction methods.
- Project A-4 shall have been completed between 2014 and 2019.
- Project A-4 may be the same as Project A-1, Project A-2, or Project A-3 listed, if project meets all the experience requirements required.

Project A-4 Description

Name of Project: _____ Location: _____

Scope of work: _____

Pipe Size(s): _____ Pipe Length(s): _____

Owner Contact's Name: _____ Owner Contact's Title: _____

Owner Contact's Phone Number(s): _____

Project Bid Amount: _____ Project Final Amount: _____

Project Start Date: _____ Project End Date: _____

Additional Information: _____

Special Conditions

SECTION 1 - SCOPE OF WORK

The San Antonio Water System is soliciting bids for the purpose of retaining a Contractor for the construction of sanitary sewer mains using open cut, guided boring methods, including sanitary sewer service lateral replacement, and replacement or rehabilitation of associated manholes.

Project locations are sites where sanitary sewer pipeline segments are planned for replacement or installation. There are three (3) project locations: Martin Luther King at Bellinger, Morningview at IH-10 and Calhoun at IH-35 frontage road. All quantities are estimated in the proposal, and it is the intent of the proposal and quantities to establish a fixed unit price for various line items to be paid to the Contractor by SAWS during the term of the contract. No change in the unit price will be made, regardless of the actual quantity of the item of work performed during the term of the contract. Some of the work involved in the project may require but is not limited to installation, replacement, or removal of sidewalks, driveways, concrete curbs, wheelchair ramps, topsoil, sodding, concrete steps, signs, and concrete or asphalt replacement.

SECTION 2 - PROJECT REQUIREMENTS

Contractor shall submit by the pre-construction meeting a project schedule identifying the order in which the project locations will be completed and milestones for each project location. As stated in the General Conditions, the Contractor is required to update the schedule monthly, as part of the Pay Application approval process.

Contractor shall submit a completion report to SAWS when construction is completed.

The completion report shall include but not be limited to the following:

- Pre and post MPEG-1 format and written to CD/DVD video and video logs.
- Any test and/or submittals specified in this contract documents such as density tests, structural properties, etc. that are required.

Special Conditions

2.1 PERFORMANCE TIME

Project locations are sites where sanitary sewer pipeline segments are planned for replacement or installation. The table below shows the project locations as identified in the design plans, contract documents, easement(s) and ROE agreements. The Contractor shall submit and maintain throughout construction, a detailed construction baseline schedule showing sequence of work, to clearly identify the project location construction activities. Contractor shall work on the project locations in the following order: 1. MLK at Bellinger, 2. Morningview at IH-10, and 3. Calhoun at IH-35.

Location No.	Project Location	Scope	Segment(s)/ COMPKEYS*	Permit(s)
1	MLK at Bellinger	Open Cut/Sewer Re-route/New Sewer Installation	1052244	TxDOT and CoSA ROW
2	Morningview at IH-10	Guided Bore Method/Open Cut/New Sewer Installation	1050244	TxDOT, CoSA ROW, CoSA Floodplain Development Permit, and Cosa Arborist
3	Calhoun at IH-35	Open Cut/Sewer Re-route/New Sewer Installation	989390	TxDOT and CoSA ROW

**Please note COMPKEYS pertain to segments that are being abandoned. New COMPKEYS to be assigned by SAWS and reflected on project as-built/redline drawings.*

The Contractor shall not work on more than two (2) project locations concurrently without written approval from SAWS Inspections. Contractor shall only be allowed to move to a new project location after site restoration is completed (including paving restoration) and written approval is obtained from SAWS Inspections. Contractor shall not commence any work until applicable permits are obtained. Copies of these permits shall be kept on site at all times, readily available. Contractor shall always abide by the permitting entities' requirements. Contractor shall provide at least 45 day written advance notice to SAWS prior to commencing activities at a different project location. This will allow time for SAWS to secure the required TxDOT permits.

Final completion of the project, all project locations, shall be achieved in **270 calendar days** from the Notice to Proceed issuance date.

Special Conditions

Project substantial complete can be achieved when the SAWS Inspector and Engineer confirm all the sanitary sewer pipeline and manhole work (replacement, installation, rehabilitation, reconstruction, etc.) has been completed, tested and the sewer system has been accepted for service. The Contractor shall address all Substantial Completion walkthrough punch-list items. As part of the Final Completion the Contractor shall submit final redlines drawings to the Engineer within 30 days of Substantial Completion date.

Final completion shall be achieved when the SAWS Inspector, Engineer, and other pertaining entities confirm punch-list items have been completed and permit(s) can be closed.

2.2 PERMITS:

SAWS will obtain Utility Installation Request/ROW permits from TxDOT in accordance with the project contract documents. Note that TxDOT permits expire if construction has not started within 90 calendar days from the date of original permit issuance unless a permit amendment is requested. If construction has not started within 45 days of original TxDOT permit issuance, Contractor shall provide SAWS written notification to allow time for SAWS to prepare the amendment. The amendment grants an additional 90 days to start construction and only one amendment is allowed per permit. If a permit extends beyond the 180 calendar days or expires prior to Contractor notifying of amendment request, the permit must be resubmitted to TxDOT by SAWS. TxDOT has up to 30 calendar days for review.

Contractor shall provide notification to SAWS if construction has not started 45 calendar days prior to expiration of permit that has already been amended so that SAWS may resubmit the permit request to TxDOT. If Contractor elects to use another bypass route other than that which is specified in the plans, Contractor must include the revised bypass plan within the 45-day advanced notice for SAWS to include in the TxDOT permit submittal. Revised bypass plan must be signed and sealed by a Professional Engineer licensed in the state of Texas. Contractor shall bear delays in construction time and costs incurred for not providing the required advance notice to SAWS prior to the permit expiring. Delays resulting in liquidated damage fees shall also be borne by the Contractor.

SAWS has also obtained all applicable Floodplain Development Permit(s) and CoSA Tree Permit(s) from City of San Antonio. Contractor is responsible for all other required permits per the General Conditions. This includes applying and paying CoSA street cut permits.

Special Conditions

2.3 ACCESS:

Access to project locations defined in the design plans, contract documents, ROE exhibits has been discussed. The Contractor shall carefully review these documents and shall closely coordinate with landowners and their tenants. The Contractor shall bear full responsibility for all actions, damages or impacts of their actions, whether intentionally or not, in or around the project location(s), including correcting said actions at their sole expense.

2.4 CONSTRUCTION ACCESS AND STAGING AREA:

The Contractor shall stake the edges of the Right-of-Entry area(s) (both sides) and easement (s) as indicated in the drawings.

Certain properties with Right-of-Entry area may have schedule limitations that are different than the overall contract duration. Refer to specific limitations of Right-of-Entry Agreements in the Appendix. Contractor shall schedule their work accordingly to complete the project within the Contract Time.

SECTION 3 - SPECIFICATIONS

All work performed shall be in accordance with the Contract Documents and the current San Antonio Water System Specifications for Water and Sanitary Sewer Construction, these Special Conditions, the current Texas Department of Transportation Standard Specification for Construction of Highways, Streets, and Bridges, the current City of San Antonio Standard Specifications for Public Work Construction, City of San Antonio Utility Excavation Criterial Manual, or specifications and requirements of any other governing jurisdiction that may apply.

SECTION 4 - CONSENT DECREE NOTICE PROVISION

The San Antonio Water System (“SAWS”), the United States of America and the State of Texas have entered into a Consent Decree in Civil Action No. 5:13-cv-00666- DAE, United States of America and State of Texas v. San Antonio Water System, in the United States District Court for the Western District of Texas, San Antonio Division (the “Consent Decree”). A copy of the Consent Decree is available at <http://www.saws.org/Infrastructure/EPA/download.cfm>

Work performed pursuant to this contract is work that SAWS is required to perform pursuant to the terms of the Consent Decree. In the event of any conflict between the terms and provisions of this Consent Decree Notice

Special Conditions

Provision and any other terms and provisions of this Contract or the Contract Documents, the terms and provisions of this Consent Decree Notice Provision shall prevail.

A. Retention of documents.

Contractor shall retain and preserve all non-identical copies of all documents, reports, research, analytical or other data, records or other information of any kind or character (including documents, records, or other information in electronic form including, but not limited to e-mails) in its or its sub-contractors' or agents' possession or control, or that come into its or its sub- contractors' or agents' possession or control, and that relate in any manner to this contract, or the performance of any work described

in this contract (the "Information"). This retention requirement shall apply regardless of any contrary corporate or institutional policy or procedure or legal requirement. Contractor, Contractor's sub-contractors and agents shall retain and shall not destroy any of the Information until such time as Contractor has received written approval from the General Counsel of SAWS that the Information or any part of the Information may be destroyed. Contractor shall, within 30 days after receipt of a written request by SAWS, deliver the Information to SAWS. Contractor shall instruct and require its agents and sub-contractors performing any part of the work described in this contract to comply with the requirements of this paragraph.

B. Notification of events that may cause delay.

If any event occurs that may delay performance by Contractor, or Contractor's agents or sub-contractors of any work or obligation of any kind under this contract, Contractor shall provide notice in accordance with the Notice Provisions of this contract to SAWS within two (2) business days of the date Contractor or Contractor's agents or sub-contractors first knew that the event might cause a delay. Contractor shall provide a written explanation and description of the reasons for the delay, the anticipated duration of the delay, all actions taken or to be taken to prevent or minimize the delay, and a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay. **TIME IS OF THE ESSENCE** in the performance of the requirements of this paragraph and of any work to be performed by the Contractor in this contract.

Special Conditions

C. Liability for stipulated penalties.

The Consent Decree provides that the United States of America, the United States Environmental Protection Agency and the State of Texas may assess stipulated penalties against SAWS upon the occurrence of certain events. To the extent that Contractor or Contractor's agents or sub-contractors cause or contribute to, in whole or in part, the assessment of any stipulated penalty against SAWS, Contractor agrees that it shall pay to SAWS the full amount of any stipulated penalty assessed against and paid by SAWS that is caused or contributed to in whole or in part by any action, failure to act, or failure to act within the time required by any provision of this contract. Contractor shall also pay to SAWS all costs, attorney fees, expert witness fees and all other fees and expenses incurred by SAWS in connection with the assessment or payment of any such stipulated penalties, or in contesting the assessment or payment of any such stipulated penalties. In addition to any and all other remedies to which SAWS may be entitled at law or in equity, Contractor expressly authorizes SAWS to withhold all amounts assessed and paid as stipulated penalties, and all associated costs, fees, or expenses from any amount unpaid to Contractor under the terms of this contract, or from any retainage provided in the contract.

- END -

SECTION 02300
CROSSINGS BY GUIDED BORING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. CONTRACTOR shall provide all labor, materials, equipment, supervision and incidentals required to furnish, install, and test casing pipes as shown on the Contract Drawings or specified herein.
- B. The Drawings indicate the smallest diameter casing pipe that is acceptable for each installation. The CONTRACTOR may elect to use a larger diameter casing pipe at his discretion and at no additional cost to OWNER subject to approval by the ENGINEER.
- C. Crossings shall be made at the following location:
 - 1. New 12” sanitary sewer main near Morningview Drive and IH 10 E (30” minimum diameter casing pipe).
- D. Coordination: CONTRACTOR shall carefully coordinate installation of casing pipes and carrier pipes with any other construction activities taking place at each crossing.
- E. Related Sections:
 - 1. Section 02310 – Jacking and Receiving Pits
 - 2. Section 02311– Tunnel Grout
- F. Definitions
 - 1. The following definitions are provided to clarify the trenchless method described in this Section:
 - a. Guided Boring: Trenchless construction method used to install a steel casing pipe by drilling a pilot hole and then pushing the casing into place by boring the ground through the casing.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. ASTM A 53, Specification for Pipe, Steel, Black and Hot-dipped, Zinc-coated, Welded and Seamless.

Addendum No. 2
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- B. ASTM A 106, Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
- C. ASTM A 139, Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over).
- D. ASTM A 153, Specification for Zinc-Coating (Hot Dip) on Iron and Steel Hardware.
- E. ASTM A 307, Specification for Low-Carbon Steel Externally and Internally Threaded Standard Fasteners.
- F. ASTM 500, Specification for Cold-Formed Welded Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- G. ASTM A 569, Specification for Hot-Rolled Carbon Steel Sheets and Strip, Commercial Quality.
- H. ASTM S 252, Welded and Seamless Steel Pipe Piles.
- I. AWS D1.1, Structural Welding Code.
- J. Local and state codes and ordinances.
- K. OSHA.
- L. SAWS Standard Specifications for Construction
- M. TxDOT Standard Specifications for Highway Construction

1.3 SUBMITTALS

- A. Shop Drawings: At least six weeks prior to construction, the CONTRACTOR shall submit shop drawings for Approval by the OWNER including installation methods with detailed drawings and descriptions showing methods and equipment for the installation of the casing pipes and carrier pipes including means and methods for maintaining grade tolerances, as appropriate for each installation method. Drawings and calculations shall be signed and sealed by a registered Professional Engineer in the State of Texas and shall be submitted to ENGINEER for record purposes to ensure that the requirements of the Drawings and Specifications are complied with in full.

- B. Qualifications Data: Submit qualifications data as specified in Paragraph 1.4.A. Qualifications information on successful projects will include as a minimum:
 - 1. Name and telephone of owners or engineers responsible for projects.
 - 2. Approximate contract cost for projects.
 - 3. Description of project including method of installation.
- C. Technical data, test reports, work schedules and any other information indicating compliance with these specifications.
- D. Certificates: Certificate of Conformance in accordance with Paragraph 21.1 of ASTM A139.
- E. Submit an approved highway traffic control plan in accordance TxDOT requirements.
- F. Submit a Safety Plan for all tunnel operations.
- G. Layout and details for Geotechnical and Instrumentation Monitoring Plan for monitoring structures, roadway, and existing utilities.

1.4 QUALITY ASSURANCE

- A. Installer's Qualifications and Experience:
 - 1. Installer shall be a specialist in the construction of casing pipes by guided boring and shall have at least 5 cumulative years of experience in this specialty. Installer shall have satisfactorily constructed completely in his own name, during the past 5 years, not less than three similar installations that are comparable in diameter and length to that shown and specified herein using the proposed installation method required for each location.
 - 2. Use only personnel thoroughly trained and experienced in the skills required. All field supervisors and machine operators shall have at least 12 months of experience in the operations of the equipment being used.
 - 3. Welds shall be made only by welders, tackers and welding operators who have been previously qualified by tests as prescribed in American Welding Society, AWS D.1.1 to perform the type of work required. Show proof of certification when requested by the OWNER'S Project Representative.
- B. Requirements of Regulatory Agencies:
 - 1. The CONTRACTOR shall obtain and pay for all additional permits, provide insurance, bonds, and guarantees, and all else required by the governing authorities.
 - 2. The CONTRACTOR'S responsibility under this paragraph may include, but is not limited to the following:
 - a. Constructing and removing temporary facilities or structures.
 - b. Providing details of construction methods.

- c. Providing detailed construction schedules.
 - d. Reimbursing the applicable governing authority for all expenses incurred in connection with the work.
 - e. Traffic maintenance.
 - f. Coordination of scheduling.
 - g. Clean up and restoration.
- C. Tolerances: The casing pipes shall be installed on the lines and grades shown on the Contract Drawings and within tolerances required to allow the carrier pipe to be installed in accordance with the lines and grades shown on the Contract Drawings and as specified herein.

1.5 DESIGN CRITERIA

A. General Criteria:

1. The thrust block shall be constructed perpendicular to the proposed pipe alignment and shall be designed to withstand the maximum jacking pressure to be used, with a safety factor of at least 2.5. The Contractor shall have the sole responsibility for maintenance and protection of existing utilities, structures, and facilities within the zone of construction.
2. The Contractor shall have the sole responsibility for sizing the shafts within the easements and limits of construction shown on the Contract Drawings. The size of the excavations shall be adequate to construct all structures required and to gain access to tunneling operations for all materials, equipment, and personnel.
3. The Contractor shall carefully monitor machine penetration rate, face pressures (when applicable), and line-and- grade of the drive.
4. The Contractor shall carefully control slurry pressures applied at the tunnel face or around the casing to prevent fracturing of the ground and discharge of slurry to the ground surface.
5. The Contractor shall allow the Engineer and Owner's representative access to the shafts, and to use the shafts to access tunnel operations.

B. Guided Bore Criteria:

1. Guided borings shall be suitable for installation in the ground conditions described in the Geotechnical Report and the diameter and distances shown in the Contract Drawings.
2. Guided borings should be capable of installing the casing to and carrier pipe to the line and grade requirements stated herein.
3. Pilot tube guidance is required and selection of cutter head should match the ground conditions described in the Geotechnical Report without significant deflection or error during installation. This included soft rock conditions and gravel with the possibility of limestone and chert cobbles.

4. The contractor shall repair any damage resulting from surface settlement or heave caused by guided boring operations or jacking and receiving pit excavation and construction at no additional cost to owner.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery:
 1. Exercise special care during delivery not to damage casing pipes and carrier pipes.
 2. Damaged materials will be rejected by the OWNER and replaced by the CONTRACTOR at his expense.
 3. Deliver materials to such locations so as to avoid excessive handling.
- B. Storage:
 1. Store casing pipe, and conduits on approved blocking for protection from corrosion until incorporation into the Work in accordance with manufacturer's recommendation.
 2. The OWNER shall be permitted access to inspect the materials in storage areas.
- C. Handling:
 1. Handle materials in a manner so as to avoid damage.
 2. Materials damaged during handling shall be repaired or replaced as ordered by the OWNER.

1.7 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive OWNER of other rights or remedies OWNER may otherwise have under the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by CONTRACTOR under the Contract Documents. The obligations of CONTRACTOR under the Contract Documents shall not be limited in any way by the provisions of the specified warranty.
- B. Special Warranty on Materials and Equipment: Provide manufacturer's written warranty, running to the benefit of OWNER, agreeing to correct, or at option of OWNER, remove or replace materials or equipment specified in this Section found to be defective during a period of 1 year after the date of Substantial Completion.

1.8 SITE CONDITIONS

- A. Existing Site Information: Geotechnical investigation information is available, for reference only.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Casing Pipe:
1. Casing pipe shall be steel pipe meeting the requirements of ASTM A139, Grade B, leakproof construction. Pipe shall be seamless or have not more than one longitudinal weld.
 2. Inside diameter and minimum nominal thickness shall be as shown on the Contract Drawings unless approved by the ENGINEER otherwise. Actual thickness shall be determined by the casing installer, based on an evaluation of the required forces to be exerted on the casing when jacking. Any buckling of the casing due to jacking forces shall be repaired at no additional cost to OWNER.
 3. Steel pipe shall have a minimum yield strength of 35,000 psi shall also meet the chemical requirements of ASTM A36.
 4. If the casing pipe is furnished in sections and the casing pipe requires field welding, then casing pipe shall be furnished with plain ends, mill beveled for field butt-welding. Field welded joints shall be performed by AWS D.1.1 certified welders and be full penetration single-vee groove, butt type welds around the entire circumference of the pipe. All welding shall receive non-destructive testing. Copies of test reports shall be submitted the OWNER.
- B. Cement Grout: Provide grout in accordance with Section 02311– Tunnel Grout.

2.2 EQUIPMENT

1. General The main jacks shall be mounted in a jacking frame and located in the jacking shaft. The excavation shall be moved forward by the jacks advancing a successive string of connected pipes toward a receiving shaft.
2. A pipe lubrication system shall be used to lower the friction developed on the surface of the pipe during jacking operation. A lubricant, typically bentonite or polymers, shall be injected near the excavation face or through lubrication ports. This lubricant is subject to approval by the ENGINEER
3. The pipe lubrication system pressure shall be continuously monitored, recorded, and controlled to prevent pipe buckling and/or ground heave.
4. Thrust block shall be perpendicular to the proposed pipe alignment. The thrust block shall be capable of supporting the maximum jacking pressure developed by the main jacking system.
5. Operate the jacks so as not to exceed 80 percent of their rated capacity. At no time shall jacks be operated so as to exceed the axial capacity of the jacked pipe, including all safety factors. Provide additional jacking capacity, such as intermediate jacking stations, if the jacking requirements shall otherwise exceed 80 percent.

6. When intermediate jacking stations are utilized, the maximum jacking force shall not exceed the maximum allowable jacking load of the pipe
 - A. Guided Boring Equipment:
 1. Manufacturer of the guiding boring system shall have at least 5 years of experience in the design and manufacture of such systems and must still be in the business of manufacturing such devices in the event that site representatives, parts, or other equipment are required. All of the various components and systems, which make up the guided boring system shall be new or reconditioned so that the machine is ready to operate upon installation at the site.
 2. Guided boring systems shall be capable of installing a pilot tube within the grade and line tolerances specified herein up to the distance shown on the contract drawings. The steel casing must be jacked through the pilot tube and can be installed utilizing a specialized cutter heads at the face of the casing or three-pass system.
 3. The guidance system shall consist of a theodolite, laser, and target system that operates in real time during pilot tube operations. It shall be capable of accuracies up to ¼ inch over 400 feet.

PART 3 - EXECUTION

3.1 GENERAL

- A. Lines and Grades: The CONTRACTOR is responsible for maintaining proper line and grade at each crossing.
 1. The CONTRACTOR shall install the center of the casing to within 3 inches of the planned location and such that it does not interfere with flowlines established on the Contract Drawings.
 2. The CONTRACTOR shall periodically check his line and grade to assure conformance with line and grade shown on the Contract Drawings and within the tolerance of ± 3 inches.
 3. Extra work required because of the CONTRACTOR'S failure to maintain the proper line and grade shown on the Contract Drawings, shall be performed by the CONTRACTOR, at no additional cost to the OWNER.
- B. Protection: Guardrail, fences, signs, lights, barricades, barrels, and all other protective items necessary shall be provided in accordance with the requirements of all applicable permits, laws, regulations, and ordinances, and as necessary to prevent damage or injury to private or public property or to workmen or the general public.
- C. Adequately support and protect utilities and facilities that are encountered in or may be affected by the Work.

- D. All excavations shall be sheeted, shored and braced as required to prevent subsurface subsidence in accordance with Section 02310 – Jacking and Receiving Pits.
- E. Construct all pits prior to beginning tunnel (trenchless) excavation.
- F. Boring pits shall be kept dewatered, and pumps shall be attended on a 24-hour basis, if conditions require. Close observation shall be maintained to detect any settlement or displacement of facilities during dewatering operations. Dewater into a sediment trap and comply with applicable environmental protection criteria specified elsewhere in these Contract Documents.
- G. Maintain the air quality in the pipe, when access is required, in a condition suitable for the health of workmen at all times.

3.2 PREPARATION

- A. Work pits at each end of the crossings shall be sufficiently large to permit satisfactory installation of the casing pipe. All excavation, backfill, sheeting, shoring, bracing, and dewatering shall comply with the applicable requirements of the applicable authorities and local, state, and federal regulations and shall be designed in accordance with Section 02310 – Jacking and Receiving Pits.
- B. CONTRACTOR shall dispose of excess excavated material or drilling mud/cuttings in an approved offsite disposal location.

3.3 INSTALLATION

- A. General Installation Requirements
 1. Pipe installation shall be completed in accordance with accepted shop drawings and accepted submittals.
 2. Provide a suitable jacking frame and thrust block to carry out the work. Provide intermediate jacking stations if required to complete the required drives. Intermediate jacking stations shall be provided when the total anticipated jacking force needed to complete the drive exceeds the capacity of the main jacks or the maximum allowable jacking force on the pipe.
 3. Special care shall be taken when setting the pipe guide rails prior to starting the work in the jacking pit to ensure correctness of the alignment, grade, and stability. Survey the location and orientation of the guide rails to ensure they are on the proper line-and-grade and verify that they are properly supported.
 4. Jacking pipe sections shall be handled and transported from the storage area to the jacking pit properly in accordance with the manufacturer's recommendations to avoid damage. Set the jacking pipe sections properly, braced and supported by guide rails.

Join the two sections together following the manufacturer's connection procedures or as indicated in accepted submittals.

5. The axial forces from the thrust jacks shall be distributed to the pipe uniformly through a properly designed thrust ring and cushion materials, as recommended by the pipe manufacturer, to prevent damage to the ends of the pipe. Jacking forces shall be applied uniformly to the pipe wall. The jacking system shall be capable of continuously monitoring the jacking pressure and advance rate.
6. Pipes shall be jacked into position following the design line-and-grade of the pipeline without damaging the pipe. In the event a section of the pipe is damaged during the jacking operation, the pipe shall be jacked through to the receiving shaft and removed. Other methods of repairing the damaged pipe may be used, subject to the acceptance by the Engineer.
7. Provide a lubrication system and inject lubricants through injection ports in the jacking pipe as necessary, to minimize friction. Lubricants shall be injected continuously as the pipe is advanced. The volume injected shall not be less than that required to fill the annular void space outside the pipe.
8. If voids develop around the casing pipe as it is bored, pump cement grout to fill all such voids, or fill by others means acceptable to the OWNER. Fill all voids as specified hereinafter as soon as possible after completion of boring operation. Grouting should be done in accordance with Section 02311 – Tunnel Grout
9. Monitor line-and-grade continuously during operations. Record deviation with respect to design line-and-grade at least once per foot and submit records to the Engineer as requested. Control line-and-grade of the pipe to within the specified tolerances.

B. Installation of Steel Casing Pipe by Guided Boring:

1. Utilize an auger rotating inside the pipe to remove the soil.
2. Borings utilizing this method of installation should be guided by a pilot tube such that proper line and grade is maintained during installation.
3. The use of specialized cutting heads or three-pass systems are acceptable and may be required for the given ground conditions.
3. Install suitable equipment on the front of the casing pipe that will positively prevent the auger and cutting head creating unsupported excavation ahead of the pipe.
4. The equipment used to bore and remove the earth shall be removable from within the casing pipe in the event an obstruction is encountered.
5. If voids develop around the casing pipe as it is bored, pump cement grout to fill all such voids, or fill by others means acceptable to the OWNER. Fill all voids as specified hereinafter as soon as possible after completion of boring operation. Grouting should be done in accordance with Section 02311 – Tunnel Grout

D. Annulus and Contact Grouting:

1. All annulus and contact grouting shall be performed in accordance with Section 02311 – Tunnel Grout.

- E. Obstructions: During casing pipe installation, if an obstruction is encountered which stops the forward action of the casing pipe, and it becomes evident that it is impossible to advance the pipe, the CONTRACTOR must stop work and propose a method for removing the obstruction or providing an alternative crossing location at the approval of the OWNER.

3.4 INSTRUMENTATION AND MONITORING

- A. Coordinate Instrumentation and Monitoring system for tunnel with bore pits as described in Section 02310 – Jacking and Receiving Pits.
- B. CONTRACTOR shall establish a monitoring system to detect movement of utilities within 20 feet and roadway or structures within 50 feet of construction operations.
- C. All movement beyond threshold values established by the Contractor in the approved Instrumentation and Monitoring Plan shall be reported immediately to the ENGINEER and OWNER. The CONTRACTOR shall restore all areas where movement or associated damage has occurred by methods approved by the OWNER at no expense to the OWNER.

++ END OF SECTION ++

**SECTION 02310
JACKING AND RECEIVING PITS**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Design and furnish all labor, materials, equipment, and incidentals required to provide all excavating, sheeting, shoring and supports shown, specified and required for construction of jacking and receiving pits, and other pits as may be required to complete the Work. These shall include a system of supports, including all bracing and associated items, to retain excavations in a safe manner and to control ground movements within tolerable limits. This may also include ancillary items such as reaction blocks, leveling pads, etc. Upon completion of the required tunnel construction, remove the system of supports as specified, and restore the pit and staging area sites.
- B. The size of the pits shall be adequate to construct all structures required. Pit excavations shall be contained within the limits shown on the Drawings. Pit excavation size shall be subject to the review of the ENGINEER.
- C. Pits shall be located at the proposed locations as shown on the Drawings unless otherwise approved by the ENGINEER.

1.2 RELATED SECTIONS

- A. Section 02300 -Crossings by Guided Boring
- B. Section 02311 – Tunnel Grout

1.3 PERMITS AND REGULATIONS

- A. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. See Paragraph 1.6 of Sections 02300.

1.4 REFERENCE STANDARDS

- A. Comply with applicable provisions and recommendations of the following except as otherwise shown or specified.
 - 1. American Institute of Steel Construction (AISC): Manual of Steel Construction, Allowable Stress Design
 - 2. ASTM A36 - Specification for Carbon Structural Steel.
 - 3. ASTM A328 - Standard Specification for Steel Sheet Piling

4. ASTM A992 - Standard Specification for Structural Steel Shapes
5. American Welding Society (AWS) – AWS D1.1 for Public Works Construction
6. OSHA Standard, Title 29, Code of Federal Regulations, Part 1926, Section .650 (Subpart P - Excavations).

1.5 SUBMITTALS

- A. Submit information regarding pit excavations, excavation support systems, and other related information as requested by the ENGINEER a minimum of six weeks prior to tunnel excavation, including the following:
 1. Construction method to be used for the installation for excavation support system design.
 2. Pit locations and sizes.
 3. Shop drawings and design calculations indicating arrangements of supports and construction sequence for proposed support system(s) signed and sealed by a P.E. in the State of Texas.
 4. Breakout plans indicating support installed to transfer loads and maintain excavation support and stability of the excavation when commencing tunneling operations and when holing out in exit pits.
 5. Thrust block/backstop design and details.
 6. Quality control procedures. Address materials testing requirements, proof-test and performance test requirements for tiebacks, and excavation monitoring provisions.
 7. A site plan for each excavation indicating the location, excavation dimensions, site grading, and site development details for the excavation and all work areas, and the proposed limits of disturbance surrounding each excavation.
 8. Provisions for protecting and monitoring adjacent facilities and utilities. All utilities within 20 feet of excavations and all structures within 50 feet of excavations shall be addressed.
 9. Site drainage and groundwater control details. Show details of the measures to control, treat, handle, and dispose of surface water runoff, groundwater, and construction water. Provide details of working slab, subdrains, and sump construction.
 10. Details of materials handling, stockpiling, and disposal sites for excavated materials.

11. Layout and details for Geotechnical and Instrumentation Monitoring Plan for monitoring structures, roadway, and existing utilities.
12. Plans indicating layout of guardrail barrier system around open pits in accordance with OSHA requirements.
13. Plans indicating removal of excavation supports and site restoration details.
14. Plans for environmental controls.
15. Copies of all documentation, releases, and permits required herein and necessary to complete the work. Documentation, releases, and permits shall include but not be limited to imported materials, material disposal, utility disturbances, and affected properties.

1.6 DESIGN CRITERIA

- A. Design pit excavation support systems and working slabs to withstand earth pressures, unrelieved hydrostatic pressures, bottom heave, equipment loads, applicable traffic and construction loads, and other surcharge loads to allow the safe construction of the tunnel or jacked pipe without movement or settlement of the ground beyond specified tolerances, and to prevent damage to or movement of adjacent structures, streets, utilities or the newly installed pipeline or structures.
- B. Design the support system to minimize horizontal and vertical movements, and to protect adjacent utilities from damage. Design support system to maintain the stability of the excavation and provide a factor of safety of at least 1.5 against sliding, global stability, and against bottom heave.
- C. Design a working slab for each pit bottom to provide stable support for guide rails, thrust blocks, and other construction operations.
- D. Design, install, operate, and maintain groundwater control system for excavations to control any groundwater inflows, prevent piping or loss of ground, and maintain stability of the excavation.
- E. Locate pits within the allowable locations indicated on the Contract Drawings unless otherwise approved by the ENGINEER.
- F. Provide temporary concrete safety K-railing and fencing around pit excavations. Provide traffic control around working areas and pits as shown on the Drawings.
- G. Design excavation support systems in accordance with all applicable OSHA requirements.
- H. Review and approval of the CONTRACTOR's plans and methods of construction by the ENGINEER does not relieve the CONTRACTOR of his responsibility to

provide and maintain an adequate support system achieving the specified requirements.

1.7 JOB CONDITIONS

- A. See Paragraph 1.6 of Section 02222.

PART 2 – PRODUCTS – (Not Used)

PART 3 - EXECUTION

3.1 PIT LOCATIONS AND SIZE

- A. Pit construction shall be limited to the locations shown on the Drawings, unless otherwise approved by the ENGINEER. Proposed pits at locations other than those shown on the Drawings shall comply with the following conditions:
 - 1. Alternate Pit Locations: Obtain all approvals, permits and all costs related to the revised pit location; including, but not limited to, traffic control, utility relocation, construction, and restoration.
 - 2. Alternate pit locations proposed by the CONTRACTOR shall not be located such that the sole vehicle access to the adjacent property is closed. Pits shall be located to minimize public inconvenience and impacts to existing facilities.
- B. Pit size shall be adequate for construction of any permanent structures indicated on the Drawings and to provide adequate room to meet the CONTRACTOR's operational requirements for tunnel construction and for backfill. Pit excavations shall be contained within the easement or public right-of-way.

3.2 PIT CONSTRUCTION

- A. Provide pit excavations with a gravel pad or concrete working slab equipped with a sump to pump out construction water and storm water.
- B. The working slab may be left in place for manhole support if the foundation has been reviewed by the ENGINEER prior to placement of the slab and no subsequent disturbance to the foundation has occurred.
- C. Access in and out of the pits for inspections by the ENGINEER or OWNER shall be provided when coordinated with the CONTRACTOR at least 24 hours in advance.

3.3 INSTRUMENTATION AND MONITORING

- A. Install excavation support system monitoring provisions as necessary to assure proper performance of the work and to monitor the deflection of the excavation.

Monitor performance of excavation support system for both horizontal and vertical deflections daily during excavation and at intervals not to exceed seven days following the completion of excavation work until all work in the area is completed.

- B. The CONTRACTOR's Professional Engineer who is responsible for design of the support of excavation system shall estimate horizontal and vertical movements each system and establish Threshold Limits for each surrounding utility, roadway or structure for utilities within 20 feet of the pit and roadways or structures within 50 feet of the pit. Threshold values shall have an Alert and Limit Value for each item to be monitored. Alert values are to be used to increase frequency of monitoring while a Limit Value is the peak value that may be reached. If the Limit Value is reached the CONTRACTOR must stop work associated with the observed movement and implement a Response Plan to abate any further movement. The CONTRACTOR will notify any structure, utility, or roadway owners of the observed movement as well as the ENGINEER and OWNER if either the Alert Value or the Limit Value is reached.
- C. Install excavation support systems in accordance with approved Shop Drawings. If settlement and deflections of supports and pit bottom indicate that support system requires modification to prevent excessive movements, the CONTRACTOR's structural engineer shall redesign and resubmit revised shop drawings and calculations to the ENGINEER at CONTRACTOR's cost.
- D. Submit all monitoring measurements to the ENGINEER within one day from when the measurements are taken.

3.4 MAINTENANCE

- A. Pits shall be kept dewatered, and pumps shall be attended on a 24-hour basis, if conditions require. Maintain close observation to detect any displacement of facilities during dewatering operations. Provide backup systems if dewatering is required to ensure 24-hour dewatering is provided in the event of a failure of the primary system.
- B. Provide adequate ventilation in pits at all times. Air quality in the pit shall be tested continuously during use of the pit.
- C. Provide adequate lighting in the tunnel pit and around equipment being utilized. Power and lighting circuits shall be separated and thoroughly insulated.

3.5 REMOVAL OF SUPPORT SYSTEM

- A. Remove all sheeting, shoring and bracing at the completion of work unless otherwise approved.

3.6 WATER CONTROLS

- A. Provide ground water control and drainage from pits while work is in progress and until adjacent pipe joints have been properly sealed and the pit is properly backfilled.
- B. Divert surface water runoff from the pit and protect the pits from infiltration or flooding by surface water, including discharge from any dewatering operation.

3.7 SAFETY

- A. Security fencing shall be placed around the CONTRACTOR's work area with appropriate signage and lighting.
- B. Construct a railing around the periphery of the pit meeting applicable safety standards.
- C. Properly maintain the fence and railing throughout the period the pit remains open. Repair broken boards, supports, and structural members.
- D. Provide a full cover or other security barrier for each access pit in which there is no construction activity or which is unattended by the CONTRACTOR's personnel.

++ END OF SECTION ++

**SECTION 02311
TUNNEL GROUT**

PART 1 – GENERAL

1.1 DESCRIPTION

1. This section pertains to:
 - a. Contact grouting between the initial support and the ground;
 - b. Contact grouting between low density cellular concrete and the initial support;
 - c. Backfill grout for filling the annular space between the carrier pipe and the initial support and/or excavated tunnel surface.

1.2 RELATED SECTIONS:

1. Section 02310 – Jacking and Receiving Pits
2. Section 02300 - Crossings by Guided Boring

1.3 REFERENCES

1. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only.
2. AMERICAN CONCRETE INSTITUTE (ACI)
 - a. ACI 214 - Recommended Practices for Evaluation of Strength Test Results of Concrete
 - b. ACI 523.1R-92 - Guide for Cast-in-Place Low-Density Concrete
 - c. ACI 523.3R-93 - Guide for Cellular Concretes Above 50 pcf, and for Aggregate Concretes Above 50 pcf with Compressive Strengths Less Than 2,500 psi
3. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
 - a. ANSI B40.1-85 - Gauge - Pressure, Indicating Dial Type - Elastic Element
4. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
 - a. ASTM C33 - Standard Specification for Concrete Aggregates
 - b. ASTM C94 - Standard Specification for Ready-Mixed Concrete
 - c. ASTM C150 - Standard Specification for Portland Cement
 - d. ASTM C311 - Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
 - e. ASTM C494 - Specification for Chemical Admixtures for Concrete
 - f. ASTM C495 - Standard Test Method for Compressive Strength of Lightweight Insulating Concrete
 - g. ASTM C567 - Standard Test Method for Unit Weight of Structural Lightweight Concrete

- h. ASTM C618 - Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
- i. ASTM C796 - Standard Test Method for Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam

1.3 QUALITY ASSURANCE

1. Submit the following shop drawings and documentation describing the tunnel grouting equipment and methods, a minimum of six weeks prior to the start of tunnel excavation:
 - a. Company or consultant specializing in the supply and placement of cellular concrete tunnel backfill shall be capable of developing a mix design, batching, mixing, handling and placing cellular concrete in underground conditions, and shall have furnished cellular concrete on at least three projects of similar type and size. The company or consultant must have the authority to direct the work and shall be on-site full-time during the placement of cellular concrete backfill.
 - b. Superintendent or foreman responsible for mixing and placing cellular concrete tunnel backfill shall have 5 years of experience in similar conditions or slip-lining operations.
 - c. Compression testing of cylinders shall be done by testing laboratory accepted by the Owner and the Engineer.
2. Certifications: Pressure and flow gauges shall conform to an accuracy of no more than one-half (0.5) percent error over the full range of the gauge. The range of the pressure gauge shall not be more than 100 percent greater than the design injection pressure.
3. Manufacturer's Field Representative: The foaming agent material manufacturer shall provide engineering field services to review the project and the material application prior to any preparation; to approve the materials, equipment and procedures to be used; and to approve the setup before production of cellular concrete.
4. Pre-Placement Meeting: Within 48 hours prior to the commencement of cellular concrete backfill operations, schedule a meeting with the Owner and Engineer to review all details of the backfill concrete mix proportions, placement procedures and sequence, blocking and stalling of the tunnel lining, and testing/inspection requirements.

1.4 SUBMITTALS

1. Submit to the Engineer the minimum of six weeks before the scheduled start of the applicable activity.
2. Data: Provide manufacturer's information, including specifications, handling and storage recommendations, and Material Safety Data Sheets for the following:
 - a. Portland Cement: Source, brand and type.
 - b. Foaming Agent: Brand and content.
 - c. Water: Source and temperature.

- d. Fly Ash: Source, brand and type.
 - e. Fine Aggregate: Source, brand, type and sieve test results.
 - f. Admixtures: Brand, content, batching methods, time of introduction, and documentation that shows admixtures have a history of demonstrable satisfactory performance under equivalent conditions and are compatible with all materials in the mix and carrier pipe materials.
3. Working Drawings:
- a. Proposed sequencing, methods, and equipment for mixing, conveying and placing grout. Include information on the batch plant, foam generating system, measures for flow control, valve arrangement at point injection, locations of monitoring gauges, and spacing of injection ports.
 - b. Provide drawings and design calculations for exterior supports and stulling necessary to maintain the carrier pipe in the required positions and alignment during placement of cellular concrete backfill, including methods to maintain and prevent flotation and deformation of the pipe and pipe ends. Deformation of the carrier pipe shall be limited as required by carrier pipe manufacturer and meeting positive flow and grade requirements of the project.
 - c. Provide lift drawings showing the following:
 - (1) Location, extent and volume of placement(s), and sequence of tunnel liner installation and backfill operation.
 - (2) End bulkhead details.
 - (3) Location and sizes of embedded items, including vents, slick lines, pipe sleeves, conduits, inserts and bulkheads.
 - (4) Details for protection of fresh cellular concrete tunnel backfill from water inflows and/or zones of water seepage.
4. Submit details of exterior supports and stulling to prevent flotation and limit deformation of the carrier pipe. Additional supports shall be provided if required by the grouting contractor. The supports shall be designed by a qualified Professional Engineer, licensed in the State of Texas, experienced in the design of such systems. Provide calculations demonstrating that carrier pipe will not be damaged during backfilling operations due to heat of hydration temperatures.
5. Quality Assurance/Control
- a. Mix Design: Provide a mix design by weight of all ingredients. Include air content as determined by ASTM C 796 and wet and dry design densities, as determined by ASTM C567. Include results of at least 10 cylinder compression tests, as determined by ASTM C495, using specified materials, including local aggregate and water.
 - b. Certified cement mill test reports.
 - c. Name and qualifications of independent testing laboratory.
 - d. Quality Control Plan to produce low density cellular concrete, including verification of mix ingredient quality, sampling, storage and testing.

- e. Calibration certificates for gauges.
- f. Qualification Statements for company or consultant responsible for supply and placement of cellular concrete tunnel backfill.
- g. Pour Reports: Provide a formatted report summarizing relevant placement and testing data.

1.5 DESIGN CONSIDERATIONS

1. The minimum acceptable compressive strengths for cellular grout for backfill grout, as determined by ASTM C 495 shall be 300 psi at 7 days and 500 psi at 28 days.
2. The minimum acceptable compressive strength of the contact grout, as determined by ASTM C 109 shall be 50 psi minimum in 4 hours, and 2000 psi at 28 days.
3. Set Time: 2 hours or less, measured in accordance with ASTM C 807.
4. The water dosage shall be between 1.5 times the volume of cement (1.5:1) to 0.75 times the volume of cement (0.75:1).
5. Maximum injection pressure shall not exceed 1 psi per foot of depth below the ground surface at the tunnel crown, or 50 psi, whichever is less.
6. Unless otherwise specified, each cellular concrete mix shall be designed and cellular concrete shall be controlled within the following limits:
 - a. Cement Content: The quantity of Portland cement, expressed in pounds per cubic yard, shall be not less than 770 pounds. At the option of the Contractor and with the approval of the foaming agent material manufacturer, fly ash may be substituted for up to 15 percent of the cement, on the basis of 1.5 pounds of fly ash added for each pound of cement reduction.
 - b. Wet Density: Wet density (unit weight) of the cellular concrete shall be not less than 45 pcf.
 - c. Preformed Foam: Preformed foam shall be generated by combining controlled quantities of air, water, and foaming agent under pressure. Foam shall retain its stability until the cement sets to form a self supporting matrix. The resulting cellular concrete shall have essentially closed cell and low water absorptive characteristics. The concentration of foam agent shall be in accordance with the foaming agent material manufacturer's recommendations. The temperature of the warm water used in performing the foam shall not exceed 80°F.
 - d. Total Foam Volume: The total volume of foam in cellular concrete after placement shall be not more than 16.6 cubic feet per cubic yard.
 - e. Admixtures: The admixture content, batching method, and time of introduction to the mix shall be in accordance with the manufacturer's recommendations for minimum shrinkage and for compliance with these specifications. Admixtures may be used when specifically approved by the foaming agent material manufacturer and shall be in accordance with their recommendations. Calcium chloride and admixtures containing chloride from sources other than impurities in admixture ingredients are not allowed.

- f. Flow Characteristics: the viscosity of the cellular concrete shall be such that it readily flows around the initial support, pipe bracing and other features in the annulus to completely fill all voids. Furthermore, the cellular concrete viscosity shall be such that there is not excessive loss of cellular concrete into the ground.

PART 2 – PRODUCTS

2.1 MATERIALS

1. Portland Cement: Conform to ASTM C150, Type II, low alkali.
2. Foaming Agent: Conform to manufacturer's requirements, as tested by ASTM C796.
3. Water (pH not less than 6.7): Must not contain impurities, suspended particles, algae or dissolved natural salts in quantities that will cause corrosion of reinforcing steel or volume change that will increase shrinkage cracking.
4. Fly Ash: Conform to ASTM C618, Class F.
5. Fine Aggregate: Conform to ASTM C33.
6. Admixtures: Conform to ASTM C494.

2.2 EQUIPMENT

1. General
 - a. Use equipment for mixing and injecting cellular concrete which is designed for underground backfill grouting service. Maintain equipment in good operating condition, capable of satisfactorily mixing, agitating and forcing cellular concrete backfill into injection ports at a uniform flow rate under the required constant pressure.
 - b. Backfill grouting equipment shall be configured so flushing can be accomplished with grout intake valves closed, with water supply valve open, and with grout pump running at full speed.
 - c. An adequate inventory of spare parts or backup equipment shall be provided to ensure that operable backfill grouting equipment is available at all times during the work. Maintain sufficient quantities of spare pressure gauges, stop valves, and other wear parts on site.
2. Batching, Mixing and Pumping Equipment
 - a. Batching, mixing and pumping equipment shall be compatible and of sufficient size and capacity to place cellular concrete to distances and volumes proposed by the Contractor.
 - b. Provide graphical or digital printout record of batch scale readings, accurate to one (1) pound, of the dry mix ingredients before delivery to mixer.
 - c. Provide a cellular concrete mixer capable of providing a homogenized mix. Mixer shall have a water meter, accurate to one-tenth of a cubic foot, for measuring amount of mixing water added to dry mix ingredients. Batch mixing or continuous mixing foam

generating systems may be used, subject to the following requirements.

- (1) Batch Mixing System: Cement shall be super wetted using high shear/high energy mixing blades. Mixer drum size shall be four (4) cubic yards or larger. Foam generating equipment shall be calibrated to produce high-grade uniform foam.
 - (2) Continuous Mixing System: Equipment shall be equipped with digital readout for RPMs on proportional equipment. Cement shall be super wetted using a high shear/high energy colloidal pump. Colloidal remixer shall be four (4) cubic yards or larger.
- d. A foam generator shall be used to produce a predetermined quantity of preformed foam which shall be injected into the mixer and blended with the cement slurry. The foam generator shall be timer-controlled to repetitively discharge a pre-selected quantity or to discharge continuously at a fixed rate. Foam generating equipment shall be tested and calibrated for dilution percentage, density and volume output.
 - e. Provide a mechanical agitator to serve as a holding tank between the mixer and the pump to allow continuous pumping.
 - f. Specially designed batch mixers may be used in conjunction with surge hopper equipped pumps. The rates of mixing and pumping shall be properly adjusted and a continuous flow of cellular concrete shall be obtained at the point of placement.
 - g. Provide pumping equipment to handle the volume of cellular concrete to be conveyed without segregation. Operate all pumping so that a continuous stream of cellular concrete, without air pockets, is conveyed. Equip pump with measures to prevent sudden excessive grout pressure from developing. Piston pumps shall be used for pumping of cellular concrete.
3. Injection Hoses and Connections
- a. Use hose of proper type and diameter to withstand maximum injection pressures used.
 - b. At the point of injection, suitable valves and calibrated pressure gauges shall be provided so that the pressure and grout flow at the grout hole may be regulated and monitored. A meter shall be provided to measure the total volume of grout pumped into each hole. Provide, at or very near the point of injection, a system of valves in the line transporting the grout that will allow easy access for collection of test specimens. Provide an automatic bypass valve set to the maximum pressure specified.
 - c. Injecting connections shall be a minimum of 2 inches in diameter.
 - d. Provide suitable stop valves at collar of hole for use in maintaining pressure, as required, until grout has set.

4. Pressure Gauges
 - a. Pressure gauges shall be oil-filled and attached to a saddle-type diaphragm seal to prevent clogging with cellular concrete.
 - b. All gauges shall be certified and calibrated in accordance with ANSI B40.1, Grade 2A.

PART 3 – EXECUTION

3.1 SOURCE QUALITY CONTROL

1. Cement mill test reports shall be provided for every batch of slurry.
2. Sample and test fine aggregate in accordance with ASTM C33, at the frequency specified in the approved Quality Control Plan.
3. Sample and test fly ash in accordance with ASTM C311 for every 400 tons used.
4. Provide delivery and measuring of materials from batching equipment to within accuracies specified in ASTM C94. Test scales periodically in a manner and at intervals in the Quality Control Plan.
5. Foam shall be introduced to the slurry by volume of the preformed foam to time. Foam generating equipment shall be tested and calibrated each day for dilution percentage, density and volume output.
6. The batching system shall be capable of maintaining slurry unit weight ± 2 percent of the design unit weight.
7. Slurry unit weight at the batch plant shall be checked at least twice per hour per ASTM C796, noting the time and temperature.
8. A Mix Design Ticket shall be prepared each day. Tickets shall identify the mix, wet unit weight, and the amount of each material in the mix.
9. Unit Weight Measurement: Cellular concrete shall be tested for unit weight at the point of injection (placement), in accordance with ASTM C567, every 60 minutes and for each batch that is sampled for compression test. The unit weight of the cellular concrete at the point of placement shall be within 2 percent of the design unit weight.
10. Compression Test Cylinders: One set of four compression test cylinders (3-inch by 6-inch) shall be cast for every 200 cubic yards of cellular concrete, with a minimum of one set per day. Test cylinders shall be sampled at the point of injection in accordance with ASTM C495. If fly ash is used, an additional set will be taken each day. Care shall be taken to ensure that cylinder samples are not jostled or moved prior to the initial set.
11. Compression Testing: Two cylinders shall be tested at an age of 7 days and the remaining two cylinders shall be tested at an age of 28 days. If fly ash is used, two additional cylinders shall be tested at 56 days. Cellular concrete shall be tested for unconfined compressive strength in accordance with ASTM C495.
12. Batching and placement shall cease immediately if the mix does not meet the design unit weight. Corrective actions shall be taken before recommencing batching and placement.

13. Documentation: A Pour Report and a Mix Design Ticket shall be prepared each day and be distributed to the Engineer.

3.2 DELIVERY STORAGE AND HANDLING

1. All manufactured products shall be delivered, stored and handled per manufacturers' instructions.

3.3 SEQUENCING AND SCHEDULING

1. Blocking, stalling and cellular concrete backfill operations shall be coordinated with installation of the carrier pipe

3.4 VERIFICATION OF CONDITIONS

1. Layout: Contractor shall provide as-built documents and records to the cellular concrete backfill contractor or consultant before installation.
2. Notification: Contractor shall notify the Owner/Engineer, in writing, of unsatisfactory conditions that would cause defective installation or latent defects in workmanship or curing of the cellular concrete backfill.
3. Acceptance: Proceeding with installation of grout work means acceptance of existing conditions.

3.5 PREPARATION, BATCHING, AND PLACEMENT OF CELLULAR CONCRETE

1. Before installation of the carrier pipe, provide protection of fresh cellular concrete backfill from water inflows and/or zones of water seepage in excess of 5 gpm.
2. Upon completion of installation of the carrier pipe, but prior to placement of cellular concrete backfill, Contractor shall install a bulkhead at each end and appropriate venting.
3. Batching: Slurry shall be batched mechanically in a manner ensuring consistency of the mix. All solids shall be thoroughly wetted before the introduction of the foam. Excessive mixing shall be avoided in order to reduce the possibility of changes in unit weight and consistency.
4. Mixing: A foam generator shall be used to produce a predetermined quantity of pre formed foam which shall be injected into the mixer and blended with the cement slurry. Foam shall be introduced per the foam concentrate manufacturer's recommendations using approved foam generating equipment. Continuous generating systems shall be used.
5. Placement
 - a. Limits of each cellular concrete placement shall be predetermined by the Contractor based on size and capacity of the batching equipment and initial set time of the proposed cellular grout.
 - b. At the Contractor's option, bulkheads may be constructed at the end of each reach of pipe to be backfilled.
 - (1) Bulkheads shall be constructed so the annular space will be completely backfilled.
 - (2) Bulkheads shall incorporate a minimum 2-inch diameter drain pipe in the invert of the tunnel to facilitate drainage of water

- during concrete backfilling. This pipe shall be securely capped and plugged once cellular concrete backfill begins to flow from the drain line.
- (3) An opening shall be provided in the tunnel crown to allow entrapped air to escape. Vent outlets shall be provided as required.
- c. The placement of cellular concrete backfill shall be by means of outlets in the final tunnel liner (carrier pipe). The size of the outlets shall be as shown on the plans or as determined by the Contractor and pipe manufacturer.
 - (1) Placement of cellular concrete at any outlet shall not exceed the period of time equal to the initial set time of the proposed mix.
 - (2) Placement of lifts or stages of cellular concrete on a previous lift of cellular concrete shall be delayed a minimum of 12 hours.
 - d. Backfilling of the annular space shall be accomplished by placing the concrete in multiple lifts. Alternatively, monolithic placement procedures may be used, provided the Contractor demonstrates that this technique will not induce flotation or unacceptable deformation of the carrier pipe.
 - e. For multiple lifts, the following shall apply:
 - (1) Connect multiple 2-inch minimum I.D. grout hoses to opposing outlets in the springline. Use two hoses injecting concrete simultaneously to prevent side movement of the pipe.
 - (2) Inject concrete until flow is visible at the next pair of outlets downstream to ensure a fairly level lift.
 - (3) A full reach of tunnel shall be completed in one lift before the second lift (topping-out concrete) is injected. For the topping-out lift, follow the procedure given below.
 - f. For monolithic or topping-out lifts, the following shall apply:
 - (1) Utilize outlets located in the crown of the tunnel. Monolithic lifts shall utilize springline outlets for inspection.
 - (2) Connect single or multiple 2-inch minimum I.D. grout hose(s) to outlets in the tunnel lining.
 - (3) Inject cellular concrete until either maximum allowable pressure is achieved, or concrete flows from the next outlet downstream, or until the maximum injection time is achieved (initial design set time or viscosity change).
 - h. The gauged pumping pressure shall not exceed the liner pipe manufacturer's recommendations.
 - i. The Contractor shall maintain a supply of water in the tunnel at the location of the cellular concrete backfilling operation to facilitate flushing of injection lines or outlets.

3.6 CLEANING

1. Equipment shall be maintained and cleaned thoroughly each day. Hydrocarbons shall be prohibited from entering the pumping chamber.
2. On completion of each cellular concrete or contact grouting placement, wash down the pipe interior.
3. On completion of all the cellular concrete backfill, including any required contact grouting, remove all waste material, spilled grout or concrete, and all timber and construction debris. Leave the tunnel in a clean condition.

++ END OF SECTION ++

STORM WATER POLLUTION PREVENTION PLAN:

1. THE CONTRACTOR SHALL PREPARE A STORM WATER POLLUTION PREVENTION PLAN AND PROVIDE A COPY OF THE SW3P PLAN TO SAWS AND THE ENGINEER PRIOR TO BEGINNING CONSTRUCTION.
2. THE CONTRACTOR SHALL PROVIDE CONTROL MEASURES TO PREVENT OR MINIMIZE THE IMPACT TO THE EXISTING MUNICIPAL SEPARATE STORM WATER SYSTEM. THE SW3P IS TO BE ADJUSTED AND UPDATED AS THE PROJECT PROGRESSES TO MEET COMPLIANCE WITH PERMIT AND ORDINANCE.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND APPROPRIATE DISPOSAL OF ANY PROJECT CONTROL MEASURES NOT INCORPORATED AS A PERMANENT CONTROL WHEN FINAL STABILIZATION HAS BEEN OBTAINED ON THE PROJECT. REMOVAL OF TEMPORARY CONTROL MEASURES, INCLUDING DISPOSAL OF SILT FENCING, ROCK, GRAVEL, OR OTHER MATERIALS WILL NOT BE MEASURED OR PAID FOR SEPARATELY.
4. CONTRACTOR SHALL CLEAN JOB SITE EVERY FRIDAY, ANY DEBRIS TRACKED ON EXISTING PAVEMENT SHALL BE CLEANED WITH A VACUUM STREET SWEEPER WITHIN 24 HOURS. IF CONTRACTOR DOESN'T COMPLY, OWNER MAY DISPATCH A DIFFERENT CONTRACTOR/SAWS PERSONNEL AND/OR WITHHOLD AND/OR DEDUCT PAYMENT FROM PRIME CONTRACTOR FOR ADDITIONAL EXPENSE INCURRED BY THE OWNER.

TxDOT, CITY OF SAN ANTONIO, BEXAR COUNTY RIGHT-OF-WAY NOTES:

1. CONTRACTOR SHALL COMPLY WITH ALL TxDOT, CITY OF SAN ANTONIO, AND/OR BEXAR COUNTY PERMIT REQUIREMENTS.
2. RIGHT-OF-WAY SHALL BE CLEARED DAILY. STOCKPILING OF MATERIAL/SPOILS WITHIN THE RIGHT-OF-WAY IS PROHIBITED UNLESS APPROVED BY PUBLIC WORKS OF ENTITIES INVOLVED. NO WASTE MATERIAL SHALL BE PLACED WITHIN A FLOOD PLAIN OR DRAINAGE WAY IN A MANNER THAT BLOCKS OR ALTERS THE FLOW OF THE EXISTING STORMFLOW.
3. NO TRENCHES SHALL BE LEFT OPEN DURING PERIODS OF NON-CONSTRUCTION OR OVERNIGHT WITHOUT THE PRIOR APPROVAL OF THE TxDOT/CITY/COUNTY ENGINEERS DEPARTMENT. IF TRENCHES ARE LEFT OPEN, SUCH TRENCHES SHALL BE SECURED WITH CONCRETE TRAFFIC BARRIERS OR OTHER ALTERNATIVE PROTECTIVE MEASURES ACCEPTABLE TO THE TxDOT/CITY/COUNTY ENGINEER.
4. ALL DRIVEWAYS WITHIN THE CITY/COUNTY RIGHT-OF-WAY, WHICH ARE DAMAGED BY CONSTRUCTION, SHALL BE REPLACED WITH CONCRETE OR ASPHALT WITHIN THE LIMITS OF THE RIGHT-OF-WAY. ALL LANDOWNERS OR TENANTS IMPACTED BY THE DRIVEWAY CONSTRUCTION SHALL BE NOTIFIED 5 DAYS PRIOR TO SUCH CONSTRUCTION. TEMPORARY ACCESS TO HOMES OR PROPERTY SHALL BE MAINTAINED DURING RECONSTRUCTION OF DRIVEWAYS.
5. ALL EXISTING ROADWAY SURFACES DAMAGED BY CONSTRUCTION SHALL BE RESURFACED FROM EDGE OF PAVEMENT TO EDGE OF PAVEMENT WITH A SURFACE COAT APPROVED BY THE TxDOT/CITY/COUNTY ENGINEER'S OFFICE.
6. IN AREAS WHERE THE EDGE OF THE TRENCH IS WITHIN 4 FEET OF THE EDGE OF PAVEMENT, THE TRENCH SHALL BE BACKFILLED WITH THE QUICKSET FLASHFILL MIX OR No 2 CRUSHED LIMESTONE COMPACTED TO 95% DENSITY. THE QUICKSET/FLASHFILL DESIGN MIX SHALL HAVE LESS THAN 1% SHRINKAGE AND SHALL BE BASED ON THE FOLLOWING SAND (2200#), FLY ASH (500#), WATER (APPROX. 350#) WITH ALL MATERIALS MEETING ASTM STANDARDS.
7. NATURAL AREAS WITHIN THE RIGHT-OF-WAY WHICH ARE DISTURBED BY CONSTRUCTION SHALL BE REVEGETATED AT NO SEPARATE PAY. THESE AREAS MAY BE HYDROMULCHED IN ACCORDANCE WITH CITY OF SAN ANTONIO OR TxDOT CRITERIA FOR SUCH WORK. VEGETATIVE WATERING SHALL BE PROVIDED BY CONTRACTOR WITH NO SEPARATE PAY.
8. CONTRACTOR SHALL REPLACE ALL EXISTING TRAFFIC CONTROL SIGNAGE DAMAGED BY CONSTRUCTION AT NO SEPARATE PAY. INSTALLED SIGNS SHALL BE CONSTRUCTED AND INSTALLED IN CONFORMANCE WITH CURRENT TxDOT/CITY/BEXAR COUNTY STANDARD.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ITS ORIGINAL OR BETTER CONDITION. ANY DAMAGE DONE TO EXISTING FENCES, CONCRETE ISLANDS, STREETS PAVING, CURBS, SHRUBS, BUSHES OR DRIVEWAYS. (NO SEPARATE PAY ITEM)
10. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE RECORDS AND ARE NOT GUARANTEED BUT SHALL BE INVESTIGATED AND VERIFIED BY THE CONTRACTOR BEFORE STARTING WORK. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE TO AND FOR THE MAINTENANCE AND PROTECTION OF THE EXISTING UTILITIES EVEN IF THEY ARE NOT SHOWN ON THE PLANS. LOCATION AND DEPTH OF EXISTING UTILITIES SHOWN HERE ARE APPROXIMATE ONLY. ACTUAL LOCATIONS AND DEPTHS MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION AND SHALL BE RESPONSIBLE FOR PROTECTION OF SAME DURING CONSTRUCTION.
11. THE CONTRACTOR SHALL PROVIDE THE TxDOT/CITY/COUNTY WITH AN EMERGENCY TELEPHONE NUMBER FOR EVENINGS, WEEKENDS, AND HOLIDAYS BY THE FIRST WORKING DAY OF THE PROJECT. THIS TELEPHONE NUMBER MUST BE COMMERCIAL ANSWERING SERVICE. THE ANSWERING SERVICE MUST BE ABLE TO CONTACT THE CONTRACTOR AND THE CONTRACTOR RESPOND BACK TO THE COUNTY STAFF WITHIN TWO HOURS OF THE INITIAL CONTACT.

ACCESSIBILITY REQUIREMENTS:

- THE CONTRACTOR SHALL PROVIDE AND MAINTAIN VEHICULAR AND PEDESTRIAN ACCESS AT ALL TIMES TO LOCAL RESIDENCES AND BUSINESSES.
1. WHEN THE WORK REQUIRES THE EXCAVATION OF THE STREET AND THE REMOVAL OF THE EXISTING DRIVEWAY APPROACHES AND SIDEWALKS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ALL-WEATHER ACCESS TO THE BUSINESSES AND RESIDENCES. THE TEMPORARY DRIVEWAY APPROACHES SHALL BE CONSTRUCTED WITH FLEXIBLE BASE OR GRAVEL MATERIAL AT NO SEPARATE COST TO THE CITY.
 2. PRIOR TO INITIATING THE CONSTRUCTION OF NEW DRIVEWAY APPROACHES, THE CONTRACTOR SHALL GIVE ADVANCE WARNING IN PERSON OR IN WRITING OF AT LEAST 48 HOURS TO EACH RESIDENCE THAT WILL BE IMMEDIATELY AFFECTED SO THAT ALTERNATE PLANS MAY BE MADE BY THE RESIDENTS.
 3. THE CONTRACTOR SHALL MAINTAIN CONTINUOUS ACCESS TO ALL INTERSECTING STREETS UNLESS OTHERWISE SHOWN ON THESE PLANS. WHEN CONTINUOUS ACCESS IS SCHEDULED TO BE BLOCKED, THE CONTRACTOR SHALL CONTACT THE DISPATCHERS FOR THE FIRE DEPARTMENT AT 210-207-2257 TO APPRAISE THEM OF THE PENDING STREET CLOSURE AT LEAST 48 HOURS IN ADVANCE. IF THE CLOSURE FALLS ALONG A BUS ROUTE, THE CONTRACTOR SHALL ALSO CONTACT THE PROJECT MANAGER.
 4. THE CONTRACTOR SHALL PROVIDE ACCESS FOR ALL DELIVERY OF MAIL BY THE U.S. POSTAL SERVICE FOR ALL DELIVERABLES & COLLECTIONS. (FEDEX, PROPANE/GAS, GARBAGE, RECYCLING, AND ORGANICS COLLECTION...ETC.)

TREE PROTECTION AND PRESERVATION NOTES:

TREE PROTECTION AND PRESERVATION NOTES ARE INCLUDED IN CITY OF SAN ANTONIO TREE PROTECTION STANDARD DETAILS.

CONSTRUCTION SCHEDULE/PHASING:

PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL PREPARE A DETAILED PROJECT CONSTRUCTION SCHEDULE THAT DEMONSTRATES COMPLIANCE WITH THE PROPOSED CONTRACT TIME.

CPS ENERGY NOTE:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 1-800-344-8377, 48 HOURS BEFORE BEGINNING ANY EXCAVATION. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.181, CPS ENERGY MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN PROJECT AREA.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING CPS ENERGY OVERHEAD AND UNDERGROUND ELECTRIC FACILITIES IF ADJACENT TO WORK AREAS.
3. CONTRACTOR TO COORDINATE WITH CPS ENERGY AND FIELD VERIFY THE DEPTH OF GAS MAINS BEFORE BEGINNING OF CONSTRUCTION.
4. POWER POLES ARE TO BE BRACED BY THE CONTRACTOR, IF NECESSARY. (NSPI)

NOTE FOR THE CITY OF SAN ANTONIO FLATWORK:

ALL LIMITS FOR CURB, SIDEWALK, AND TREE PREP BEYOND WHAT IS CONSIDERED INCIDENTAL TO NORMAL UTILITY CONSTRUCTION WILL BE ADDRESSED BY THE SAWS INSPECTOR. SAWS INSPECTOR WILL ALSO DETERMINE IF ADDITIONAL COMPENSATION IS WARRANTED IF LIMITS EXCEED INCIDENTALS.

AT&T NOTES:

1. THE EXISTENCE AND LOCATION OF UNDERGROUND CABLE INDICATED ON THE PLANS ARE TAKEN FROM THE BEST RECORDS AVAILABLE AND ARE NOT GUARANTEED TO BE ACCURATE.
2. THE CONTRACTOR SHOULD CALL FOR LOCATES THROUGH THE "ONE CALL" UTILITY LOCATE SERVICE (1-800-545-6005) 48 HOURS PRIOR TO CONSTRUCTION/ EXCAVATION WORK. CONTRACTORS HAVE THE RESPONSIBILITY TO PROTECT AND SUPPORT TELEPHONE COMPANY PLANT DURING CONSTRUCTION.

VIA NOTES:

1. THE CONTRACTOR SHALL NOT REMOVE OR ADJUST ANY VIA ASSETS.
2. THE CONTRACTOR MUST CONTACT VIA DISPATCH ((210)362-5020) 48 HOURS PRIOR OF ANY WORK IN THE VICINITY OF A VIA BUS STOP.
3. THE CONTRACTOR IS REQUIRED TO REPLACE ALL FLATWORK REMOVED OR DAMAGED IN THE COURSE OF EXECUTING THE CONTRACT UNLESS OTHERWISE NOTED BY VIA.
4. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING VIA FACILITIES IF ADJACENT TO WORK AREA.

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 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 OF 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.

TRENCHLESS TUNNELING GENERAL NOTES:

1. PERFORM TRENCHLESS TUNNEL INSTALLATIONS IN ACCORDANCE WITH DETAILS ON THESE PLANS AND SPECIFICATION SECTION 02300 - CROSSINGS BY GUIDED BORING OR MICROTUNNELING.
2. DESIGN AND INSTALL TEMPORARY SHORING SYSTEMS, REACTION BLOCKS, AND OTHER ANCILLARY ITEMS FOR TRENCHLESS OPERATIONS IN ACCORDANCE WITH SPECIFICATION SECTION 02310 - JACKING AND RECEIVING PITS.
3. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DESIGN OF THE SUPPORT OF EXCAVATION SYSTEMS FOR JACKING AND RECEIVING PITS AND SHALL MEET ALL OSHA GUIDELINES, STATE AND LOCAL REQUIREMENTS AND ENSURE THE SAFETY OF ALL PERSONNEL IN AND AROUND THESE PITS.
4. CONTRACTOR SHALL PROTECT ALL SURROUNDING UTILITIES, ROADWAYS, AND OTHER STRUCTURES DURING TRENCHLESS OPERATIONS TO PREVENT SETTLEMENT, MOVEMENT, VIBRATIONS OR OTHER DISTURBANCES TO THE EXISTING SITE CONDITIONS AND REPAIR OR REPLACE ALL DAMAGE TO THEIR ORIGINAL CONDITION UNLESS OTHERWISE INDICATED IN THE CONTRACT DOCUMENTS.
5. CONTRACTOR IS TO PROTECT, RELOCATE, OR TEMPORARILY SUPPORT ANY UTILITIES CROSSING THE PROPOSED RECEIVING PIT AND SUBMIT SIGNED AND SEALED PLANS FOR PROTECTING THESE UTILITIES IN ACCORDANCE WITH SPECIFICATION SECTION 02300 - CROSSING BY GUIDED BORING.
6. TRENCHLESS CROSSINGS MAY BE INSTALLED BY MEANS OF GUIDED BORINGS AND STEEL CASING SHALL BE UTILIZED FOR TEMPORARY SUPPORT AS SPECIFIED.
7. PROPER VENTILATION AND SAFETY PRECAUTIONS SHALL BE PROVIDED FOR ALL PERSONNEL ENTERING ANY PORTION OF THE CASING (IF REQUIRED) AND THE CONTRACTOR SHALL FOLLOW ALL OSHA AND MSHA REQUIREMENTS FOR SAFETY..
8. CONTRACTOR MAY SUBMIT ALTERNATIVE DESIGNS FOR CONSIDERATION BY THE ENGINEER OF RECORD AND THE OWNER FOR ACCEPTANCE.

CITY OF SAN ANTONIO FLOOD PLAIN NOTES:

1. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN ALL REQUIRED STORM WATER PERMITS, FEES, AND APPROVALS. NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THOROUGHLY REVIEWED ALL PERMITS REQUIRED FOR CONSTRUCTION IN DRAINAGE EASEMENTS, RIGHT-OF-WAYS, AND FLOODPLAINS.
2. THE CONTRACTOR SHALL NOTIFY STORM WATER ENGINEERING AT LEAST 24 HOURS PRIOR TO THE INSTALLATION OF ANY DRAINAGE FACILITY WITHIN A DRAINAGE EASEMENT OR STREET RIGHT-OF-WAY NOT INDICATED ON THE CONSTRUCTION PLANS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING DRAINAGE FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING DRAINAGE SYSTEMS, WHETHER OR NOT SHOWN ON THE PLANS, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AT HIS EXPENSE. THE CONTRACTOR SHALL NOTIFY STORM WATER ENGINEERING AT 210-206-8433 AS SOON AS CONFLICTS WITH UTILITIES ARE ENCOUNTERED OR ANY DRAINAGE SYSTEM IS DAMAGED DURING CONSTRUCTION.
4. CONSTRUCTION SPOILS WILL NOT BE ALLOWED TO BE DEPOSITED ANYWHERE WITHIN A DRAINAGE EASEMENT, RIGHT-OF-WAY, OR FLOODPLAIN WITHIN THE LIMITS OF THE PROJECT AND SHALL BE DEPOSITED OFF SITE IN COMPLIANCE WITH CURRENT APPLICABLE REGULATIONS.
5. NO STRUCTURE, FENCES, WALLS, LANDSCAPING, OR OTHER OBSTRUCTIONS THAT IMPEDE DRAINAGE SHALL BE PLACED WITHIN THE LIMITS OF THE DRAINAGE EASEMENTS SHOWN ON THE CONSTRUCTION DOCUMENTS.
6. UPON COMPLETION OF TRENCHING, THE AREA WILL BE BACKFILLED AND COMPACTED TO ITS ORIGINAL CONDITION. TRENCHES/BORE PITS TO BE OPEN AND UNATTENDED LONGER THAN 24 HOURS SHALL BE PROTECTED TO WITHSTAND ALL HYDRODYNAMIC FORCES AND PREVENT DOWNSTREAM IMPACTS. TRENCHES/BORE PITS TO BE OPEN LONGER THAN 30 DAYS AFTER STARTING EXCAVATION SHALL BE BACKFILLED WITH A SEMI-PERMANENT REPAIR BACKFILL.
7. IMPROVED SECTIONS OF EARTHEN CHANNELS AND/OR WATERWAYS WILL BE VEGETATED BY SEEDING OR SODDING. EIGHTY-FIVE PERCENT OF THE CHANNEL SURFACE AREA MUST HAVE ESTABLISHED VEGETATION BEFORE THE CITY OF SAN ANTONIO WILL ACCEPT THE CHANNEL FOR MAINTENANCE.



FIRM REGISTRATION NUMBER: F-533

FINAL DESIGN



8/22/19

SAN ANTONIO WATER SYSTEM



MULTIPLE SEWERSHED PACKAGE 8 REPLACEMENT PROJECT

NO.	DATE	REVISION	BY
1	8/22/19	ADDENDUM NO. 2	JAM

COPYRIGHT: ARCADIS U.S., INC.

DATE: AUGUST 2019

PROJECT NO.: 02196053.0000

DESIGNED BY: M. K.

DRAWN BY: J. MEEKER

CHECKED BY: J. RECK

SHEET TITLE

GENERAL NOTES

SCALE: NONE

SHEET G-03 3 OF 61

1
2
3
4
5
6

CIVIL SYMBOLS

EXISTING

⊕ FIRE HYDRANT

⊙ BOLLARD

○ ROAD GUARD POST

⊙ MANHOLE

⊙(W) SEWER MANHOLE

⊙(T) TELEPHONE JUNCTION BOX

□ E.G.B. ELECTRICAL GROUND BOX

⊠ COMM BOX

—GL— GAS LINE

—OE— OVERHEAD ELECTRIC

—OT— OVERHEAD TELEPHONE

—W— WATER LINE

—STM— STORM DRAIN

—WWL— SANITARY SEWER

—UT— UNDERGROUND TELEPHONE

—485— CONTOUR

—X—X— CHAIN LINK FENCE

// WIRE FENCE

⊙ SIGN

☁ TREES OR DENSE VEGETATION

⊙ TREE

— RIGHT-OF-WAY OR PROPERTY BOUNDARY

— EXISTING EASEMENT BOUNDARY

ASPHALT ACCESS ROAD

CONCRETE

— EXISTING EXPOSED PIPELINE

⊙ LP POWER POLE W/ LIGHT

⊙ PP SERVICE / POWER POLE

⊙ TP TELEPHONE POLE

— DITCH LINE

○ SUE TEST HOLE LOCATION

PROPOSED

— PROPOSED PIPE LINE

— STEEL CASING (PLAN VIEW)

— STEEL CASING (PROFILE VIEW)

⊗ CP-X TRAVERSE TURN POINT / CONTROL POINT

NEW PAVEMENT MILLING AND OVERLAY LIMITS

PAVEMENT REPAIR LIMITS FOR TRENCHING

DEMOLITION/ABANDONMENT

— SILT FENCE

— EL — EROSION LOG

— LOC — LIMITS OF CONSTRUCTION

⊕ B-X SOIL BORING

SAWS CO STATION (TYP)

SAWS CO (TYP)

STA 11+11

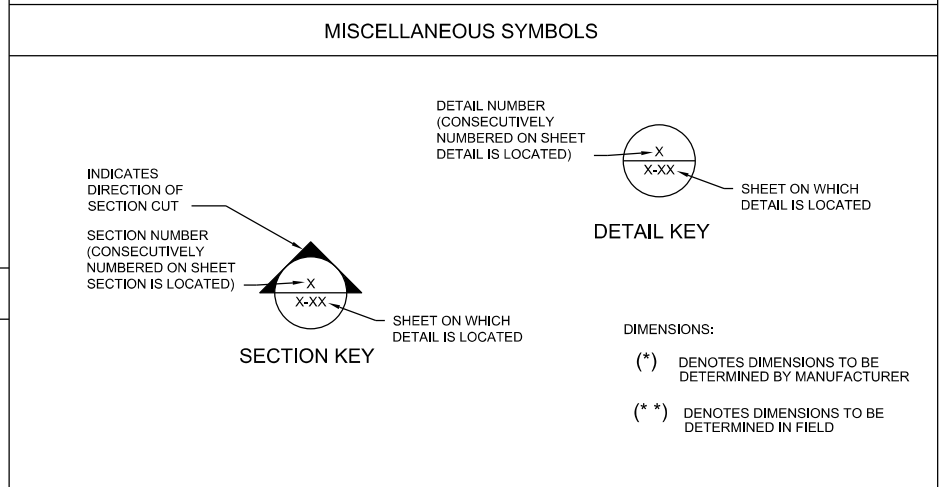
SANITARY CLEANOUT

SHEET CATEGORY

G - GENERAL
C - CIVIL
BP - BYPASS
TCP - TRAFFIC CONTROL PLAN

ABBREVIATIONS

ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
AFF	ABOVE FINISHED FLOOR	MH	MANHOLE
ARV	AIR RELEASE VALVE	MAX.	MAXIMUM
&	AND	MECH	MECHANICAL
APPROX	APPROXIMATE	MJ	MECHANICAL JOINT
@	AT	MIN.	MINIMUM
AWWA	AMERICAN WATER WORKS ASSOCIATION	MG	MILLION GALLON
AS	AUTOMATIC SWITCHOVER	N	NORTH
ASPH	ASPHALT	NO. OR #	NUMBER
BP	BOOSTER PUMP	NPT	NATIONAL PIPE THREAD
BM	BENCH MARK	NPW	NON POTABLE WATER
BF	BLIND FLANGE	NSPI	NOT A SEPARATE PAY ITEM
BFV	BUTTERFLY VALVE	NTS	NOT TO SCALE
BFP	BACKFLOW PREVENTER	OC	ON CENTER
BLDG	BUILDING	OD	OUTSIDE DIAMETER
BV	BALL VALVE	OF	OVERFLOW
BWF	BARBED WIRE FENCE	OE	OVERHEAD ELECTRIC
COSA	CITY OF SAN ANTONIO	PVMT	PAVEMENT
CO	CLEAN OUT	+	PLUS OR MINUS
COV	CONE VALVE	PT, OR PNT	POINT
CAV	COMBINATION AIR VALVE	PC	POINT OF CURVATURE
CML	CEMENT MORTAR LINED	PI	POINT OF INTERSECTION
CMP	CORRUGATED METAL PIPE	PT	POINT OF TANGENCY
℄	CENTERLINE	PVI	POINT OF VERTICAL INTERSECTION
CONC.	CONCRETE	PSI	POUNDS PER SQUARE INCH
CCP	CONCRETE CYLINDER PIPE	PCCP	PRECAST CONCRETE CYLINDER PIPE
CPLG	COUPLING	PG	CONCRETE PAVEMENT
CJ	CONSTRUCTION JOINT	PG	PRESSURE GAUGE
C	CURVE	PSF	POUND PER SQUARE FOOT
CONST.	CONSTRUCTION	PL OR R	PROPERTY LINE
CLF	CHAIN LINK FENCE	PRC	POINT OF REVERSE CURVATURE
CV	CHECK VALVE	PLMK	PIPELINE MARKER
CI	CORROSION INHIBITOR	POLY	POLYMER
CNP	CONTROL CONSTRUCTION POINT	PROP	PROPOSED
CP	CONTROL PANEL	PVC	POLYVINYL CHLORIDE
CSC	CONCRETE STEEL CYLINDER	PW	POTABLE WATER
CTI	CONCEPT THERAPY INSTITUTE	PRV	PRESSURE REDUCING VALVE
D	DRAIN	R	RADIUS
DV	DENSE VEGETATION	RED OR RED'R	REDUCER
DIA.	DIAMETER	RED'G	REDUCING
DIM	DIMENSION	REINF	REINFORCE
DWGS	DRAWINGS	RCCP	REINFORCED CONCRETE CYLINDER PIPE
DI OR DIP	DUCTILE IRON PIPE	REQD	REQUIRED
DGW	DISINFECTED GROUNDWATER	RJ	RESTRAINED JOINT
DCO	DOUBLE CLEAN OUT	ROW	RIGHT-OF-WAY
E	EAST	RT	RIGHT
EXIST./EX.	EXISTING	SA	SAMPLE
EA.	EACH	SAWS	SAN ANTONIO WATER SYSTEM
E.W.	EACH WAY	S	SOUTH
E.F.	EACH FACE	SHT	SHEET
E.G.B.	ELECTRICAL GROUND BOX	SD	STORM DRAIN
ELEC.	ELECTRIC	SF	SILT FENCE
EL. OR ELEV.	ELEVATION	SLG	SLUDGE
EP	EDGE OF PAVEMENT	SPEC.	SPECIFICATION
ESMT OR ESMT.	EASEMENT	SS, SST	STAINLESS STEEL
FF	FINISHED FLOOR	STD	STANDARD
FL	FLOOR LEVEL	STA.	STATION
FLG	FLANGE	STL	STEEL
FCA	FLANGED COUPLING ADAPTER	SP	STOCK PILE
FLEX	FLEXIBLE	SSK	SECONDARY SKIMMINGS
FH	FIRE HYDRANT	SW	SURFACE WATER
FT	FOOT OR FEET	SWBD	SWITCHBOARD
GV	GATE VALVE	TBM	TEMPORARY BENCHMARK
GW	GROUNDWATER	TEL	TELEPHONE
HMAC	HOT MIX ASPHALTIC CONCRETE.	TEMP.	TEMPORARY OR TEMPERATURE
ID	INSIDE DIAMETER	TOU	TOP OF UTILITY
INV	INVERT	TR	TRUNNION
IE	INVERT ELEVATION	TYP.	TYPICAL
JT	JOINT	UG	UNDERGROUND
KG	THOUSAND GALLON	UW	UTILITY WATER
LOC	LIMIT OF CONSTRUCTION	VERT.	VERTICAL
LT	LEFT	WL	WATER LINE
L	LENGTH	WIF	WROUGHT IRON FENCE
LF	LINEAR FEET	WTR	WATER
		W	WEST
		WV	WATER VALVE



SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	U/F	QTY
100	MOBILIZATION (10% MAX)	LS	1
101	PREP ROW (5% MAX)	LS	1
103.1	REMOVE CONCRETE CURB	LF	50
103.3	REMOVE CONCRETE SIDEWALKS & DRIVEWAYS	SF	120
202.1	PRIME COAT (0.2 gal/sq yd)	GAL	2120
203.1	TACK COAT (0.10 gal/sq yd)	GAL	1060
205.2	HOT MIX ASPHALTIC PAVEMENT, TYPE B (10" COMP. DEPTH)	SY	899
205.2	HOT MIX ASPHALTIC PAVEMENT, TYPE B (12" COMP. DEPTH)	SY	33
205.3	HOT MIX ASPHALTIC PAVEMENT, TYPE C (3" COMP. DEPTH)	SY	443
205.4	HOT MIX ASPHALTIC PAVEMENT, TYPE D (2" COMP. DEPTH)	SY	5763
205.4	HOT MIX ASPHALTIC PAVEMENT, TYPE D (3" COMP. DEPTH)	SY	2198
208.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVEMENT(2" DEPTH)	SY	5763
209.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVEMENT(3" DEPTH)	SY	2641
TXDOT 401	FLOWABLE BACKFILL	CY	124
500.1	CONCRETE CURB & GUTTER	LF	50
502.1	CONCRETE SIDEWALKS	SY	13
503.1	PORTLAND CEMENT CONCRETE DRIVEWAYS	SY	350
506	CONCRETE RETAINING WALL	CY	6
509.1	METAL BEAM GUARD RAIL	LF	30
515.1	TOPSOIL (4")	CY	11
516.1	SODDING	SY	103
530.7	BARRICADES, SIGNS, AND TRAFFIC HANDLING- CALHOUN	LS	1
530.7	BARRICADES, SIGNS, AND TRAFFIC HANDLING- MLK DRIVE	LS	1
530.7	BARRICADES, SIGNS, AND TRAFFIC HANDLING- MORNING VIEW	LS	1
535.1	4 INCH WIDE YELLOW LINE	LF	554
535.2	4 INCH WIDE WHITE LINE	LF	554
540.7	TEMPORARY CONSTRUCTION PERIMETER FENCE (INSTALL/REMOVE)	LF	320
550	TRENCH EXCAVATION SAFETY PROTECTION	LF	2180
848	8" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (6'-10')	LF	98
848	8" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (10'-14')	LF	452
848	8" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (>14')	LF	350
848	10" ASTM D2241 SDR 26 160 PSI PVC SAN. SEWER LINE (10'-14')	LF	150
848	10" ASTM D2241 SDR 26 160 PSI PVC SAN. SEWER LINE (14'-20')	LF	31
848	12" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (0'-6')	LF	300
848	12" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (6'-10')	LF	633
848	12" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (10'-14')	LF	20
848	12" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (14'-18')	LF	59
848	12" ASTM D2241 SDR 26 160 PSI PVC SAN. SEWER LINE (10'-14')	LF	87
852	STANDARD PRECAST 4' DIAMETER MANHOLE (0'-6')	EA	8
852	CAST-IN PLACE CONCRETE 4' DIAMETER STANDARD MANHOLE (PERMANENT DOG HOUSE)	EA	1
852	STANDARD EXTRA DEPTH MANHOLES (>6')	VF	67
852	STD DROP MANHOLE 4' DIAMETER (0'-6')	EA	4
854	SANITARY SEWER LATERALS-ASTM D 2241 (160 PSI)	LF	1200
854	TWO-WAY SANITARY SEWER CLEAN-OUT	EA	40
855	RECONSTRUCTION OF EXISTING MANHOLE	EA	1
856	12" CARRIER PIPE - PVC SDR 26 ASTM D2241 (RESTRAINED)	LF	314
856	30" STEEL CASING	LF	314
SS 2300	CROSSINGS BY GUIDED BORING - 30" DIAMETER	LF	314
858	CONCRETE ENCASUREMENT, CRADLES, SADDLES, AND COLLARS	CY	40
860	VERTICAL STACKS	VF	118
864	BYPASS PUMPING (SMALL DIAMETER SANITARY SEWERS)- CALHOUN	LS	1
864	BYPASS PUMPING (SMALL DIAMETER SANITARY SEWERS)- MLK DRIVE	LS	1
864	BYPASS PUMPING (SMALL DIAMETER SANITARY SEWERS)- MORNING VIEW	LS	1
866	SEWER MAIN POST TELEVISION INSPECTION (8" THROUGH 15" DIA.)	LF	2494
SS 7185	ABANDONMENT OF SANITARY SEWER MAIN (8" DIA)	LF	502
SS7185	ABANDONMENT OF SANITARY SEWER MAIN (10" DIA)	LF	450
SS 7185	ABANDONMENT OF SANITARY SEWER MAIN (12" DIA)	LF	312
SS 7185	ABANDONMENT OF SANITARY SEWER MANHOLE	EA	1
SS 518.2	TREE PROTECTION - LEVEL IIB	EA	3
3300	SANITARY SEWER PRIVATE LATERALS (4"-6")	LF	600

ARCADIS
FIRM REGISTRATION NUMBER: F-533

STATE OF TEXAS
JEFFREY E. RECK
93786
LICENSED PROFESSIONAL ENGINEER
8/22/19

SAN ANTONIO WATER SYSTEM

San Antonio Water System

MULTIPLE SEWERSHED PACKAGE 8 REPLACEMENT PROJECT

NO.	DATE	REVISION	BY
Δ	8/22/19	ADDENDUM NO. 2	JAM

COPYRIGHT: ARCADIS U.S., INC.
DATE: AUGUST 2019
PROJECT NO.: 02196053.0000
DESIGNED BY: M. K.
DRAWN BY: J. MEEKER
CHECKED BY: J. RECK

SHEET TITLE

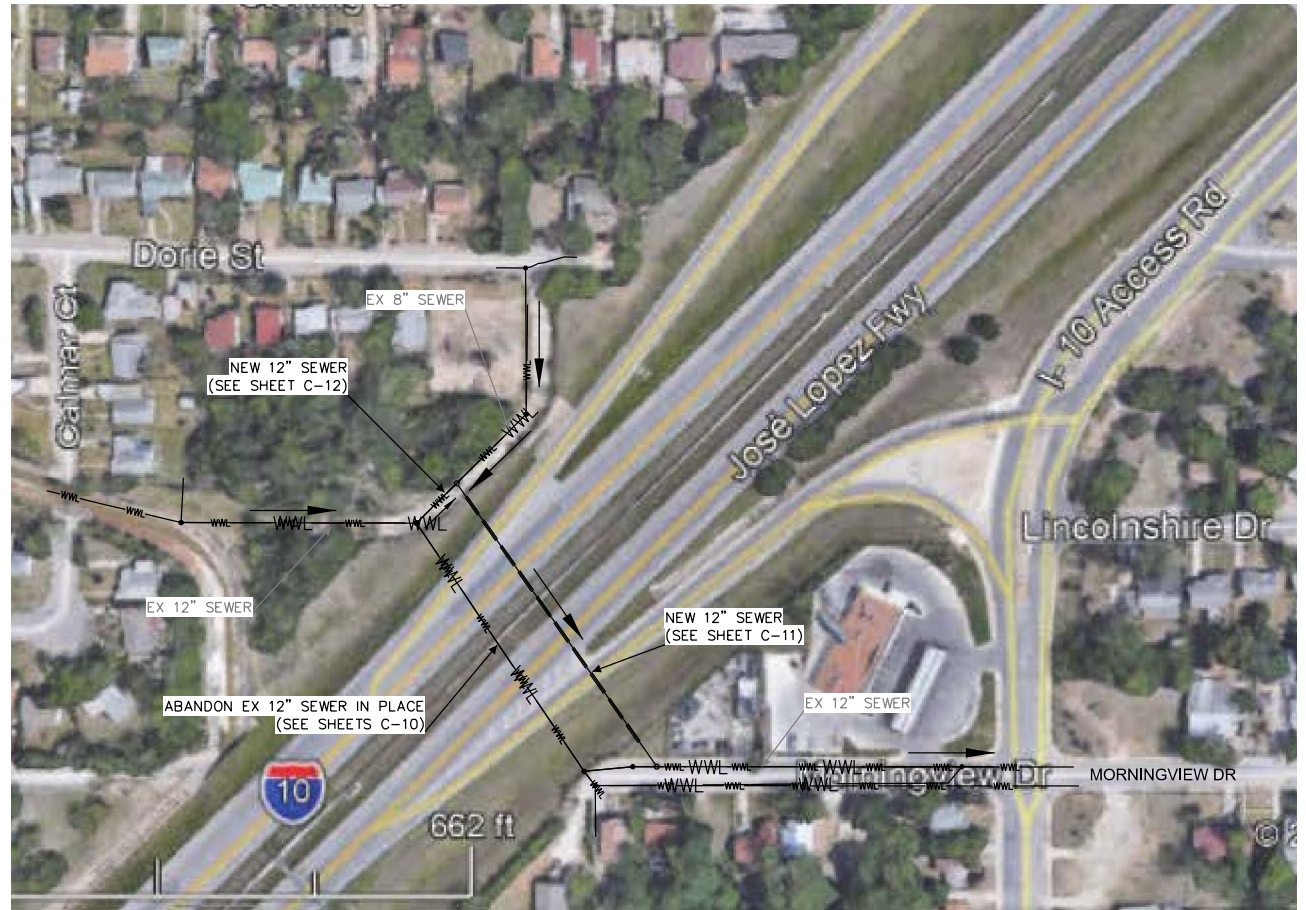
SYMBOLS, ABBREVIATIONS & QUANTITY SUMMARY

SCALE: NONE

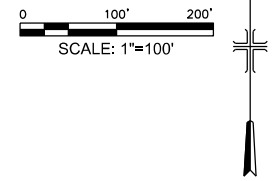
SHEET **G-05**
5 OF 61

E
D
C
B
A

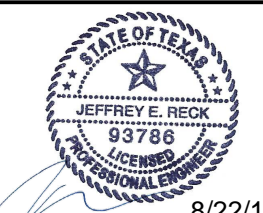
ITEM NO.	DESCRIPTION	UF	QTY
100	MOBILIZATION (10% MAX)	LS	1
101	PREP ROW (5% MAX)	LS	1
103.1	REMOVE CONCRETE CURB	LF	10
103.3	REMOVE CONCRETE SIDEWALKS & DRIVEWAYS	SF	40
202.1	PRIME COAT (0.2 gal/sq yd)	GAL	8
203.1	TACK COAT (0.10 gal/sq yd)	GAL	4
205.2	HOT MIX ASPHALTIC PAVEMENT, TYPE B (10" COMP. DEPTH)	SY	34
205.4	HOT MIX ASPHALTIC PAVEMENT, TYPE D (2" COMP. DEPTH)	SY	42
208.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVEMENT(2" DEPTH)	SY	42
500.1	CONCRETE CURB & GUTTER	LF	10
502.1	CONCRETE SIDEWALKS	SY	4
503.1	PORTLAND CEMENT CONCRETE DRIVEWAYS	SY	350
515.1	TOPSOIL (4")	CY	5
516.1	SODDING	SY	42
530.7	BARRICADES, SIGNS, AND TRAFFIC HANDLING- MORNING VIEW	LS	1
540.7	TEMPORARY CONSTRUCTION PERIMETER FENCE (INSTALL/REMOVE)	LF	320
550	TRENCH EXCAVATION SAFETY PROTECTION	LF	106
848	12" ASTM D3034 SDR 26 PVC SAN. SEWER LINE (14'-10")	LF	59
848	12" ASTM D2241 SDR 26 160 PSI PVC SAN. SEWER LINE (10'-14")	LF	47
852	STANDARD PRECAST 4' DIAMETER MANHOLE (0'-6")	EA	2
852	STANDARD EXTRA DEPTH MANHOLES (-6")	VF	26
852	STD. 4' DIA. MANHOLE 4' DIAMETER (0'-6")	EA	1
856	12" CARRIER PIPE - PVC SDR 26 ASTM D2241 (RESTRAINED)	LF	314
856	30" STEEL CASING	LF	314
SS 2300	CROSSINGS BY GUIDED BORING - 30" DIAMETER	LF	314
884	CROSSING SMALL DIAMETER SANITARY SEWER BY GENERAL MORNING VIEW	LS	1
886	SEWER MAIN POST TELEVISION INSPECTION (8" THROUGH 15" DIA.)	LF	420
SS 7185	ABANDONMENT OF SANITARY SEWER MAIN (12" DIA)	LF	312
SS 518.2	TREE PROTECTION - LEVEL II B	EA	3



PROJECT 1050244 LOCATION
MORNINGVIEW DR. / JOSE LOPEZ FREEWAY AREAS



FINAL DESIGN



8/22/19

SAN ANTONIO WATER SYSTEM



MULTIPLE SEWERSHED PACKAGE 8 REPLACEMENT PROJECT

NO.	DATE	REVISION	BY
1	8/22/19	ADDENDUM NO. 2	JAM

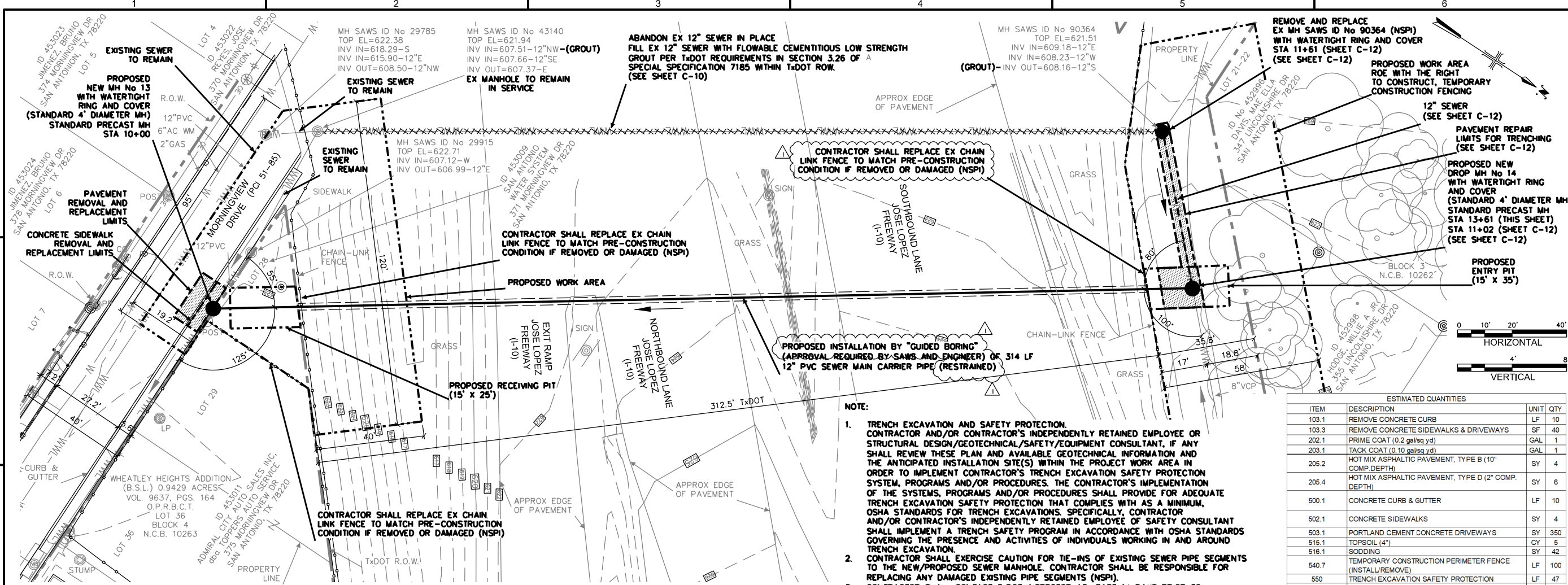
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 DATE: AUGUST 2019
 PROJECT NO.: 02196053.0000
 DESIGNED BY: M. K.
 DRAWN BY: J. MEEKER
 CHECKED BY: J. RECK

SHEET TITLE

OVERALL PROJECT LAYOUT
 SEGMENT 1050244
 (MORNING VIEW/IH-10)

SCALE: AS SHOWN

SHEET **G-07**
 7 OF 61



8/22/19

SAN ANTONIO
WATER SYSTEM



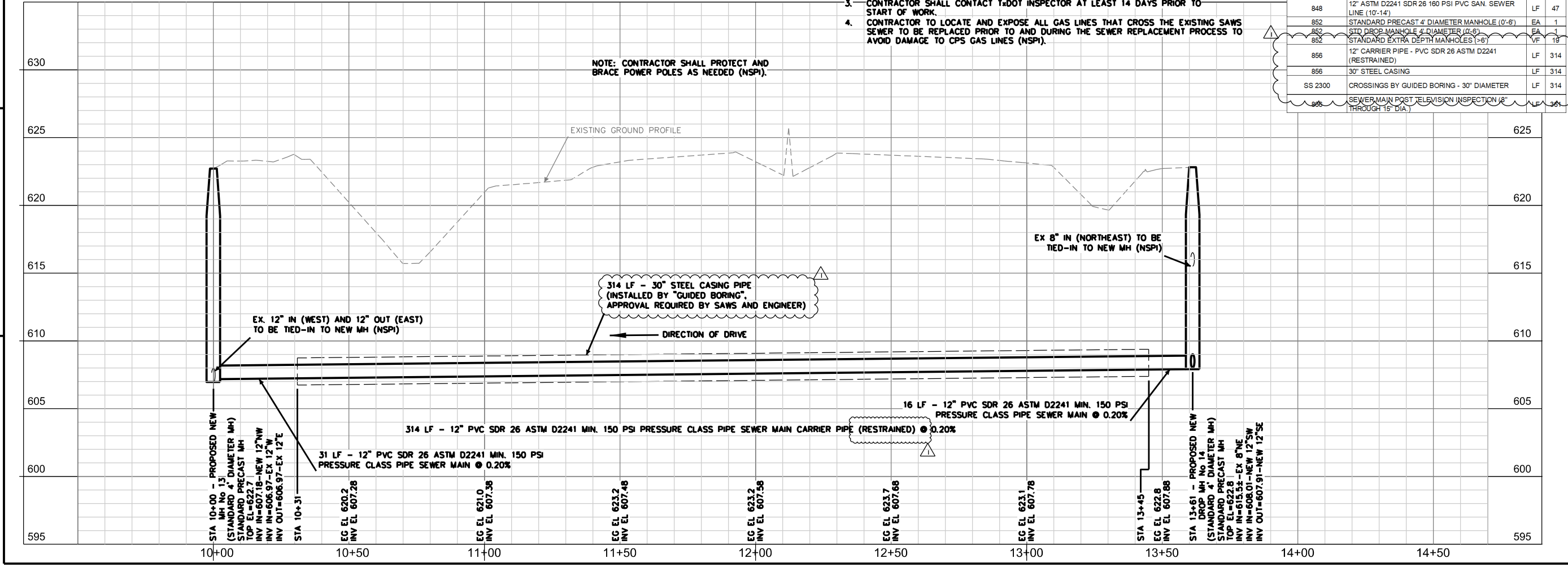
MULTIPLE SEWERSHED
PACKAGE 8
REPLACEMENT PROJECT

NO.	DATE	REVISION	BY
Δ	8/22/19	ADDENDUM NO. 2	JAM

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 PROJECT NO.: 02196053.0000
 DESIGNED BY: M. K.
 DRAWN BY: J. MEEKER
 CHECKED BY: J. RECK

SEGMENT 1050244
JOSE LOPEZ FREEWAY
(I-10) CROSSING
NORTH FROM
MORNINGVIEW DR
PLAN AND PROFILE
STA. 10+00 TO STA. 15+00

SCALE: AS SHOWN
 SHEET: C-11
 35 OF 61



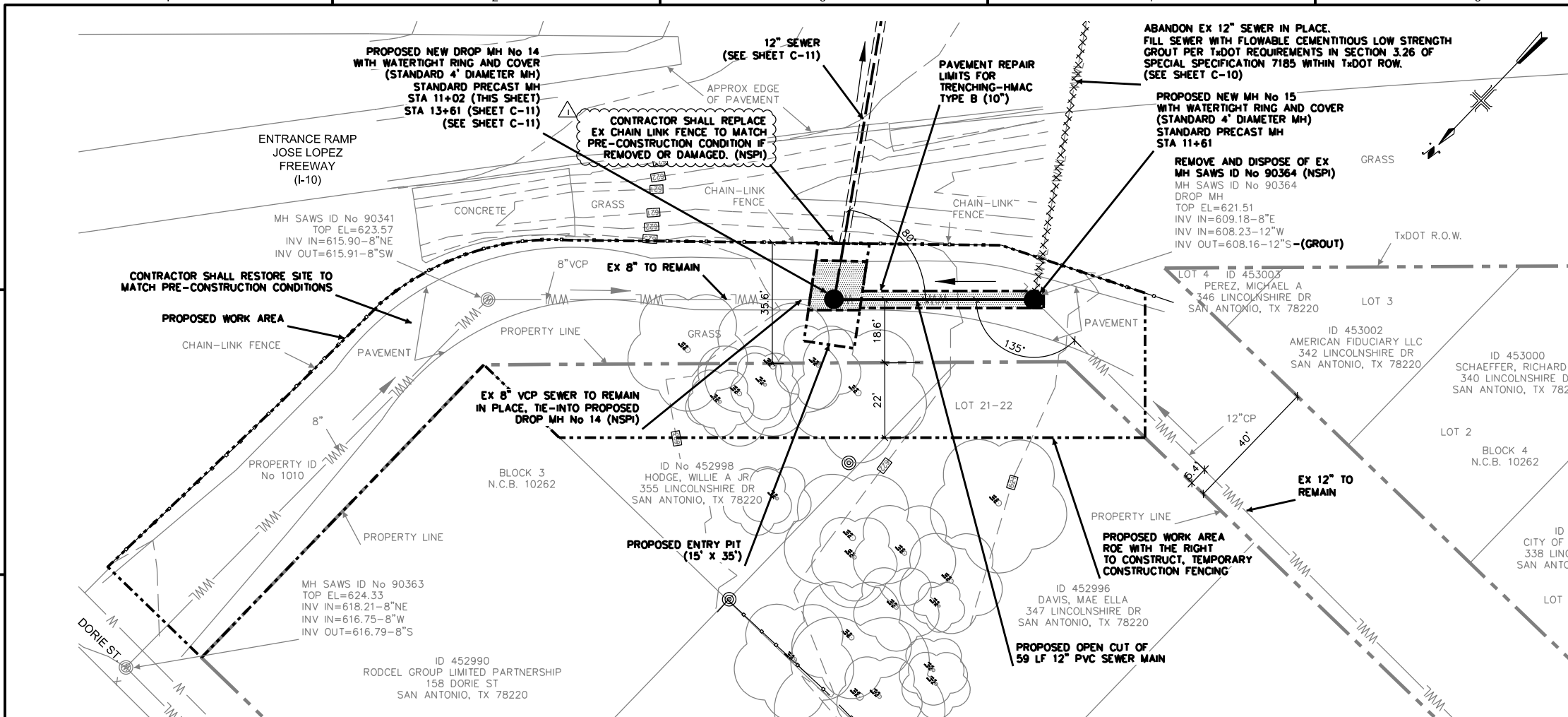
ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
103.1	REMOVE CONCRETE CURB	LF	10
103.3	REMOVE CONCRETE SIDEWALKS & DRIVEWAYS	SF	40
202.1	PRIME COAT (0.2 gal/sq yd)	GAL	1
203.1	TACK COAT (0.10 gal/sq yd)	GAL	1
205.2	HOT MIX ASPHALTIC PAVEMENT, TYPE B (10\"/>		

- NOTE:**
- TRENCH EXCAVATION AND SAFETY PROTECTION. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY SHALL REVIEW THESE PLAN 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 SYSTEM, 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 OF 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.
 - CONTRACTOR SHALL EXERCISE CAUTION FOR TIE-INS OF EXISTING SEWER PIPE SEGMENTS TO THE NEW/PROPOSED SEWER MANHOLE. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ANY DAMAGED EXISTING PIPE SEGMENTS (NSPI).
 - CONTRACTOR SHALL CONTACT T&DOT INSPECTOR AT LEAST 14 DAYS PRIOR TO START OF WORK.
 - CONTRACTOR TO LOCATE AND EXPOSE ALL GAS LINES THAT CROSS THE EXISTING SAWS SEWER TO BE REPLACED PRIOR TO AND DURING THE SEWER REPLACEMENT PROCESS TO AVOID DAMAGE TO CPS GAS LINES (NSPI).

NOTE: CONTRACTOR SHALL PROTECT AND BRACE POWER POLES AS NEEDED (NSPI).

STATION	DESCRIPTION	TOP ELEVATION	INVERT ELEVATION	LENGTH
10+00	PROPOSED NEW MH No 13 (STANDARD PRECAST 4' DIAMETER MH)	622.8	607.88	10
10+31	NEW 12" PVC SDR 26 ASTM D2241 MIN. 150 PSI PRESSURE CLASS PIPE SEWER MAIN @ 0.20%	621.7	607.97	31
11+00	EXISTING MH No 29915 (TOP EL=622.71, INV IN=607.12, INV OUT=606.99)	622.71	606.99	10
11+48	NEW 12" PVC SDR 26 ASTM D2241 MIN. 150 PSI PRESSURE CLASS PIPE SEWER MAIN @ 0.20%	623.2	607.48	48
12+00	NEW 12" PVC SDR 26 ASTM D2241 MIN. 150 PSI PRESSURE CLASS PIPE SEWER MAIN @ 0.20%	623.2	607.58	58
12+68	NEW 8" (NORTHEAST) TO BE TIED-IN TO NEW MH (NSPI)	623.7	607.68	68
13+00	EXISTING MH No 90364 (TOP EL=621.51, INV IN=609.18, INV OUT=608.23)	621.51	608.23	10
13+45	PROPOSED NEW DROP MH No 14 (STANDARD PRECAST MH)	622.8	607.88	45
13+61	PROPOSED NEW 12" PVC SDR 26 ASTM D2241 MIN. 150 PSI PRESSURE CLASS PIPE SEWER MAIN @ 0.20%	621.7	607.97	61
14+00	EXISTING MH No 90364 (TOP EL=621.51, INV IN=609.18, INV OUT=608.23)	621.51	608.23	10
14+50	PROPOSED NEW 12" PVC SDR 26 ASTM D2241 MIN. 150 PSI PRESSURE CLASS PIPE SEWER MAIN @ 0.20%	621.7	607.97	50

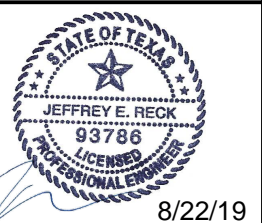


NOTE:

- TRENCH EXCAVATION AND SAFETY PROTECTION. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY SHALL REVIEW THESE PLAN 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 SYSTEM, 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 OF 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. CONTRACTOR SHALL EXERCISE CAUTION FOR TIE-INS OF EXISTING SEWER PIPE SEGMENTS TO THE NEW/PROPOSED SEWER MANHOLE. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ANY DAMAGED EXISTING PIPE SEGMENTS (NSPI).
- CONTRACTOR SHALL CONTACT TxDOT INSPECTOR AT LEAST 14 DAYS PRIOR TO START OF WORK.
- CONTRACTOR TO LOCATE AND EXPOSE ALL GAS LINES THAT CROSS THE EXISTING SAWS SEWER TO BE REPLACED PRIOR TO AND DURING THE SEWER REPLACEMENT PROCESS TO AVOID DAMAGE TO CPS GAS LINES (NSPI).



FINAL DESIGN



SAN ANTONIO WATER SYSTEM



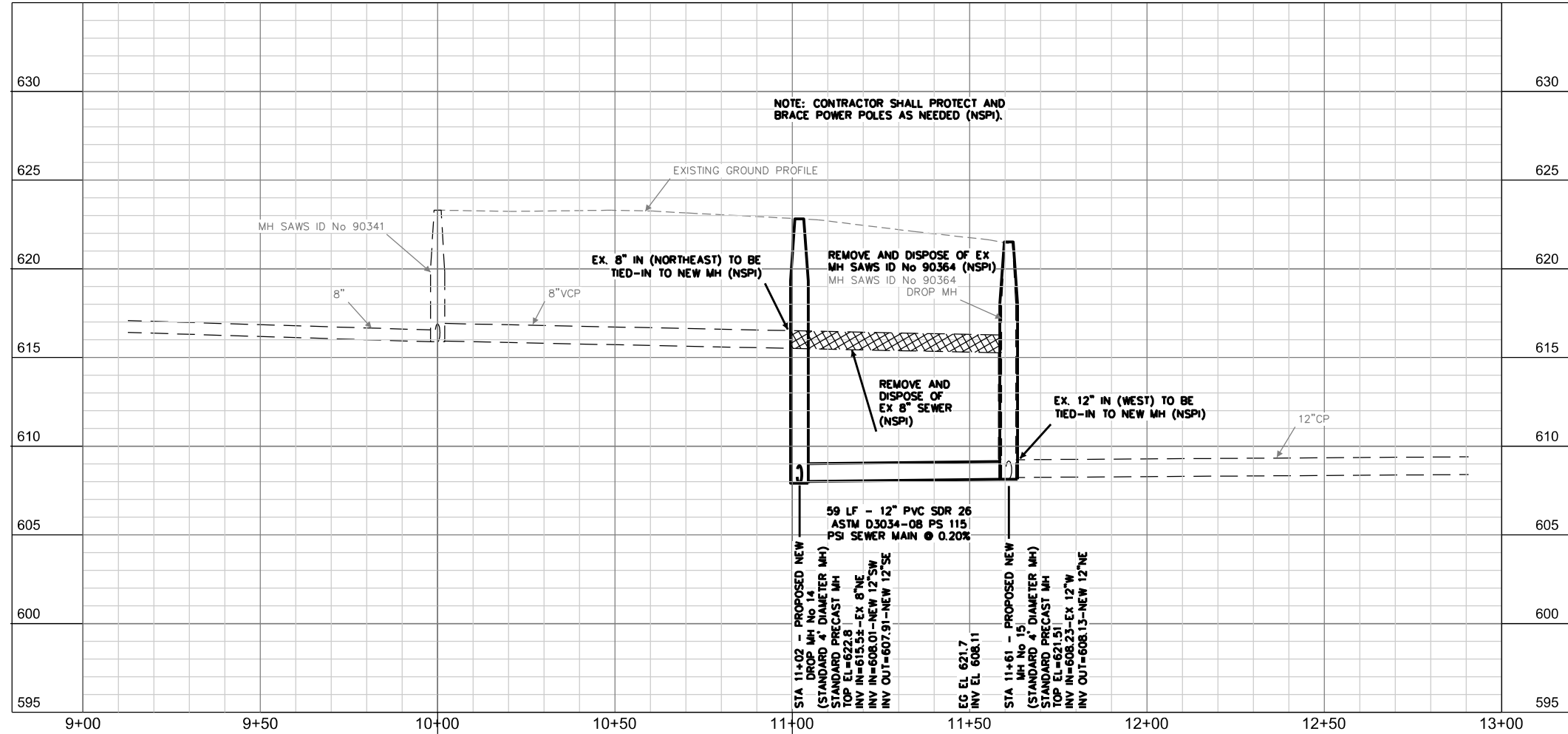
MULTIPLE SEWERSHED PACKAGE 8 REPLACEMENT PROJECT

NO.	DATE	REVISION	BY
Δ	8/22/19	ADDENDUM NO. 2	JAM

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 DATE: AUGUST 2019
 PROJECT NO.: 02196053.0000
 DESIGNED BY: M. K.
 DRAWN BY: J. MEEKER
 CHECKED BY: J. RECK

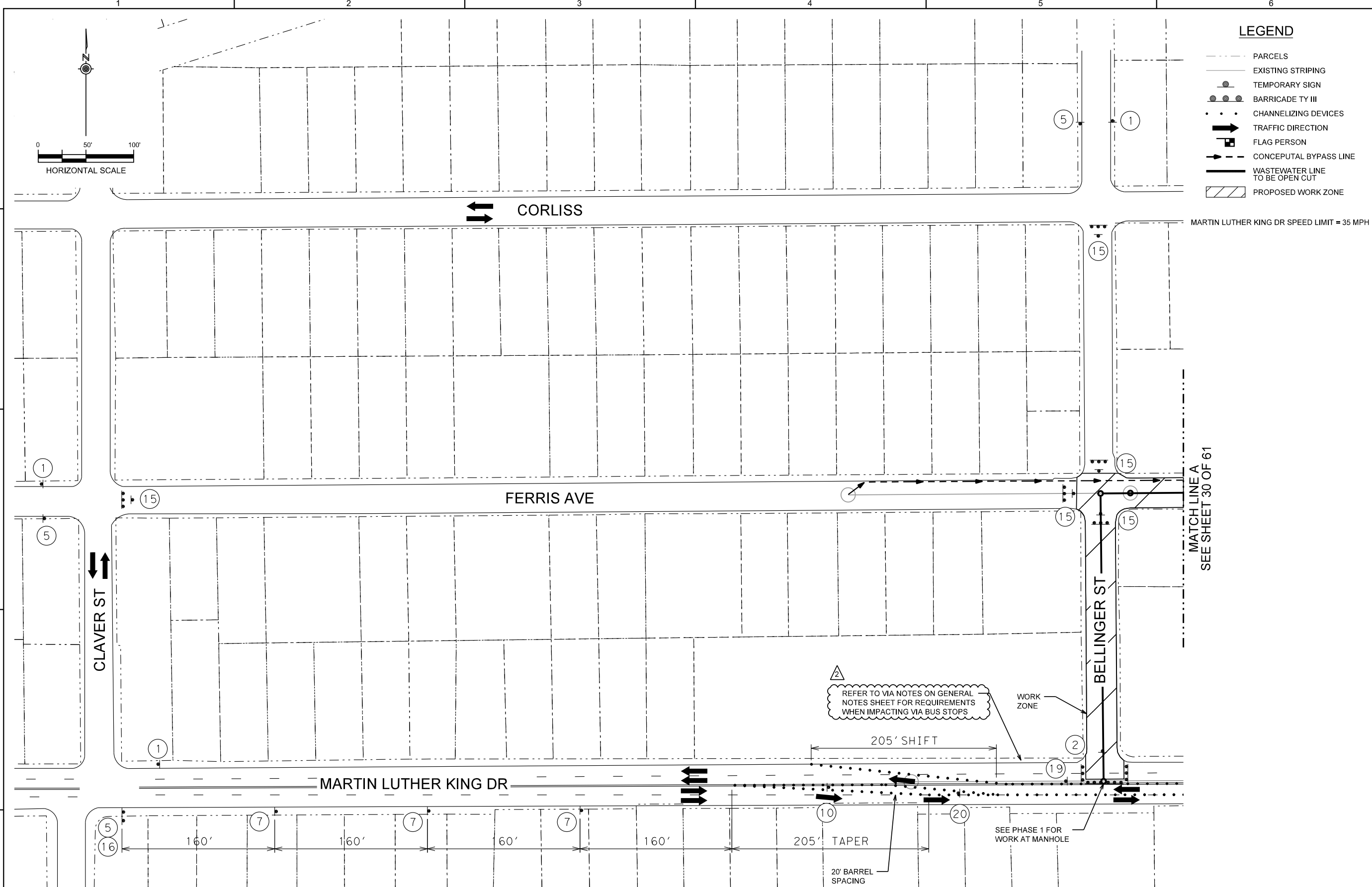
SEGMENT 1050244
 JOSE LOPEZ FREEWAY (I-10)
 WEST SIDE SOUTH OF DORIE ST
 PLAN AND PROFILE
 STA. 10+00 TO STA. 12+50

SCALE: AS SHOWN
 SHEET: C-12
 36 OF 61



ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
202.1	PRIME COAT (0.2 gal/sq yd)	GAL	7
203.1	TACK COAT (0.10 gal/sq yd)	GAL	4
205.2	HOT MIX ASPHALTIC PAVEMENT, TYPE B (10" COMP. DEPTH)	SY	29
205.4	HOT MIX ASPHALTIC PAVEMENT, TYPE D (2" COMP. DEPTH)	SY	37
540.7	TEMPORARY CONSTRUCTION PERIMETER FENCE (INSTALL/REMOVE)	LF	220
550	TRENCH EXCAVATION SAFETY PROTECTION	LF	59
848	12' ASTM D3034 SDR 26 PVC SAN. SEWER LINE (14'-18')	LF	59
852	STANDARD PRECAST 4' DIAMETER MANHOLE (0'-6')	EA	1
852	STANDARD EXTRA DEPTH MANHOLES (>6')	VF	7
866	SEWER MAIN POST TELEVISION INSPECTION (8" THROUGH 15" DIA.)	LF	59
SS 518.2	TREE PROTECTION - LEVEL IIB	EA	3

NOTE: CONTRACTOR SHALL PROTECT AND BRACE POWER POLES AS NEEDED (NSPI).



ARCADIS
FIRM REGISTRATION NUMBER: F-533

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TBPE Firm #6535 www.kfriese.com

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STATE OF TEXAS
CHRISTOPHER BOENTGES
109721
LICENSED PROFESSIONAL ENGINEER
08/20/19

SAN ANTONIO WATER SYSTEM

San Antonio Water System

MULTIPLE SEWERSHED PACKAGE 8 PROJECT

JOB NO. 17-4560

NO.	DATE	REVISION	BY
1	8/20/2019	ADDENDUM # 2	CB

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DATE: JULY 2019
PROJECT NO.: 02196053.0000
DESIGNED BY:
DRAWN BY:
CHECKED BY:

SHEET TITLE

PHASE 2 TRAFFIC CONTROL PLAN 1 OF 3
SEGMENT 1052244
IH 10 EAST & MLK DR

SCALE: AS SHOWN

SHEET TCP-08
29 OF 61

- 1 END ROAD WORK G20-2 36" X 18"
- 2 ROAD CLOSED R11-2 48" X 30"
- 3 R3-2 24" X 24"
- 4 SIDEWALK CLOSED R9-9 24" X 12"
- 5 UTILITY WORK AHEAD CW21-7D 30" X 30"
- 6 ONLY R3-5R 30" X 36"
- 7 LEFT LANE CLOSED CW20-5TL 30" X 30"
- 8 RIGHT LANE CLOSED CW20-5TR 30" X 30"
- 9 RIGHT LANE CLOSED 100 FT CW20-5BR 30" X 30"
- 10 FLASHING ARROW BOARD
- 11 RAMP CLOSED R11-2bT 48" X 30"
- 12 RAMP CLOSED AHEAD CW20RP-3D 30" X 30"
- 13 RAMP CLOSED 1/2 MILE CW20RP-3E 30" X 30"
- 14 USE NEXT RAMP CW25-1T 48" X 48"
- 15 ROAD CLOSED AHEAD LOCAL TRAFFIC ONLY R11-3a 60" X 30"
- 16 EMB ELECTRONIC MESSAGE BOARD
- 17 ROAD WORK AHEAD CW20-1D 30" X 30"
- 18 CW1-4L 30" X 30"
- 19 CW1-4R 30" X 30"
- 20 CW1-6aT 30" X 30"
- 21 CW1-6aT 30" X 30"
- 22 RIGHT SHOULDER CLOSED CW21-5a 30" X 30"