Job No. 40706.B6.01

URBAN ENGINEERING

March 9, 2016

City of Corpus Christi
Development Services
Attn: Dan McGinn, AICP, Interim Director of Development Services
2406 Leopard, Suite 100
Corpus Christi, Texas 78408

Subject: Wastewater Master Plan Amendment
Greenwood WWTP Service Area 5

Dear Dan,

Pursuant to attached city approved design memorandum and public improvement plans, we are requesting an amendment to the Wastewater Master Plan for Greenwood WWTP Service Area 5. The only portions of improvements shown in the approved plans that are part of the current Master Plan are the gravity sewer lines. The proposed Master Plan Amendment will add two additional lift stations and associated force mains to Service Area 5. Approval of this Master Plan Amendment will facilitate providing needed wastewater service to properties near South Padre Island Drive (SPID) and Old Brownsville Road in a timely and efficient manner. We have also provided estimates of proposed wastewater improvements for both current and proposed Master Plans to illustrate relative cost of service provided by each scenario. All estimated costs are shown in today's dollars for the sake of comparison. The likely scenario is that the two proposed new lift stations in the Master Plan Amendment will be constructed in the very near future with one already under contract. The other two lift stations are many years from development due to their being further removed from existing development.

At the time the design memorandum and improvement plans were generated the new lift stations conceived were assumed temporary and to be removed at some point in the future when master plan lift stations and gravity sewer were constructed and extended. For this reason the service areas shown in the Master Plan Amendment are different from those shown in the design memorandum and approved plans. The Master Plan Amendment looked at the proposed lift stations as permanent and developed their services areas to maximize their impact and provide service in the most efficient manner to all properties it had the potential to serve. The locations remained the same and both new lift stations remained the same size. They are proposed to be staged installation of pumps to serve initially small service flows and be capable of expansion to serve entire service areas at assumed land uses.

As stated previously, the current approved improvement plans are under contract and owner is prepared to issue notice to proceed. The primary difference between what was initially approved and what is now proposed in the Master Plan Amendment is that the lift station and force main will be permanent. The design capacities and functionality remain unchanged. The estimates indicate that the Master Plan Amendment does not significantly impact over-all service cost to the city or its funding mechanisms. We request approval of the Master Plan Amendment per attached plan and supporting documentation. We are available to meet at your convenience to discuss any questions that may arise as time is critical to maintain development time lines for planned facilities within the service area of the proposed lift station.

Sincerely,

URBAN ENGINEERING

Murray F. Hudson, P.E.

encl/ph

(361)854-3101 2725 SWANTNER DR. • CORPUS CHRISTI, TEXAS 78404 FAX (361)854-6001
www.urbaneng.com
TBPE Firm #145
TBPLS Firm #10032400

SEE EXHIBIT 6 FOR AREA 6 MASTER PLAN

NOTES

1. LAND USE CHARACTERISTICS WERE DETERMINED FROM THE ADOPTED CORPUS CHRISTI FUTURE LAND USE MAP, MAY 24, 2005 (ORDINANCE #026278) AND THROUGH A REVIEW WITH DEVELOPMENT SERVICES STAFF ON AUGUST 8, 2006.
2. IN THE ABSENCE OF EXISTING FLOW DATA, RESIDENTIAL FLOWS WERE ASSUMED TO BE 100 GAL/CAP/DAY AS PER TCEQ 30 TAC 317.4 (a), DATED JANUARY 6, 2005.
3. ALL PIPE SIZES AND SLOPES MEET TCEQ RULES AS ESTABLISHED IN 30 TAC 317, EFFECTIVE JANUARY 6, 2005.
4. THE PEAKING FACTOR WAS CALCULATED USING THE HAROLD E. BABBITT FORMULA WHICH HAS BEEN WIDELY USED IN PREVIOUS AREA MASTER PLANS.
5. SOME MANHOLES ARE NOT SHOWN FOR CLARITY.
6. THE SERVICE AREA WAS ASSUMED TO BE FULLY DEVELOPED.
7. ALL OF THE ELEVATION CONTOURS WERE DERIVED FROM THE USGS 7.5 MINUTE SERIES TOPOGRAPHIC MAPS TITLED CRANE ISLAND SW QUADRANGLE, 1968 AND CRANE ISLAND NW, 1968.
8. TO THE EXTENT POSSIBLE, THE UPSTREAM END OF ALL LATERALS SHALL HAVE A MINIMUM DEPTH OF 4 FEET.
9. THE CORPUS CHRISTI INTERNATIONAL AIRPORT MASTER PLAN, DATED 9-28-99, WAS ADOPTED THROUGH CITY ORDINANCE NO. 023782 AND IDENTIFIED THE PROPERTY INCLUDED IN THE FUTURE AIRPORT EXPANSION.

N

0 250 500 1000
GRAPHIC SCALE (FT)

EXISTING AIRPORT PROPERTY

MATCHLINE (SEE EXHIBIT 5B)

BEAR LN
JUNIOR BECK DR
HOLLY FUTURE EXTENSION
SOUTH PADRE ISLAND DR
DITCH
WEST POINT RD
DRAINAGE DITCH
OLD BROWNSVILLE RD
CR 35 FUTURE EXTENSION
AIRPORT DITCH
HOLLY RD
GREENWOOD DR
SARATOGA BLVD
CR 37 FUTURE EXTENSION
JURICA RD
OSO CREEK TRIBUTARY
OSO CREEK TRIBUTARY 10
OSO CREEK
GREENWOOD WWTP

PROPOSED OLD BROWNSVILLE LIFT STATION
SERVICE AREA = 1631 ACRES
AVG. DAILY FLOW = 1.49 MGD
DESIGN FLOW = 5.09 MGD

COASTAL MEADOWS LIFT STATION
ABANDON THIS LIFT STATION WHEN THE GRAVITY LINE ALONG SARATOGA IS INSTALLED

PROPOSED CR 35 LIFT STATION
SERVICE AREA = 853 ACRES
AVG. DAILY FLOW = 1.16 MGD
DESIGN FLOW = 4.10 MGD

LEGEND

- PROPOSED WASTEWATER LINE
- EXISTING WASTEWATER LINE
- PROPOSED FORCEMAIN
- EXISTING FORCEMAIN
- EXISTING WASTEWATER LINES OUTSIDE OF AREA 5
- AREA BOUNDARY
- LIFT STATION INTERNAL BOUNDARY
- SUB AREA BOUNDARY
- ADJACENT AREA BOUNDARY
- EXISTING AIRPORT PROPERTY LINE
- 6 / 67.8 ac / 66 gpm — ID / AREA / AVG DAILY FLOW — SUB AREA CALLOUT
- PROPOSED LIFT STATION
- EXISTING LIFT STATION
- EXISTING LIFT STATION OUTSIDE OF AREA 5
- PROPOSED MANHOLE
- EXISTING MANHOLE
- EXISTING MANHOLE OUTSIDE OF AREA 5

FINAL

BROWN AND CALDWELL

LNV ENGINEERING
engineers & consultants
CIVIL * STRUCTURAL * TRANSPORTATION * SURVEYING *
MARINE * CONSTRUCTION MANAGEMENT
801 NAVIGATION, SUITE 300 CORPUS CHRISTI, TEXAS 78408
PH. (361) 883-1984 FAX (361) 883-1986 WWW.LNVINC.COM

CITY OF CORPUS CHRISTI
TEXAS
WASTEWATER DEPARTMENT
Department of Engineering Services

OCTOBER 26, 2006

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY SUSAN LINDA KELLY, P.E. NO. 86839 ON 10-26-06. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

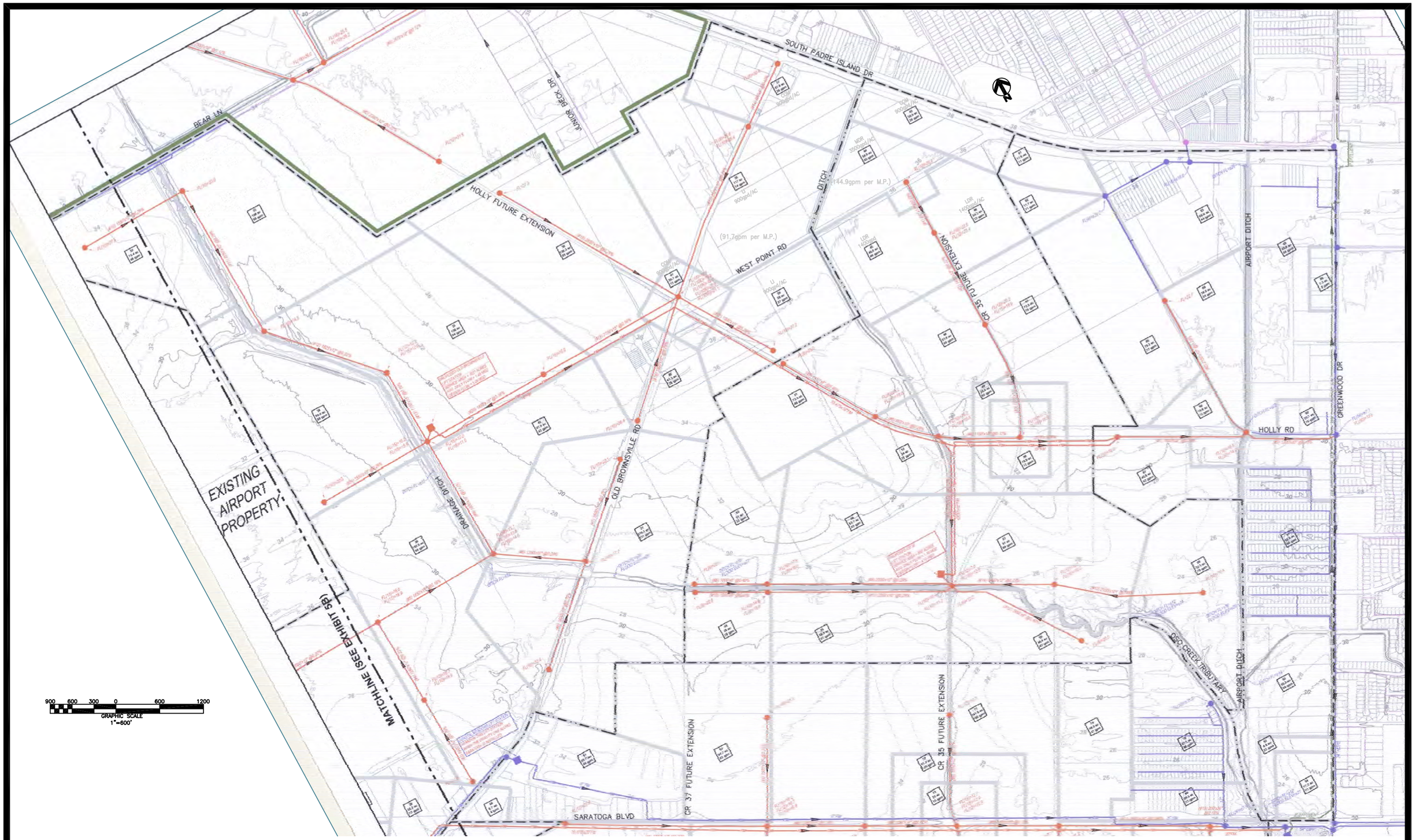
STATE OF TEXAS — SUSAN LINDA KELLY — 86839 — LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DAN S. LEYENDECKER, P.E. NO. 81499 ON 10-26-06. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

STATE OF TEXAS — DAN S. LEYENDECKER — 81499 — REGISTERED PROFESSIONAL ENGINEER

WASTEWATER COLLECTION SYSTEM MASTER PLAN
GREENWOOD WWTP SERVICE AREA
AREA 5

EXHIBIT 5A



EXISTING PLAN
MASTER PLAN REVISION
GREENWOOD WWTP SERVICE AREA
AREA 5

MARCH 4, 2016
JOB NO. 40706.B6.01 MFH/crr

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
2725 SWANTNER DR, CORPUS CHRISTI, TX 78404
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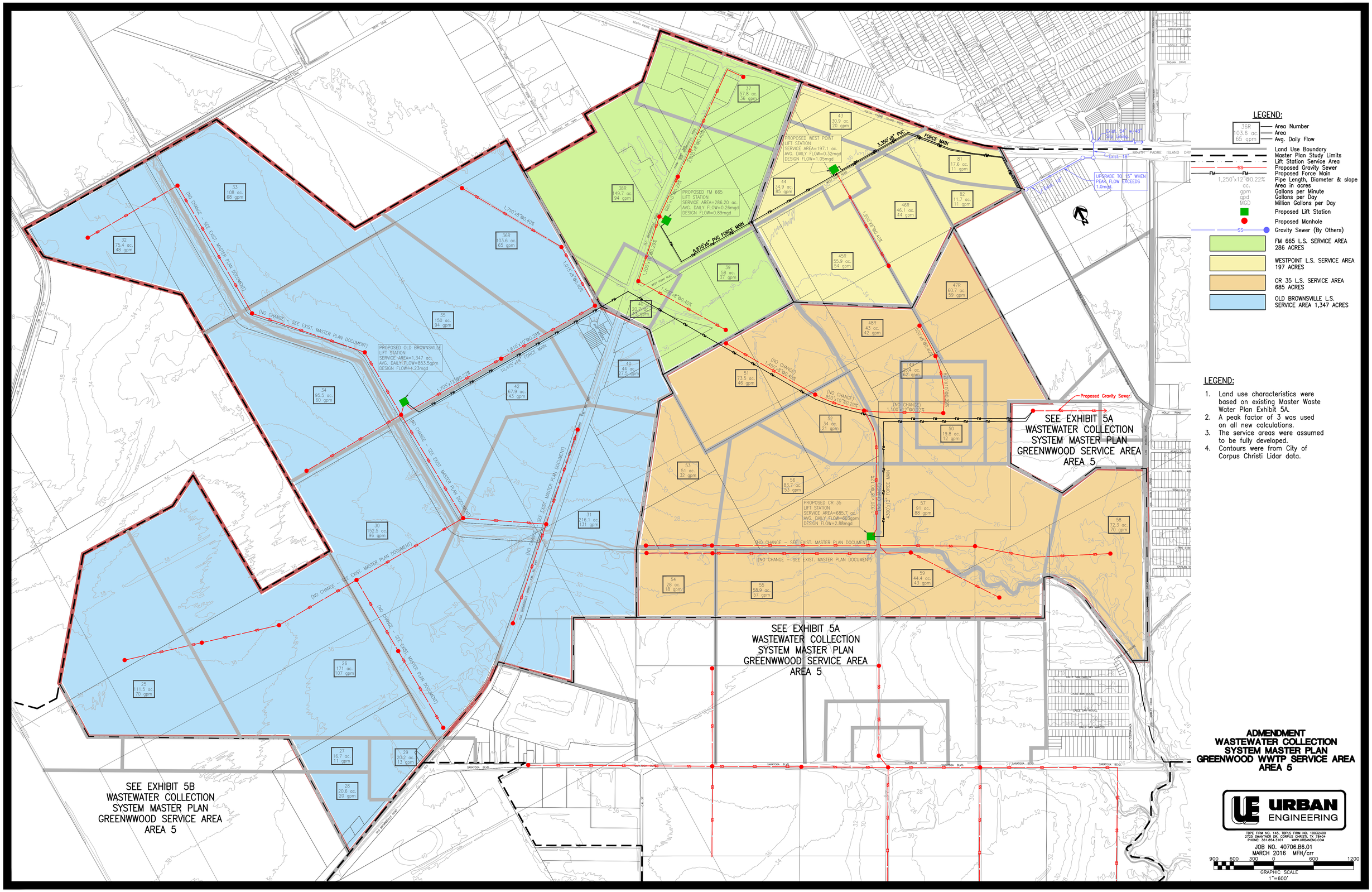

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JOB NO. 40706.B6.01
MARCH 2016 MFH/crr

Eng: Murf Hudson, P.E.
By: C.R.R.

Preliminary Cost Estimates

March 10, 2016
Job No. 40706.B6.01

CURRENT MASTER PLAN

CR 35 LIFT STATION
and
OLD BROWNSVILLE LIFT STATION

ITEM	DESCRIPTION	QUAN.	QUAN. + 5%	UNIT	UNIT PRICE	TOTAL COST
A. CR 35 LIFT STATION IMPROVEMENTS:						
1	Lift Station (14' dia., 24' deep)	1	1	LS	$450,000.00	$450,000.00
2	16" PVC Force Main	4,300	4,515	LF	$58.00	$261,870.00
3	8" PVC SDR 26 (4'-6' Cut)	1,339	1,406	LF	$28.00	$39,368.00
4	8" PVC SDR 26 (6'-8' Cut)	1,339	1,406	LF	$31.00	$43,586.00
5	8" PVC SDR 26 (8'-10' Cut)	339	356	LF	$42.00	$14,952.00
6	8" PVC SDR 26 (10'-12' Cut)	1,789	1,878	LF	$55.00	$103,290.00
7	8" PVC SDR 26 (12'-14' Cut)	339	356	LF	$65.00	$23,140.00
8	8" PVC SDR 26 (14'-16' Cut)	255	268	LF	$75.00	$20,100.00
9	10" PVC SDR 26 (6'-8' Cut)	125	131	LF	$47.50	$6,222.50
10	10" PVC SDR 26 (8'-10' Cut)	1,580	1,659	LF	$50.50	$83,779.50
11	10" PVC SDR 26 (10'-12' Cut)	2,380	2,499	LF	$61.50	$153,688.50
12	10" PVC SDR 26 (12'-14' Cut)	2,530	2,657	LF	$72.50	$192,632.50
13	10" PVC SDR 26 (14'-16' Cut)	1,555	1,633	LF	$84.50	$137,988.50
14	10" PVC SDR 26 (16'-18' Cut)	780	819	LF	$95.50	$78,214.50
15	12" PVC SDR 26 (10'-12' Cut)	294	309	LF	$80.00	$24,720.00
16	12" PVC SDR 26 (12'-14' Cut)	1,156	1,214	LF	$109.00	$132,326.00
17	12" PVC SDR 26 (16'-18' Cut)	1,400	1,470	LF	$125.00	$183,750.00
18	15" PVC SDR 26 (14'-16' Cut)	1,675	1,759	LF	$165.00	$290,235.00
19	18" PVC SDR 26 (14'-16' Cut)	2,100	2,205	LF	$205.00	$452,025.00
20	Embedment	20,975	22,024	LF	$10.00	$220,240.00
21	OSHA Trench Protection	20,975	22,024	LF	$2.00	$44,048.00
22	Well Pointing	7,765	8,153	LF	$22.00	$179,366.00
23	4' Diameter Manhole (4'-6' Deep)	2	2	EA	$4,400.00	$8,800.00
24	4' Diameter Manhole (6'-8' Deep)	4	4	EA	$4,800.00	$19,200.00
25	4' Diameter Manhole (8'-10' Deep)	6	6	EA	$5,100.00	$30,600.00
26	4' Diameter Manhole (10'-12' Deep)	6	6	EA	$5,600.00	$33,600.00
27	5' Diameter Manhole (12'-14' Deep)	12	12	EA	$6,750.00	$81,000.00
28	5' Diameter Manhole (14'-16' Deep)	11	11	EA	$13,500.00	$148,500.00
29	5' Diameter Manhole (16'-18' Deep)	9	9	EA	$14,200.00	$127,800.00
			CR 35 L.S. SUB-TOTAL:			**$3,585,042.00**

Urban Engineering
2725 Swantner
Corpus Christi, TX 78404
1-361-854-3101

CURRENT MASTER PLAN

CR 35 LIFT STATION
and
OLD BROWNSVILLE LIFT STATION

ITEM	DESCRIPTION	QUAN.	QUAN. + 5%	UNIT	UNIT PRICE	TOTAL COST
B. OLD BROWNSVILLE LIFT STATION IMPROVEMENTS:						
1	Lift Station (14' dia., 28' deep)	1	1	LS	$475,000.00	$475,000.00
2	18" PVC Force Main	10,475	10,999	LF	$65.00	$714,935.00
3	8" PVC SDR 26 (8'-10' Cut)	625	656	LF	$42.00	$27,552.00
4	8" PVC SDR 26 (10'-12' Cut)	325	341	LF	$55.00	$18,755.00
5	10" PVC SDR 26 (6'-8' Cut)	2,319	2,435	LF	$47.50	$115,662.50
6	10" PVC SDR 26 (8'-10' Cut)	3,514	3,690	LF	$50.50	$186,345.00
7	10" PVC SDR 26 (10'-12' Cut)	5,777	6,066	LF	$61.50	$373,059.00
8	10" PVC SDR 26 (12'-14' Cut)	5,253	5,516	LF	$72.50	$399,910.00
9	10" PVC SDR 26 (14'-16' Cut)	2,677	2,811	LF	$84.50	$237,529.50
10	10" PVC SDR 26 (16'-18' Cut)	335	352	LF	$95.50	$33,616.00
11	12" PVC SDR 26 (12'-14' Cut)	313	329	LF	$109.00	$35,861.00
12	12" PVC SDR 26 (14'-16' Cut)	2,449	2,571	LF	$117.00	$300,807.00
13	12" PVC SDR 26 (16'-18' Cut)	2,363	2,481	LF	$125.00	$310,125.00
14	15" PVC SDR 26 (12'-14' Cut)	565	593	LF	$145.00	$85,985.00
15	15" PVC SDR 26 (14'-16' Cut)	2,425	2,546	LF	$165.00	$420,090.00
16	15" PVC SDR 26 (16'-18' Cut)	1,355	1,423	LF	$205.00	$291,715.00
17	15" PVC SDR 26 (18'-20' Cut)	2,605	2,735	LF	$245.00	$670,075.00
18	18" PVC SDR 26 (12'-14' Cut)	1,000	1,050	LF	$185.00	$194,250.00
19	18" PVC SDR 26 (14'-16' Cut)	800	840	LF	$205.00	$172,200.00
20	Embedment	34,700	36,435	LF	$10.00	$364,350.00
21	OSHA Trench Protection	34,700	36,435	LF	$2.00	$72,870.00
22	Well Pointing	16,763	17,601	LF	$22.00	$387,222.00
23	4' Diameter Manhole (6'-8' Deep)	9	9	EA	$4,800.00	$43,200.00
24	4' Diameter Manhole (8'-10' Deep)	10	10	EA	$5,100.00	$51,000.00
25	4' Diameter Manhole (10'-12' Deep)	17	17	EA	$5,600.00	$95,200.00
26	5' Diameter Manhole (12'-14' Deep)	15	15	EA	$6,750.00	$101,250.00
27	5' Diameter Manhole (14'-16' Deep)	24	24	EA	$13,500.00	$324,000.00
28	5' Diameter Manhole (16'-18' Deep)	10	10	EA	$14,200.00	$142,000.00
29	5' Diameter Manhole (18'-20' Deep)	6	6	EA	$16,000.00	$96,000.00
			OLD BROWNSVILLE L.S. SUB-TOTAL:			**$6,740,564.00**
			CURRENT MASTER PLAN TOTAL:			**$10,325,606.00**

Urban Engineering
2725 Swantner
Corpus Christi, TX 78404
1-361-854-3101

AMENDED MASTER PLAN

CR 35, OLD BROWNSVILLE, FM 665 AND WEST POINT LIFT STATIONS

ITEM	DESCRIPTION	QUAN.	QUAN. + 5%	UNIT	UNIT PRICE	TOTAL COST
A. AMENDED CR 35 LIFT STATION IMPROVEMENTS:						
1	Lift Station (12' dia., 24' deep)	1	1	LS	$400,000.00	$400,000.00
2	12" PVC Force Main	4,300	4,515	LF	$48.00	$216,720.00
3	8" PVC SDR 26 (4'-6' Cut)	1,339	1,406	LF	$28.00	$39,368.00
4	8" PVC SDR 26 (6'-8' Cut)	1,839	1,931	LF	$31.00	$59,861.00
5	8" PVC SDR 26 (8'-10' Cut)	359	377	LF	$42.00	$15,834.00
6	8" PVC SDR 26 (10'-12' Cut)	1,789	1,878	LF	$55.00	$103,290.00
7	8" PVC SDR 26 (12'-14' Cut)	339	356	LF	$65.00	$23,140.00
8	8" PVC SDR 26 (14'-16' Cut)	255	268	LF	$75.00	$20,100.00
9	10" PVC SDR 26 (6'-8' Cut)	125	131	LF	$47.50	$6,222.50
10	10" PVC SDR 26 (8'-10' Cut)	1,608	1,688	LF	$50.50	$85,244.00
11	10" PVC SDR 26 (10'-12' Cut)	2,422	2,543	LF	$61.50	$156,394.50
12	10" PVC SDR 26 (12'-14' Cut)	2,530	2,657	LF	$72.50	$192,632.50
13	10" PVC SDR 26 (14'-16' Cut)	1,555	1,633	LF	$84.50	$137,988.50
14	10" PVC SDR 26 (16'-18' Cut)	780	819	LF	$95.50	$78,214.50
15	12" PVC SDR 26 (16'-18' Cut)	1,400	1,470	LF	$125.00	$183,750.00
16	18" PVC SDR 26 (14'-16' Cut)	2,100	2,205	LF	$205.00	$452,025.00
17	Embedment	18,440	19,362	LF	$10.00	$193,620.00
18	OSHA Trench Protection	18,440	19,362	LF	$2.00	$38,724.00
19	Well Pointing	6,435	6,757	LF	$22.00	$148,654.00
20	4' Diameter Manhole (4'-6' Deep)	2	2	EA	$4,400.00	$8,800.00
21	4' Diameter Manhole (6'-8' Deep)	2	2	EA	$4,800.00	$9,600.00
22	4' Diameter Manhole (8'-10' Deep)	6	6	EA	$5,100.00	$30,600.00
23	4' Diameter Manhole (10'-12' Deep)	1	1	EA	$5,600.00	$5,600.00
24	5' Diameter Manhole (12'-14' Deep)	10	10	EA	$6,750.00	$67,500.00
25	5' Diameter Manhole (14'-16' Deep)	8	8	EA	$13,500.00	$108,000.00
26	5' Diameter Manhole (16'-18' Deep)	9	9	EA	$14,200.00	$127,800.00
				AMENDED CR 35 L.S. SUB-TOTAL:		**$2,909,682.50**

Urban Engineering
2725 Swantner
Corpus Christi, TX 78404
1-361-854-3101

AMENDED MASTER PLAN

CR 35, OLD BROWNSVILLE, FM 665 AND WEST POINT LIFT STATIONS

ITEM	DESCRIPTION	QUAN.	QUAN. + 5%	UNIT	UNIT PRICE	TOTAL COST
B. AMENDED OLD BROWNSVILLE LIFT STATION IMPROVEMENTS:						
1	Lift Station (12' dia., 27' deep)	1	1	LS	$425,000.00	$425,000.00
2	14" PVC Force Main	10,475	10,999	LF	$53.00	$582,947.00
3	8" PVC SDR 26 (8'-10' Cut)	690	725	LF	$42.00	$30,450.00
4	8" PVC SDR 26 (10'-12' Cut)	690	725	LF	$55.00	$39,875.00
5	8" PVC SDR 26 (12'-14' Cut)	690	725	LF	$65.00	$47,125.00
6	8" PVC SDR 26 (14'-16' Cut)	690	725	LF	$75.00	$54,375.00
7	10" PVC SDR 26 (6'-8' Cut)	2,319	2,435	LF	$47.50	$115,662.50
8	10" PVC SDR 26 (8'-10' Cut)	3,149	3,306	LF	$50.50	$166,953.00
9	10" PVC SDR 26 (10'-12' Cut)	5,186	5,445	LF	$61.50	$334,867.50
10	10" PVC SDR 26 (12'-14' Cut)	2,655	2,788	LF	$72.50	$202,130.00
11	10" PVC SDR 26 (14'-16' Cut)	392	412	LF	$84.50	$34,814.00
12	12" PVC SDR 26 (12'-14' Cut)	313	329	LF	$109.00	$35,861.00
13	12" PVC SDR 26 (14'-16' Cut)	2,449	2,571	LF	$117.00	$300,807.00
14	12" PVC SDR 26 (16'-18' Cut)	2,363	2,481	LF	$125.00	$310,125.00
15	15" PVC SDR 26 (12'-14' Cut)	565	593	LF	$145.00	$85,985.00
16	15" PVC SDR 26 (14'-16' Cut)	2,425	2,546	LF	$165.00	$420,090.00
17	15" PVC SDR 26 (16'-18' Cut)	455	478	LF	$205.00	$97,990.00
18	15" PVC SDR 26 (18'-20' Cut)	2,605	2,735	LF	$245.00	$670,075.00
19	18" PVC SDR 26 (12'-14' Cut)	1,000	1,050	LF	$185.00	$194,250.00
20	18" PVC SDR 26 (14'-16' Cut)	800	840	LF	$205.00	$172,200.00
21	Embedment	29,436	30,908	LF	$10.00	$309,080.00
22	OSHA Trench Protection	29,436	30,908	LF	$2.00	$61,816.00
23	Well Pointing	13,843	14,535	LF	$22.00	$319,770.00
24	4' Diameter Manhole (6'-8' Deep)	6	6	EA	$4,400.00	$26,400.00
25	4' Diameter Manhole (8'-10' Deep)	9	9	EA	$5,100.00	$45,900.00
26	4' Diameter Manhole (10'-12' Deep)	13	13	EA	$5,600.00	$72,800.00
27	5' Diameter Manhole (12'-14' Deep)	10	10	EA	$6,750.00	$67,500.00
28	5' Diameter Manhole (14'-16' Deep)	23	23	EA	$13,500.00	$310,500.00
29	5' Diameter Manhole (16'-18' Deep)	7	7	EA	$14,250.00	$99,750.00
30	5' Diameter Manhole (18'-20' Deep)	6	6	EA	$16,000.00	$96,000.00
	AMENDED OLD BROWNSVILLE L.S. SUB-TOTAL:					**$5,731,098.00**

Urban Engineering
2725 Swantner
Corpus Christi, TX 78404
1-361-854-3101

AMENDED MASTER PLAN

CR 35, OLD BROWNSVILLE, FM 665 AND WEST POINT LIFT STATIONS

ITEM	DESCRIPTION	QUAN.	QUAN. + 5%	UNIT	UNIT PRICE	TOTAL COST
C. FM 665 LIFT STATION IMPROVEMENTS:						
1	Lift Station (8' dia., 22' deep)	1	1	LS	$300,000.00	$300,000.00
2	6" PVC Force Main	7,485	7,859	LF	$30.00	$235,770.00
3	8" PVC SDR 26 (6'-'8' Cut)	1,000	458	LF	$31.00	$14,198.00
4	8" PVC SDR 26 (8'-10' Cut)	1,000	578	LF	$42.00	$24,276.00
5	8" PVC SDR 26 (10'-12' Cut)	1,000	158	LF	$55.00	$8,690.00
6	8" PVC SDR 26 (12'-14' Cut)	500	158	LF	$65.00	$10,270.00
7	8" PVC SDR 26 (14'-16' Cut)	35	158	LF	$75.00	$11,850.00
6	10" PVC SDR 26 (8'-10' Cut)	660	693	LF	$50.50	$34,996.50
7	10" PVC SDR 26 (10'-12' Cut)	510	536	LF	$61.50	$32,964.00
8	10" PVC SDR 26 (14'-16' Cut)	690	725	LF	$84.50	$61,262.50
9	Embedment	5,395	5,665	LF	$10.00	$56,650.00
10	OSHA Trench Protection	5,395	5,665	LF	$2.00	$11,330.00
11	Well Pointing	725	761	LF	$22.00	$16,742.00
12	4' Diameter Manhole (6'-8' Deep)	2	2	EA	$4,800.00	$9,600.00
13	4' Diameter Manhole (8'-10' Deep)	3	3	EA	$5,100.00	$15,300.00
14	4' Diameter Manhole (10'-12' Deep)	3	3	EA	$5,600.00	$16,800.00
15	5' Diameter Manhole (12'-14' Deep)	5	5	EA	$6,750.00	$33,750.00
16	5' Diameter Manhole (14'-16' Deep)	4	4	LS	$13,500.00	$54,000.00
			FM 665 L.S. SUB-TOTAL:			**$948,449.00**
D. WEST POINT LIFT STATION IMPROVEMENTS:						
1	Lift Station (10' dia., 23' deep)	1	1	LS	$350,000.00	$350,000.00
2	8" PVC Force Main	3,300	3,465	LF	$35.00	$121,275.00
3	8" PVC SDR 26 (8'-10' Cut)	800	840	LF	$42.00	$35,280.00
4	8" PVC SDR 26 (10'-12' Cut)	800	840	LF	$55.00	$46,200.00
5	Embedment	1,600	1,680	LF	$10.00	$16,800.00
6	OSHA Trench Protection	1,600	1,680	LF	$2.00	$3,360.00
7	4' Diameter Manhole (8'-10' Deep)	2	2	EA	$5,100.00	$10,200.00
8	4' Diameter Manhole (10'-12' Deep)	1	1	EA	$5,600.00	$5,600.00
			WEST POINT L.S. SUB-TOTAL:			**$588,715.00**
E. OFF-SITE GRAVITY SEWER IMPROVEMENTS:						
1	15" PVC SDR 26 (10'-12' Cut)	650	683	LF	$135.00	$92,205.00
2	15" PVC SDR 26 (12'-14' Cut)	500	525	LF	$145.00	$76,125.00
			OFF-SITE GRAVITY SUB-TOTAL:			**$168,330.00**
			AMENDED MASTER PLAN TOTAL:			**$10,346,274.50**

Urban Engineering
2725 Swantner
Corpus Christi, TX 78404
1-361-854-3101

WEST POINT CROSSING – TEMPORARY SANITARY SEWER LIFT STATION

DESIGN MEMORANDUM

APRIL 2015

PREPARED BY:

URBAN ENGINEERING

2725 Swantner St. • Corpus Christi, Texas 78404
Phone: (361) 854-3101 • FAX (361) 854-6001

Job No. 40706.B4.01

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B. LIFT STATION
C. FORCE MAIN

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B Flow Calculations

EXECUTIVE SUMMARY

The following is the Executive Summary for the plan submission for the West Point Crossing Sanitary Sewer Improvements. This project involves the installation of approximately 2,700 linear feet of gravity sanitary sewer, one temporary sanitary sewer duplex lift station, and approximately 6,700 linear feet of 6" diameter temporary sanitary sewer force main.

There is a proposed development located at the south east corner of the Old Brownsville Road and North Padre Island Drive intersection. Currently there is no City of Corpus Christi sanitary sewer infrastructure on the south side of North Padre Island Drive in this area. Existing businesses in this area are on septic systems.

The proposed project would include approximately 2,700 linear of 10" and 8" diameter gravity sanitary sewer to be built at master plan depths (Un-adopted City of Corpus Christi Wastewater Collection Master Plan, Greenwood WWTP Service Area, Area 5). The proposed gravity sanitary sewer will start with an upstream point near the Old Brownsville Road and North Padre Island Drive intersection. The proposed gravity sanitary sewer will extend from that point 2,700 south west towards the Old Brownsville Road and West Point Road intersection where it will tie into the proposed temporary sanitary sewer lift station. The proposed gravity sanitary is planned to be constructed within a 20' wide utility easement on the south side of Old Brownsville Road. This segment of proposed gravity sanitary sewer will be built per master plan and will remain in service once the master plan lift station for this area is built.

The proposed sanitary sewer lift station is a duplex, 8' diameter x 22' deep fiberglass wet well. There are proposed interim pumps and proposed future pumps for this lift station. The proposed interim pumps are 5 horsepower submersible pumps. Future development in this area will dictate when the future 35 horsepower submersible pumps will need to be installed in the proposed lift station. See the Exhibit A for the proposed services areas. At a later date, when the future master plan lift station for this service is constructed, additional gravity sanitary sewer will be built and will make this temporary lift station no longer useful. Design of the proposed lift station will follow criteria established by TCEQ in TAC 30 Chapter 317 and will conform to the City of Corpus Christi standards

for temporary lift station construction. A basis of design including size, capacity and pumps is included in Section IV of this Design Memorandum.

The proposed lift station will pump into a proposed 6" diameter force main that will be constructed along West Point Road and North Padre Island Drive and then discharge into an existing manhole located at the Bush Street and Hendricks Street intersection. The proposed force main will be installed in a 10 foot wide utility easement along West Point Road, North Padre Island Drive, and Bush Street. Design of the force main will follow criteria established by TCEQ in TAC 30 Chapter 290. Material for the force main line will be PVC (Green, C-900, DR 25, pressure class 165 psi). Pipe embedment and trench backfill will conform to applicable City of Corpus Christi standards.

Section I - INTRODUCTION

A. PURPOSE

The purpose of this project is to construct sanitary sewer infrastructure in an area where there currently is no service. The proposed sanitary sewer infrastructure includes permanent gravity sewer, a temporary lift station, and temporary force main.

There is a proposed development for a tract of land at the south east corner of the North Padre Island Drive and Old Brownsville Road intersection. Currently there is no sanitary sewer service in this area. There are a few other existing businesses in this area, but they rely on individual septic systems. There are existing gravity lines on the north side of North Padre Island Drive, but there is no sanitary sewer infrastructure on the south side of North Padre Island Drive in this area.

There currently is an unadopted wastewater collection plan for this area. As part of the collection plan there is proposed gravity sewer that will parallel Old Brownsville near the proposed development. As part of the proposed improvement, a segment of the permanent gravity sanitary sewer will be constructed. The downstream end of the proposed segment will discharge into the proposed temporary sanitary sewer lift station. At a later date when the master plan lift station is constructed, additional gravity sewer will be extended past the proposed lift station making the lift station no longer needed.

The proposed improvements as part of this project will provide sanitary sewer service to not only the proposed development at the North Padre Island Drive and Old Brownsville Road intersection but will also serve future developments along Old Brownsville Road between West Point Road and North Padre Island Drive (see attached Exhibit A for service area boundary map).

Section II - PROPOSED IMPROVEMENTS

A. GRAVITY SANITARY SEWER

1. 10" and 8" diameter PVC

All proposed PVC gravity lines will be installed at master plan depths.

2. Manholes

Manholes for this project will be spaced at a maximum of 500' apart per TCEQ Chapter 217 requirements. The upstream manholes less than 14' deep will be 4' diameter. The downstream manholes 14' and deeper will be 5' in diameter. Manhole wall thickness and construction will conform to City of Corpus Standard Details and Specifications.

B. LIFT STATION

1. Pumps and Accessories

The proposed temporary lift station is a duplex lift station, two pumps will be installed, with one pump handling the design flow and the other pump acting as a backup pump. The temporary lift station will initially have 5 horsepower interim pumps. When flows increase and the interim pumps near capacity future 35 horsepower pumps can be installed.

2. Wet Well

The proposed wet well will be 8' in diameter and approximately 22' deep and will be made of fiberglass.

3. Lift Station Discharge Piping and Valves (above ground)

For ease of maintenance, the proposed lift station valves will be installed above ground. All above ground discharge piping will be constructed with ductile iron pipe, fittings, and valves.

4. Wet Well Ventilation

The proposed lift station will have passive ventilation per TCEQ Chapter 217 Regulations. The passive ventilation will consist of a 6" PVC pipe with a stainless steel bird screen.

5. Flow Meter

The proposed lift station will include a flow meter to measure flow through the discharge piping. The flow meter will be installed in a fiberglass manhole adjacent to the lift station wet well downstream of the above ground discharge piping.

6. Odor Control

Since the proposed lift station is temporary and peak flows are minimal, there will be no odor control systems installed at the lift station site.

7. Miscellaneous Site Improvements

The proposed temporary lift station will have a 6' tall wood picket fence with three strands of barbed wire. There will be a 3' wide personnel gate and a 12' wide main gate to allow for vehicular entry. The lift station will include a 12' wide concrete driveway that will be installed between Old Brownsville Road edge of pavement and the top slab of the lift station wet well. A water service for the lift station site will be installed. The water service will be installed by boring under Old Brownsville Road and tying into an existing waterline on the north side of Old Brownsville Road. A meter will be installed on the water service line.

C. FORCE MAIN

1. Force Main Piping

The proposed 6" diameter sanitary sewer force main will be constructed of PVC (green, C-900, DR 25, pressure class 165 psi). The proposed force main will be installed with a minimum of 2'-6" of ground cover.

2. Line Valves

Live valves for isolation of the force main will be installed at maximum 2,000' intervals.

Section III - GRAVITY PIPE AND FORCE MAIN ALIGNMENT

A topographic survey was performed to identify existing conditions, utilities and other possible obstructions.

A. LOCATIONS AND ALIGNMENT FOR PROPOSED SEWER LINES

Both the proposed gravity sewer line and the proposed force main will be installed in utility easements outside of the existing street right of ways. The 10" and 8" diameter gravity sewer will be installed within a 20' proposed utility easement outside of the Old Brownsville Road right of way. The proposed 6" force main will be installed within a proposed 10' wide utility easement outside of the right of ways of West Point Road, North Padre Island Drive, and Bush Street. A segment of the proposed 6" force main will cross the West Point Road right of way (near North Padre Island Drive) in order to switch sides of the street. Also, approximately 30 feet of proposed 6" force main will be installed in the Bush Street right of way in order to tie to an existing manhole on the existing gravity sewer system at the Bush Street and Hendricks Street intersection.

B. CROSSINGS

The proposed 6" force main will cross an existing drainage ditch and a City gas line.

1. Utilities

a. Electrical:

There are overhead electrical lines at various locations along the proposed force main route. To the best of our knowledge, all electrical lines are above ground and will not interfere with the installation of the proposed force main.

b. Telephone and Fiberoptics:

It does not appear that there will be any crossing of telephone or fiberoptic lines.

c. Water:

A preliminary investigation indicates that there will not be any crossing of existing water lines.

d. Sewer (Wastewater):

A preliminary investigation indicates that there will not be any crossing of existing sewer lines.

e. Gas Utility:

A preliminary investigation indicates that there will one crossing of an existing City gas line.

f. Petroleum and Other Petrochemical Lines:

A preliminary investigation indicates that there will not be any crossing of existing petroleum or petrochemical lines.

g. Storm Water Drainage Facilities:

There is one storm water drainage ditch along the proposed force main route.

Section IV – LIFT STATION DESIGN CRITERIA

A. SERVICE AREA AND SITE SELECTION

The proposed temporary lift station is designed to serve approximately 146.77 acres of land with various uses and build out rates that include low density residential, light industrial, and commercial development. See Exhibit A for a map of the area that the proposed temporary lift station will serve.

As shown on Exhibit A, there is a Phase I lift station service area and a Phase II lift station service area. The proposed Phase I lift station will be constructed under this project with interim pumps. The proposed development at the corner of North Padre Island Drive and Old Brownsville Road is within the Phase I service area. The Phase II lift station will be built at a later date when development begins to occur in the Phase II service area.

All previous and continued references to the proposed temporary lift station will be to the Phase I service area lift station. The proposed temporary lift station site will be located approximately 1,100 feet to the north east of the Old Brownsville Road and West Point Road intersection on the south side of Old Brownsville Road. The lift station will be located in an easement outside of the street right of way.

B. DESIGN FLOW

The design flow for the proposed temporary lift station was calculated by determining the land use for the various parcels of land within the lift station service area per the Waste Water Collection System Master Plan, applying the master plan flow rate per land use type and then totaling the flows. A peaking factor of 4 was used and 400 gallons/day/acre was used for infiltration. See Exhibit B for the design flow calculations.

C. LIFT STATION DESIGN

The lift station will be designed using the criteria set forth in Chapter 217 of TAC 30. The primary design consideration for lift stations is given to wet well volumes. The wet well will be constructed of fiberglass and will be 8-foot diameter by approximately 22-feet deep.

The wet well volume required was calculated using the following formula:

$$V = (T * Q) / (4 * 7.48)$$

where T is the pump cycle time in minutes and Q is the peak flow in gallons per minute. This formula is used to calculate wet well volumes when the pump capacity is equal to the peak flow. Using a pump cycle time of 6 minutes (or 10 pump starts per hour) and a peak flow of 470 gpm, the wet well volume required is 94.25 cubic feet (or 1.87 vertical feet inside of the 8 foot diameter wet well).

The lift station will be designed using Flygt (Xylem) submersible centrifugal pumps. The pump motors would be 3-phase, 460V, 60 Hz.

The force main will be 6" pressure class 150 psi PVC, approximately 6,700 feet in length. The velocities in the force main and force main sizing will be evaluated as part of the detailed design process.

D. STORAGE CAPACITY

According to TAC 30 Chapter 317, storage capacity must be provided for 20 minutes of peak flow in the event of a power outage to prevent the release of untreated wastewater. This storage can be provided in the wet well volume and influent gravity line collection system.

Section V - BASIS OF DESIGN

The proposed temporary lift station is designed for an interim phase and a future phase. The interim phase will handle flows contributed from the proposed development at the corner of North Padre Island Drive and Old Brownsville Road and other developments. After completing a computer model of the wastewater pressure system, the interim pumps will be able to handle a total flow of 201 gpm. The interim pumps would be 5 horsepower submersible pumps.

The interim pumps would serve the area until future flows require that the pumping capacity be increased. When the pumping capacity needs to be increased, the interim pumps would be removed and the future pumps would be installed.

After completing a computer model of the wastewater pressure system at the future flows, the future pumps would need to be 35 horsepower. The 35 horsepower pumps would handle the wastewater flow from the proposed development at the corner North Padre Island Drive and Old Brownsville Road as well as the rest of the area shown in the service area on Exhibit A.

A. INTERIM FLOWS

Total Interim Flow = 201 gpm

Pumping Condition = 40 feet total dynamic head

Pump = 5 horsepower

B. FUTURE FLOWS

Total Peak Future Flow = 471 gpm

Pumping Condition = 130 feet total dynamic head

Pump = 35 horsepower

Section VI - WORK PLAN

A. SURVEYS AND PLAN PREPARATION

1. Datum

All work on this project (surveys, plans) will be on the Texas State Plane Coordinate System, NAD 83, South Zone (City Standard Datum).

2. Ground Surveys

Ground elevations and validation of general land features shall be made to determine trench depths, utility locations and other obstructions. Specific areas of concern such as major channels and street crossings will require more than the normal surveys to identify topographic variations and other sub-surface structures.

3. Drawings

Drawings will be completed in accordance with the City of Corpus Christi's Standards, properly coordinated with the project specifications and other details and arranged in such a fashion as to allow the Contractor to accurately estimate the cost of the project and construct it.

All drawings will be produced electronically using a computer aided drafting design (CADD) package.

Horizontal and Vertical Scale: The scale recommended and utilized on this project shall be 1"= 40' horizontal, 1" = 4' vertical.

All pipeline plan and profile sheets will be so arranged as to read from left to right with the project beginning at the proposed lift station.

Where possible, plan views will be oriented with the north to either the top or left of the sheet.

Section VII - CONSTRUCTION REQUIREMENTS

A. DISPOSAL OF EXCESS SITE EXCAVATION MATERIAL

All excess excavation material shall be disposed of by the Contractor. Provisions shall be provided in the Contract Documents to direct the Contractor in proper disposal of contaminated soil.

B. RESTORATION

Fields and ditches shall be seeded or sodded to prevent erosion.

All driveways and pavements shall be repaired.

C. STORM WATER POLLUTION PREVENTION PLAN

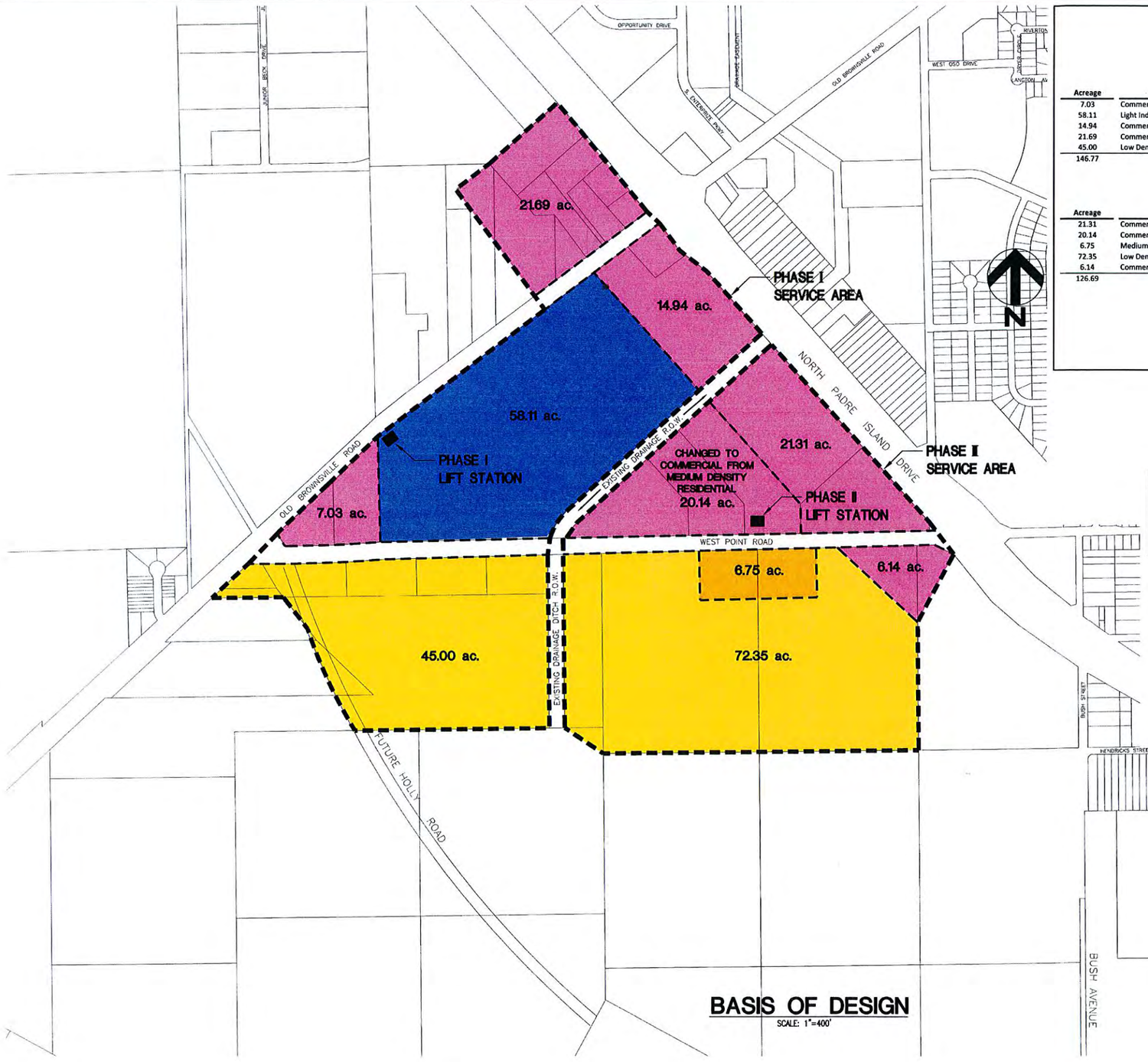
A storm water pollution prevention plan shall be incorporated into the Contractor's work plan to minimize pollution entering the storm sewers along the project (including open drainage ditches). Specific emphasis shall be made near street intersections and large drainage facilities where access to and from the work area shall be critical.

D. EROSION CONTROL

There are no specific areas where the force main installation shall cause erosion of property. Therefore, no specific erosion control measures are recommended, beyond the City Standard Stormwater Pollution Prevention Plan.

E. TRAFFIC CONTROL PLAN

A Traffic Control Plan will be provided in accordance with standard City specifications and latest edition of the Texas Uniform Manual on Traffic Control Devices.



West Point Area -

Phase I Lift Station Flow Calculations

Acreage	Land Use	Persons / Acre	Gallons/Person/Day	Peak Factor	Flow without I/I (gpm)	I/I	Total Flow (gpm)
7.03	Commercial	30	30	4	18	2	20
58.11	Light Industrial	30	30	4	145	16	161
14.94	Commercial	30	30	4	37	4	42
21.69	Commercial	30	30	4	54	6	60
45.00	Low Density Residential	14	100	4	175	13	188
146.77					429	41	470

Phase II Lift Station Flow Calculations

Acreage	Land Use	Persons / Acre	Gallons/Person/Day	Peak Factor	Flow without I/I (gpm)	I/I	Total Flow (gpm)
21.31	Commercial	30	30	4	53	6	59
20.14	Commercial	30	30	4	50	6	56
6.75	Medium Density Residential	35	100	4	66	2	68
72.35	Low Density Residential	14	100	4	281	20	301
6.14	Commercial	30	30	4	15	2	17
126.69					466	2	501

NOTE: LAND USE ASSUMPTIONS ARE IN ACCORDANCE WITH FUTURE LAND USE MAP AND WASTE WATER FLOWS ARE FROM UN-ADOPTED WASTE WATER MASTER PLAN FOR SUBJECT AREA.

PHASE I LIFT STATION (INTERIM):	PHASE I LIFT STATION (FUTURE):
8' DIAMETER WET WELL	8' DIAMETER WET WELL
2 EA. 5HP 480V PUMPS	2 EA. 35HP 480V PUMPS
1-6" FORCE MAIN	1-6" FORCE MAIN

NOTE: CURRENT DEVELOPMENT PLANS ONLY COVERS SOUTH EAST CORNER OF OLD BROWNSVILLE ROAD AND S.P.I.D. WHICH WILL FACILITATE CONSTRUCTION OF PHASE I LIFT STATION. FUTURE DEVELOPMENT WILL DICTATE NEED AND TIMING FOR CONSTRUCTION OF PHASE II LIFT STATION.

LEGEND
- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- COMMERCIAL
- LIGHT INDUSTRIAL

BASIS OF DESIGN
SCALE: 1"=400'

Exhibit A

CALL BEFORE YOU DIG!
Texas 811 Know what's below. Call before you dig. 811
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST - STOP AND CALL
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

450 300 200 0 300 600
GRAPHIC SCALE 1"=300'

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APPROVED	DESCRIPTION	DATE	BY	REV.

SCALE: 1"=400' | DRAWN: CG | CHECKED: MFH | DATE: MARCH 2015

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MARRAY F. HUDSON, P.E. TX. REG. 78108 (01/27/2015)

BASIS OF DESIGN

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 100329-00
2725 SWANTNER DR. CORPUS CHRISTI, TX 78404
PHONE: 361.854.3101 WWW.URBANENG.COM

SHEET 2 OF 20

JOB NO. 40706.B4.01

West Point Area -

Phase I Lift Station Flow Calculations

Acreage	Land Use	Persons / Acre	Gallons/Person/Day	Peak Factor	Flow without I/I (gpm)	I/I	Total Flow (gpm)
7.03	Commercial	30	30	4	18	2	20
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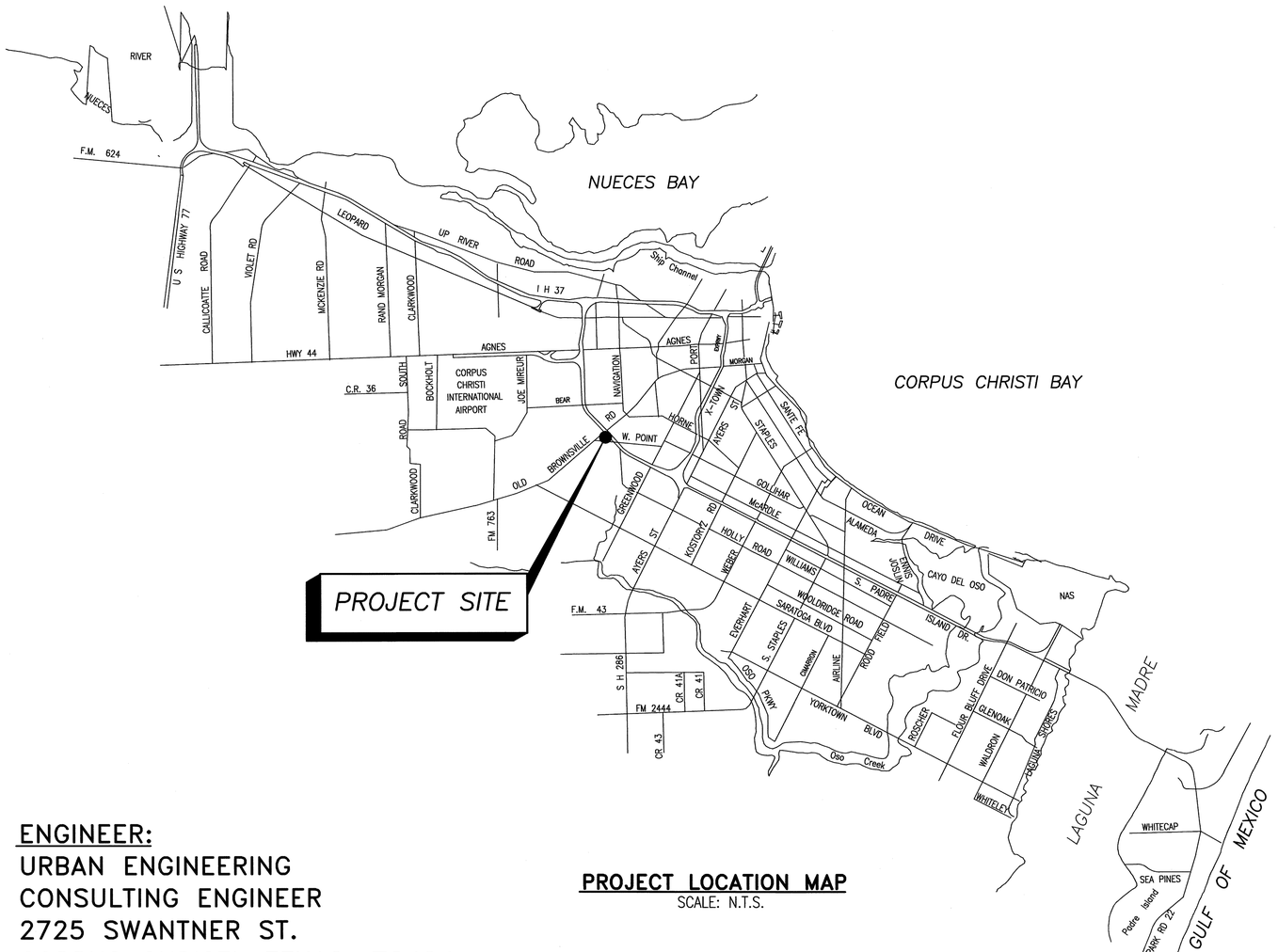
14.94	Commercial	30	30	4	37	4	42
21.69	Commercial	30	30	4	54	6	60
45.00	Low Density Residential	14	100	4	175	13	188
146.77					429	41	**470**

Phase II Lift Station Flow Calculations

Acreage	Land Use	Persons / Acre	Gallons/Person/Day	Peak Factor	Flow without I/I (gpm)	I/I	Total Flow (gpm)
21.31	Commercial	30	30	4	53	6	59
20.14	Commercial	30	30	4	50	6	56
6.75	Medium Density Residential	35	100	4	66	2	68
72.35	Low Density Residential	14	100	4	281	20	301
6.14	Commercial	30	30	4	15	2	17
126.69					466	2	**501**

Exhibit B

CONSTRUCTION PLANS
FOR
WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS



PROJECT LOCATION MAP
SCALE: N.T.S.

N

SHEET INDEX

SHEET NO.	DESCRIPTION
1.	TITLE SHEET AND INDEX
2.	BASIS OF DESIGN
3.	KEY MAP
4.	AREA MAP FOR FORCE MAIN
5.	FORCE MAIN PLAN AND PROFILES STA. 0+00 THRU STA. 8+00
6.	FORCE MAIN PLAN AND PROFILES STA. 8+00 THRU STA. 18+00
7.	FORCE MAIN PLAN AND PROFILES STA. 18+00 THRU STA. 28+00
8.	FORCE MAIN PLAN AND PROFILES STA. 28+00 THRU STA. 38+00
9.	FORCE MAIN PLAN AND PROFILES STA. 38+00 THRU STA. 48+00
10.	FORCE MAIN PLAN AND PROFILES STA. 48+00 THRU STA. 58+00
11.	FORCE MAIN PLAN AND PROFILES STA. 58+00 THRU END
12.	LIFT STATION SITE PLAN
13.	LIFT STATION DIMENSION PLAN
14.	LIFT STATION SECTION AND DETAILS
15.	LIFT STATION ELECTRICAL
16.	AREA MAP FOR GRAVITY SANITARY SEWER
17.	GRAVITY SEWER PLAN AND PROFILES STA. 0+00 THRU STA. 20+00
18.	GRAVITY SEWER PLAN AND PROFILES STA. 20+00 THRU END
19.	WATER SERVICE PLAN

THE FOLLOWING TxDOT STANDARDS SHEETS SPECIFICALLY IDENTIFIED BELOW HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

_____, P.E. _____

20. SAFETY END TREATMENT

CORPUS CHRISTI CITY STANDARDS DETAILS
CITY STANDARDS SANITARY SEWER
CITY STANDARDS SANITARY SEWER (2)
CITY STANDARDS SANITARY SEWER (3)
CITY STANDARDS SANITARY SEWER (4)
CITY STANDARDS SANITARY SEWER (5)
CITY STANDARDS WATER DETAILS
CITY STANDARDS WATER DETAILS (2)
CITY STANDARDS WATER DETAILS (3)
CITY STANDARDS WATER DETAILS (4)
CITY STANDARDS WATER DETAILS (5)

EXISTING UTILITIES SHOWN ARE FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO CONSTRUCTION.

ENGINEER:
URBAN ENGINEERING
CONSULTING ENGINEER
2725 SWANTNER ST.
CORPUS CHRISTI, TEXAS, 78404

MURRAY F. HUDSON 78198 REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 78198 (03/27/2015)

BY_____
MURRAY F. HUDSON, P.E.

CALL BEFORE YOU DIG!
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THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
2725 SWANTNER DR, CORPUS CHRISTI, TX 78404
PHONE: 361.854.3101 WWW.URBANENG.COM

JOB NO. 40706.B4.01
DATE: MARCH 2015

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1 OF 20

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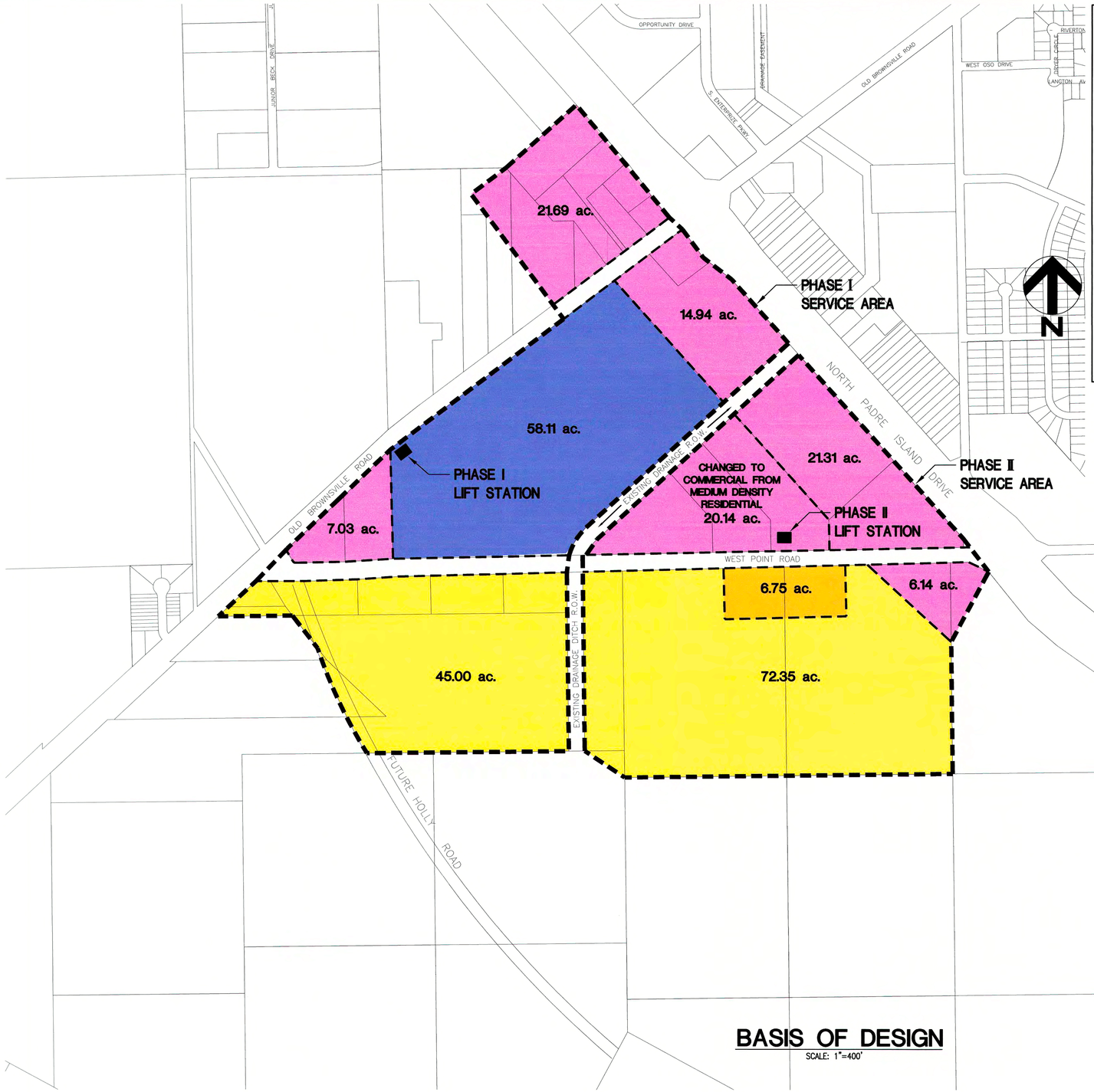

West Point Area -

Phase I Lift Station Flow Calculations

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PHASE I LIFT STATION (INTERIM):
8' DIAMETER WET WELL
2 EA. 5HP 480V PUMPS
1-6" FORCE MAIN

PHASE I LIFT STATION (FUTURE):
8' DIAMETER WET WELL
2 EA. 35HP 480V PUMPS
1-6" FORCE MAIN

NOTE: CURRENT DEVELOPMENT PLANS ONLY COVERS SOUTH EAST CORNER OF OLD BROWNSVILLE ROAD AND S.P.I.D. WHICH WILL FACILITATE CONSTRUCTION OF PHASE I LIFT STATION. FUTURE DEVELOPMENT WILL DICTATE NEED AND TIMING FOR CONSTRUCTION OF PHASE II LIFT STATION.

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- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- COMMERCIAL
- LIGHT INDUSTRIAL

BASIS OF DESIGN
SCALE: 1"=400'

CALL BEFORE YOU DIG!
Texas 811 Know what's below. Call before you dig.
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL OR BLAST - STOP AND CALL 811
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

GRAPHIC SCALE 1"=300'
450 300 200 0 300 600

S:\Projects\40000up\40706\B401\PLANS\40706B401_AREA_MAP_FM_AND_GRAVITY.dwg modified by cyg on Mar 27, 2015 - 2:22pm

APPROVED BY | DESCRIPTION | REV. | BY | DATE

SCALE: 1"=400' | DRAWN: CG | CHECKED: MFH | DATE: MARCH 2015

MURRAY F. HUDSON 78186 REGISTERED PROFESSIONAL ENGINEER
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 78186 (03/27/2015)

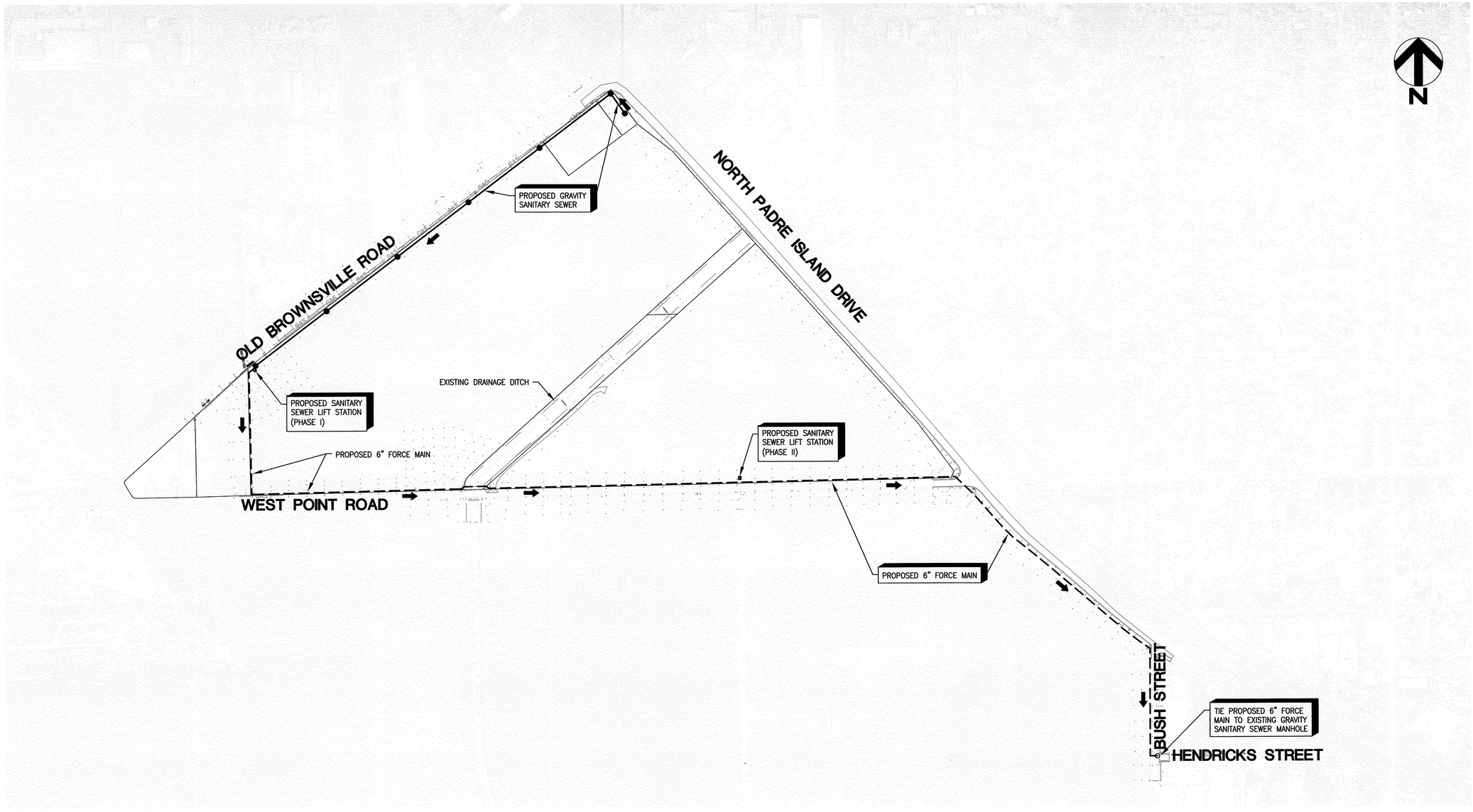
BASIS OF DESIGN

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10035400
2725 SWANTNER DR. CORPUS CHRISTI, TX 78404
PHONE: 361.854.3101
WWW.URBANENG.COM

SHEET 2 OF 20

JOB NO. 40706.B4.01



AREA MAP - PROPOSED GRAVITY SYSTEM AND PROPOSED FORCE MAIN

SCALE: 1"=300'

LEGEND:

- PROPOSED FORCE MAIN
- PROPOSED GRAVITY SANITARY SEWER
- PROPOSED SANITARY SEWER MANHOLE
- FLOW DIRECTION ARROW

CALL BEFORE YOU DIG!

LONE STAR 811 — Know what's below. Call before you dig.

PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST – STOP AND CALL 811

THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

300 200 100 0 200 400

GRAPHIC SCALE 1"=200'

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APPROVED BY	DESCRIPTION	DATE	BY	REV.

SCALE: 1"=200'

DRAWN: CG

CHECKED: MFH

DATE: MARCH 2015

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 79188 (03/27/2015)

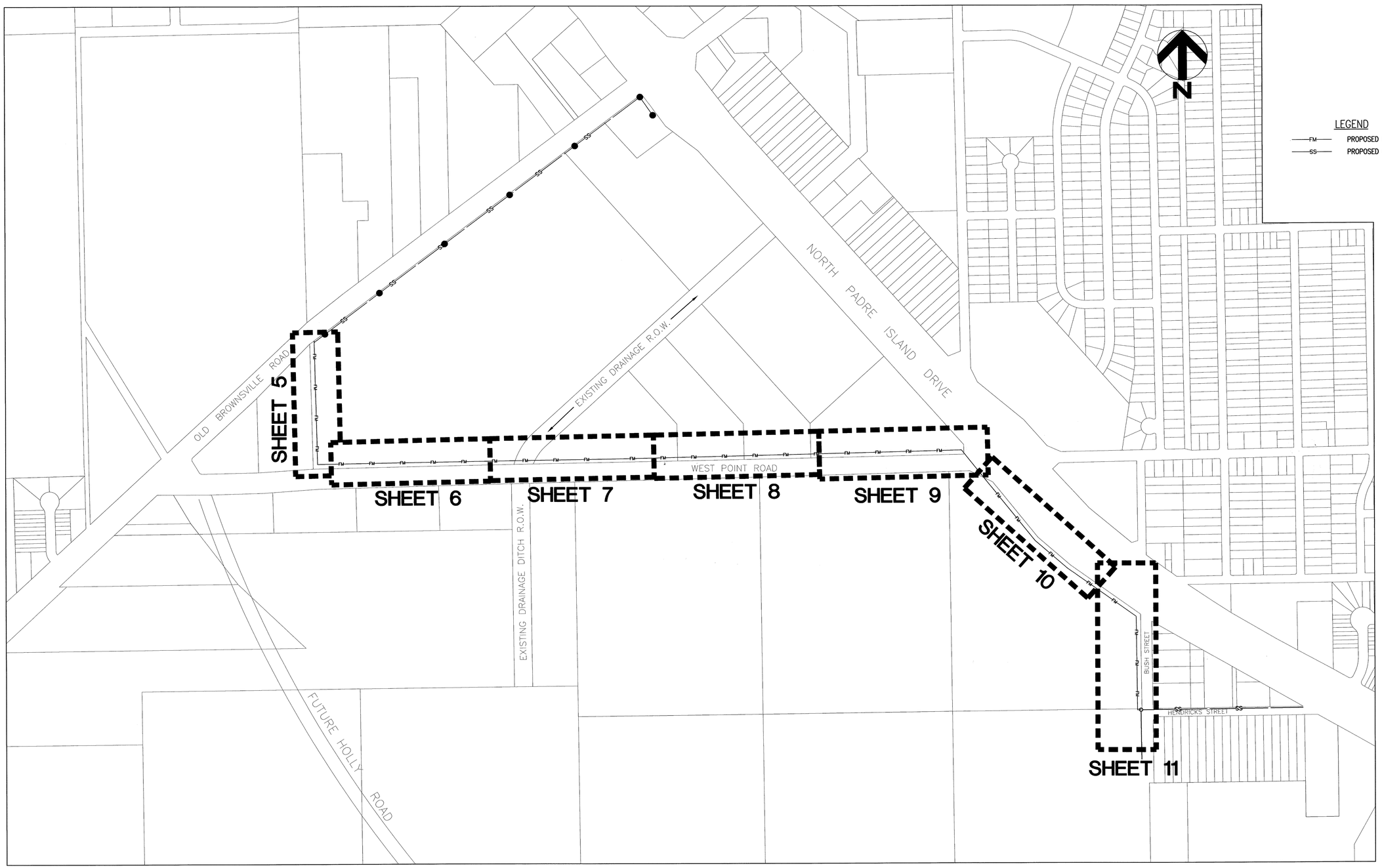
KEY MAP

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10035400
2725 SWANTNER DR. CORPUS CHRISTI, TX 78404
PHONE: 361.854.3101
WWW.URBANENG.COM

SHEET 3 OF 20

JOB NO. 40706.B4.01



AREA MAP - PROPOSED FORCE MAIN

SCALE: 1"=300'

CALL BEFORE YOU DIG!
Texas 811 Know what's below. Call before you dig.
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST – STOP AND CALL 811
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

450 300 200 0 300 600
GRAPHIC SCALE 1"=300'

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REV.	BY	DATE	DESCRIPTION	APPROVED BY

SCALE: 1"=300'
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 79198 (03/27/2015)

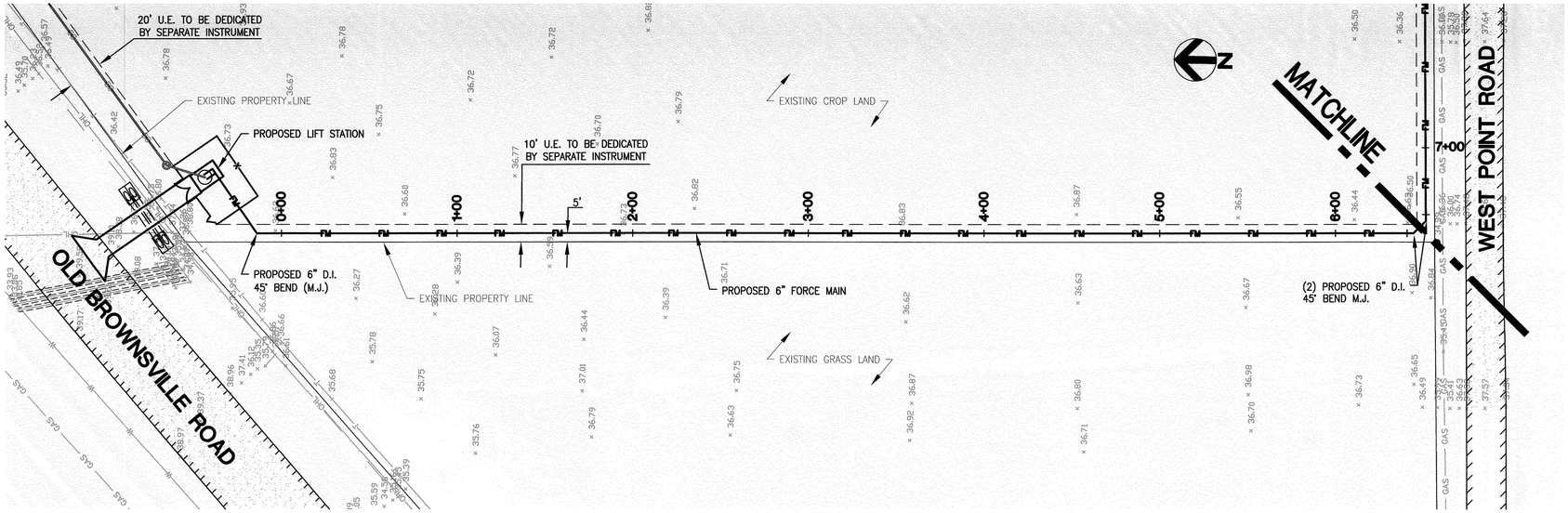
AREA MAP FOR FORCE MAIN

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

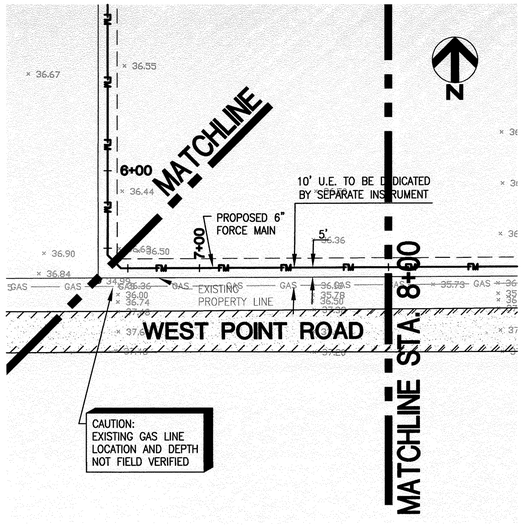
URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
725 SOUTHWEST DR., CORPUS CHRISTI, TEXAS 78404
PHONE: 361.854.3101 WWW.URBANENG.COM

SHEET 4 OF 20

JOB NO. 40706.B4.01



PLAN VIEW
SCALE: 1"=40'



PLAN VIEW
SCALE: 1"=40'

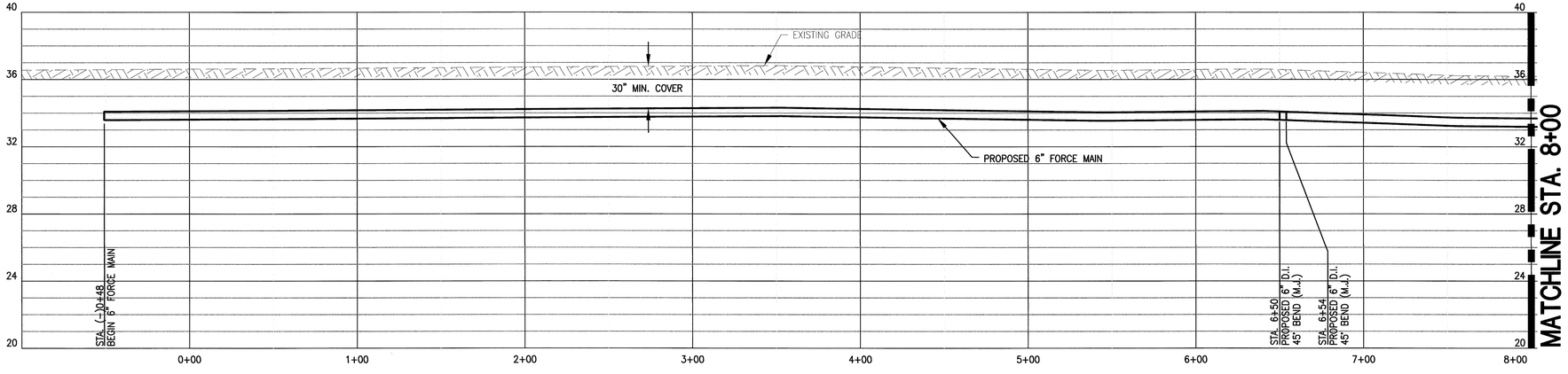
LEGEND

- EXISTING SANITARY SEWER MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING FENCE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- UTILITY EASEMENT (U.E.)
- EXISTING FORCE MAIN
- PROPOSED FORCE MAIN
- EXISTING STORM
- EXISTING GAS LINE
- EXISTING ELECTRICAL
- EXISTING FIBER OPTIC CABLE LINE
- EXISTING UNDERGROUND TELEPHONE
- EXISTING DRAINAGE DITCH FLOW LINE
- EXISTING OVERHEAD ELECTRICAL

NOTE: ALL PROPOSED SANITARY SEWER FORCE MAIN SHALL BE GREEN, PVC C-900, DR25, PRESSURE CLASS 165. SEE FORCE MAIN PIPING SPECIFICATION FOR ADDITIONAL INFORMATION.

CALL BEFORE YOU DIG!
LONE STAR 811 Know what's below. Call before you dig.
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST – STOP AND CALL 811
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

60 40 20 0 40 80
GRAPHIC SCALE 1"=40'



PROFILE VIEW
SCALE: 1"=40' HORIZ.
1"=4' VERT.

EXISTING UTILITIES SHOWN ARE FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO CONSTRUCTION.

FORCE MAIN PLAN AND PROFILES STA. 0+00 THRU STA. 8+00

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

APPROVED BY	DESCRIPTION	BY	DATE	REV.

SCALE: 1"=40'
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 76195 (03/27/2015)

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
2725 SWANTNER DR, CORPUS CHRISTI, TX 78404
PHONE: 361.854.3101 WWW.URBANENG.COM

SHEET 5 OF 20

JOB NO. 40706.B4.01

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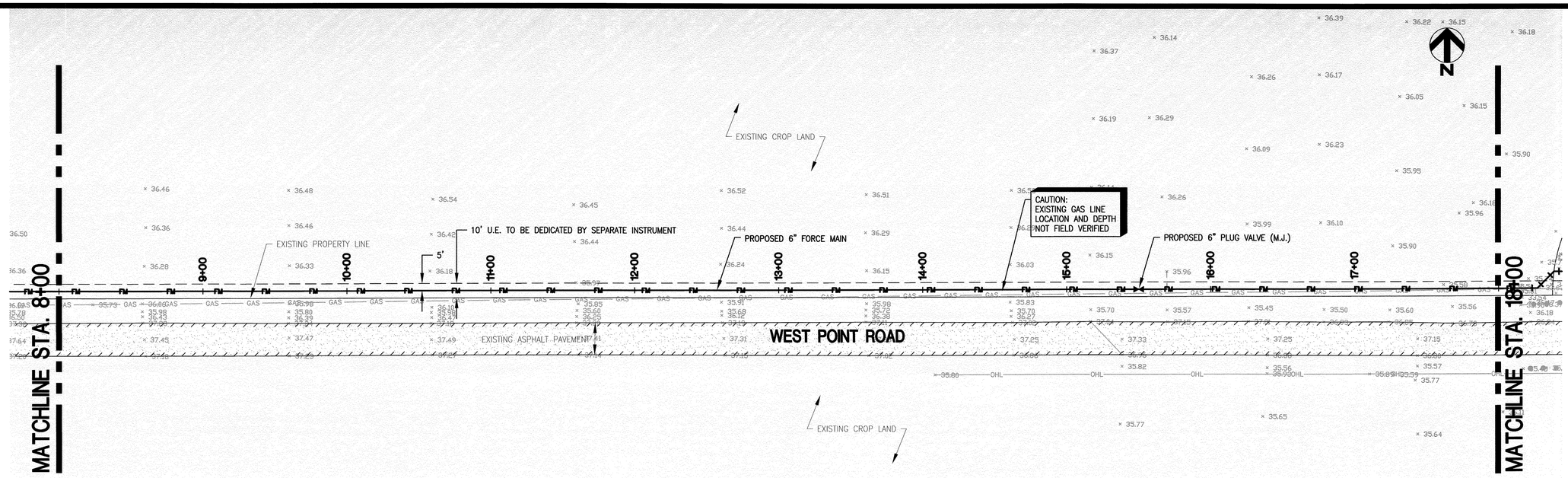


PLAN VIEW
SCALE: 1"=40'

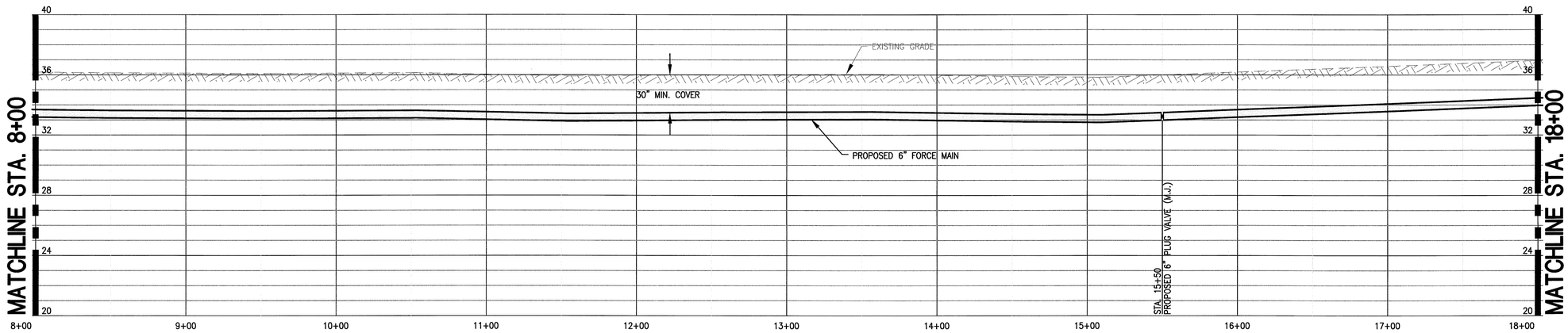
NOTE: ALL PROPOSED SANITARY SEWER FORCE MAIN SHALL BE GREEN, PVC C-900, DR25, PRESSURE CLASS 165. SEE FORCE MAIN PIPING SPECIFICATION FOR ADDITIONAL INFORMATION.

LEGEND

- EXISTING SANITARY SEWER MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING FENCE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- UTILITY EASEMENT (U.E.)
- EXISTING FORCE MAIN
- PROPOSED FORCE MAIN
- EXISTING STORM
- EXISTING GAS LINE
- EXISTING ELECTRICAL
- EXISTING FIBER OPTIC CABLE LINE
- EXISTING UNDERGROUND TELEPHONE
- EXISTING DRAINAGE DITCH FLOW LINE
- EXISTING OVERHEAD ELECTRICAL

CALL BEFORE YOU DIG!
LONE STAR 811 — Know what's below. Call before you dig.
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST – STOP AND CALL! 811
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

GRAPHIC SCALE 1"=40'
60 40 20 0 40 80



PROFILE VIEW
SCALE: 1"=40' HORIZ.
1"=4' VERT.

EXISTING UTILITIES SHOWN ARE FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO CONSTRUCTION.

REV.	BY	DATE	DESCRIPTION	APPROVED BY

SCALE: 1"=40'
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 78198 (03/27/2015)

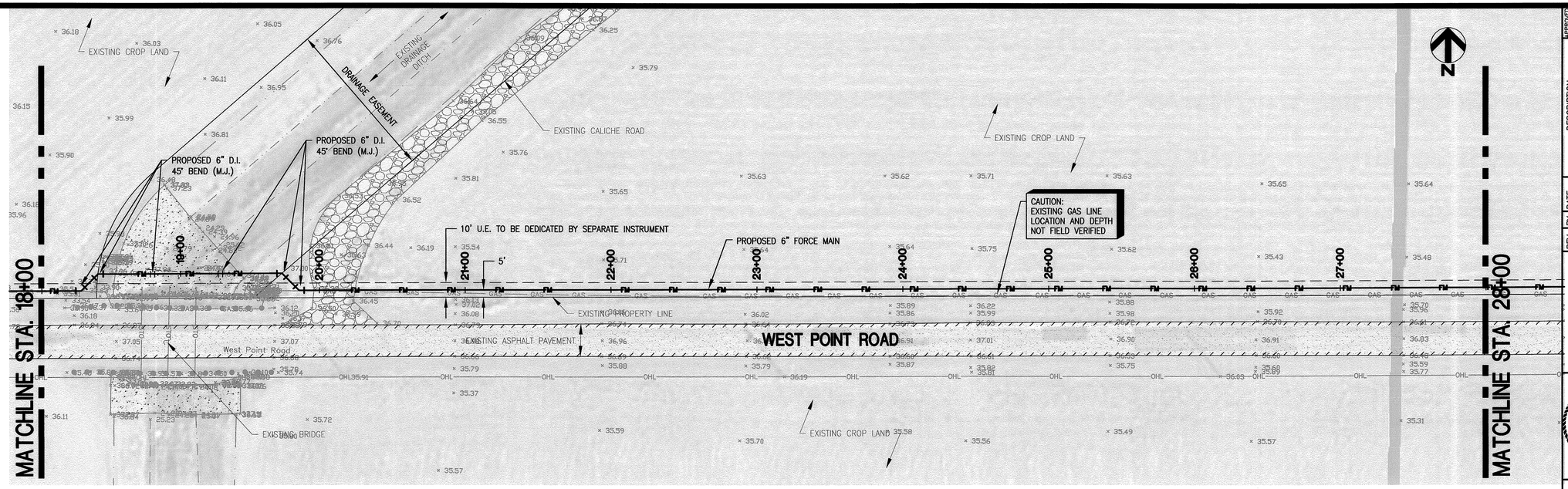
FORCE MAIN PLAN AND PROFILE STA. 8+00 THRU 18+00

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
2725 SWANTNER DR. CORPUS CHRISTI, TX 78404
PHONE: 361.854.3101 WWW.URBANENG.COM

SHEET 6 OF 20

JOB NO. 40706.B4.01



PLAN VIEW

SCALE: 1"=40'

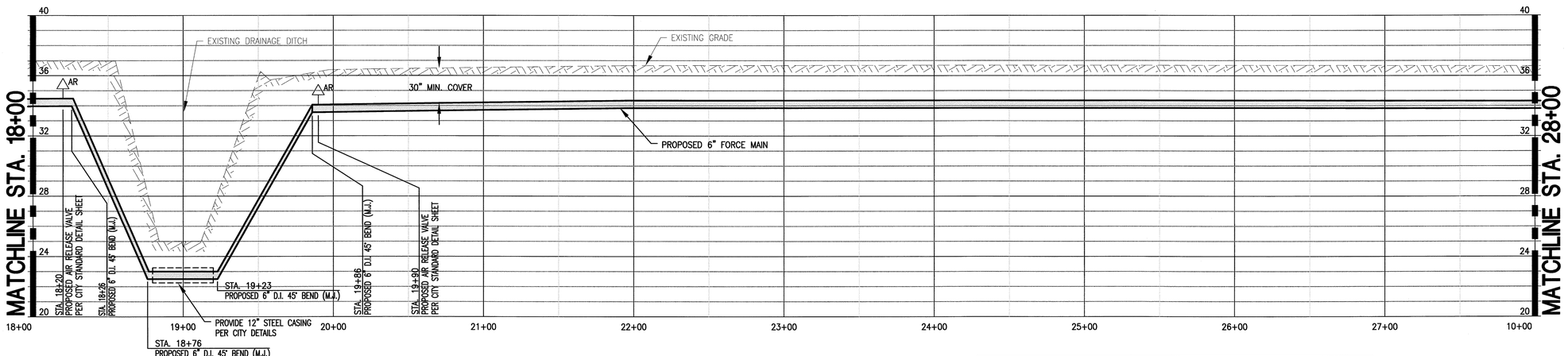
LEGEND

- EXISTING SANITARY SEWER MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING FENCE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- UTILITY EASEMENT (U.E.)
- EXISTING FORCE MAIN
- PROPOSED FORCE MAIN
- EXISTING STORM
- EXISTING GAS LINE
- EXISTING ELECTRICAL
- EXISTING FIBER OPTIC CABLE LINE
- EXISTING UNDERGROUND TELEPHONE
- EXISTING DRAINAGE DITCH FLOW LINE
- EXISTING OVERHEAD ELECTRICAL

NOTE: ALL PROPOSED SANITARY SEWER FORCE MAIN SHALL BE GREEN, PVC C-900, DR25, PRESSURE CLASS 165. SEE FORCE MAIN PIPING SPECIFICATION FOR ADDITIONAL INFORMATION.

CALL BEFORE YOU DIG!
LONE STAR 811 Know what's below. Call before you dig.
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST – STOP AND CALL 811
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

GRAPHIC SCALE 1"=40'



PROFILE VIEW

SCALE: 1"=40' HORIZ.
1"=4' VERT.

EXISTING UTILITIES SHOWN ARE FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO CONSTRUCTION.

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REV.	BY	DATE	DESCRIPTION	APPROVED

SCALE: 1"=40' | DRAWN: CG | CHECKED: MFH | DATE: MARCH 2015

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 78198 (3/27/2015)

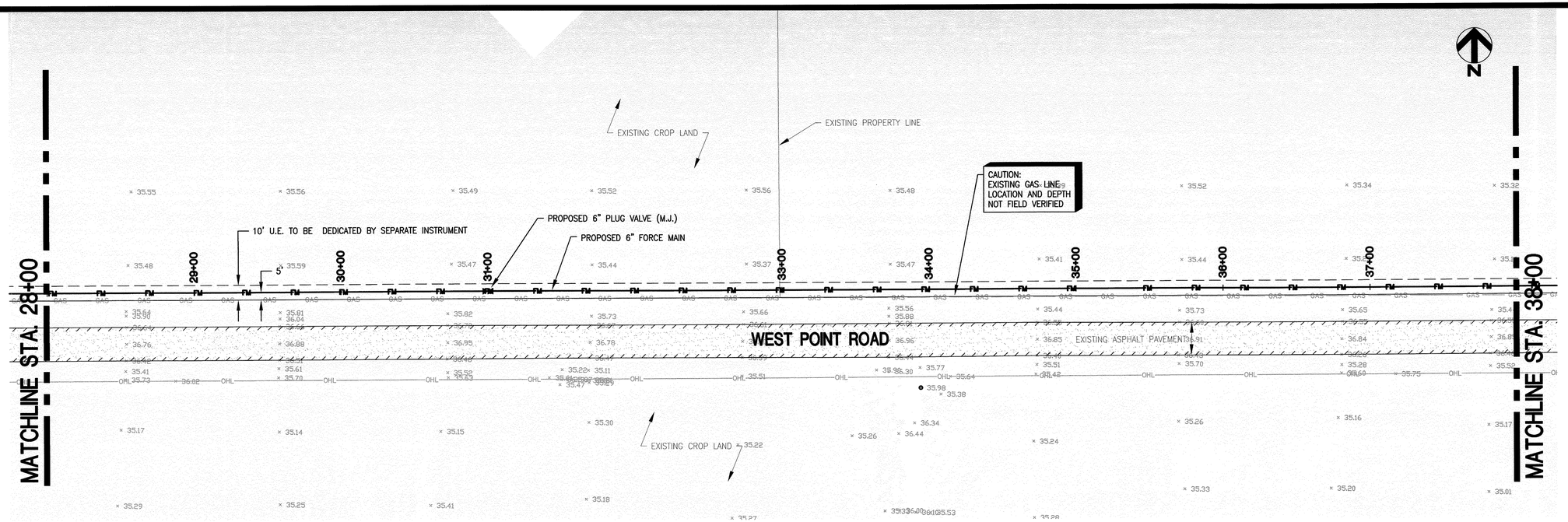
FORCE MAIN PLAN AND PROFILE STA. 18+00 THRU 28+00

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10035400
2725 SWANTNER DR., CORPUS CHRISTI, TX. 78404
PHONE: 361.854.3101 WWW.URBANENG.COM

SHEET 7 OF 20

JOB NO. 40706.B4.01



PLAN VIEW
SCALE: 1"=40'

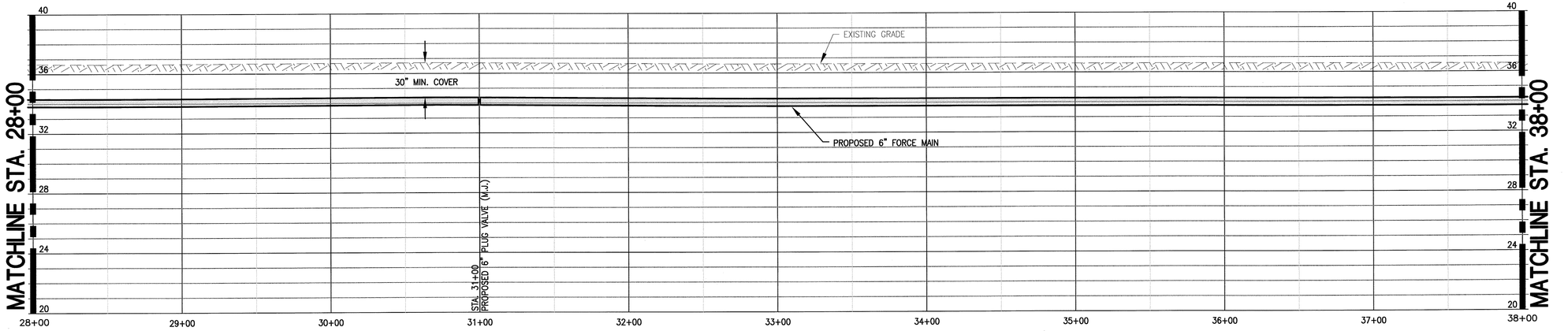
LEGEND

- EXISTING SANITARY SEWER MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING FENCE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- UTILITY EASEMENT (U.E.)
- EXISTING FORCE MAIN
- PROPOSED FORCE MAIN
- EXISTING STORM
- EXISTING GAS LINE
- EXISTING ELECTRICAL
- EXISTING FIBER OPTIC CABLE LINE
- EXISTING UNDERGROUND TELEPHONE
- EXISTING DRAINAGE DITCH FLOW LINE
- EXISTING OVERHEAD ELECTRICAL

NOTE: ALL PROPOSED SANITARY SEWER FORCE MAIN SHALL BE GREEN, PVC C-900, DR25, PRESSURE CLASS 165. SEE FORCE MAIN PIPING SPECIFICATION FOR ADDITIONAL INFORMATION.

CALL BEFORE YOU DIG!
LONE STAR 811 Know what's below. Call before you dig.
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST – STOP AND CALL 811
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

60 40 20 0 40 80
GRAPHIC SCALE 1"=40'



PROFILE VIEW
SCALE: 1"=40' HORIZ.
1"=4' VERT.

EXISTING UTILITIES SHOWN ARE FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO CONSTRUCTION.

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APPROVED BY	DESCRIPTION	REV.	BY	DATE

SCALE: 1"=40'
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

MURRAY F. HUDSON 78198 LICENSED PROFESSIONAL ENGINEER
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 78198 (03/27/2015)

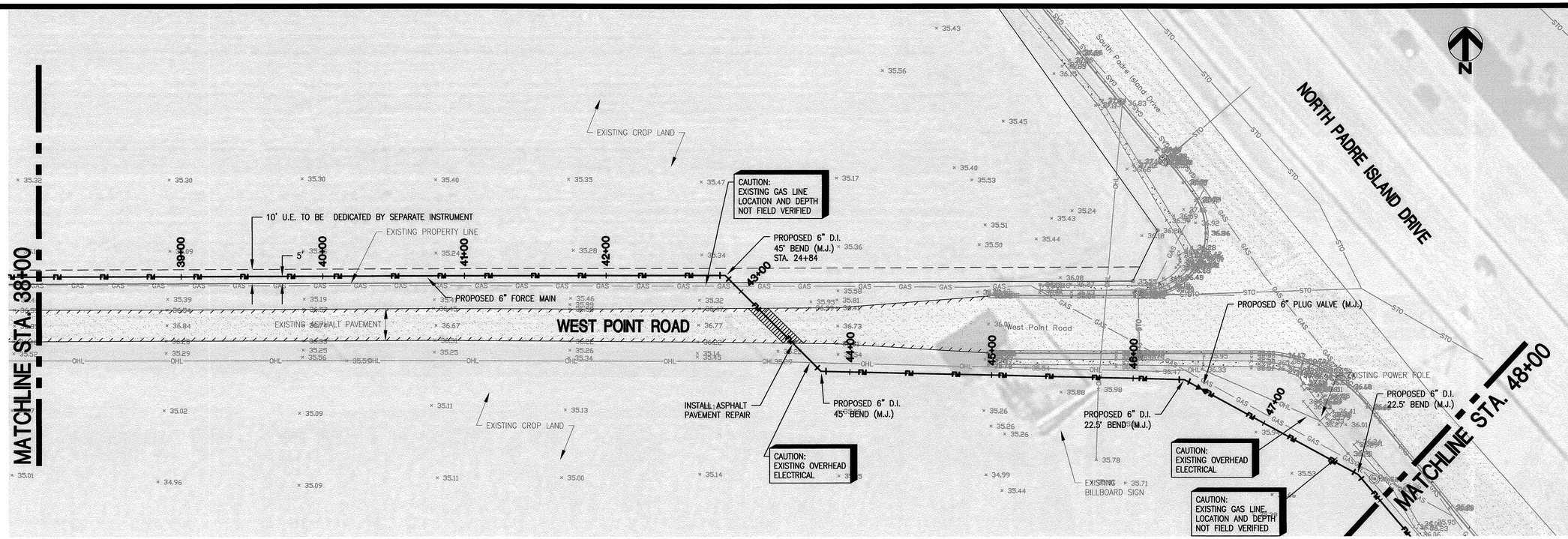
FORCE MAIN PLAN AND PROFILES STA. 28+00 THRU 38+00

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
7725 SOUTHWEST BLVD., CORPUS CHRISTI, TEXAS 78414
PHONE: 361.854.3101 WWW.URBANENG.COM

SHEET 8 OF 20

JOB NO. 40706.B4.01



PLAN VIEW
SCALE: 1"=40'

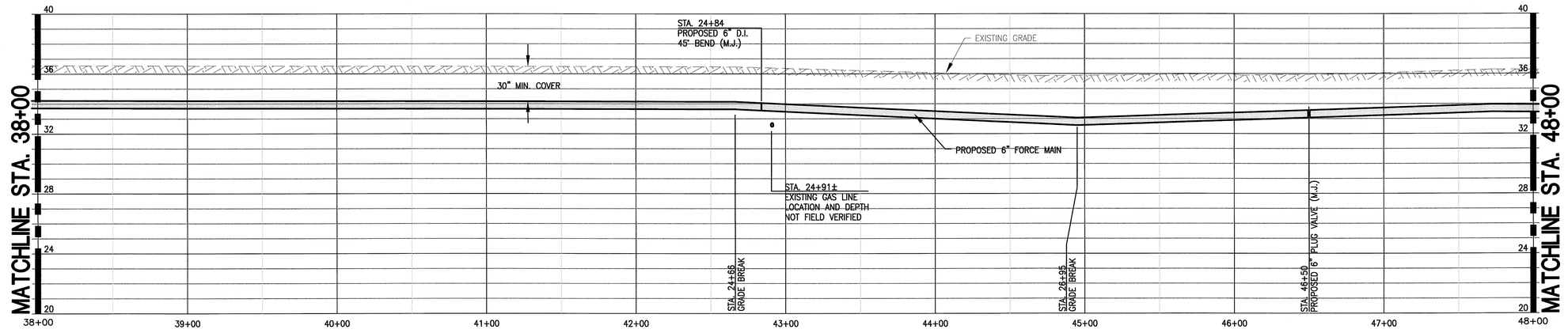
LEGEND

- EXISTING SANITARY SEWER MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING FENCE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- UTILITY EASEMENT (U.E.)
- EXISTING FORCE MAIN
- PROPOSED FORCE MAIN
- EXISTING STORM
- EXISTING GAS LINE
- EXISTING ELECTRICAL
- EXISTING FIBER OPTIC CABLE LINE
- EXISTING UNDERGROUND TELEPHONE
- EXISTING DRAINAGE DITCH FLOW LINE
- EXISTING OVERHEAD ELECTRICAL

NOTE: ALL PROPOSED SANITARY SEWER FORCE MAIN SHALL BE GREEN, PVC C-900, DR25, PRESSURE CLASS 165. SEE FORCE MAIN PIPING SPECIFICATION FOR ADDITIONAL INFORMATION.

CALL BEFORE YOU DIG!
LONE STAR 811 — Know what's below. Call before you dig.
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST - STOP AND CALL 811
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

GRAPHIC SCALE 1"=40'
60 40 20 0 40 80



PROFILE VIEW
SCALE: 1"=40' HORIZ.
1"=4' VERT.

EXISTING UTILITIES SHOWN ARE FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO CONSTRUCTION.

FORCE MAIN PLAN AND PROFILES STA. 38+00 THRU 48+00

WEST POINT CROSSING SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

APPROVED BY	DESCRIPTION	REV.	BY	DATE

SCALE: 1"=40'
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 79198 (03/27/2015)

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10023400
2725 SWANTNER DR., CORPUS CHRISTI, TX. 78404
PHONE: 361.854.3101 WWW.URBANENG.COM

SHEET 9 OF 20

JOB NO. 40706.B4.01

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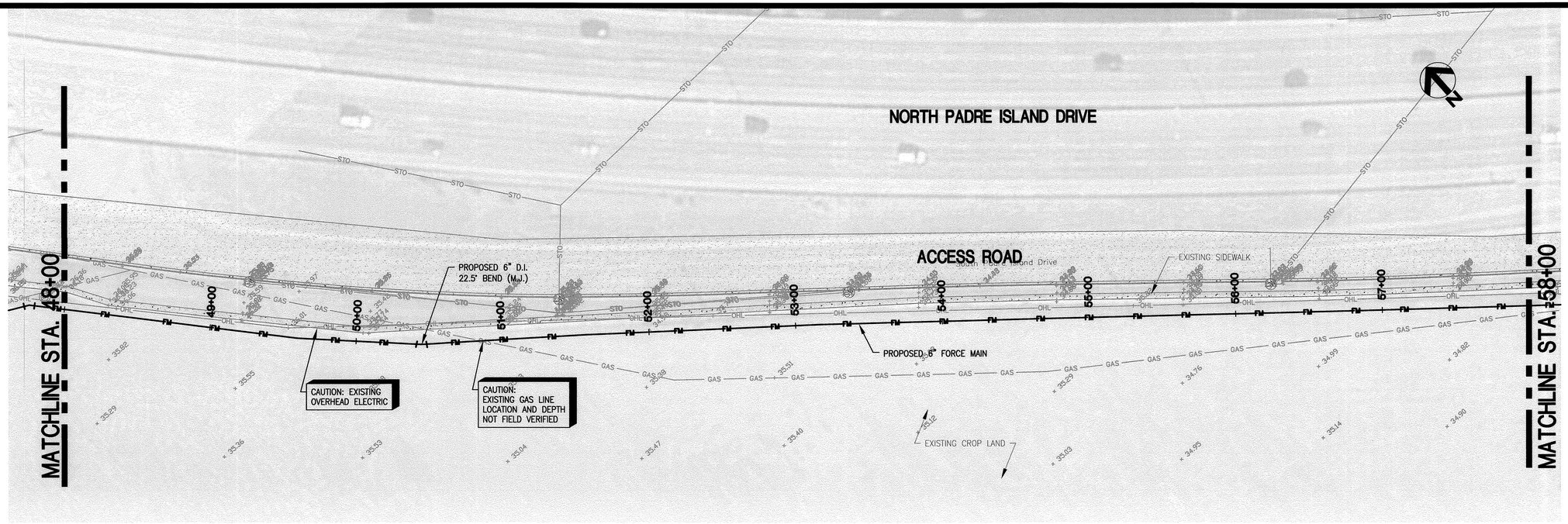

PLAN VIEW
SCALE: 1"=40'

NOTE: ALL PROPOSED SANITARY SEWER FORCE MAIN SHALL BE GREEN, PVC C-900, DR25, PRESSURE CLASS 165. SEE FORCE MAIN PIPING SPECIFICATION FOR ADDITIONAL INFORMATION.

LEGEND

- EXISTING SANITARY SEWER MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING FENCE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- UTILITY EASEMENT (U.E.)
- EXISTING FORCE MAIN
- PROPOSED FORCE MAIN
- EXISTING STORM
- EXISTING GAS LINE
- EXISTING ELECTRICAL
- EXISTING FIBER OPTIC CABLE LINE
- EXISTING UNDERGROUND TELEPHONE
- EXISTING DRAINAGE DITCH FLOW LINE
- EXISTING OVERHEAD ELECTRICAL

CALL BEFORE YOU DIG!
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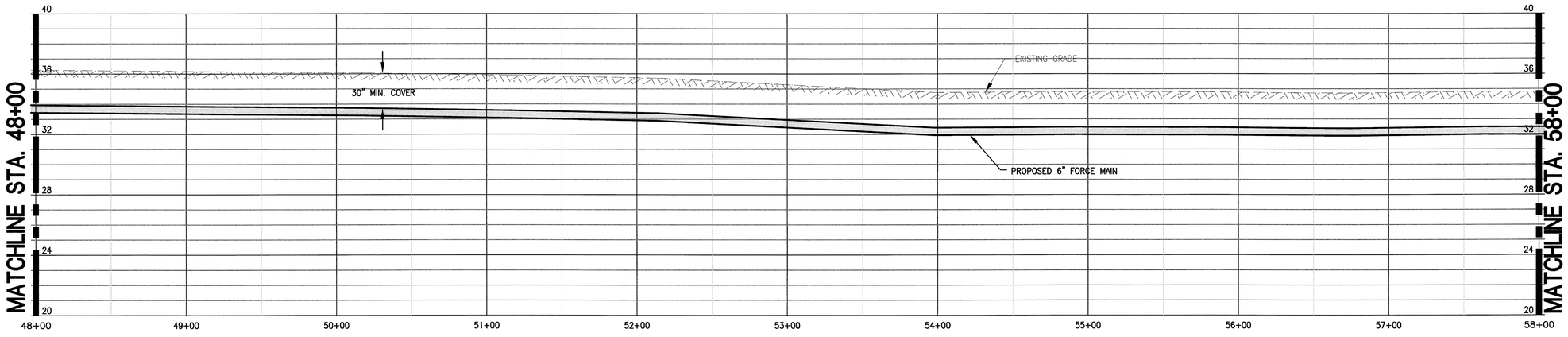
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

60 40 20 0 40 80
GRAPHIC SCALE 1"=40'



PROFILE VIEW
SCALE: 1"=40' HORIZ.
1"=4' VERT.

EXISTING UTILITIES SHOWN ARE FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO CONSTRUCTION.

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REV.	BY	DATE	DESCRIPTION	APPROVED BY

SCALE: 1"=40'
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

MURRAY F. HUDSON 78198 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 78198 (03/27/2015)

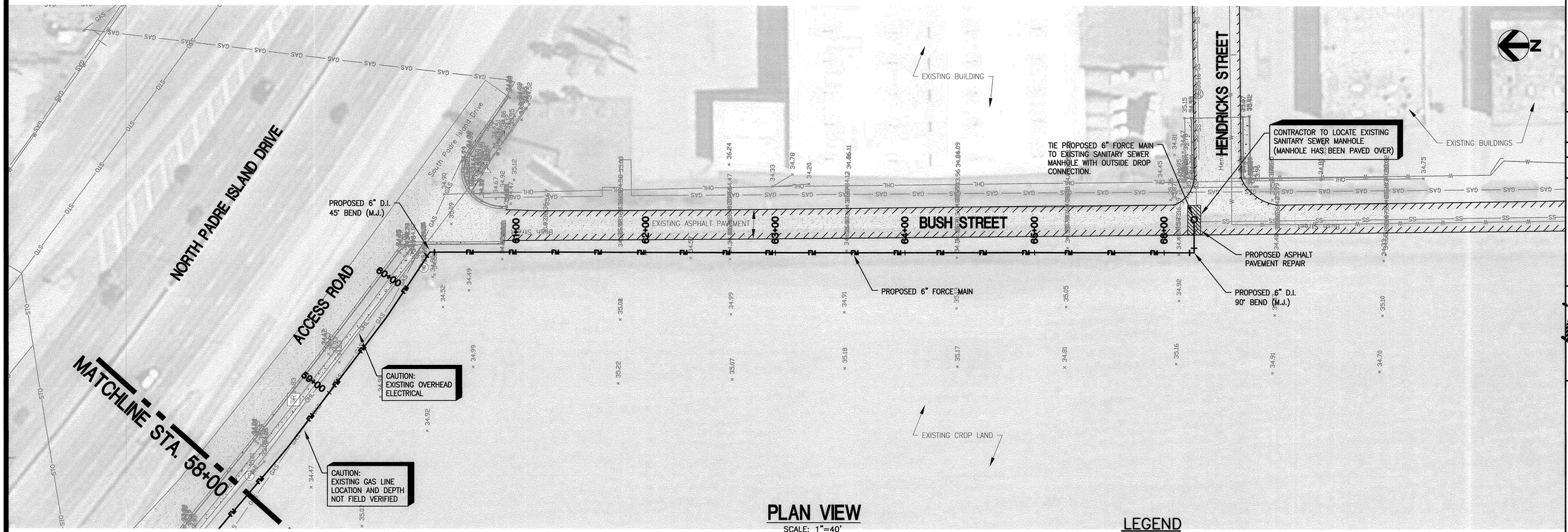
FORCE MAIN PLAN AND PROFILES STA. 48+00 THRU 58+00

WEST POINT CROSSING SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10023400
2725 SWANTNER DRIVE, CORPUS CHRISTI, TX 78404
PHONE: 361.854.3101 WWW.URBANENG.COM

SHEET 10 OF 20

JOB NO. 40706.B4.01



PLAN VIEW
SCALE: 1"=40'

NOTE: ALL PROPOSED SANITARY SEWER FORCE MAIN SHALL BE GREEN, PVC C-900, DR25, PRESSURE CLASS 165. SEE FORCE MAIN PIPING SPECIFICATION FOR ADDITIONAL INFORMATION.

EXISTING UTILITIES SHOWN ARE FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO CONSTRUCTION.

LEGEND

- EXISTING SANITARY SEWER MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING FENCE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- UTILITY EASEMENT (U.E.)
- EXISTING FORCE MAIN
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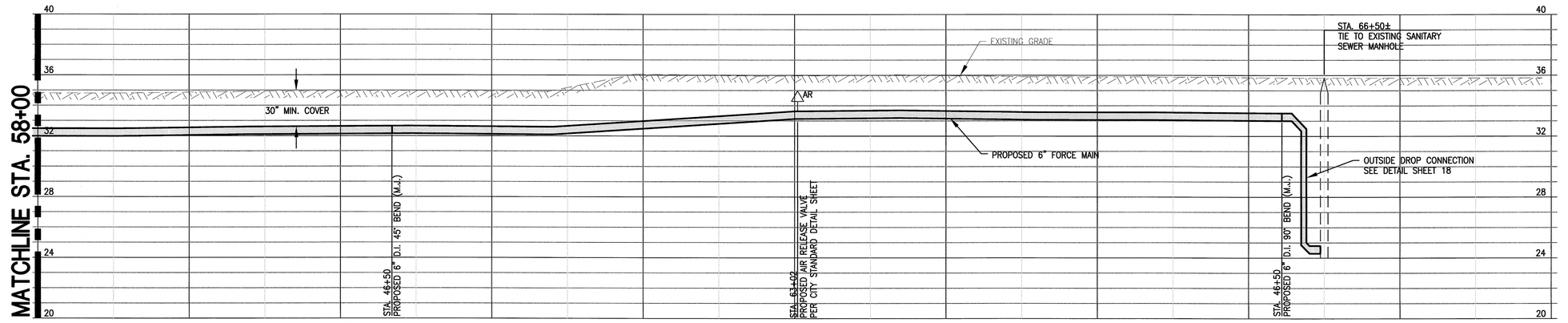
- EXISTING OVERHEAD ELECTRICAL

CALL BEFORE YOU DIG!
LONE STAR 811 — Know what's below. Call before you dig.
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST – STOP AND CALL 811
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

60 40 20 0 40 80
GRAPHIC SCALE 1"=40'



PROFILE VIEW
SCALE: 1"=40' HORIZ.
1"=4' VERT.

FORCE MAIN PLAN AND PROFILES STA. 58+00 THRU END

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

APPROVED BY	DESCRIPTION	DATE	BY	REV.

SCALE: 1"=40'
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

MURRAY F. HUDSON 78188 REGISTERED PROFESSIONAL ENGINEER
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 78188 (03/27/2015)

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10074400
2725 SWANTNER DR., CORPUS CHRISTI, TX 78404
PHONE: 361.854.3101 WWW.URBANENG.COM

SHEET 11 OF 20

JOB NO. 40706.B4.01

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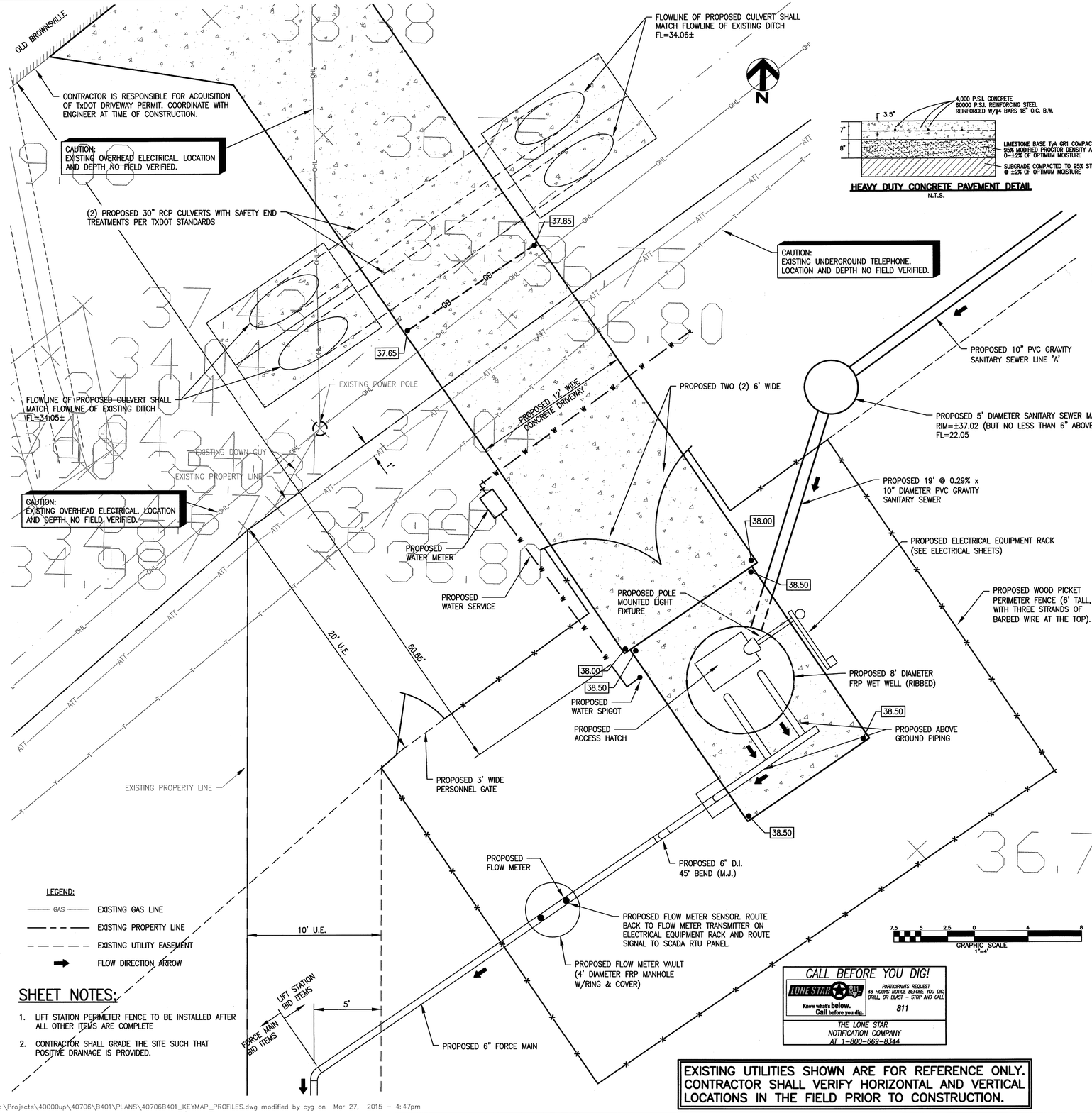


LEGEND:

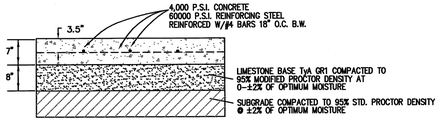
- GAS — EXISTING GAS LINE
- EXISTING PROPERTY LINE
- EXISTING UTILITY EASEMENT
- FLOW DIRECTION ARROW

SHEET NOTES:

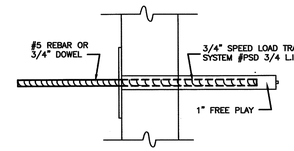
1. LIFT STATION PERIMETER FENCE TO BE INSTALLED AFTER ALL OTHER ITEMS ARE COMPLETE
2. CONTRACTOR SHALL GRADE THE SITE SUCH THAT POSITIVE DRAINAGE IS PROVIDED.

CALL BEFORE YOU DIG!
LONE STAR 811 Know what's below. Call before you dig.
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL OR BLAST – STOP AND CALL 811
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

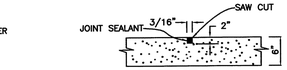
EXISTING UTILITIES SHOWN ARE FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO CONSTRUCTION.



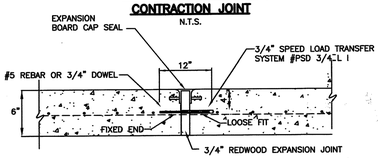
HEAVY DUTY CONCRETE PAVEMENT DETAIL
N.T.S.



LOAD TRANSFER SYSTEM
N.T.S.

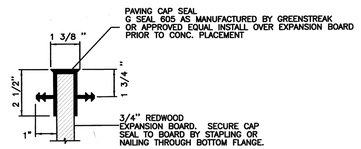


CONTRACTION JOINT
N.T.S.



NOTE:
STEEL TO MEET ASTM STD. SPEC. FOR CONCRETE REINFORCING BAR UNITS AND TO BE SPACED AS SHOWN.

EXPANSION JOINT WITH LOAD TRANSFER SYSTEM FOR CONCRETE PAVING
N.T.S.



CAP SEAL DETAIL
NEW CONC. TO NEW CONC.
NOT TO SCALE

INSTALLATION STEPS:

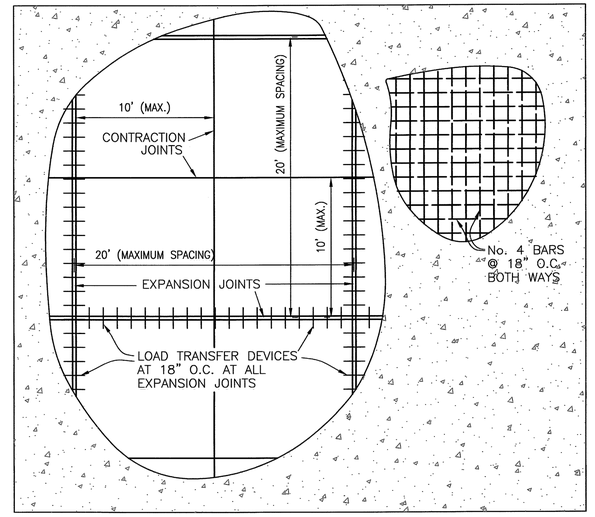
1. TERMINATE STAKES BELOW THE TOP OF THE BOARD A DISTANCE EQUAL TO THE DEPTH OF THE CAP SEAL PROFILE PLUS 1/4".
2. USE FACTORY FABRICATIONS FOR INTERSECTIONS AND CHANGES OF DIRECTION. INSURE ALL SECTIONS TO BE SPLICED ARE CUT SQUARE AND BOUND TOGETHER USING CAP SEAL ADHESIVE.
3. SECURE CAP SEAL TO THE EXPANSION BOARD WITH STAPLES, NAILS, SCREWS (APPROXIMATELY 18" ON CENTER) OR ADHESIVE TO PREVENT DISLOCATION DURING CONCRETE PLACEMENT.
4. PLACE CONCRETE USING NORMAL PLACEMENT TECHNIQUES, UTILIZING THE CAP SEAL AS SCREED RAIL. VIBRATE CONCRETE TO INSURE GOOD CONSOLIDATION AROUND CAP SEAL.

THINGS TO AVOID:

DO NOT CAP SEAL JOINT.
INADEQUATE STAKING-EXPANSION BOARDS THAT BOW OR TWIST DURING CONCRETE PLACEMENT WILL RESULT IN IMPROPERLY ALIGNED SEALCAP.

INSUFFICIENT CONCRETE AT THE CAP SEAL PROFILE- CAP SEAL SHOULD BE FLUSH OR SLIGHTLY BELOW THE FINISHED CONCRETE SURFACE. CONCRETE WILL NOT ADHERE TO THE TOP OF CAP SEAL.

IMPROPER DOWEL ALIGNMENT- REGARDLESS OF THE JOINT SEALING METHOD USED, IMPROPER DOWEL ALIGNMENT MAY CAUSE CRACKING OR SPALLING. PROPER USE OF A DOWEL ALIGNING DEVICE WILL ELIMINATE THIS CONCERN.



REINFORCEMENT DETAIL
NOT TO SCALE

GENERAL NOTES FOR CONCRETE PAVEMENT

1. ALL REINFORCING STEEL LAPS SHALL BE 30 BARS DIAMETERS. BAR LENGTHS SHALL BE SUCH TO PROVIDE A CLEARANCE OF AT LEAST 2" ALONG PAVEMENT EDGES AND AT JOINTS WHERE THE REINFORCING STEEL IS NOT TO BE CONTINUOUS.
2. EXPANSION JOINT SEALANT SHALL BE G SEAL 605 AS MANUFACTURED BY GREENSTREAK OR APPROVED EQUAL. POLYURETHANE JOINT SEALANT MEETING THE REQUIREMENTS OF ASTM C920-87, TYPE S OR M, GRADE P, CLASS 25 USES T,M,A AND O. SHALL BE USED IN ALL CONTRACTION JOINTS AND EXPANSION JOINS WHERE CAP SEAL IS NOT FEASIBLE. WHERE GRADE IS GREATER THAN 3% SLOPE USE BOSTIK 900 SEALANT.SEALANT NOT REQUIRED AT CAP SEAL JOINTS.
3. CONCRETE PAVEMENT SHALL BE 4000 P.S.I.
4. REINFORCING STEEL SHALL BE SUPPORTED DURING CONSTRUCTION TO MAINTAIN NOT LESS THAN 3 INCHES AND NOT GREATER THAN 4 INCHES COVER FROM TOP OF SLAB.
5. CONCRETE FOR ALL 6" BLOCK CURB SHALL BE 3000 P.S.I.

APPROVED BY	DESCRIPTION	DATE	BY	REV.

SCALE: 1"=4'
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

MURRAY F. HUDSON 76198 LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 76198 (03/27/2015)

LIFT STATION SITE PLAN

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 100324-00
2725 SWANTNER DR., CORPUS CHRISTI, TX 78404
PHONE: 361.854.3101
WWW.URBANENG.COM

SHEET 12 OF 20

JOB NO. 40706.B4.01

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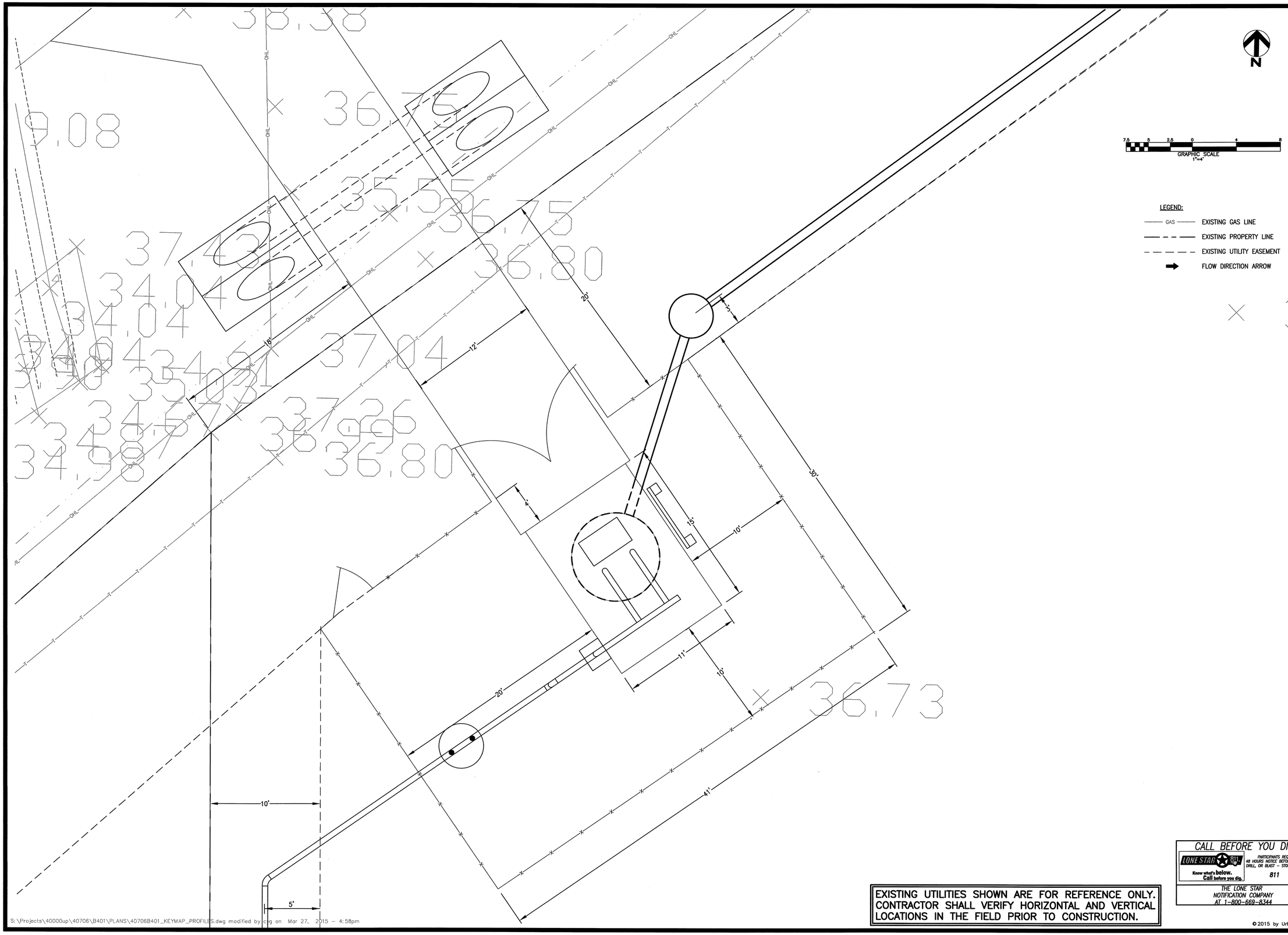

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THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

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LIFT STATION DIMENSION PLAN

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
2725 SWANTNER DRIVE, CORPUS CHRISTI, TX 78404
PHONE: 361.854-3101 WWW.URBANENG.COM

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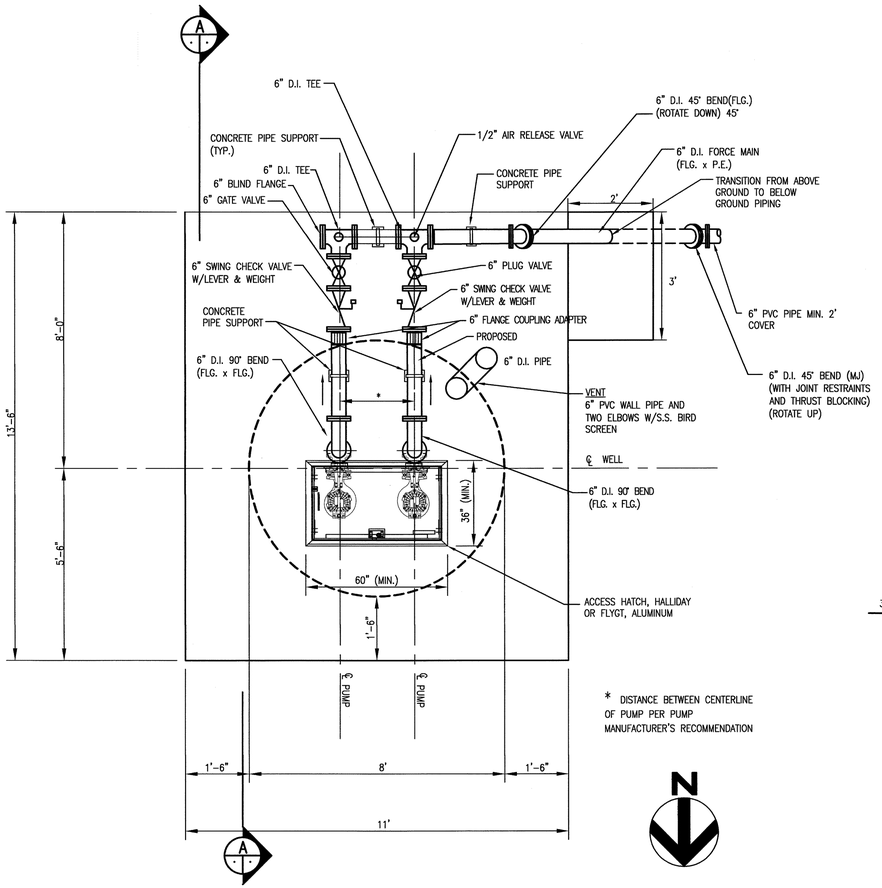
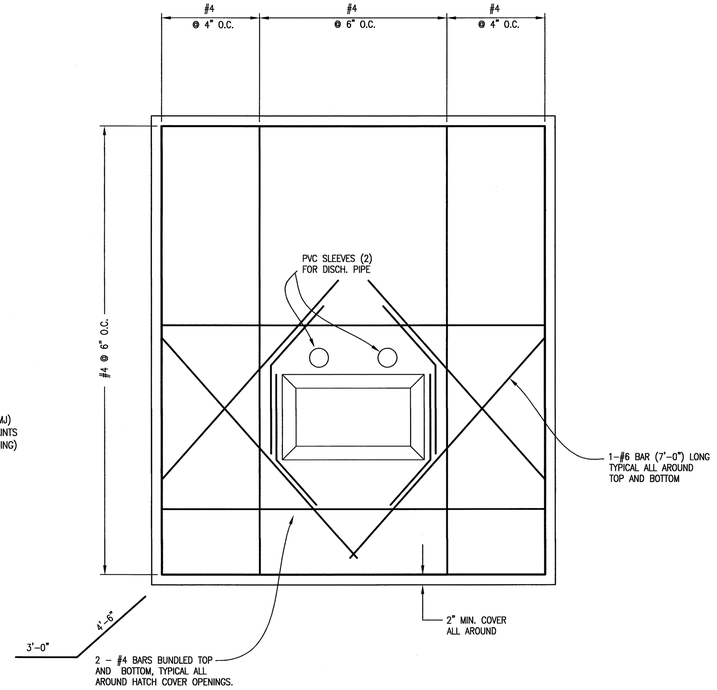


* DISTANCE BETWEEN CENTERLINE OF PUMP PER PUMP MANUFACTURER'S RECOMMENDATION

PLAN VIEW AT GRADE ELEVATION–DUPLEX

NOT TO SCALE



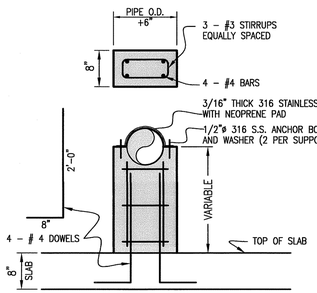
WET WELL TOP SLAB STEEL CONFIGURATION

NOT TO SCALE

NOTE:
PROPOSED LIFT STATION PUMPS AND ACCESSORIES (PUMP BASES, GUIDE RAILS, LIFT CHAINS, FLOATS, CABLE HOLDER, ACCESS COVER, ETC.) TO BE PROVIDED BY FLYGT (XYLEM). CONTACT DOUG WALTHALL AT (361) 808-7867.
PROPOSED LIFT STATION INTERIM PUMPS TO BE FLYGT NP3102, 463 IMPELLER, 5HP. FUTURE PUMPS TO BE FLYGT NP3171, 277 IMPELLER, 35HP.

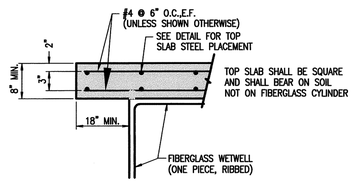
GENERAL NOTES FOR LIFT STATION:

1. ALL CONCRETE SHALL BE 6 SACK–4,000 PSI DESIGN. MAXIMUM WATER/CEMENT RATIO: 0.45
2. ALL CONCRETE SHALL BE CURED A MINIMUM OF 7 DAYS. CURING SHALL CONSIST OF PLACEMENT NON–DISTURBANCE AND ONE OF THE FOLLOWING TREATMENTS OF EXPOSED SURFACES:
   A) FLOODING WITH WATER,
   B) BURLAP SACKS KEPT WET AT ALL TIMES, OR
   C) USE OF CURING COMPOUND.
3. ALL EXPOSED CONCRETE EDGES SHALL BE ROUNDED OR CHAMFERED 1/2".
4. ALL REBAR SHALL BE GRADE 60 AND TIED AT EACH JUNCTION. REBAR SPLICES, IF REQUIRED, SHALL HAVE A MINIMUM OF 18" OVERLAP OR 40 BAR DIAMETER, WHICHEVER IS GREATER. REBAR TIE WIRE SHALL BE TURNED INWARD AWAY FROM FORM AND SHALL NOT BE TOUCHING THE FORM.
5. ALL ABOVE GROUND PIPING SHALL BE FLANGED AND PIPING SHALL BE D.I.
6. EPOXY BONDING AGENT SHALL BE USED AT JOINT BETWEEN GROUT AND LOWER SLAB.
7. FIBERGLASS WETWELL BACKFILL: BACKFILL OF THE WETWELL SHALL BE PERFORMED IN MAXIMUM 6" LOOSE LAYERS WITH SAND OR SANDY MATERIAL WITH NOT MORE THAN 20%%% PASSING THE #200 SIEVE ACCORDING TO ASTM D1140. BACKFILL LAYERS SHALL BE COMPACTED TO 95%%% RELATIVE OR STANDARD PROCTOR DENSITY AT OPTIMUM MOISTURE CONTENT (TO +2%%%) WITH MECHANICAL TAMPERS. HEAVY EQUIPMENT SHALL NOT BE OPERATED CLOSER TO THE WETWELL THAN A DISTANCE EQUAL TO THE HEIGHT OF THE BACKFILL.
8. LOCATION OF ALL ANCHOR BOLTS, RELATIVE POSITION TO PUMPS, AND ACCESS COVER MUST BE MAINTAINED ACCORDING TO THE MANUFACTURER RECOMMENDATIONS.
9. SEE LIFT STATION PLAN VIEWS FOR FORCE MAIN PIPING ARRANGEMENT, GRAVITY PIPE SIZE AND LOCATION. CONTROL PANEL IS TO BE LOCATED ADJACENT TO WET WELL. EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD AFTER AEP HAS PROVIDED SERVICE LOCATIONS TO THE SITES.
10. CONTRACTOR WILL GRADE SITE AFTER INSTALLATION OF IMPROVEMENTS TO NATURAL GROUND WITHIN 10' OF FENCE LINE. CONTRACTOR WILL PROVIDE SWALES AS NECESSARY TO ESTABLISH POSITIVE DRAINAGE AWAY FROM THE SITE.
11. FIBERGLASS WET WELL SHALL BE RIBBED.
12. LIFT STATION EXCAVATION MUST BE KEPT DE–WATERED UNTIL BACKFILL HAS BEEN PLACED TO GRADE, OTHERWISE LIFT STATION MAY FLOAT. DE–WATERING MUST BE MAINTAINED OVER WEEKENDS AND HOLIDAYS.
13. ALL EXPOSED METAL OUTSIDE OF WET WELL, EXCEPT ALUMINUM, STAINLESS STEEL AND GALVANIZED SHALL BE PAINTED. SEE SPECIFICATION 9K1.
14. ALL STAINLESS STEEL ITEMS SHALL BE TYPE 316.
15. ALL FASTENERS AND ACCESSORIES INSIDE WET WELL SHALL BE STAINLESS STEEL (316 GRADE).



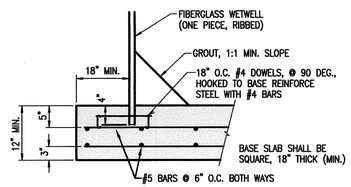
CONCRETE PIPE SUPPORT

NOT TO SCALE



DETAIL 1

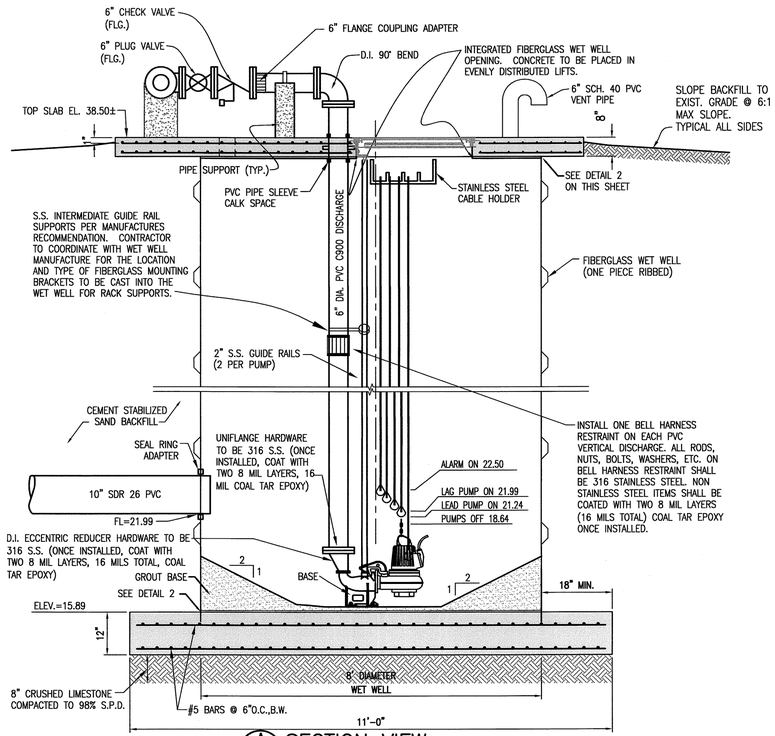
NOT TO SCALE



DETAIL 2

NOT TO SCALE

NOTE:
1. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL PIPING DIMENSIONS, ACCESS COVER LOCATIONS, AND PIPE PENETRATION LOCATIONS (TOP & SIDES) PRIOR TO ORDERING FIBERGLASS WET WELL AND OTHER ASSOCIATED MATERIALS.



A 20/20 SECTION VIEW

NOT TO SCALE

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CHECKED: MFH
DATE: MARCH 2015

LICENSED PROFESSIONAL ENGINEER MURRAY F. HUDSON 78198 STATE OF TEXAS
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WASTEWATER LIFT STATION SECTION AND DETAILS

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
2725 SWANTNER DR., CORPUS CHRISTI, TX. 78404
PHONE: 361.854.3101 WWW.URBANENG.COM

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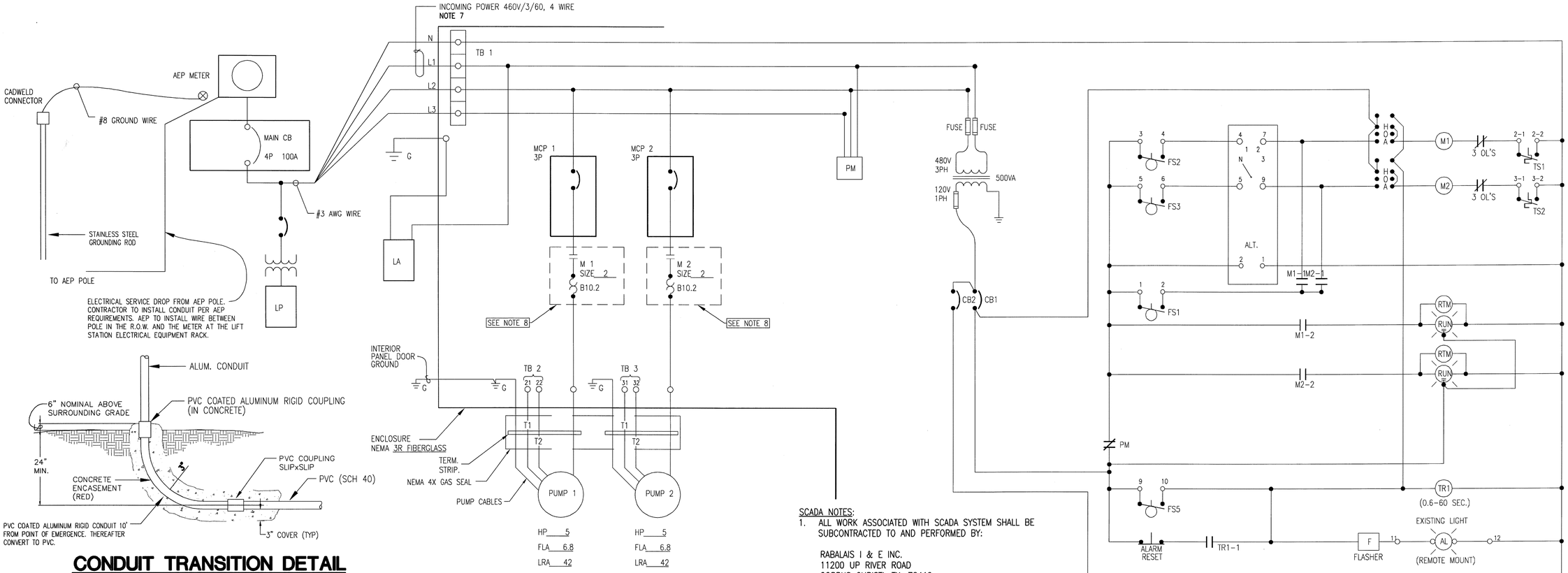


CONDUIT TRANSITION DETAIL

SCALE: N.T.S.

SCADA NOTES:

1. ALL WORK ASSOCIATED WITH SCADA SYSTEM SHALL BE SUBCONTRACTED TO AND PERFORMED BY:

   RABALAIS I & E INC.
   11200 UP RIVER ROAD
   CORPUS CHRISTI, TX. 78410
   (361) 242-3121

2. SCADA WORK INCLUDES INSTALLATION OF ALL ASSOCIATED SCADA EQUIPMENT. INSTALLATION OF NEW RTU AND ANTENNA, INSTALLATION OF ANTENNA POLE, ALL WIRING AND TERMINATION BETWEEN RTU AND PUMP CONTROL PANEL, PLC PROGRAMMING AND UPDATING HMI GRAPHICS AT CITY MONITORING SITES, SYSTEM FUNCTION TEST COMPLETE WITH 1 YEAR WARRANTY.

SHEET NOTES:

1. CONTRACTOR SHALL OBTAIN ELECTRICAL PERMIT FOR INSTALLATION OF THE NEW ELECTRICAL SERVICE TO THE PROPOSED LIFT STATION SITE.
2. CONTRACTOR TO COORDINATE WITH THE ELECTRIC COMPANY FOR THE INSTALLATION OF THE NEW 480V SERVICE TO THE PROPOSED LIFT STATION SITE. CONTRACTOR TO PROVIDE ALL MATERIALS AND EQUIPMENT AS REQUIRED BY THE ELECTRIC COMPANY. CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED FOR NEW ELECTRICAL SERVICE.
3. CONTRACTOR TO INSTALL NEW METER CAN ON SERVICE RACK PER ELECTRIC COMPANY REQUIREMENTS. GROUNDING SHALL BE PER ELECTRIC COMPANY REQUIREMENTS.
4. CONTRACTOR TO INSTALL MAIN SERVICE DISCONNECT SWITCH IN NEMA 4X S.S. ENCLOSURE.
5. CONTRACTOR TO INSTALL NEW CCA TREATED ELECTRICAL EQUIPMENT RACK AND MOUNT ON ALL NEW EQUIPMENT WITH 316 S.S. HARDWARE.
6. ALL FASTENERS AND ANCHOR BOLTS TO BE 316 STAINLESS STEEL.
7. ELECTRICAL SUBCONTRACTOR TO VERIFY PRIOR TO CONSTRUCTION.
8. PROVIDE SPACE IN CONTROL PANEL FOR FUTURE SIZE 3 STARTERS.
9. PUMP CONTROL PANEL TO BE PROVIDED BY PUMP SUPPLIER AND INSTALLED BY CONTRACTOR.

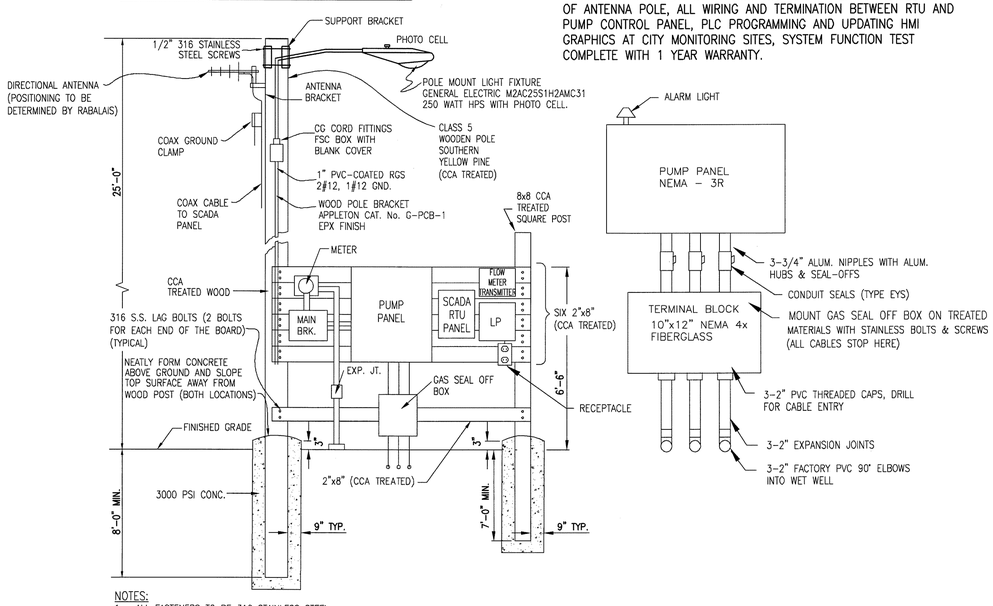
PANEL "L" - SCHEDULE

100 AMP, 240 VAC, 1-PHASE, 3-WIRE, 30 CKT, 80A MCB
NEMA 4X SURFACE, GROUND BUS, INTERRUPT CAPACITY - 10KAIC

TOTAL LOAD 5 KVA — LOAD - PHASE "A" 825 VA, LOAD - PHASE "B" 2,025 VA — SERVICE: 120/240 VAC, 1-PHASE, 3 WIRE — SOURCE: TRANSFORMER

	WIRE SIZE	SERVICE	VA LOAD	BRK. SIZE	PH	BRK. SIZE	VA LOAD	SERVICE	WIRE SIZE	CKT
1	12	AREA LIGHT	275	20A	A	20A	500	FLOWMETER	12	2
3	12	SPARE	-	20A	B	20A	1,000	SCADA RTU	12	4
5	12	SPARE	-	20A	A	20A	560	RECEPTACLE	12	6
7	-	-	-	20A	B	20A	-	SPARE	12	8
9	-	-	-	20A	A	20A	-	-	-	10
11	-	-	-	20A	B	20A	-	-	-	12
13	-	-	-	20A	A	20A	-	-	-	14
15	-	-	-	20A	B	20A	-	-	-	16
17	-	-	-	20A	A	20A	-	-	-	18
19	-	-	-	20A	B	20A	-	-	-	20
21	-	-	-	20A	A	20A	-	-	-	22
23	-	-	-	20A	B	20A	-	-	-	24
25	-	-	-	20A	A	20A	-	-	-	26
27	-	-	-	20A	B	20A	-	-	-	28
29	-	-	-	20A	A	20A	-	-	-	30

CONTRACTOR TO CONFIRM AND PROVIDE ALL CONDUIT AND WIRING AS REQUIRED FOR A FUNCTIONAL SYSTEM.

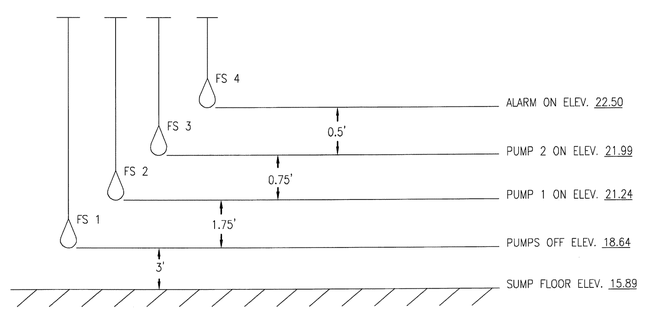


NOTES:
1. ALL FASTENERS TO BE 316 STAINLESS STEEL
2. ALL LUMBER TO BE CCA TREATED.

ELECTRICAL EQUIPMENT RACK

N.T.S.

FLOAT SEQUENCE DIAGRAM



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SCALE: AS NOTED
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DATE: MARCH 2015

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LIFT STATION ELECTRICAL

WEST POINT CROSSING SANITARY SEWER IMPROVEMENTS

CORPUS CHRISTI, TEXAS

URBAN ENGINEERING

TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
2725 SWANTNER DR., CORPUS CHRISTI, TX. 78404
PHONE: 361-854-3101 WWW.URBANTX.COM

SHEET 15 OF 20

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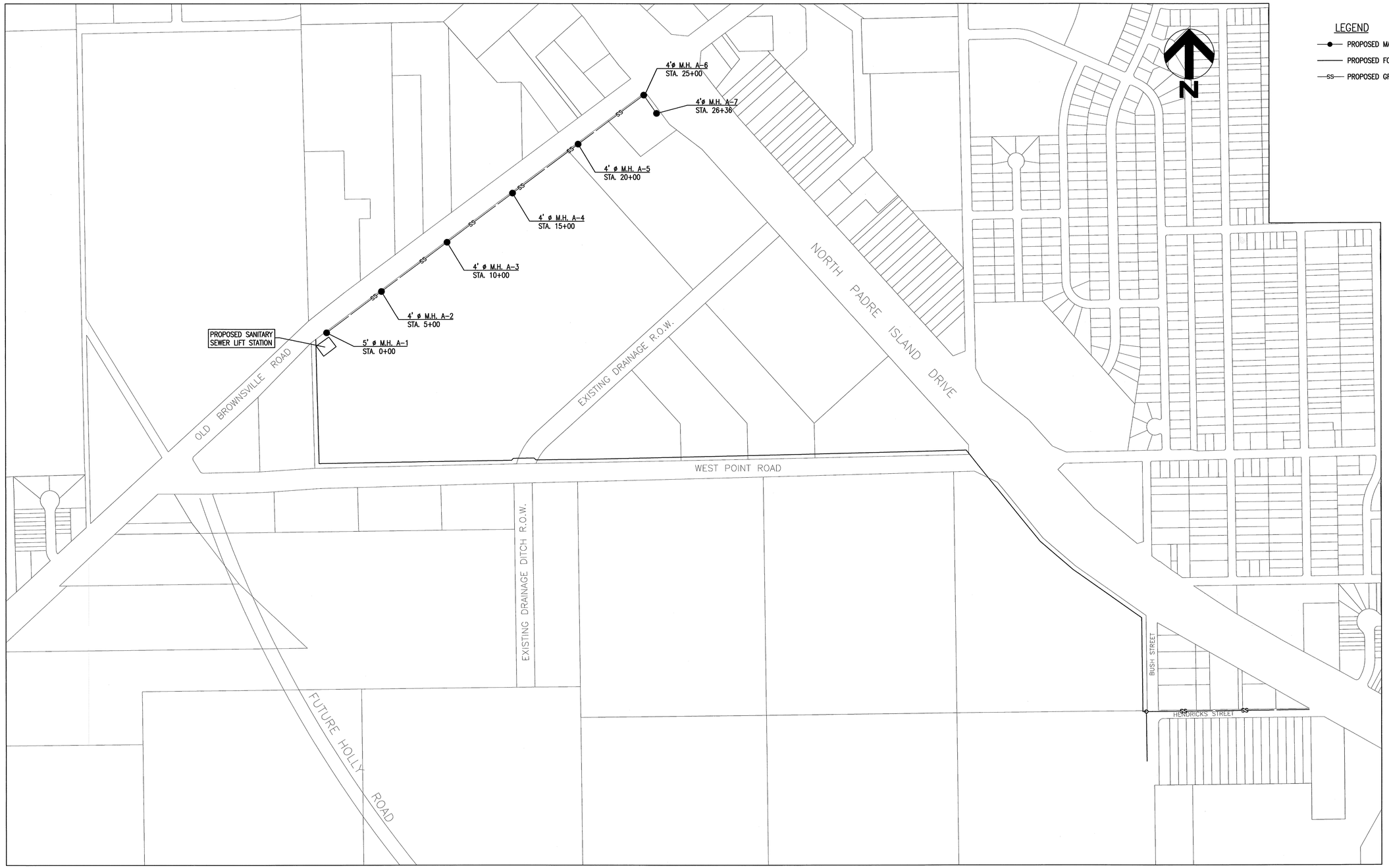

LEGEND

- PROPOSED MANHOLE
- PROPOSED FORCE MAIN
- SS PROPOSED GRAVITY SANITARY SEWER

AREA MAP - GRAVITY SANITARY SEWER

SCALE: 1"=300'

CALL BEFORE YOU DIG!
Texas811 Know what's below. Call before you dig.
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST – STOP AND CALL 811
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

450 300 200 0 300 600
GRAPHIC SCALE 1"=300'

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NO.	DESCRIPTION	DATE	BY	REV.

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SCALE: 1"=300'
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

MURRAY F. HUDSON 78198 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

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AREA MAP FOR GRAVITY SANITARY SEWER

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
2725 SWANTNER DR., CORPUS CHRISTI, TX 78404
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SHEET 16 OF 20

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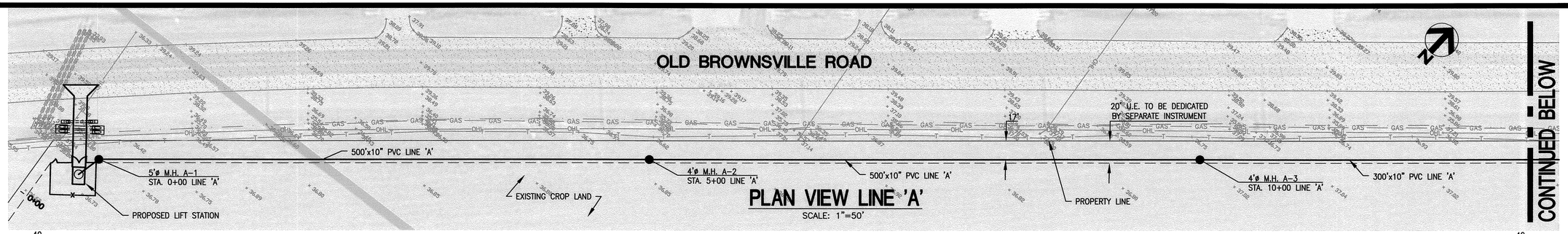
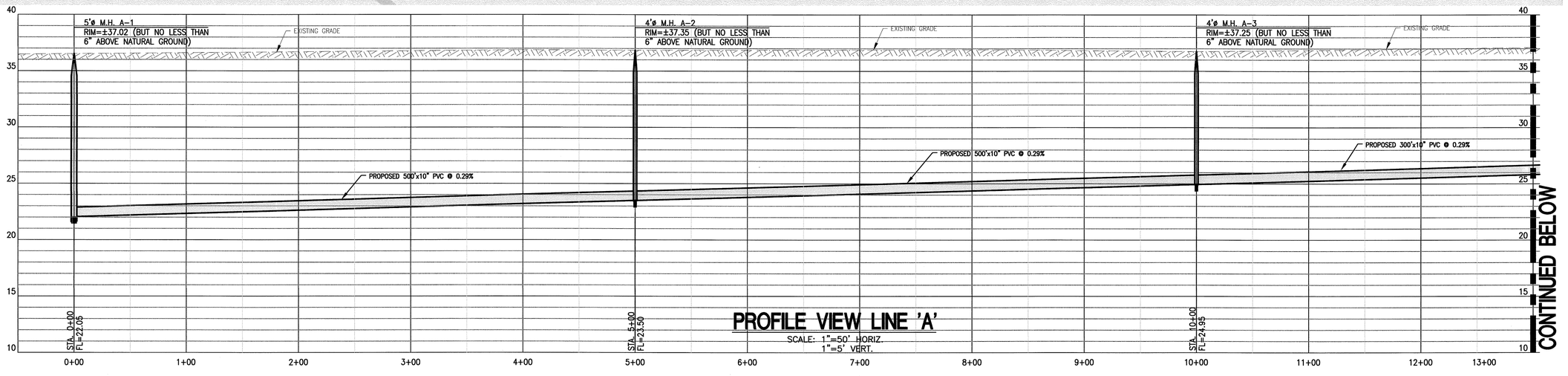


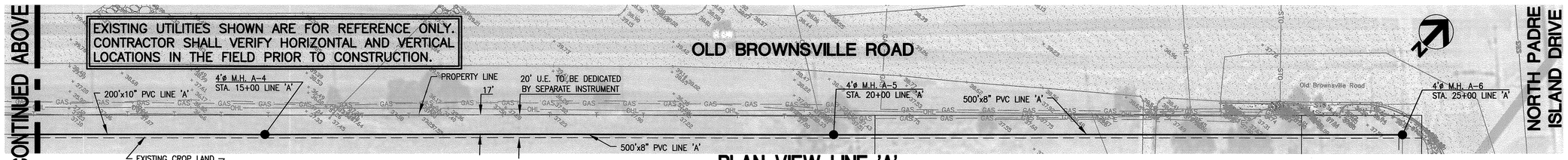
PLAN VIEW LINE 'A'

SCALE: 1"=50'



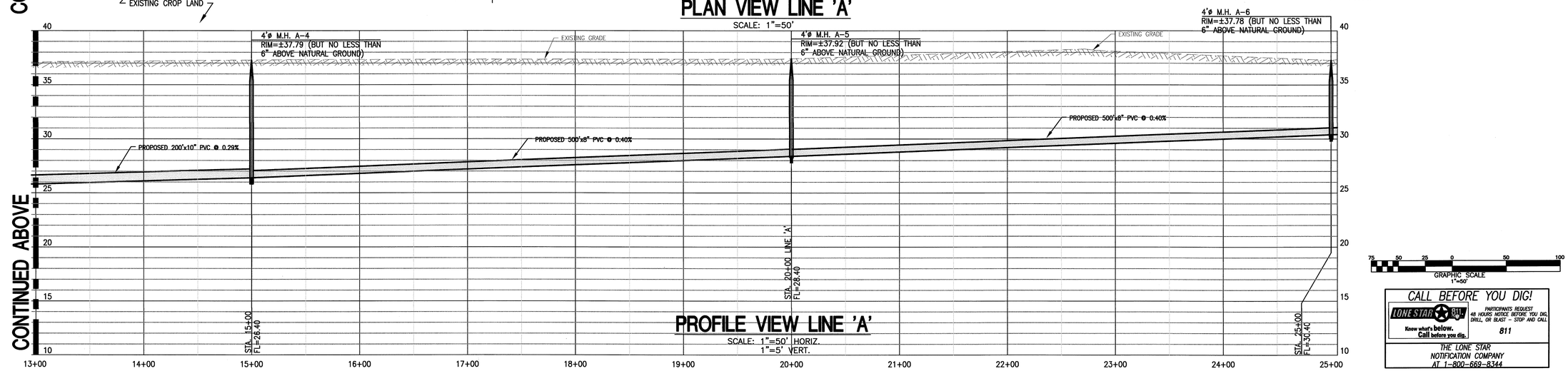
PROFILE VIEW LINE 'A'

SCALE: 1"=50' HORIZ.
1"=5' VERT.



PLAN VIEW LINE 'A'

SCALE: 1"=50'



PROFILE VIEW LINE 'A'

SCALE: 1"=50' HORIZ.
1"=5' VERT.

GRAPHIC SCALE 1"=50'

CALL BEFORE YOU DIG!
LONE STAR 811 Know what's below. Call before you dig.
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST – STOP AND CALL 811
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

S:\Projects\40000up\40706\B401\PLANS\40706B401_KEYMAP_PROFILES.dwg modified by cyg on Mar 27, 2015 – 3:18pm

REV.	BY	DATE	DESCRIPTION	APPROVED

SCALE: 1"=50'
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 78186 (03/27/2015)

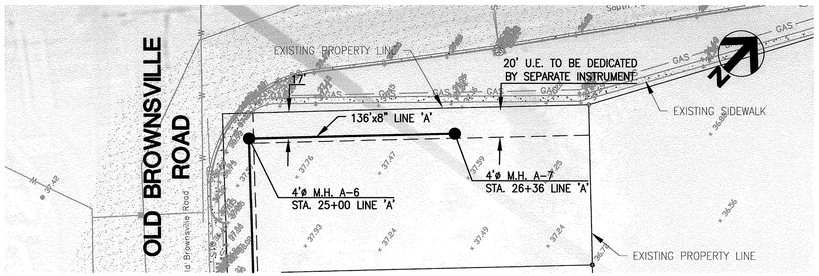
GRAVITY SEWER LINE 'A' PLAN & PROFILE

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
2725 SWANTNER DR., CORPUS CHRISTI, TX. 78404
PHONE: 361-854-3101 WWW.URBANENG.COM

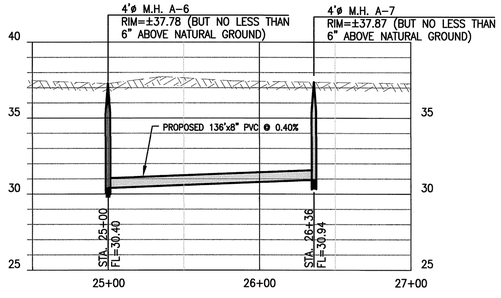
SHEET 17 OF 20

JOB NO. 40706.B4.01



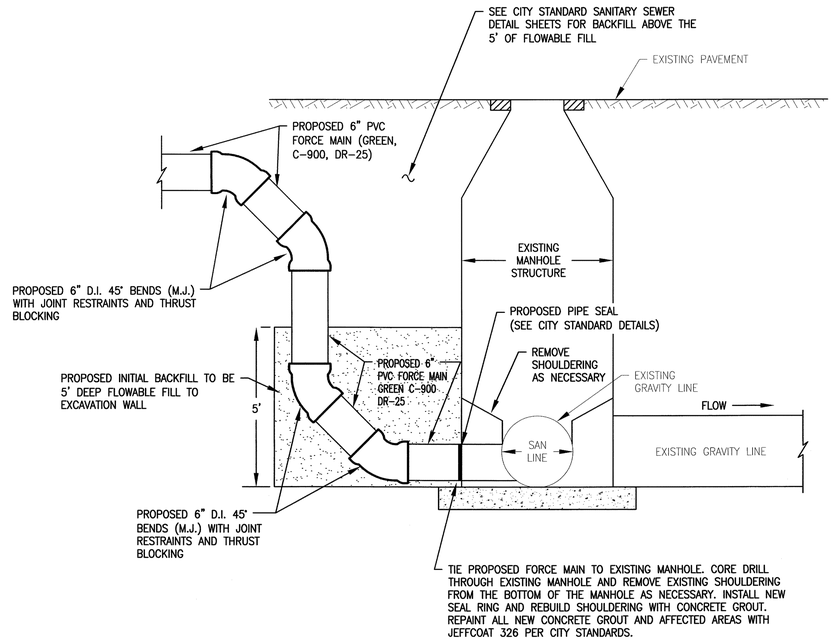
PLAN VIEW LINE 'A'

SCALE: 1"=50'



PROFILE VIEW LINE 'A'

SCALE: 1"=50' HORIZ.
1"=5' VERT.



OUTSIDE FORCE MAIN DROP CONNECTION

N.T.S.

75 50 25 0 50 100
GRAPHIC SCALE
1"=50'

CALL BEFORE YOU DIG!
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THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

EXISTING UTILITIES SHOWN ARE FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO CONSTRUCTION.

REV.	BY	DATE	DESCRIPTION	APPROVED BY

SCALE: 1"=50'
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

MURRAY F. HUDSON 78198 LICENSED PROFESSIONAL ENGINEER
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 78198 (03/27/2015)

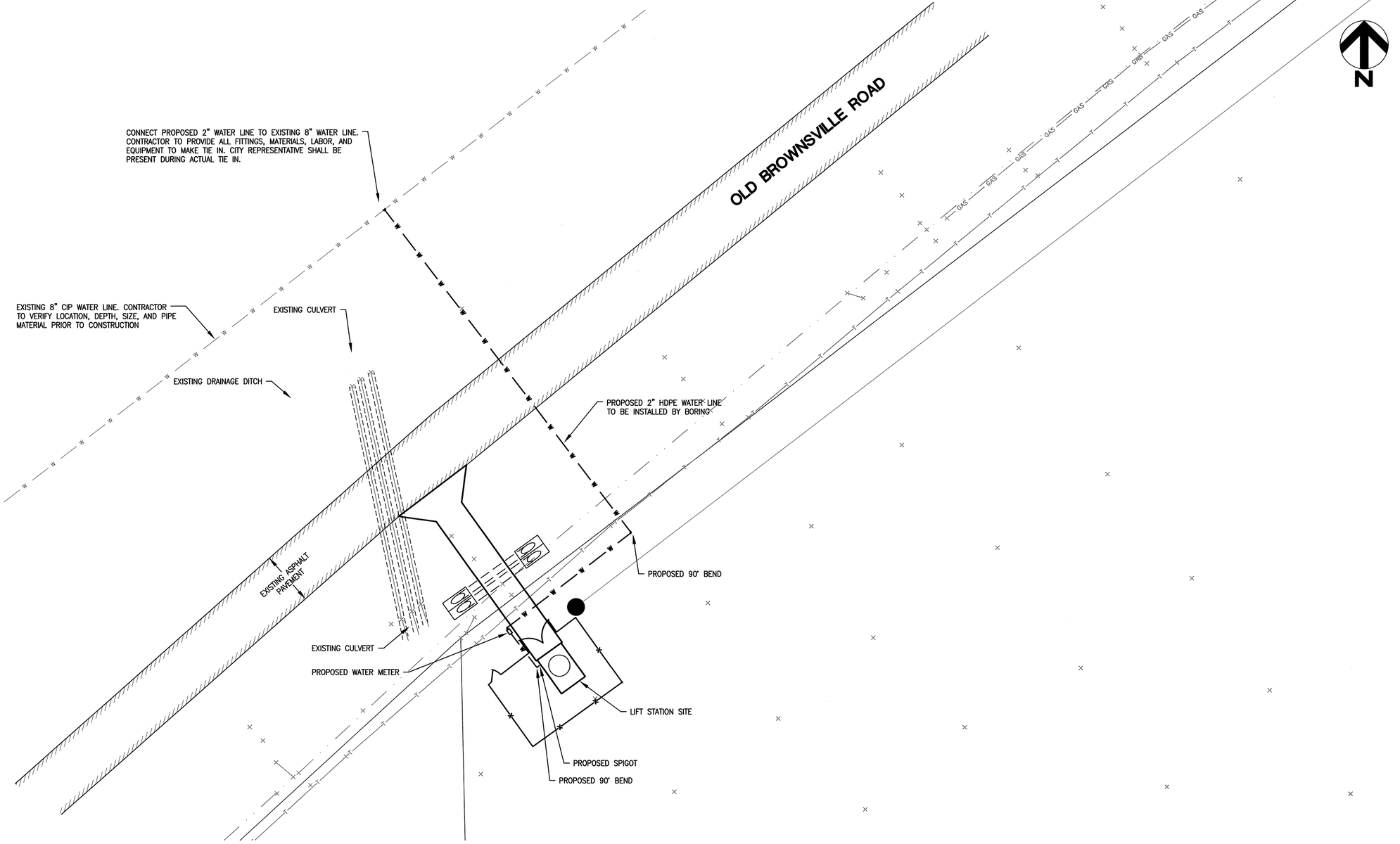
GRAVITY SEWER LINE 'A' PLAN & PROFILE STA. 20+00 THRU END

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
2725 SWANTNER DR. CORPUS CHRISTI, TX 78404
PHONE: 361.854.3101 WWW.URBANENG.COM

SHEET 18 OF 20

JOB NO. 40706.B4.01



WATER SERVICE PLAN

SCALE: 1"=20'

LEGEND:

- PROPOSED FORCE MAIN
- PROPOSED GRAVITY SANITARY SEWER
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED WATER LINE
- EXISTING WATER LINE

CALL BEFORE YOU DIG!
LONE STAR 811 Know what's below. Call before you dig.
PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST — STOP AND CALL 811
THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

300 200 100 0 200 400
GRAPHIC SCALE 1"=200'

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APPROVED BY	DESCRIPTION	DATE	BY	REV.

SCALE: 1"=20'
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

MURRAY F. HUDSON 78198 REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MURRAY F. HUDSON, P.E. TX. REG. 78198 (03/27/2015)

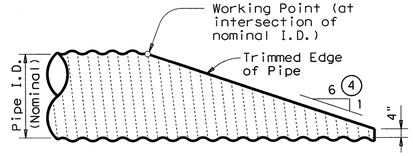
WATER SERVICE PLAN

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

URBAN ENGINEERING
TBPE FIRM NO. 145; TBPLS FIRM NO. 10032400
2725 SWANTNER DR., CORPUS CHRISTI, TX 78404
PHONE: 361.854.3101
WWW.URBANENG.COM

SHEET 19 OF 20

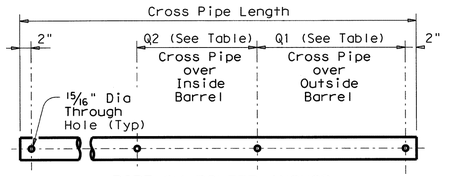
JOB NO. 40706.B4.01



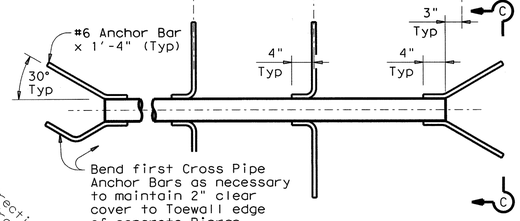
NOTE: All Cross Pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

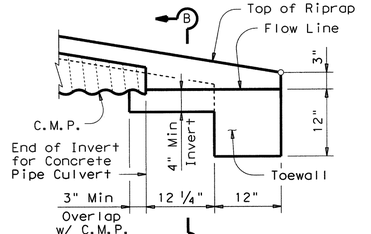
(Showing Corrugated Metal Pipe Culvert.)
(Details at Concrete Pipe Culvert are similar.)



PIPE W/ BOLTED ANCHOR

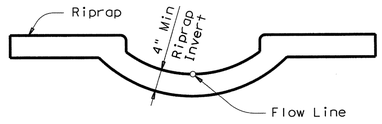


PIPE W/ ANCHOR BARS



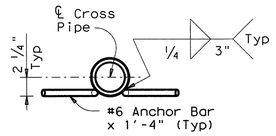
DETAIL "A"

(Showing Invert with Corrugated Metal Pipe Culvert. Concrete Pipe Culvert details are similar. Cross Pipes not shown for clarity.)



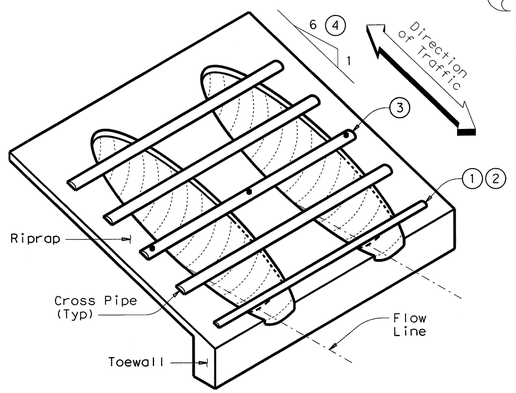
SECTION B-B

(Cross Pipes not shown for clarity.)

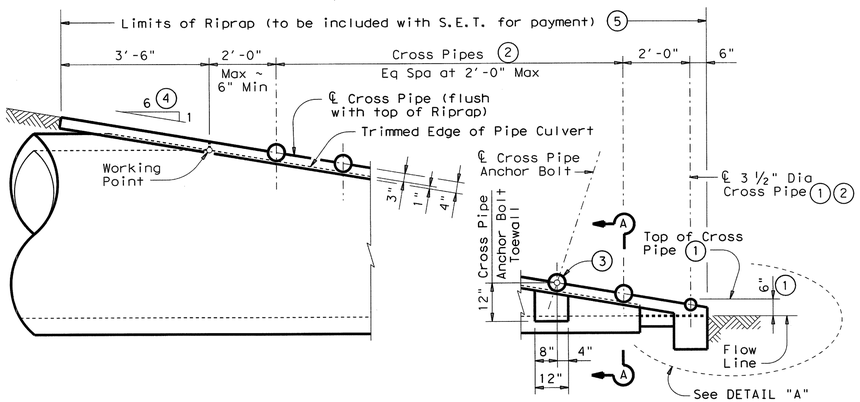


SECTION C-C

CROSS PIPE DETAILS

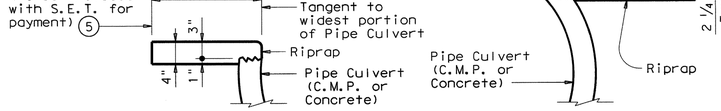


ISOMETRIC VIEW OF TYPICAL INSTALLATION



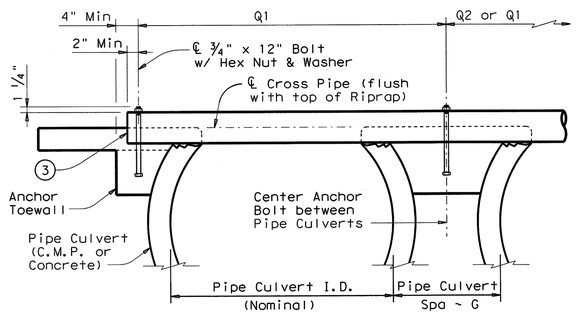
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing Concrete Pipe Culvert.)
(Details at Corrugated Metal Pipe Culvert are similar.)



SHOWING TYPICAL PIPE CULVERT & RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, & RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for use of Cross Pipes	Cross Pipe Size
12"	0.6	9"	N/A	2'- 1"	1'- 9"	3 or more Pipe Culverts	3" Std (3.500" O.D.)
15"	0.7	11"	N/A	2'- 5"	2'- 2"		
18"	0.8	1'- 2"	N/A	2'-10"	2'- 8"		
21"	0.9	1'- 4"	N/A	3'- 2"	3'- 1"		
24"	0.9	1'- 7"	N/A	3'- 6"	3'- 7"		
27"	1.0	1'- 8"	N/A	3'-10"	3'-11"	3 or more Pipe Culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1'-10"	N/A	4'- 2"	4'- 4"	2 or more Pipe Culverts	
33"	1.2	1'-11"	4'- 2"	4'- 5"	4'- 8"	All Pipe Culverts	
36"	1.3	2'- 1"	4'- 5"	4'- 9"	5'- 1"	All Pipe Culverts	4" Std (4.500" O.D.)
42"	1.5	2'- 4"	4'-11"	5'- 5"	5'-10"		
48"	1.7	2'- 7"	5'- 5"	6'- 0"	6'- 7"	All Pipe Culverts	5" Std (5.563" O.D.)
54"	2.0	3'- 0"	5'-11"	6'- 9"	7'- 6"		
60"	2.2	3'- 3"	6'- 5"	7'- 4"	8'- 3"		
66"	2.4	3'- 3"	6'-11"	7'-10"	8'- 9"		
72"	2.7	3'- 4"	7'- 5"	8'- 5"	9'- 4"		

(1) The proper installation of the first Cross Pipe is critical for vehicle safety. The top of the first Cross Pipe must be placed at no more than 6" above the flow line.

(2) Size of Cross Pipes, except the first bottom pipe, shall be as shown in the PIPE SIZE table. The first bottom pipe shall be 3 1/2" Standard Pipe (4" O.D.).

(3) The third Cross Pipe from the bottom of the Culvert shall always be installed using a bolted connection. Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, all other Cross Pipes may also be installed using the bolted connection details.

(4) Match Cross Slope as shown elsewhere in the plans. Cross Slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".

(6) Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple pipe culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

GENERAL NOTES:

Cross Pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Cross Pipes.

Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

Cross Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Bolts and nuts shall conform to ASTM A307.

All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA
PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: setppdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO.

APPROVED BY	DESCRIPTION	REV.	BY	DATE

SCALE: AS NOTED
DRAWN: CG
CHECKED: MFH
DATE: MARCH 2015

WEST POINT CROSSING
SANITARY SEWER IMPROVEMENTS
CORPUS CHRISTI, TEXAS

SHEET 20 OF 20

JOB NO. 40706.B4.01

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PHONE: 361.854.3101 WWW.URBANENG.COM

DATE:
FILE:

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