CITY OF LUCAS

CONSTRUCTION PLANS FOR

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION

MAYOR
BILL CARMICKLE

CITY COUNCIL

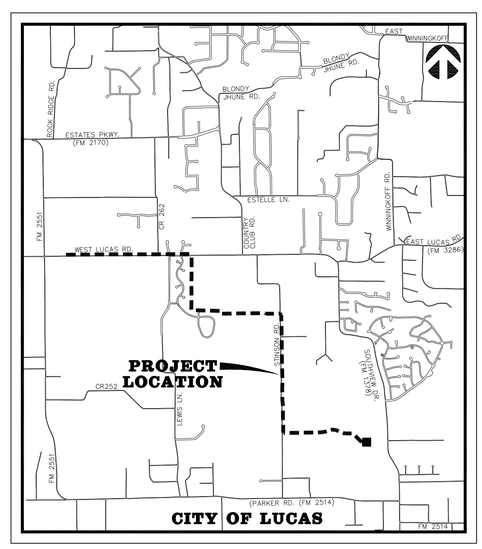
MARK BARRATT — DEBBIE FISHER
PHILIP LAWRENCE — REBECCA MARK
KATHLEEN PEELE — DON ZRINY

CITY MANAGER
ROBERT PATRICK

DIRECTOR OF PUBLIC WORKS
STACY CAUDELL, P.E.

CONTRACTOR
UTILITEX CONSTRUCTION, LLP
COMPLETED JULY 2011

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.



VICINITY MAP

BW2 JOB NO. 09-1389

AUGUST 2010

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ENGINEER:
BW2
BW2 ENGINEERS, INC.
1919 S. SHILOH ROAD
SUITE 500, L.B. 27
GARLAND, TEXAS 75042
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

OWNER:
CITY OF LUCAS
665 COUNTRY CLUB ROAD
LUCAS, TEXAS 75002

WASTEWATER SYSTEM IMPROVEMENTS – WASTEWATER FORCE MAIN AND LIFT STATION – 09-1389

GENERAL NOTES:

1. It is the CONTRACTOR's responsibility to maintain neat and accurate plans of record.
2. The CONTRACTOR is responsible for maintaining adequate site drainage throughout the duration of this project.
3. The CONTRACTOR is responsible for obtaining all necessary permits and approvals before construction begins.
4. The CONTRACTOR shall replace all fence removed during construction in as good or better condition than before construction.
5. The CONTRACTOR shall take all necessary precautions to ensure that electric power and telephone poles are either moved to a safe location by the affected utility company or not disturbed during construction. All costs incurred for moving electric power and telephone poles shall be included in the price bid for the construction of the project.
6. The CONTRACTOR shall restore all property including driveways, public streets, sidewalks, public utilities, franchise utilities, private utilities, and all other improvements removed or damaged inside and outside the project limits during construction to as good or better condition than before construction. Restoration shall be made immediately after the property no longer interferes with construction.
7. The information shown on these drawings concerning type and location of underground and other utilities is not guaranteed to be accurate or all-inclusive. The CONTRACTOR is responsible for making his own determinations as to the type and location of underground utilities and other utilities as may be necessary to avoid damage thereto.
8. The CONTRACTOR shall not place fill or waste material on any private property without prior written permission from the property owner and written concurrence from the City. No excess excavated material shall be deposited in low areas or along natural drainage ways that will restrict the natural flow of water. If the CONTRACTOR places excavated material in low areas that will cause flood damage, CONTRACTOR will be responsible for all damage resulting from such fill, and he shall remove the fill at CONTRACTOR's expense.
9. All streets within the scope of the Contract shall be kept accessible to fire trucks, ambulances, and other emergency vehicles.
10. The CONTRACTOR shall be responsible for public safety during the duration of construction. All barricades, warning signs, lights, devices, etc., for the guidance and protection of traffic and pedestrians must conform to the installation shown in 1980 Texas Manual of Uniform Traffic Control Devices, as currently amended by the Texas Department of Transportation. CONTRACTOR shall at all times provide barricades, warning signs and lighting adequate to safeguard the public from any hazards resulting from open trenches during non-work hours.
11. Filter fabric fence for erosion control shall be provided in accordance with specifications and as shown on the plans and in accordance with the EPA regulations.
12. The CONTRACTOR shall use the public right-of-ways and existing utility easements for access to the job site.
13. The CONTRACTOR shall select the subcontractor to be utilized for testing and lab work. The CONTRACTOR shall be responsible for paying for testing and lab work. Selection of subcontractor for this purpose will be subject to approval by the City. Testing referred to herein includes any compaction and pressure testing required on this project. Testing shall also include testing of concrete required to determine and ascertain that concrete strengths in specifications are attained for all concrete members on the project.
14. The CONTRACTOR shall keep excavated trenches free of groundwater during construction. If necessary, the CONTRACTOR shall utilize dewatering procedures in order to control groundwater during construction such that it does not affect his construction work.
15. The CONTRACTOR shall provide means for adequately controlling and avoiding soil erosion during construction. The CONTRACTOR shall not store spoil in drainage ways during construction.
16. All disturbed earth areas are to be finish graded to original or proposed contours, fertilized and either hydromulched with bermuda seed or covered with block sod according to NCTCOG specifications immediately after construction. Backfill to be select material free of rock and other debris. CONTRACTOR shall thoroughly water the hydromulch or block sod immediately after placement. Block sod shall match the existing type of grass on a case by case basis, as determined by the City. There shall be no separate pay for matching each type of grass. The CONTRACTOR shall also be responsible for continued maintenance and watering of the newly hydromulched or sodded areas until the entire project is completed and accepted by the City of Lucas. Watering of the bermuda hydromulch or block sod shall be done in a manner and quantity as directed by City of Lucas field representative.
17. No existing sprinkler/irrigations systems have been shown on the plans; however, they may exist in certain areas. It is the CONTRACTORS responsibility to locate any existing irrigation systems within the project limits and determine if they will be affected by this construction. If CONTRACTOR encounters any sprinkler systems during construction, he shall repair and/or replace in as good or better condition than before construction.
18. The CONTRACTOR shall maintain adequate sanitary facilities for use by workers throughout construction.
19. The CONTRACTOR shall conform to the Occupational Safety and Health Administration's (OSHA) standards for trench safety that are in effect during the period of construction.
20. All materials and workmanship shall conform to the City of Lucas Standards and Specifications and the North Central Texas Council of Government (NCTCOG) Standards and Specifications, except as noted. In the event of a conflict, the City of Lucas Standards and Specifications shall govern.
21. No existing trees shall be removed without approval of the City of Lucas.
22. CONTRACTOR shall provide all necessary construction staking.
23. CONTRACTOR's working hours shall be in accordance with the provisions of the current City Ordinance governing hours of construction work in the City.
24. Driveways affected by construction shall be replaced with driveway of same type material and surface as that removed for installation of proposed pipeline. Driveway culverts shall be removed when necessary to allow for construction of water line. Culverts are to be replaced in the same location if condition of culvert is deemed satisfactory by City. If culvert cannot be salvaged, a new culvert of the same type removed will be installed by the CONTRACTOR. Driveways that are disturbed during construction shall be restored to as good or better condition than they were prior to construction and materials utilized to restore the driveway shall be the same material as what the driveway is presently made of.

GENERAL NOTES CONT'D.:

25. All concrete shall have a minimum compressive strength of 4000 psi at 28 days (minimum 6 sacks of cement per cubic yard) unless otherwise noted. All reinforcing steel and dowel bars in pavement shall be supported and maintained at the correct clearances by the use of bar chairs or other approved support.
26. All existing service lines are to remain in service during construction. If a water service line has to be cut-off, the CONTRACTOR shall coordinate with the City of Lucas to notify the affected resident at least 48 hours prior to cut-off.
27. The CONTRACTOR shall phase his daily work schedule so that all driveway crossings are to be complete prior to the end of the day. No driveway crossings are to be left open overnight. During installation of the pipeline across driveways, the CONTRACTOR shall be prepared to provide access across trenches and driveways at all times in case of emergency.
28. Proposed force main shall be High Density Polyethylene (HDPE).
29. CONTRACTOR shall install valves at locations shown on plans unless otherwise directed by City. City may direct CONTRACTOR to locate valves at locations other than those shown on plans. Also, City may add additional valves as required for operational purposes.
30. The CONTRACTOR is responsible for keeping streets, parking areas, sidewalks, etc., adjacent to the project free of mud and debris from construction.
31. The CONTRACTOR shall assume responsibility for protection of public utilities in the construction of this project. All manholes, valve boxes, etc., must be adjusted to proper line and grade by the CONTRACTOR prior to and/or after placing any permanent paving. The CONTRACTOR shall also be responsible for support of existing utility poles, street signs, etc., when excavating in the vicinity of such poles.
32. The City of Lucas Public Works Department is to be notified 48 hours (2 working days) prior to any construction of paving and utilities in rights-of-way, easements and alleys.
33. Arrangements for construction water shall be made through the City of Lucas.
34. All locations of underground utility lines are approximate. CONTRACTOR shall contact the proper utility companies at least 48 hours prior to construction, shall inform them of beginning of construction and shall make arrangements to have utilities located by flagging. Flagging of utilities shall be completed prior to beginning construction.
35. HDPE pipe shall be manufactured from components capable of meeting the highest performance standards of the applicable ASTM specifications.
36. Construction sites shall be secure at all times. Safety precautions shall be taken to protect the public from any injury which might result from construction activities.
37. As part of bid item, "EROSION CONTROL", the CONTRACTOR shall be responsible for implementing any and all erosion control measures as needed to control runoff of siltation from the project site. This shall include, but is not limited to, silt fencing, rock berms, inlet protection, etc. The CONTRACTOR shall maintain these erosion control measures as required until the construction is completed and sod has been placed over disturbed areas.
38. CONTRACTOR shall furnish and install four (4) isolation gate valves at locations on the force main, as determined by the City.
39. There is no separate pay resulting from any of the work required as a result of the requirements included in these General Notes. All work required shall be included in the price bid for the project.
40. The High Density Polyethylene Pipe shall be IPS HDPE pipe and it shall be DR11 for the southern most half (approximately) of the project (including pipe installed with encasement) and DR17 for the northern most half (approximately) of the project (including pipe installed with encasement). City will determine exact point of transition for DR11 to DR17. The HDPE pipe shall be in compliance with applicable ASTM and AWWA specifications for this project. Color shall be gray or black. Fittings for the force main shall be HDPE.
41. The force main shall be pressure tested per TCEQ requirements to a pressure of 150 psi (measured at the highest point in the test section). The pressure test shall be of at least a 2-hour duration and any damage or defective pipe, fittings, or valves that are discovered following the pressure test shall be replaced by the CONTRACTOR. The CONTRACTOR shall furnish all necessary equipment, materials, and labor for making the test as specified. Before applying the specified test pressure, air shall be expelled from the pipe and valves. The CONTRACTOR shall test the line prior to contacting the Owner for the formal pressure test. The CONTRACTOR shall furnish all pumps, fittings, and gages as necessary to fill the line. With water, dispel air from the system, and pressurize the pipeline for the test. The Owner reserves the right to test gauges to determine their accuracy. The test pressure shall not vary by more than ±5 psi for the duration of the test. Testing allowance shall be defined at the quantity of makeup water as determined by the Owner. The CONTRACTOR shall provide all necessary temporary restraint and support during testing at no additional cost to the Owner. The CONTRACTOR will be responsible for providing proper safety measures during pressure testing operations. CONTRACTOR shall provide necessary pumping facilities, plugs, and other accessories necessary to pressure test the force main. Water for pressure testing will be provided by the City at no charge to the CONTRACTOR.
42. CONTRACTOR shall save existing top soil and shall utilize it for the top of the backfill prior to hydromulch seeding.
43. Joints for the HDPE pipes shall be heat fused.
44. Steel casing for the encasement pipe shall be epoxy-coated.
45. CONTRACTOR shall be responsible for a disposal plan for dirt spoil generated during the course of the project.
46. CONTRACTOR shall be responsible for coordinating construction work at the lift station site and on the force main with property owners in order to minimize the impact on property owners.
47. CONTRACTOR shall expose each existing NTMWD pipeline and shall verify the horizontal and vertical location of the existing pipeline prior to the installation of the proposed force main.
48. The fittings for the proposed ductile iron pipe at the lift station site shall be AWWA C153 compact fittings.
49. All materials furnished and installed on this project shall be domestic materials and shall be in compliance with the appropriate ASTM and AWWA Standards for such items.

GENERAL NOTES CONT'D.:

50. Hydromulch or block sodding shall be installed to match surrounding areas where the ground is disturbed in the construction area. City reserves the right to provide direction with regard to areas to be hydrolmulched or sodded.
51. If any conflicts with other utilities occur during the construction activities, the CONTRACTOR shall immediately notify the City's representative and shall make adjustments as necessary with City's concurrence.
52. CONTRACTOR shall perform leakage testing in accordance with TCEQ requirements for pressure pipe.

GENERAL TRAFFIC CONTROL NOTES

1. All temporary signs, markings, cones, channelizing devices, warning lights and barricades shall be in accordance with the current State of Texas Manual on Uniform Traffic Control Devices (MUTCD).
2. Type "A" warning lights shall be placed on all advance warning signs. In addition, flags shall be placed on all advance warning signs that detour traffic.
3. Any existing conflicting markings shall be removed prior to shifting traffic.
4. All temporary pavement markings required during construction shall be of the removable type. Temporary markings and striping may be required to transition travel lanes between construction phases. All pavement markings and striping shall be reflective.
5. The spacing of signs and channelization devices may be adjusted to fit the geometric conditions encountered, such as driveways, intersecting roadways, vertical and horizontal alignment, etc., as approved by the City of Lucas.
6. Advance warning signs shall not be displayed more than forty-eight (48) hours before physical construction begins. Signs may be erected up to one week before needed, if the sign face is fully covered.
7. Use of barricades, portable barrier rails, vertical panels, and drums shall be limited to the immediate areas of construction where a hazard is present. These devices shall not be stored along the roadway within thirty (30) feet of the edge of the traveled way before or after use unless protected by guardrail, bridge rail, and/or barriers installed for other purposes. These devices shall be removed from the construction work zone when the City of Lucas determines they are no longer needed. Where there is insufficient right-of-way to provide for this thirty (30) foot setback, the City of Lucas shall approve alternate locations.
8. The posted speed for warning signage is to be determined at the site by the City of Lucas.
9. Reduced speed warning signage should be placed prior to and at regular intervals within the construction zone.
10. As part of the bid item, "Construction Barricading/Signing/Traffic Control," the CONTRACTOR is required to submit a traffic control plan for construction a minimum of 3 days prior to changes in traffic handling or movement, These plans are to be reviewed and approved by the City of Lucas prior to construction of that phase.
11. The CONTRACTOR shall accommodate existing traffic during construction and shall maintain at least one open lane of traffic at all times. Use of flag men, barricades, vertical panels, etc. shall be required and shall be considered subsidiary to "Construction Barricading/Signing/Traffic Control". Two-way traffic shall be re-established in each instance at the end of the work day.
12. CONTRACTOR shall be required to place temporary pavement markings and/or buttons as needed to maintain traffic in a safe and efficient manner after removal of existing markings. These temporary markings shall not be paid for separately but shall be considered subsidiary to "CONSTRUCTION BARRICADING/SIGNING/TRAFFIC CONTROL".

NTMWD NOTES:

1. North Texas Municipal Water District (NTMWD) water transmission pipelines located within limits of construction.
2. Operation of heavy earth moving equipment, compaction equipment or heavy construction equipment, such as concrete trucks, shall be restricted to specific crossing points across NTMWD easements, as approved by the NTMWD. The crossings shall be designated and verified to provide a minimum of five feet of cover.
3. To assure that placing of significant loads over the NTMWD pipeline does not damage the existing pipeline, no materials shall be stockpiled on the NTMWD easement without authorization from the NTMWD. If the CONTRACTOR desires to use NTMWD's easement for stockpile of materials, contact NTMWD Engineering at (972) 442-5405 so your plans for use of NTMWD's easement can be reviewed.
4. Unless otherwise shown or required, a minimum of one-foot clearance shall be provided for all utilities crossing the NTMWD pipelines.
5. The CONTRACTOR shall contact NTMWD Engineering at (972) 442-5404 at least 48 hours prior to performing any work in the vicinity of the NTMWD facilities.
6. For open cut where crossing under the NTMWD pipeline, within ten feet either side of centerline of pipeline, the trench width shall be limited to four-foot with vertical walls, no sloping banks and with the appropriate trench safety. The entire excavation within the limits noted above shall be backfilled with sand to one-foot above top of NTMWD pipeline. One-foot minimum vertical clearance is required between NTMWD pipeline and proposed utilities.
7. Limits of bore shall be a minimum of the NTMWD easement width.
8. The casing pipe shall terminate outside of the NTMWD easement.
9. Boring and receiving pits shall be located outside of NTMWD easements.
10. A minimum of two-foot horizontal and one-foot vertical clearance is required between proposed pipelines and NTMWD pipelines.
11. Pipelines crossing the NTMWD easement shall be installed in compliance with the applicable NTMWD Rules and Regulations.

RECORD DRAWING

BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

!! CAUTION !!

THERE ARE EXISTING AND/OR PROPOSED UTILITIES IN PROJECT AREA. UTILITY INFORMATION SHOWN ON PLANS REPRESENTS APPROXIMATE LOCATIONS OF EXISTING UTILITIES AND IS NOT NECESSARILY ALL-INCLUSIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXACT LOCATIONS OF ALL EXISTING UTILITIES AND SHALL BE REQUIRED TO PROTECT UTILITIES TO AVOID DAMAGE.

PRIOR TO ANY EXCAVATION, CONTRACTOR SHALL CONTACT DIG-TESS, TEXAS ONE CALL, LONE STAR NOTIFICATION AND OTHERS AS REQUIRED TO LOCATE EXISTING UTILITIES.

CONTRACTOR SHALL ALSO CONTACT APPROPRIATE CITY UTILITY DEPARTMENT FOR FIELD LOCATES OF MUNICIPAL INFRASTRUCTURE 48 HOURS PRIOR TO CONSTRUCTION.

NO.	DATE	REVISION	REVIEWED
6			
5			
4			
3			
2			
1			

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: NO SCALE
DATE: AUGUST 2010
DWG. NAME: 1389GENNOTE

BW2 Engineers, Inc.
1919 S. Shiloh Road
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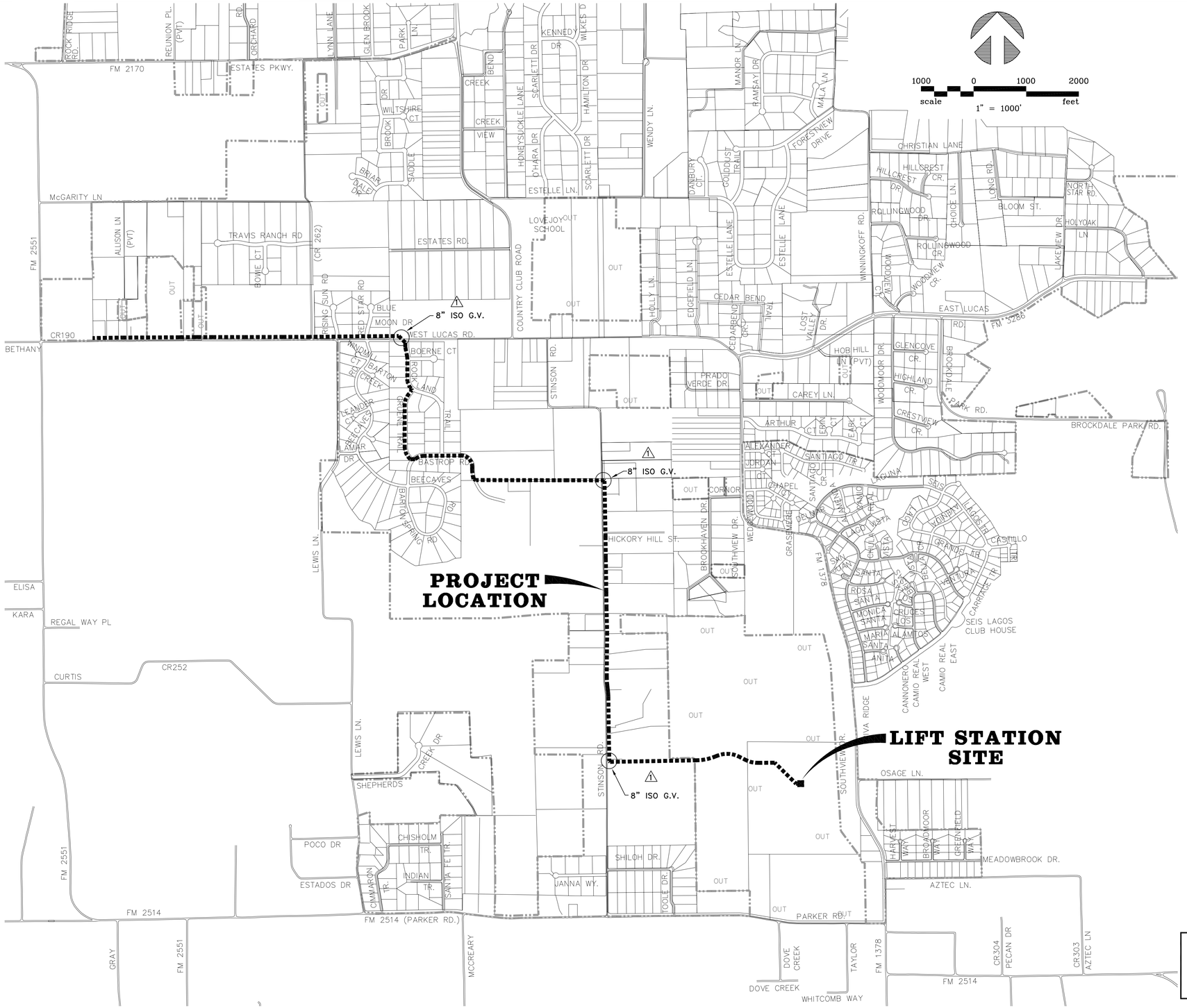
STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
GENERAL NOTES
CITY OF LUCAS

SHEET NO. C1
OF SHEETS
JOB NO. 09-1389



RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

NO.	DATE	REVISION	REVIEWED
6			
5			
4			
3			
2			
1	7/25/11	REVISED PER CONTRACTORS MARKUPS	MRB

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: 1" = 1000'
DATE: AUGUST 2010
DWG. NAME: 1389LOCMAPREV

BW2

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Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
PROJECT LOCATION MAP
CITY OF LUCAS

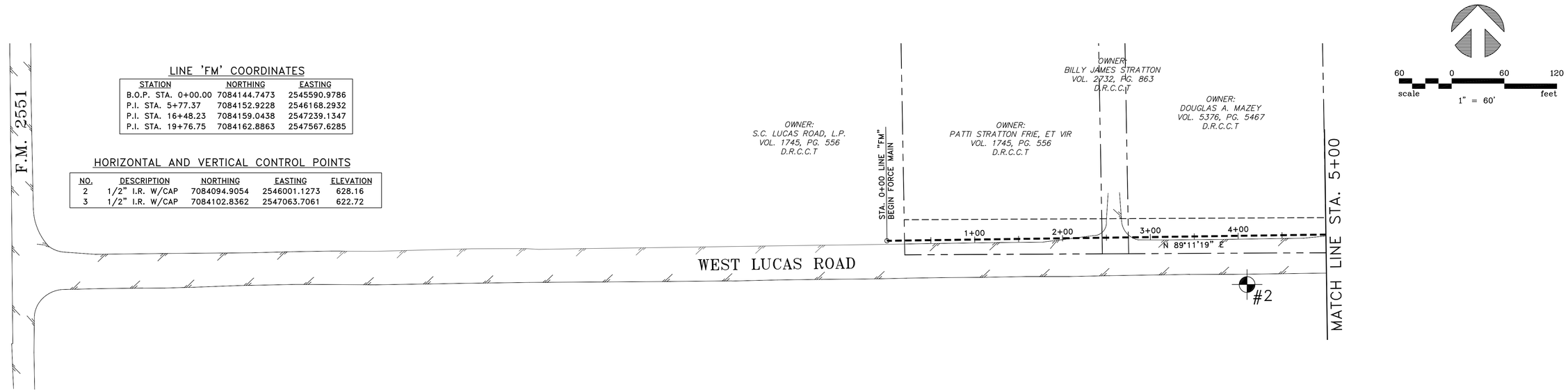
SHEET NO. C2
OF SHEETS
JOB NO. 09-1389

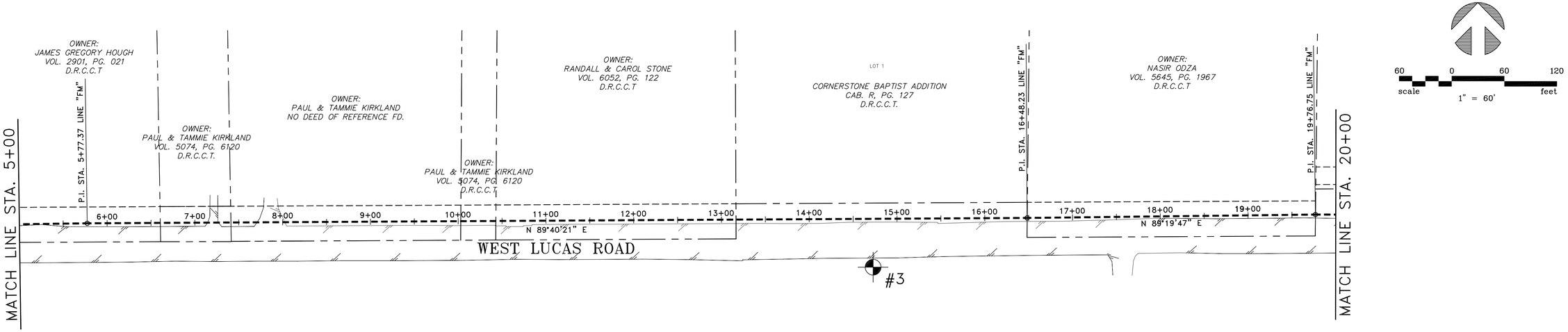
LINE 'FM' COORDINATES

STATION	NORTHING	EASTING
B.O.P. STA. 0+00.00	7084144.7473	2545590.9786
P.I. STA. 5+77.37	7084152.9228	2546168.2932
P.I. STA. 16+48.23	7084159.0438	2547239.1347
P.I. STA. 19+76.75	7084162.8863	2547567.6285

HORIZONTAL AND VERTICAL CONTROL POINTS

NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
2	1/2" I.R. W/CAP	7084094.9054	2546001.1273	628.16
3	1/2" I.R. W/CAP	7084102.8362	2547063.7061	622.72





RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

NOTES:

1. BASIS FOR HORIZONTAL CONTROL IS THE NAD 83 STATE PLANE COORDINATE SYSTEM, TEXAS NORTH CENTRAL ZONE (4202). HORIZONTAL CONTROL IS AT SURFACE USING A SCALE FACTOR OF 1.000152710 (COLLIN CO.), ABOUT 0,0.

2. BASIS FOR VERTICAL CONTROL IS NAVD 88.

NO.	DATE	REVISION	REVIEWED
6			
5			
4			
3			
2			
1			

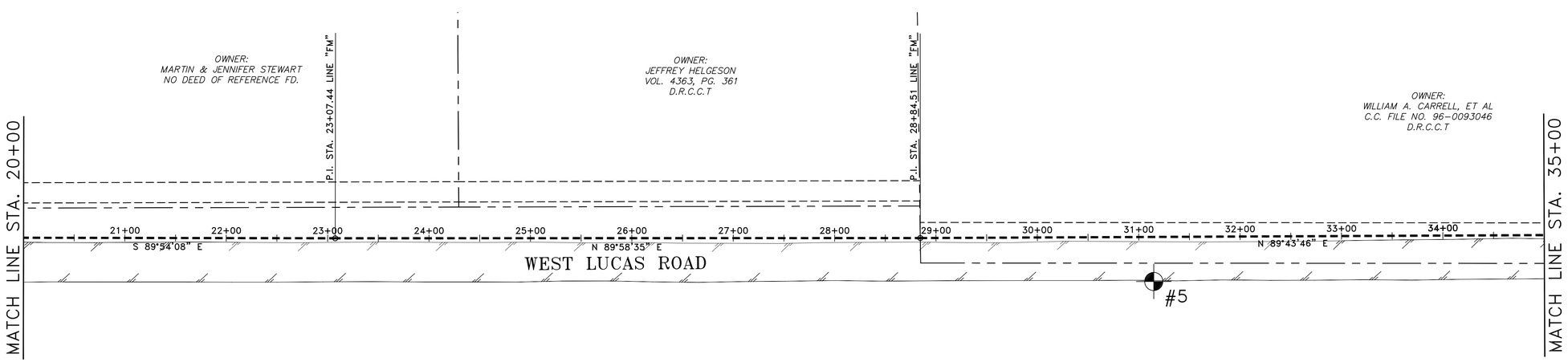
DRAWN: BW2
DESIGN: JCT
REVIEWED: MRB
SCALE: 1" = 60'
DATE: AUGUST 2010
DWG. NAME: 1389HORCTRL01

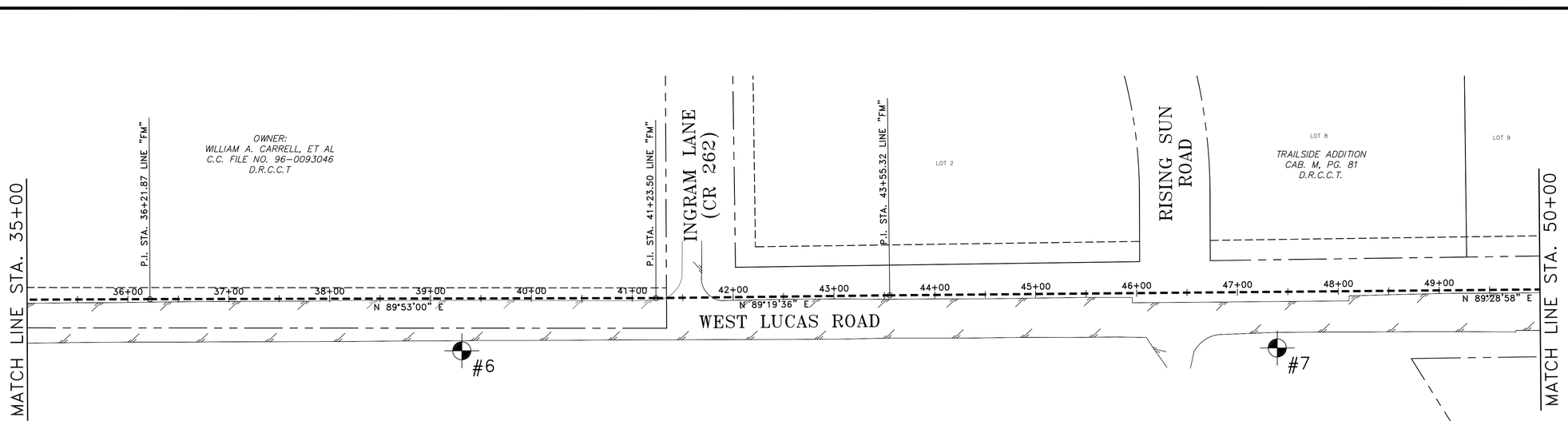
BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
HORIZONTAL AND VERTICAL CONTROL PLAN
(STA. 0+00 TO STA. 20+00)
CITY OF LUCAS

SHEET NO. C3
OF SHEETS
JOB NO. 09-1389





60 0 60 120
scale 1" = 60' feet

LINE 'FM' COORDINATES

STATION	NORTHING	EASTING
P.I. STA. 23+07.44	7084162.3213	2547898.3245
P.I. STA. 28+84.51	7084162.5583	2548475.3925
P.I. STA. 36+21.87	7084166.0385	2549212.7400
P.I. STA. 41+23.50	7084167.0599	2549714.3735
P.I. STA. 43+55.32	7084169.7839	2549946.1706

HORIZONTAL AND VERTICAL CONTROL POINTS

NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
5	1/2" I.R. W/CAP	7084119.7666	2548705.7122	614.55
6	1/2" I.R. W/CAP	7084114.8478	2549521.8696	619.51
7	1/2" I.R. W/CAP	7084117.6277	2550330.3529	619.36

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

NOTES:

1. BASIS FOR HORIZONTAL CONTROL IS THE NAD 83 STATE PLANE COORDINATE SYSTEM, TEXAS NORTH CENTRAL ZONE (4202). HORIZONTAL CONTROL IS AT SURFACE USING A SCALE FACTOR OF 1.000152710 (COLLIN CO.), ABOUT 0,0.
2. BASIS FOR VERTICAL CONTROL IS NAVD 88.

NO.	DATE	REVISION	REVIEWED
6			
5			
4			
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2			
1			

DRAWN: BW2
DESIGN: JCT
REVIEWED: MRB
SCALE: 1" = 60'
DATE: AUGUST 2010
DWG. NAME: 1389HORCTRL02

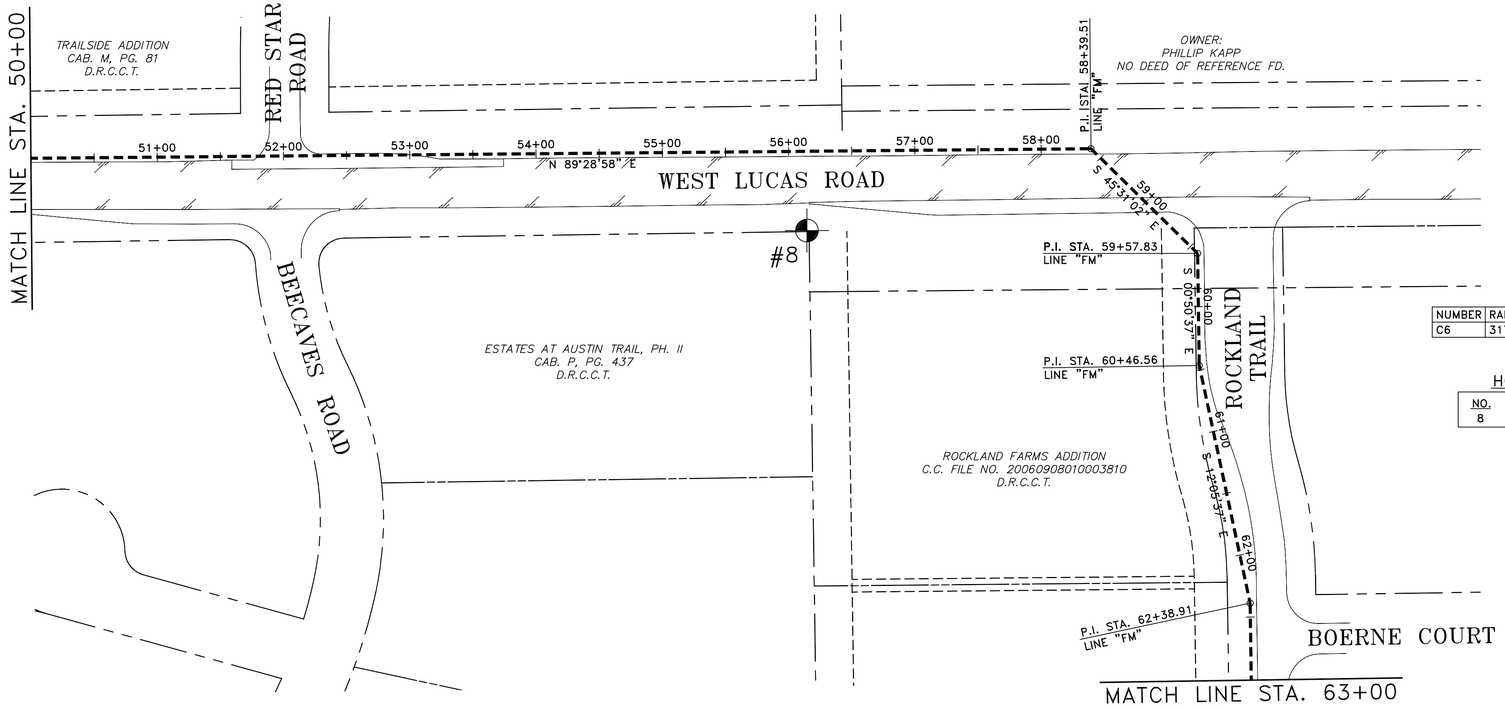
BW2

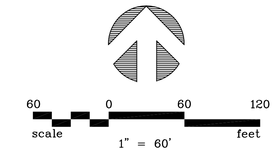
BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
HORIZONTAL AND VERTICAL CONTROL PLAN
(STA. 20+00 TO STA. 50+00)
CITY OF LUCAS

SHEET NO. C4
OF SHEETS
JOB NO. 09-1389





C/L CURVE TABLE

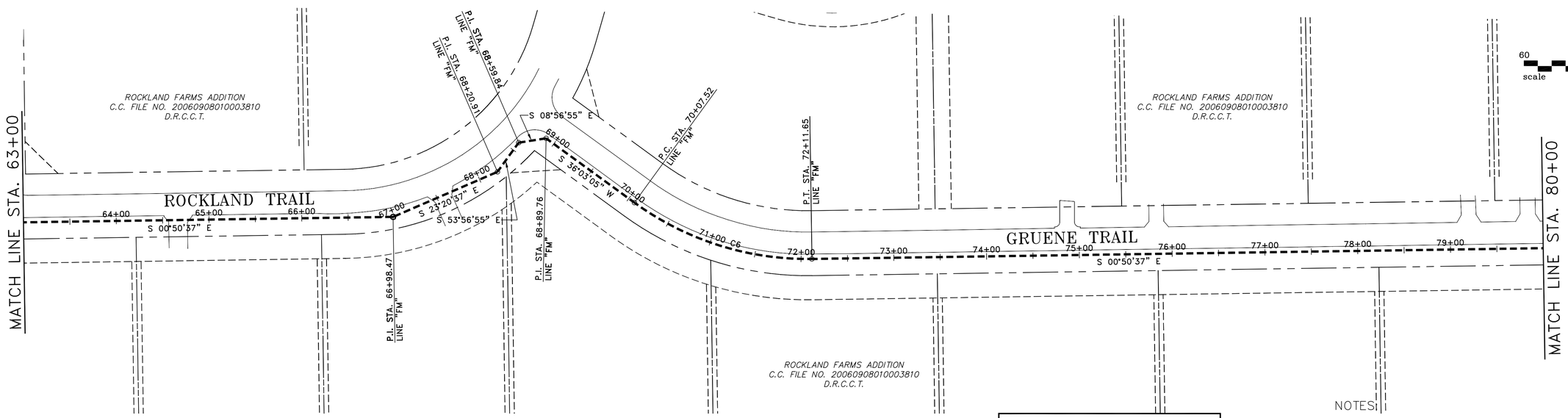
NUMBER	RADIUS	DELTA ANGLE	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C6	317.00'	36°53'42"	204.13'	S 17°36'14" W	200.62'

HORIZONTAL AND VERTICAL CONTROL POINTS

NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
8	1/2" I.R. W/CAP	7084118.4245	2551205.4304	619.6529

LINE "FM" COORDINATES

STATION	NORTHING	EASTING
P.I. STA. 58+39.51	7084183.1815	2551430.3084
P.I. STA. 59+57.83	7084100.2781	2551514.7221
P.I. STA. 60+46.56	7084011.5584	2551516.0285
P.I. STA. 62+38.91	7083823.4740	2551556.3284
P.I. STA. 66+98.47	7083363.9706	2551563.0946
P.I. STA. 68+20.91	7083251.5509	2551611.6117
P.I. STA. 68+59.84	7083228.6392	2551643.0874
P.I. STA. 68+89.76	7083199.0843	2551647.7412
P.C. STA. 70+07.52	7083103.8737	2551578.4359
P.T. STA. 72+11.65	7082912.6480	2551517.7611



RECORD DRAWING

BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

NOTES:

1. BASIS FOR HORIZONTAL CONTROL IS THE NAD 83 STATE PLANE COORDINATE SYSTEM, TEXAS NORTH CENTRAL ZONE (4202). HORIZONTAL CONTROL IS AT SURFACE USING A SCALE FACTOR OF 1.000152710 (COLLIN CO.), ABOUT 0,0.

2. BASIS FOR VERTICAL CONTROL IS NAVD 88.

NO.	DATE	REVISION	REVIEWED
6			
5			
4			
3			
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1			

DRAWN: BW2
DESIGN: JCT
REVIEWED: MRB
SCALE: 1" = 100'
DATE: AUGUST 2010
DWG. NAME: 1389HORCTRL03REV

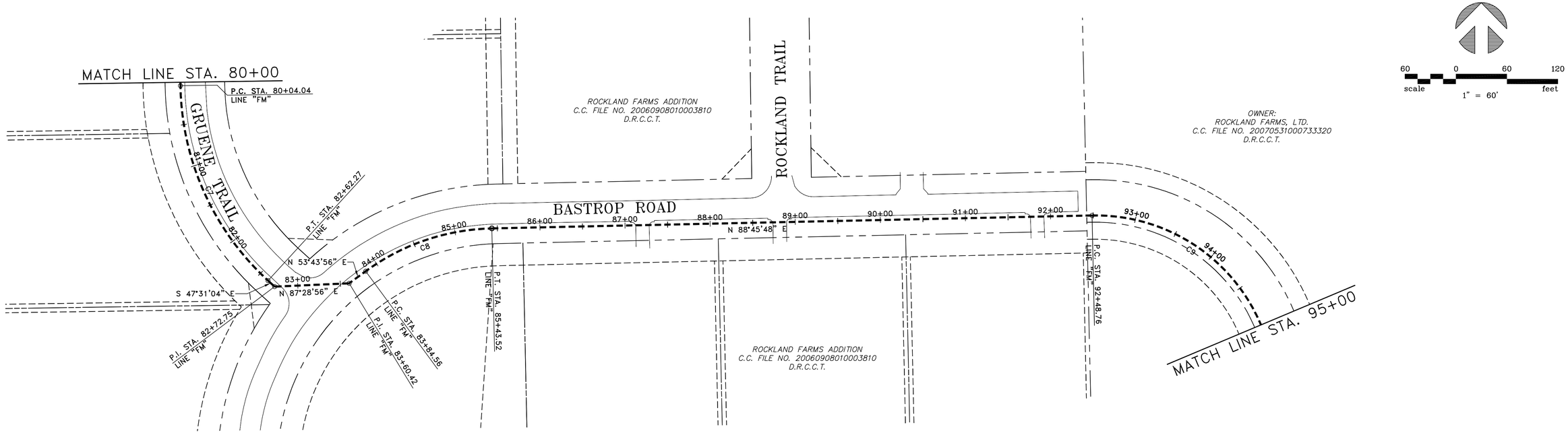
BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
HORIZONTAL AND VERTICAL CONTROL PLAN
(STA. 50+00 TO STA. 80+00)
CITY OF LUCAS

SHEET NO. C5
OF SHEETS
JOB NO. 09-1389



C/L CURVE TABLE

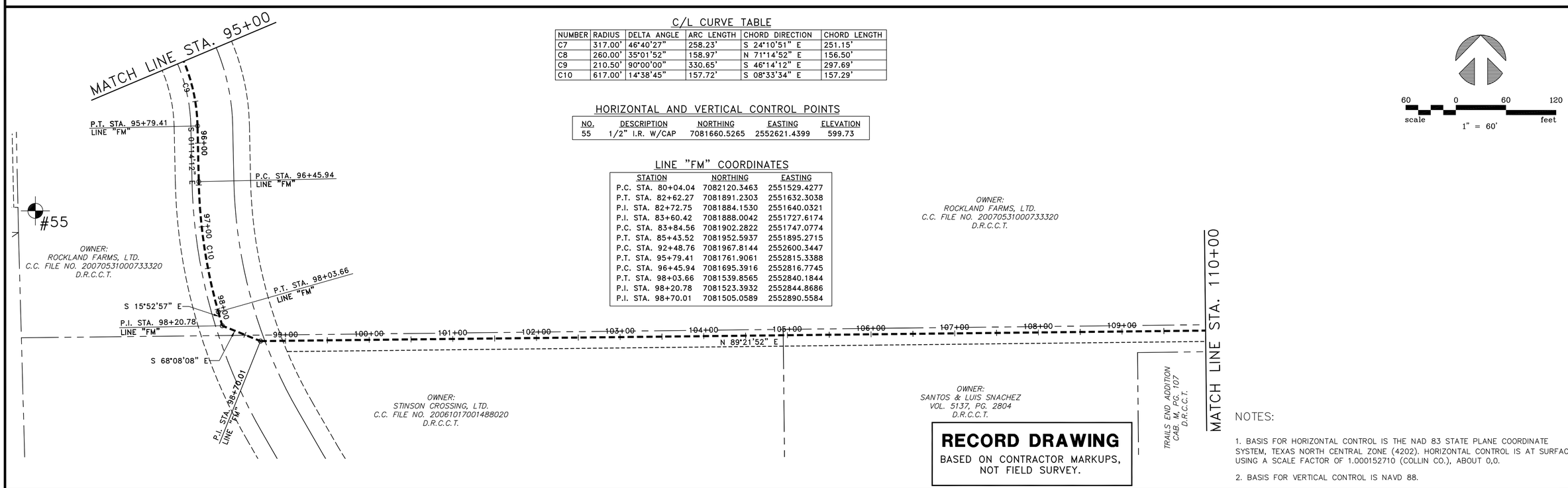
NUMBER	RADIUS	DELTA ANGLE	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C7	317.00'	46°40'27"	258.23'	S 24°10'51" E	251.15'
C8	260.00'	35°01'52"	158.97'	N 71°14'52" E	156.50'
C9	210.50'	90°00'00"	330.65'	S 46°14'12" E	297.69'
C10	617.00'	14°38'45"	157.72'	S 08°33'34" E	157.29'

HORIZONTAL AND VERTICAL CONTROL POINTS

NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
55	1/2" I.R. W/CAP	7081660.5265	2552621.4399	599.73

LINE "FM" COORDINATES

STATION	NORTHING	EASTING
P.C. STA. 80+04.04	7082120.3463	2551529.4277
P.T. STA. 82+62.27	7081891.2303	2551632.3038
P.I. STA. 82+72.75	7081884.1530	2551640.0321
P.I. STA. 83+60.42	7081888.0042	2551727.6174
P.C. STA. 83+84.56	7081902.2822	2551747.0774
P.T. STA. 85+43.52	7081952.5937	2551895.2715
P.C. STA. 92+48.76	7081967.8144	2552600.3447
P.T. STA. 95+79.41	7081761.9061	2552815.3388
P.C. STA. 96+45.94	7081695.3916	2552816.7745
P.T. STA. 98+03.66	7081539.8565	2552840.1844
P.I. STA. 98+20.78	7081523.3932	2552844.8686
P.I. STA. 98+70.01	7081505.0589	2552890.5584



RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

NOTES:

1. BASIS FOR HORIZONTAL CONTROL IS THE NAD 83 STATE PLANE COORDINATE SYSTEM, TEXAS NORTH CENTRAL ZONE (4202). HORIZONTAL CONTROL IS AT SURFACE USING A SCALE FACTOR OF 1.000152710 (COLLIN CO.), ABOUT 0,0.

2. BASIS FOR VERTICAL CONTROL IS NAVD 88.

NO.	DATE	REVISION	REVIEWED
6			
5			
4			
3			
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1			

DRAWN: BW2
DESIGN: JCT
REVIEWED: MRB
SCALE: 1" = 60'
DATE: AUGUST 2010
DWG. NAME: 1389HORCTRL04REV

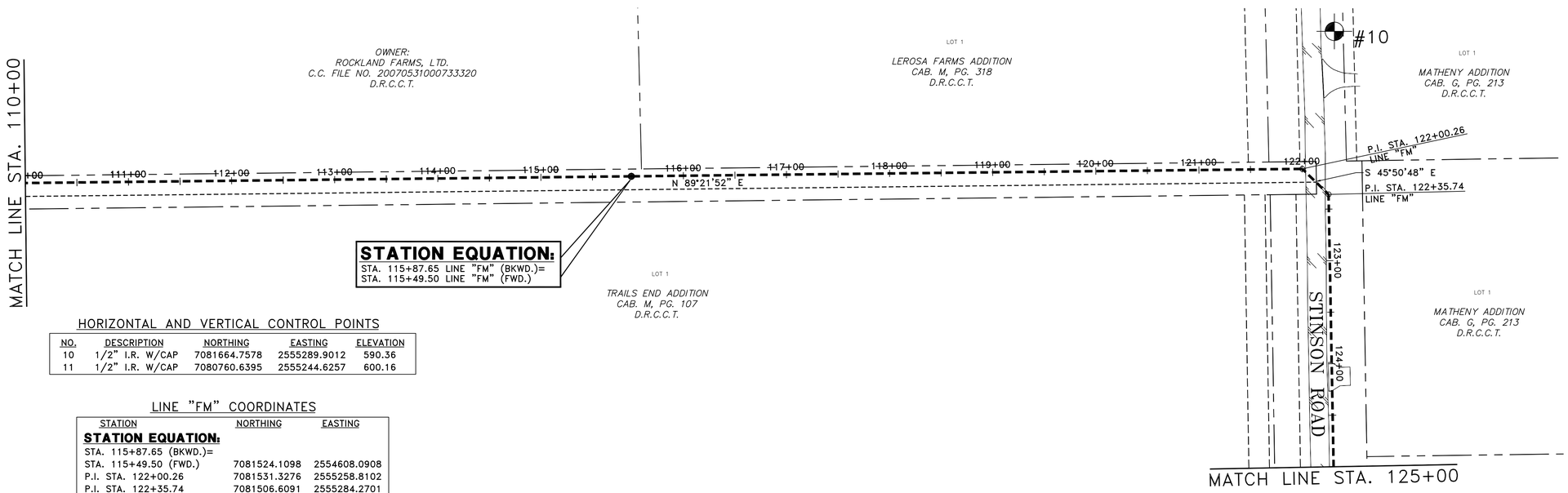
BW2

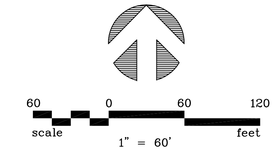
BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED
PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
HORIZONTAL AND VERTICAL CONTROL PLAN
(STA. 80+00 TO STA. 110+00)
CITY OF LUCAS

SHEET NO. C6
OF SHEETS
JOB NO. 09-1389



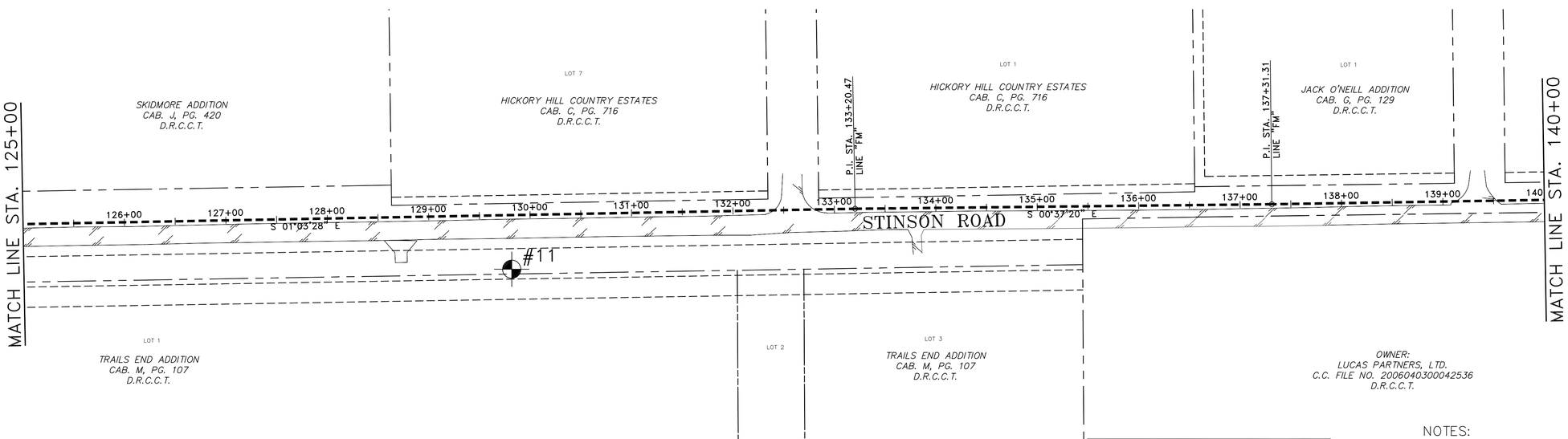


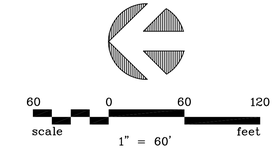
HORIZONTAL AND VERTICAL CONTROL POINTS

NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
10	1/2" I.R. W/CAP	7081664.7578	2555289.9012	590.36
11	1/2" I.R. W/CAP	7080760.6395	2555244.6257	600.16

LINE "FM" COORDINATES

STATION	NORTHING	EASTING
STATION EQUATION:		
STA. 115+87.65 (BKWD.)=		
STA. 115+49.50 (FWD.)	7081524.1098	2554608.0908
P.I. STA. 122+00.26	7081531.3276	2555258.8102
P.I. STA. 122+35.74	7081506.6091	2555284.2701
P.I. STA. 133+20.47	7080422.0615	2555304.2931
P.I. STA. 137+31.31	7080011.2477	2555308.7555





RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

NOTES:

1. BASIS FOR HORIZONTAL CONTROL IS THE NAD 83 STATE PLANE COORDINATE SYSTEM, TEXAS NORTH CENTRAL ZONE (4202). HORIZONTAL CONTROL IS AT SURFACE USING A SCALE FACTOR OF 1.000152710 (COLLIN CO.), ABOUT 0,0.

2. BASIS FOR VERTICAL CONTROL IS NAVD 88.

NO.	DATE	REVISION	REVIEWED
6			
5			
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1			

DRAWN: BW2
DESIGN: JCT
REVIEWED: MRB
SCALE: 1" = 60'
DATE: AUGUST 2010
DWG. NAME: 1389HORCTRL05REV

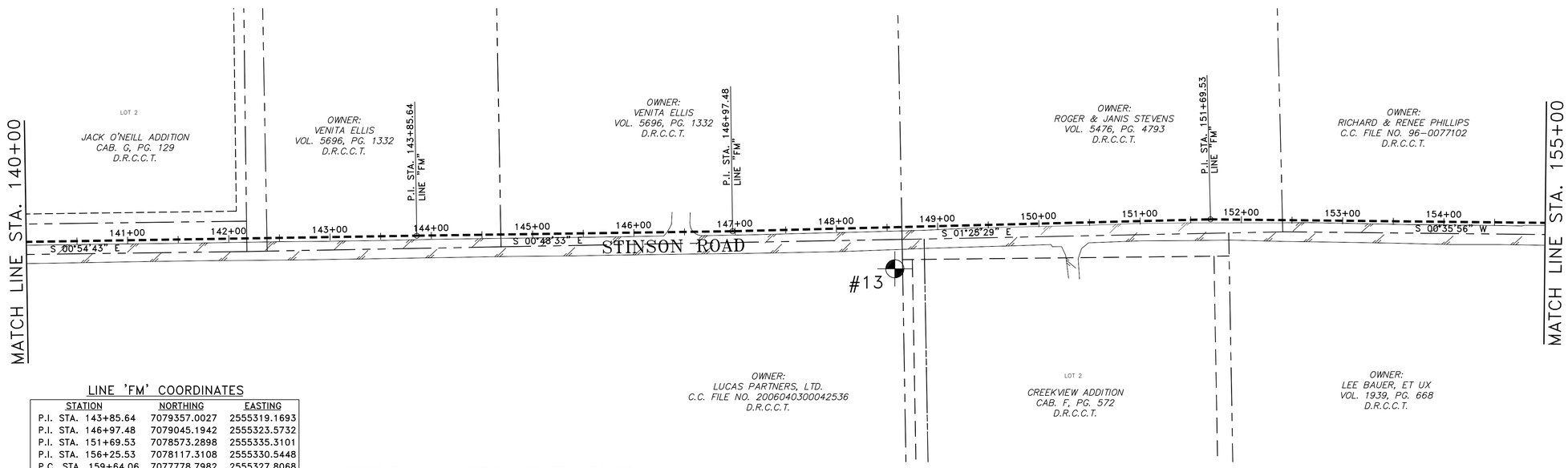
BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
HORIZONTAL AND VERTICAL CONTROL PLAN
(STA. 110+00 TO STA. 140+00)
CITY OF LUCAS

SHEET NO. C7
OF SHEETS
JOB NO. 09-1389

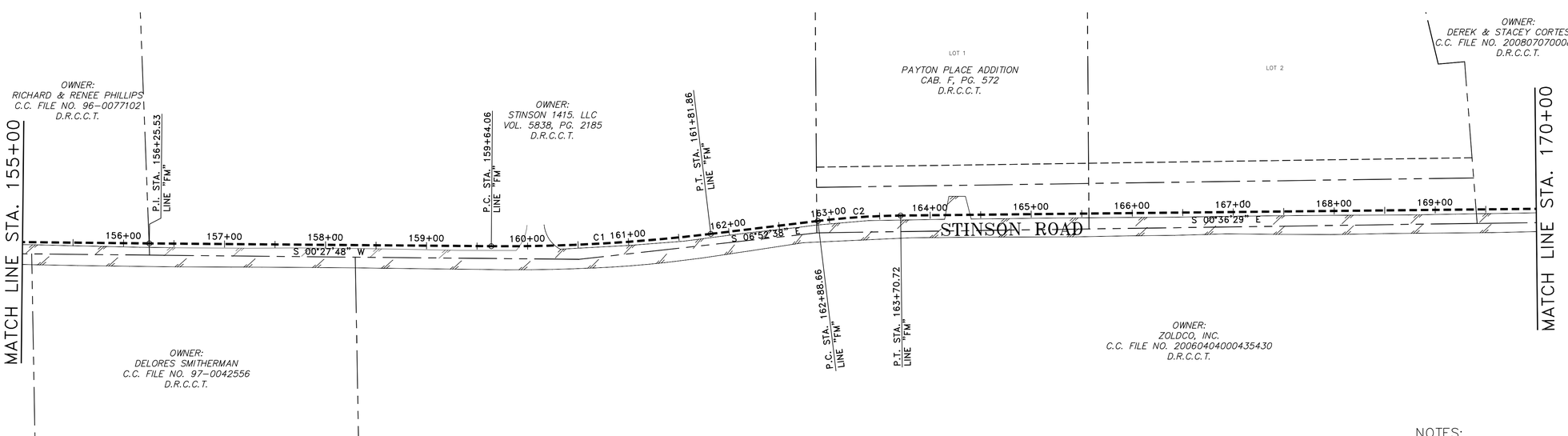


LINE 'FM' COORDINATES

STATION	NORTHING	EASTING
P.I. STA. 143+85.64	7079357.0027	2555319.1693
P.I. STA. 146+97.48	7079045.1942	2555323.5732
P.I. STA. 151+69.53	7078573.2898	2555335.3101
P.I. STA. 156+25.53	7078117.3108	2555330.5448
P.C. STA. 159+64.06	7077778.7982	2555327.8068
P.T. STA. 161+81.86	7077561.4885	2555339.9824
P.C. STA. 162+88.66	7077455.4521	2555352.7713
P.T. STA. 163+70.72	7077373.6069	2555358.1252

HORIZONTAL AND VERTICAL CONTROL POINTS

NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
13	1/2" I.R. W/CAP	7078884.9649	2555286.4029	574.18



C/L CURVE TABLE

NUMBER	RADIUS	DELTA ANGLE	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C1	1700.00	07°20'26"	217.80	S 03°12'25" E	217.65
C2	750.00	06°16'08"	82.06	S 03°44'34" E	82.02

RECORD DRAWING

BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

NOTES:

1. BASIS FOR HORIZONTAL CONTROL IS THE NAD 83 STATE PLANE COORDINATE SYSTEM, TEXAS NORTH CENTRAL ZONE (4202). HORIZONTAL CONTROL IS AT SURFACE USING A SCALE FACTOR OF 1.000152710 (COLLIN CO.), ABOUT 0,0.

2. BASIS FOR VERTICAL CONTROL IS NAVD 88.

NO.	DATE	REVISION	REVIEWED
6			
5			
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1			

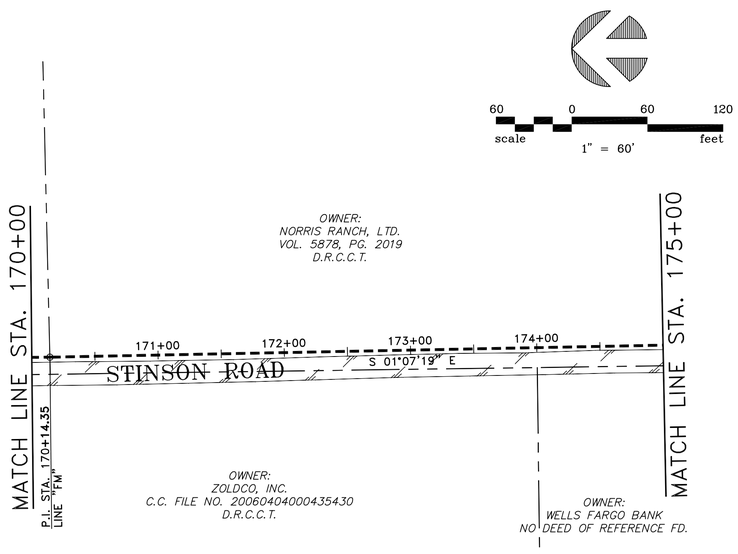
DRAWN: BW2
DESIGN: JCT
REVIEWED: MRB
SCALE: 1" = 60'
DATE: AUGUST 2010
DWG. NAME: 1389HORCTRL06

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

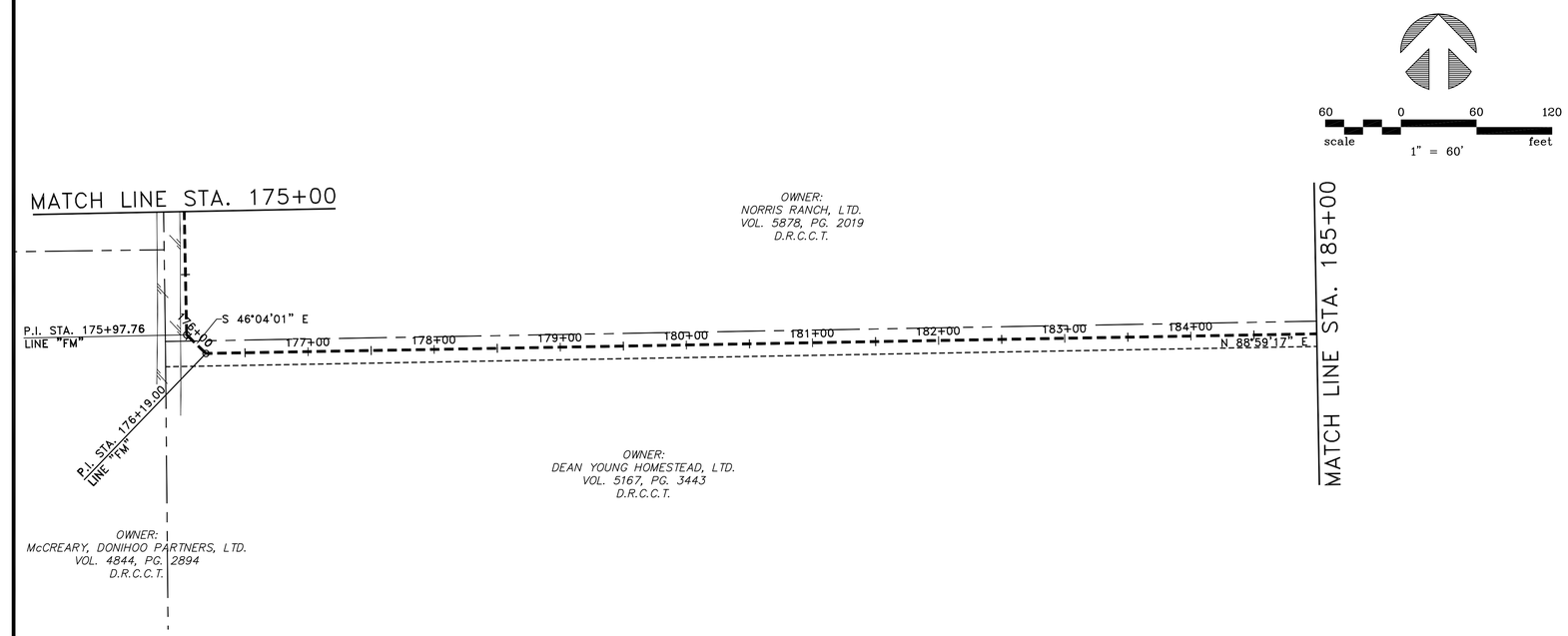
WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
HORIZONTAL AND VERTICAL CONTROL PLAN
(STA. 140+00 TO STA. 170+00)
CITY OF LUCAS

SHEET NO. C8
OF SHEETS
JOB NO. 09-1389



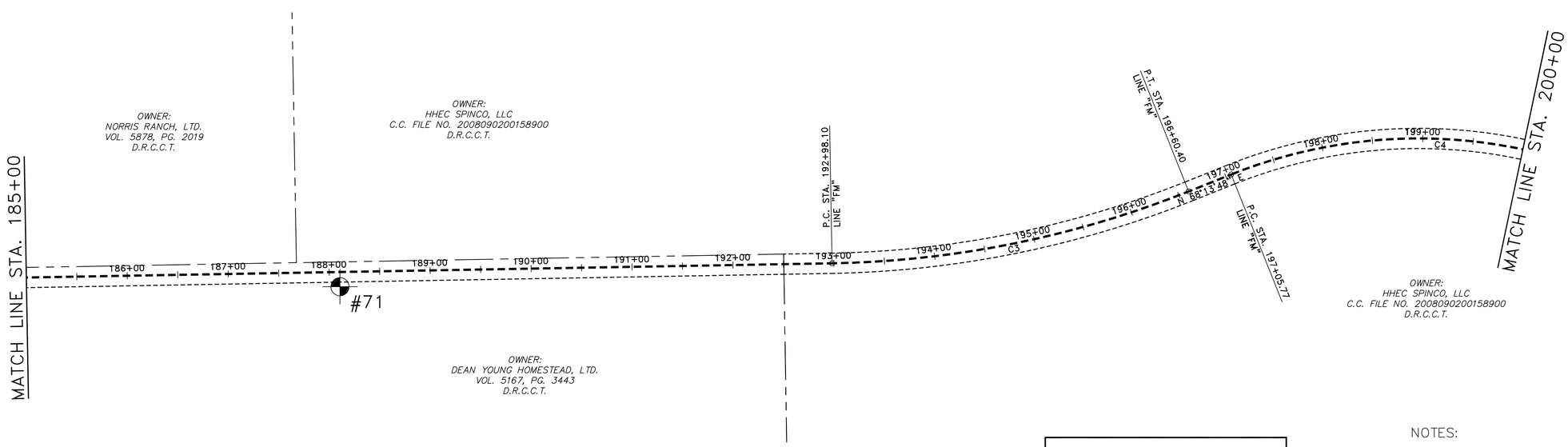
LINE 'FM' COORDINATES

STATION	NORTHING	EASTING
P.I. STA. 170+14.35	7076730.0204	2555364.9567
P.I. STA. 175+97.76	7076146.7143	2555376.3809
P.I. STA. 176+19.00	7076131.9820	2555391.6723
P.C. STA. 192+98.10	7076161.6359	2557070.5169
P.T. STA. 196+60.40	7076232.7996	2557423.7375
P.C. STA. 197+05.77	7076249.6279	2557465.8755



HORIZONTAL AND VERTICAL CONTROL POINTS

NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
71	1/2" I.R. W/CAP	7076138.4242	2556583.1909	565.84



C/L CURVE TABLE

NUMBER	RADIUS	DELTA ANGLE	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C3	1000.00	20°45'29"	362.30	N 78°36'33" E	360.32
C4	500.00	48°36'26"	424.18	S 87°27'59" E	411.57

RECORD DRAWING

BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

NOTES:

1. BASIS FOR HORIZONTAL CONTROL IS THE NAD 83 STATE PLANE COORDINATE SYSTEM, TEXAS NORTH CENTRAL ZONE (4202). HORIZONTAL CONTROL IS AT SURFACE USING A SCALE FACTOR OF 1.000152710 (COLLIN CO.), ABOUT 0,0.

2. BASIS FOR VERTICAL CONTROL IS NAVD 88.

NO.	DATE	REVISION	REVIEWED
6			
5			
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1			

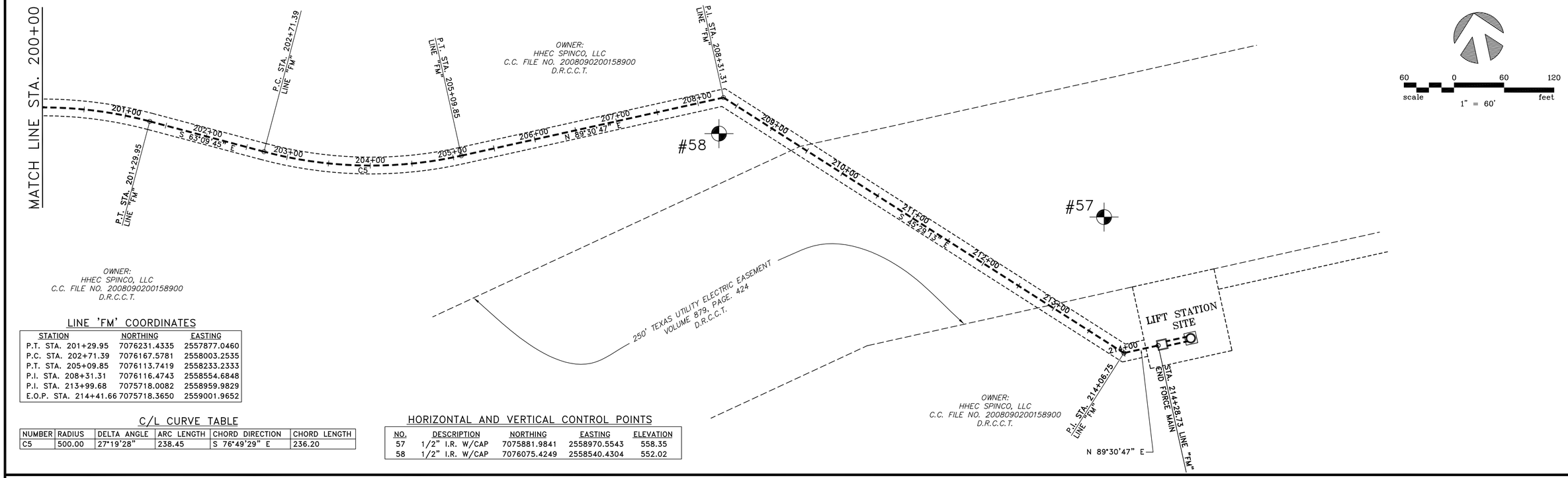
DRAWN: BW2
DESIGN: JCT
REVIEWED: MRB
SCALE: 1" = 60'
DATE: AUGUST 2010
DWG. NAME: 1389HORCTRL07

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
HORIZONTAL AND VERTICAL CONTROL PLAN
(STA. 170+00 TO STA. 200+00)
CITY OF LUCAS

SHEET NO. C9
OF SHEETS
JOB NO. 09-1389



LINE 'FM' COORDINATES

STATION	NORTHING	EASTING
P.T. STA. 201+29.95	7076231.4335	2557877.0460
P.C. STA. 202+71.39	7076167.5781	2558003.2535
P.T. STA. 205+09.85	7076113.7419	2558233.2333
P.I. STA. 208+31.31	7076116.4743	2558554.6848
P.I. STA. 213+99.68	7075718.0082	2558959.9829
E.O.P. STA. 214+41.66	7075718.3650	2559001.9652

C/L CURVE TABLE

NUMBER	RADIUS	DELTA ANGLE	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C5	500.00	27°19'28"	238.45	S 76°49'29" E	236.20

HORIZONTAL AND VERTICAL CONTROL POINTS

NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
57	1/2" I.R. W/CAP	7075881.9841	2558970.5543	558.35
58	1/2" I.R. W/CAP	7076075.4249	2558540.4304	552.02

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

NOTES:

1. BASIS FOR HORIZONTAL CONTROL IS THE NAD 83 STATE PLANE COORDINATE SYSTEM, TEXAS NORTH CENTRAL ZONE (4202). HORIZONTAL CONTROL IS AT SURFACE USING A SCALE FACTOR OF 1.000152710 (COLLIN CO.), ABOUT 0,0.

2. BASIS FOR VERTICAL CONTROL IS NAVD 88.

NO.	DATE	REVISION	REVIEWED
6			
5			
4			
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1			

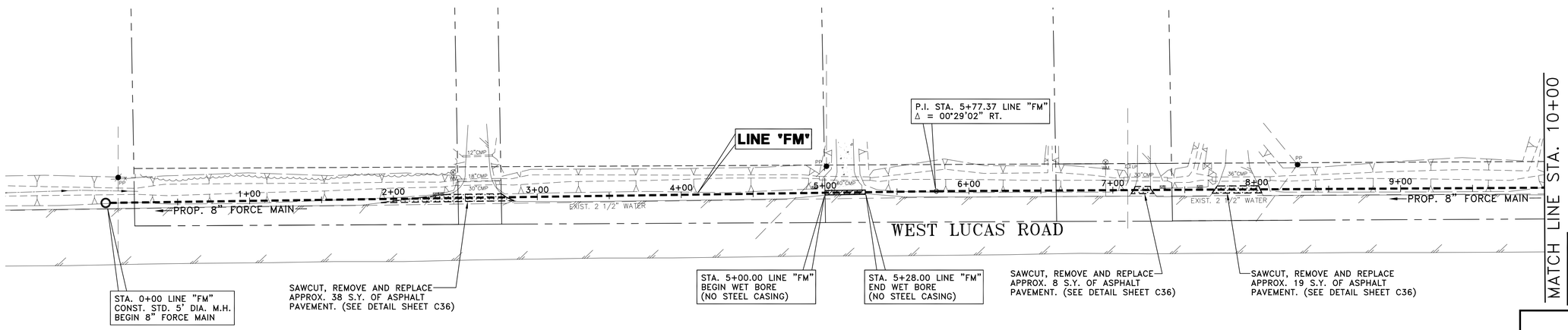
DRAWN: BW2
DESIGN: JCT
REVIEWED: MRB
SCALE: 1" = 60'
DATE: AUGUST 2010
DWG. NAME: 1389HORCTRL08

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED
PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
HORIZONTAL AND VERTICAL CONTROL PLAN
(STA. 200+00 TO STA. 214+41.66)
CITY OF LUCAS

SHEET NO. C10
OF SHEETS
JOB NO. 09-1389



40 0 40 80
scale 1" = 40' feet

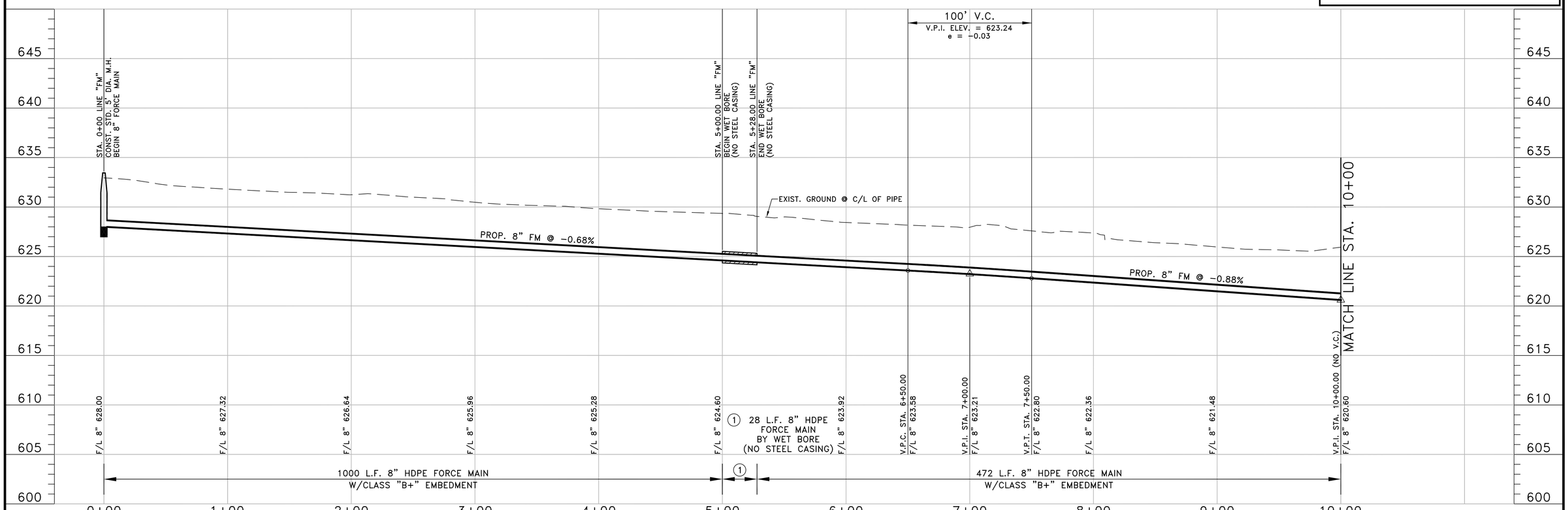
RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

!! CAUTION !!

THERE ARE EXISTING AND/OR PROPOSED UTILITIES IN PROJECT AREA. UTILITY INFORMATION SHOWN ON PLANS REPRESENTS APPROXIMATE LOCATIONS OF EXISTING UTILITIES AND IS NOT NECESSARILY ALL-INCLUSIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXACT LOCATIONS OF ALL EXISTING UTILITIES AND SHALL BE REQUIRED TO PROTECT UTILITIES TO AVOID DAMAGE.

PRIOR TO ANY EXCAVATION, CONTRACTOR SHALL CONTACT DIG-TESS, TEXAS ONE CALL, LONE STAR NOTIFICATION AND OTHERS AS REQUIRED TO LOCATE EXISTING UTILITIES.

CONTRACTOR SHALL ALSO CONTACT APPROPRIATE CITY UTILITY DEPARTMENT FOR FIELD LOCATES OF MUNICIPAL INFRASTRUCTURE 48 HOURS PRIOR TO CONSTRUCTION.



NO.	DATE	REVISION	REVIEWED
6			
5			
4			
3			
2			
1			

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP01

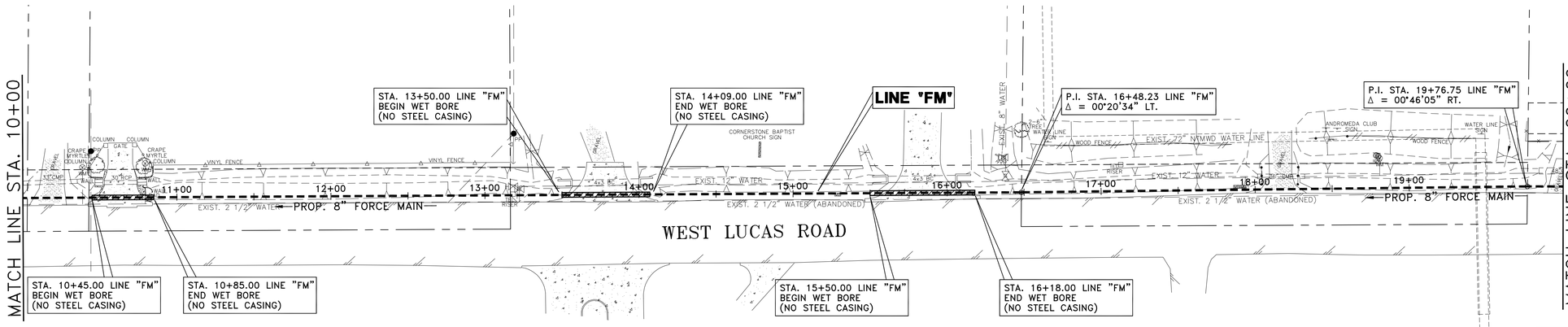
BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 0+00 TO STA. 10+00)
CITY OF LUCAS

SHEET NO. C11
OF SHEETS
JOB NO. 09-1389



40 0 40 80
scale 1" = 40' feet

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

!! CAUTION !!

THERE ARE EXISTING AND/OR PROPOSED UTILITIES IN PROJECT AREA. UTILITY INFORMATION SHOWN ON PLANS REPRESENTS APPROXIMATE LOCATIONS OF EXISTING UTILITIES AND IS NOT NECESSARILY ALL-INCLUSIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXACT LOCATIONS OF ALL EXISTING UTILITIES AND SHALL BE REQUIRED TO PROTECT UTILITIES TO AVOID DAMAGE.

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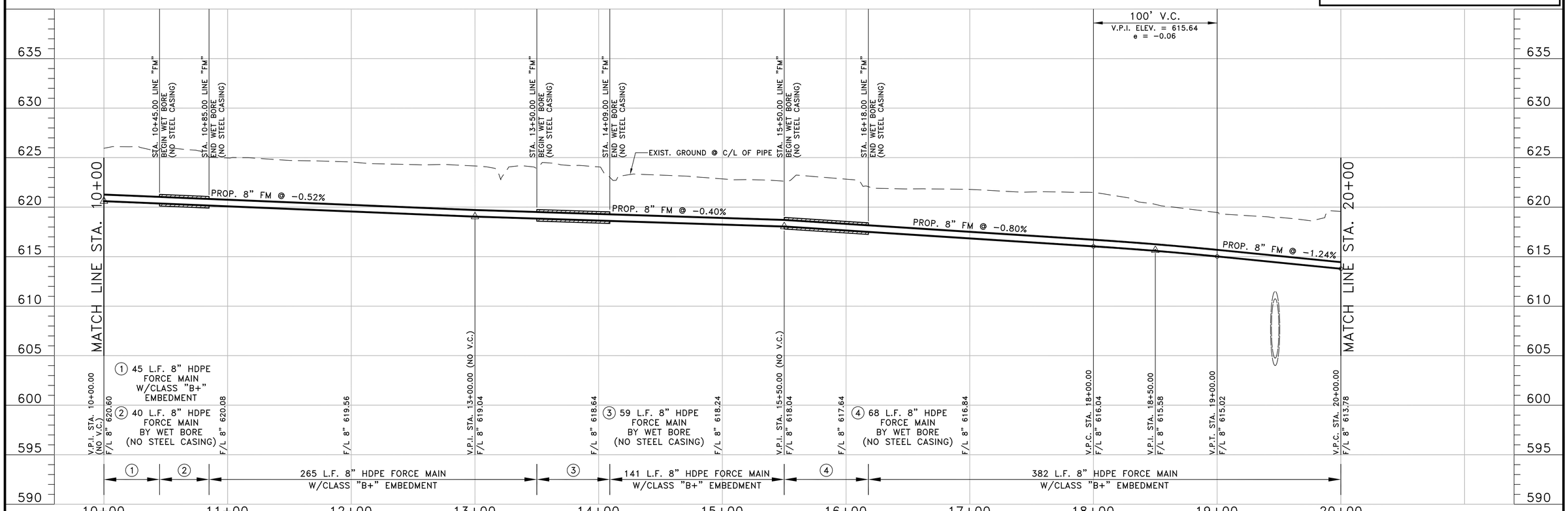
CONTRACTOR SHALL ALSO CONTACT APPROPRIATE CITY UTILITY DEPARTMENT FOR FIELD LOCATES OF MUNICIPAL INFRASTRUCTURE 48 HOURS PRIOR TO CONSTRUCTION.



NO.	DATE	REVISION	REVIEWED
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DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP02

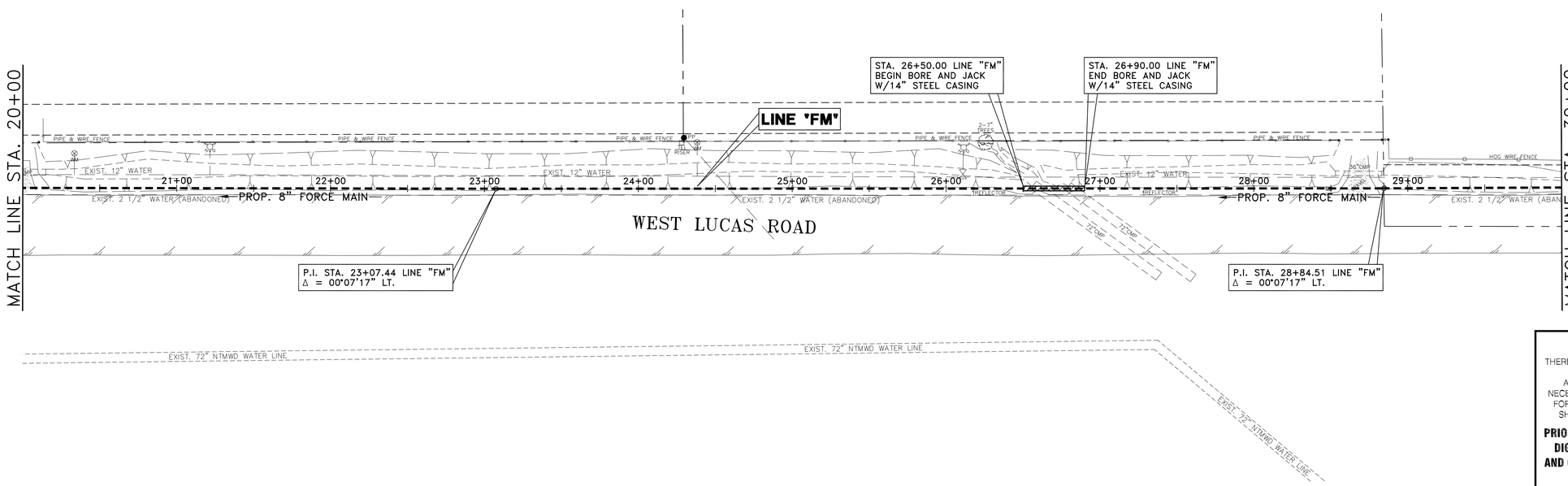
BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 10+00 TO STA. 20+00)
CITY OF LUCAS

SHEET NO. C12
OF SHEETS
JOB NO. 09-1389



40 0 40 80
scale 1" = 40' feet

RECORD DRAWING
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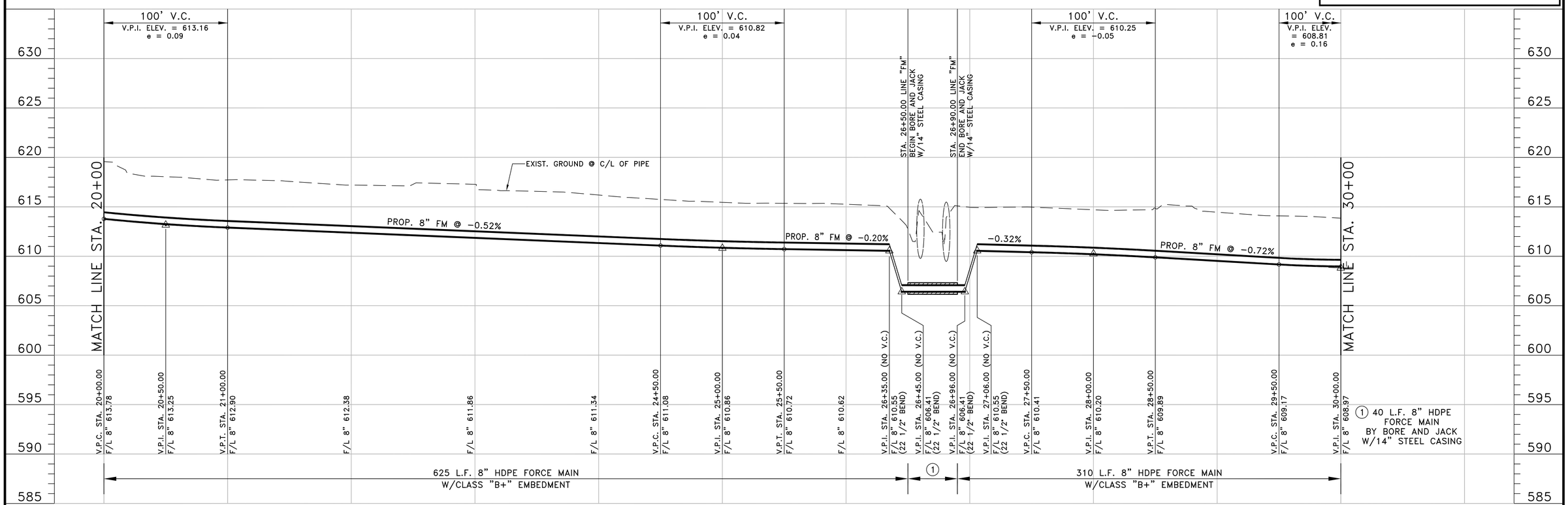

NO.	DATE	REVISION	REVIEWED
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DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP03

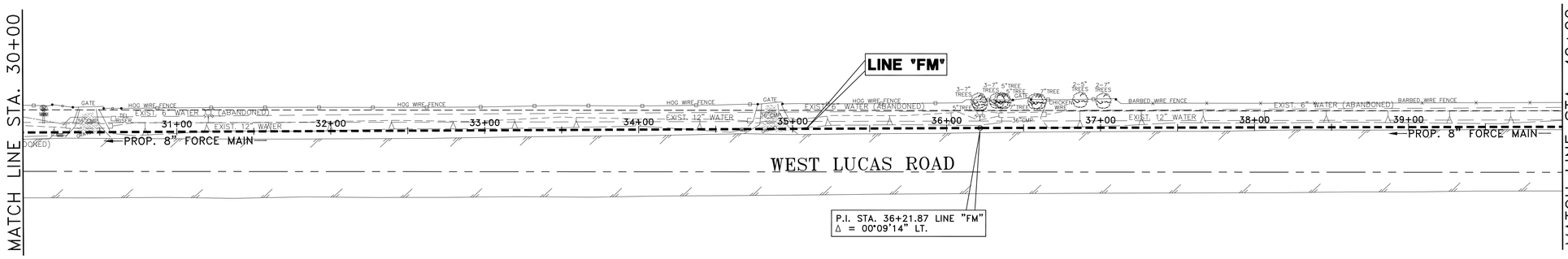
BW2

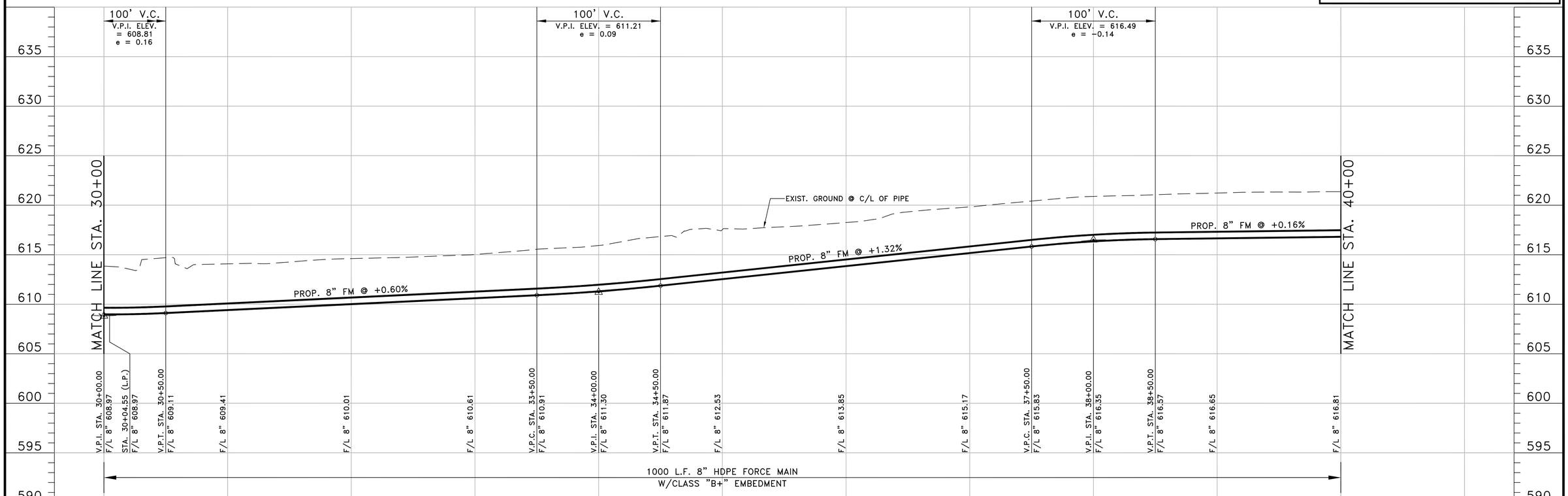
BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 20+00 TO STA. 30+00)
CITY OF LUCAS

SHEET NO. C13
OF SHEETS
JOB NO. 09-1389





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scale 1" = 40' feet

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

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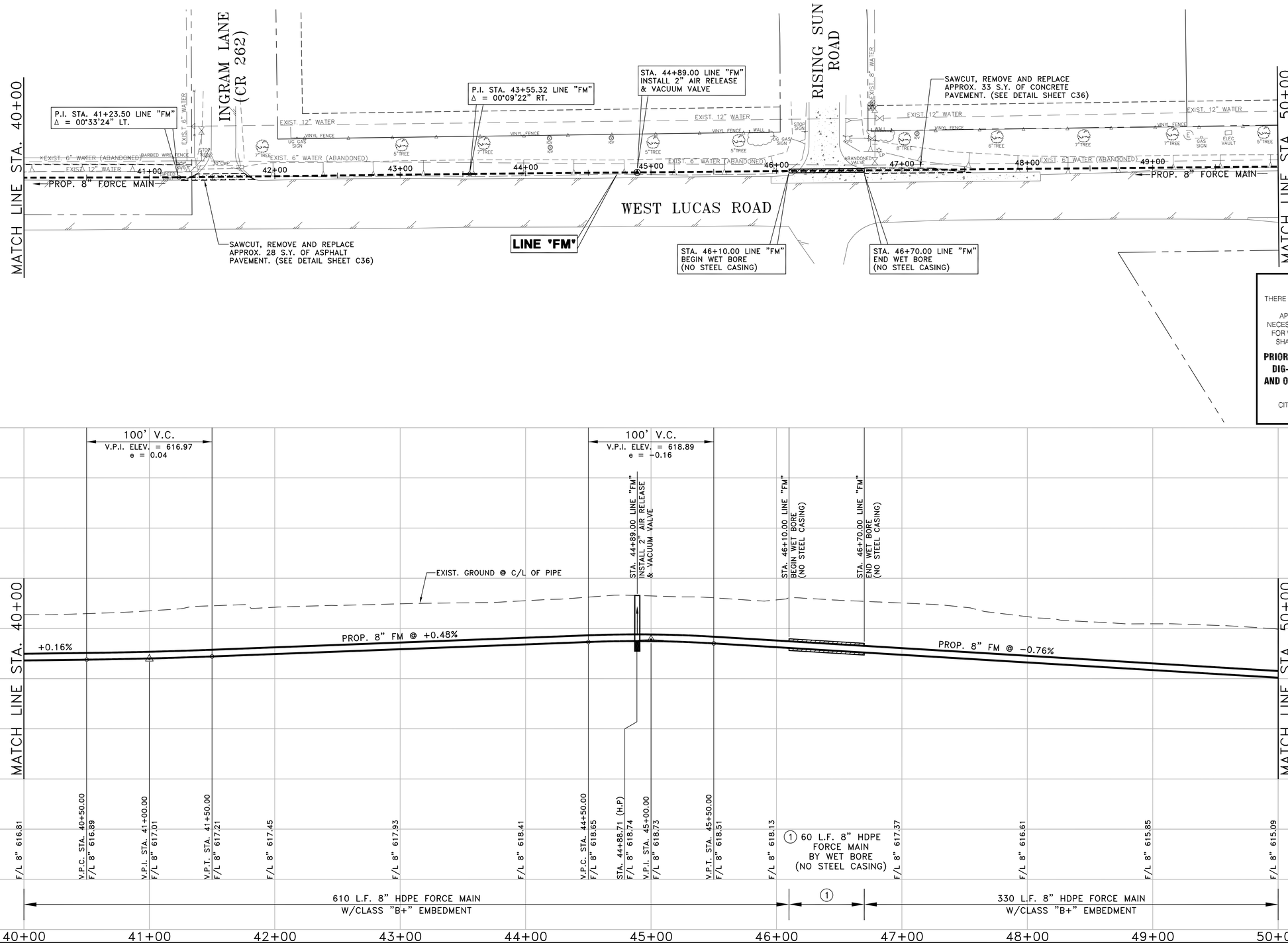
DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP04

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 30+00 TO STA. 40+00)
CITY OF LUCAS

SHEET NO. C14
OF SHEETS
JOB NO. 09-1389



RECORD DRAWING

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NO.	DATE	REVISION	REVIEWED
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DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP05

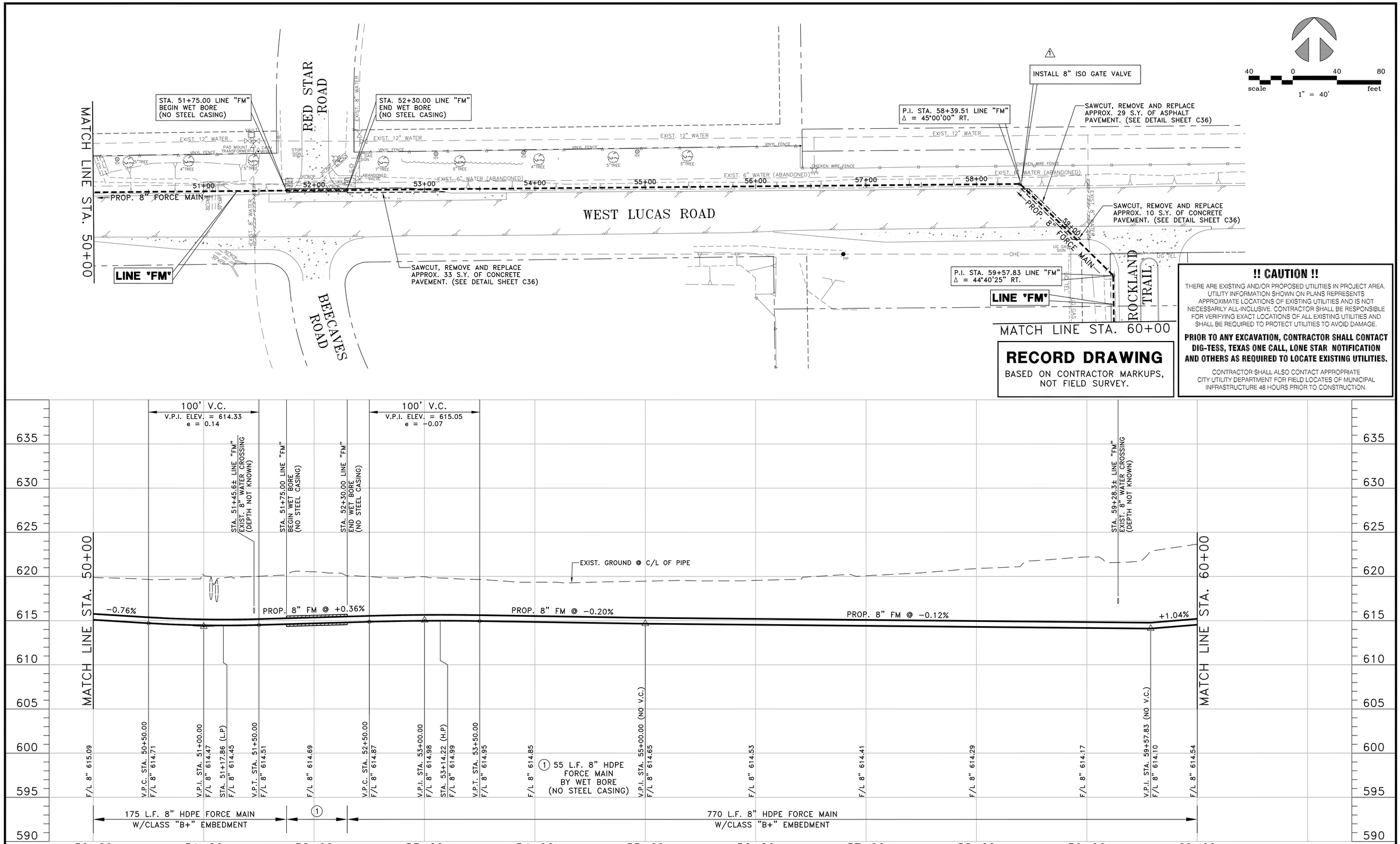
BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 40+00 TO STA. 50+00)
CITY OF LUCAS

SHEET NO. C15
OF SHEETS
JOB NO. 09-1389



RECORD DRAWING

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NO.	DATE	REVISION	REVIEWED
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1	7/25/11	REVISED PER CONTRACTORS MARKUPS	MRB

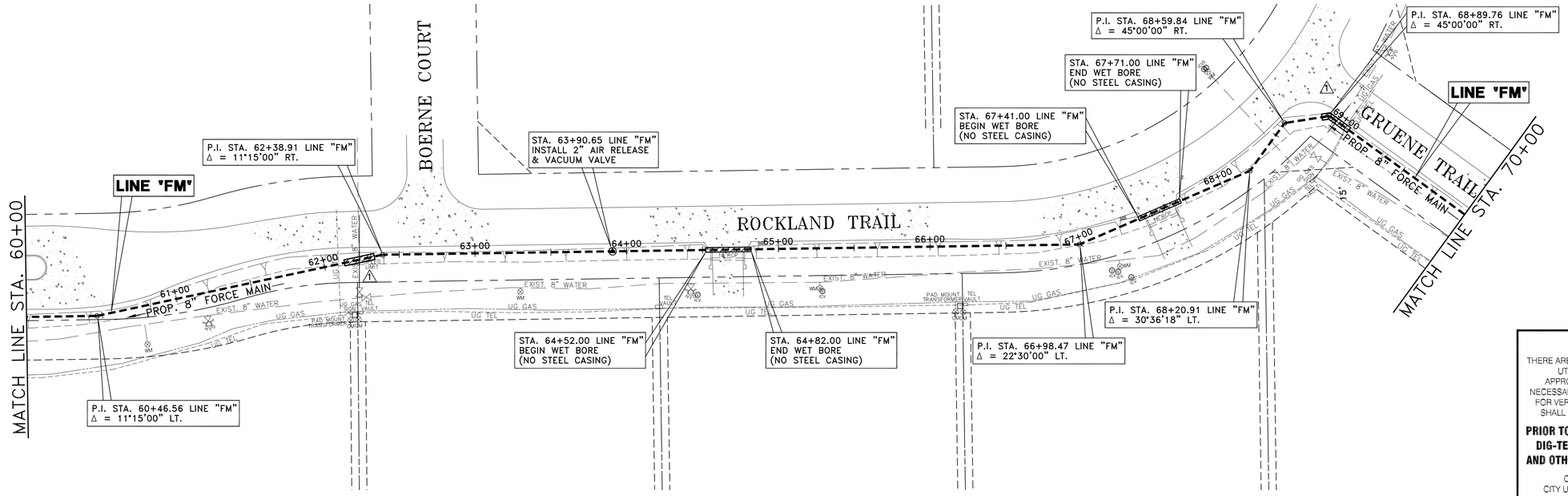
DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP06REV

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 50+00 TO STA. 60+00)
CITY OF LUCAS

SHEET NO. C16
OF SHEETS
JOB NO. 09-1389



scale 1" = 40' (40 0 40 80 feet)

RECORD DRAWING

BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

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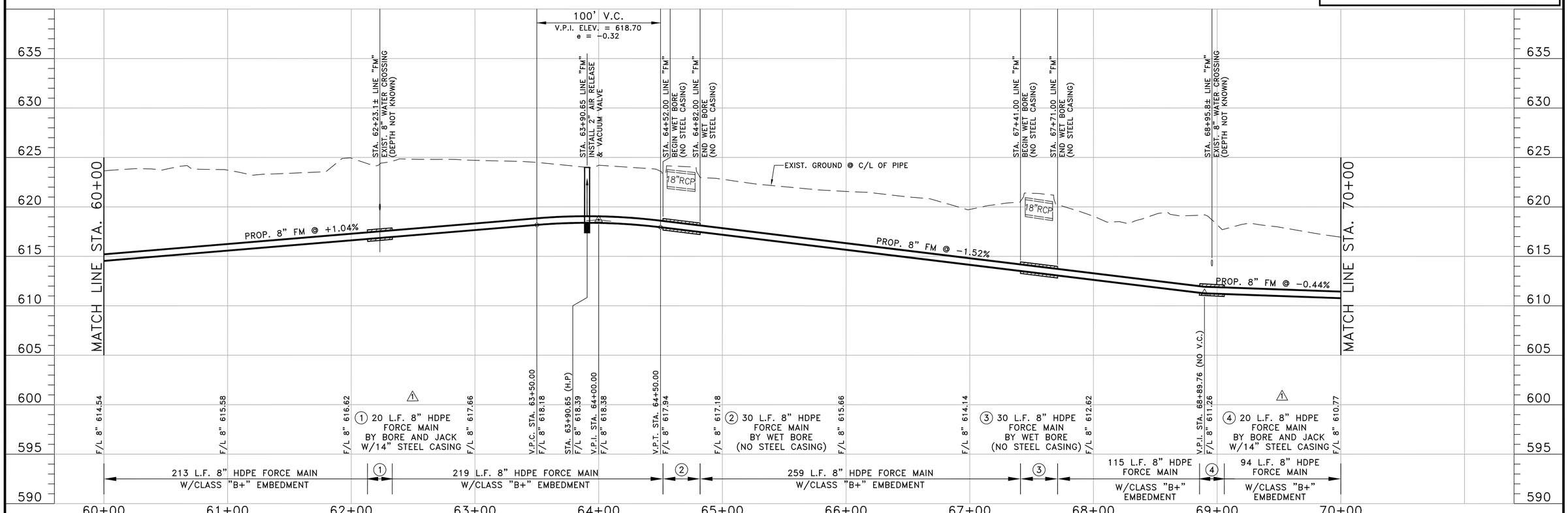

NO.	DATE	REVISION	REVIEWED
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1	7/25/11	REVISED PER CONTRACTORS MARKUPS	MRB

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP07REV

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

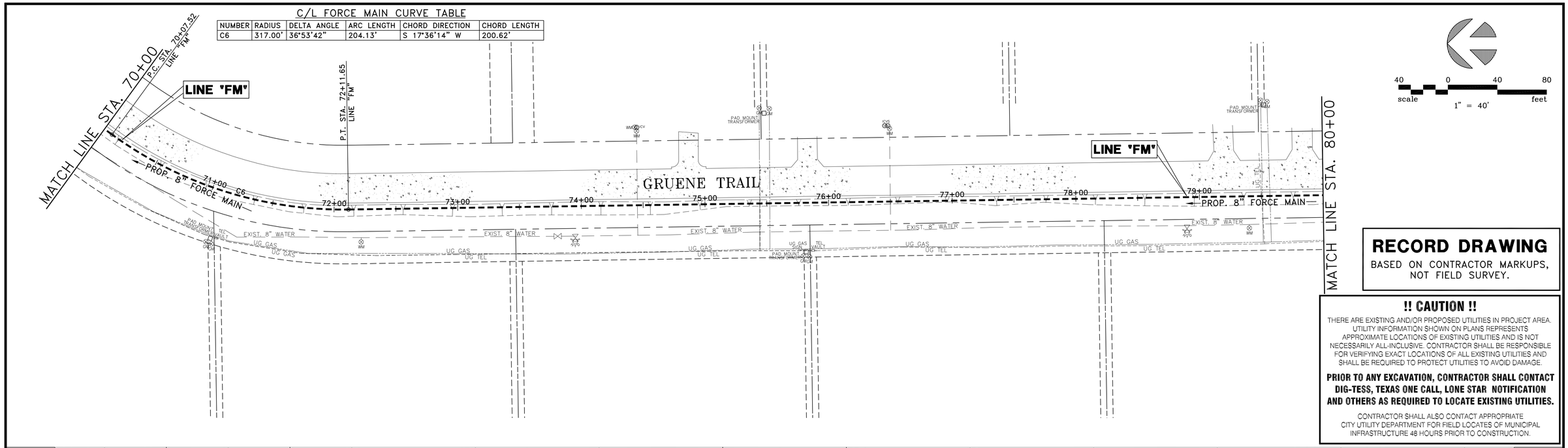
STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 60+00 TO STA. 70+00)
CITY OF LUCAS

SHEET NO. C17
OF SHEETS
JOB NO. 09-1389

C/L FORCE MAIN CURVE TABLE

NUMBER	RADIUS	DELTA ANGLE	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C6	317.00'	36°53'42"	204.13'	S 17°36'14" W	200.62'



RECORD DRAWING

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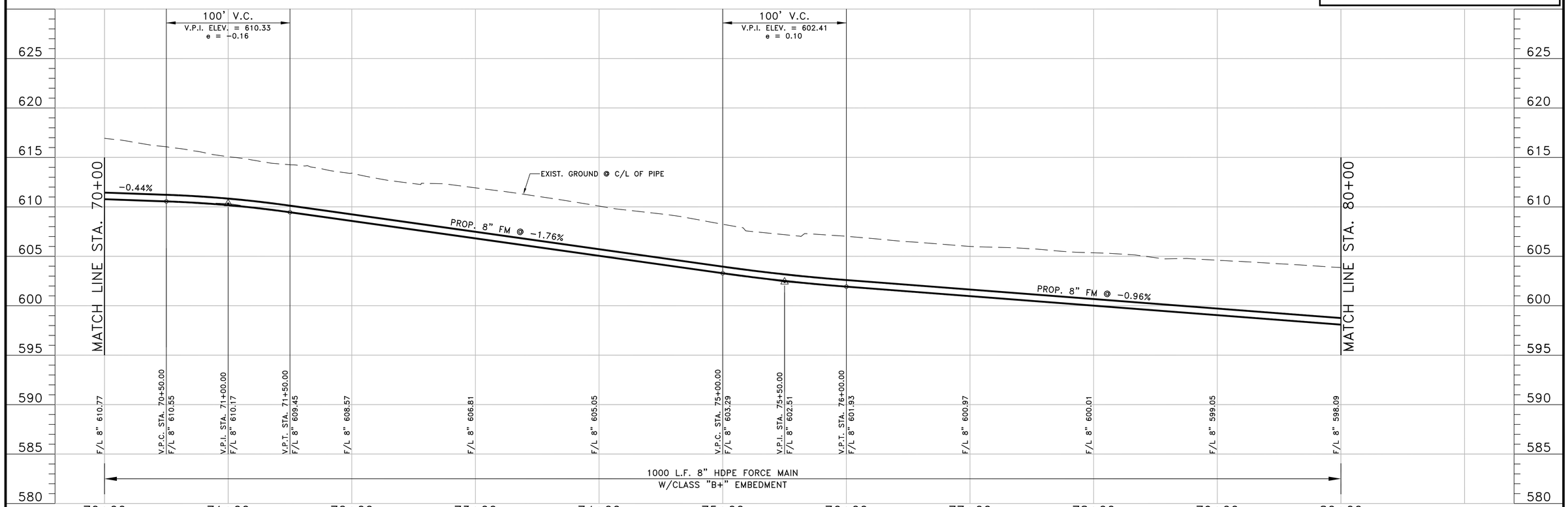

NO.	DATE	REVISION	REVIEWED
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DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP08REV

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

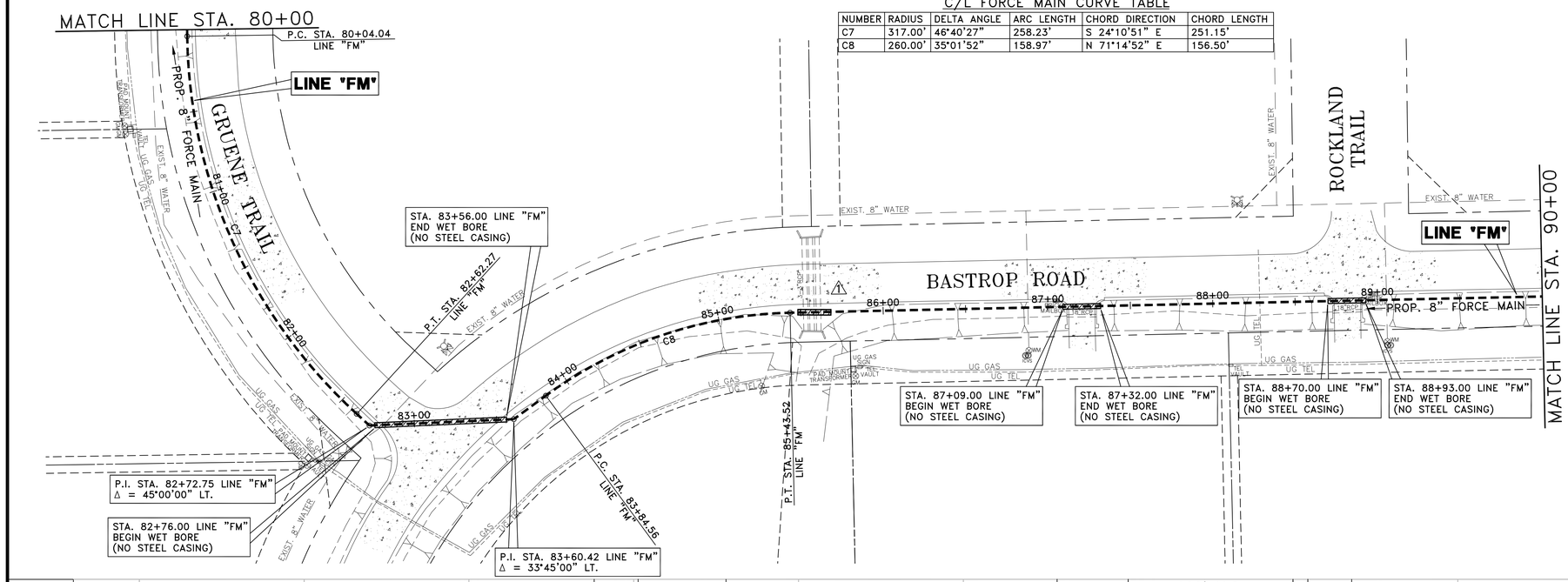
STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

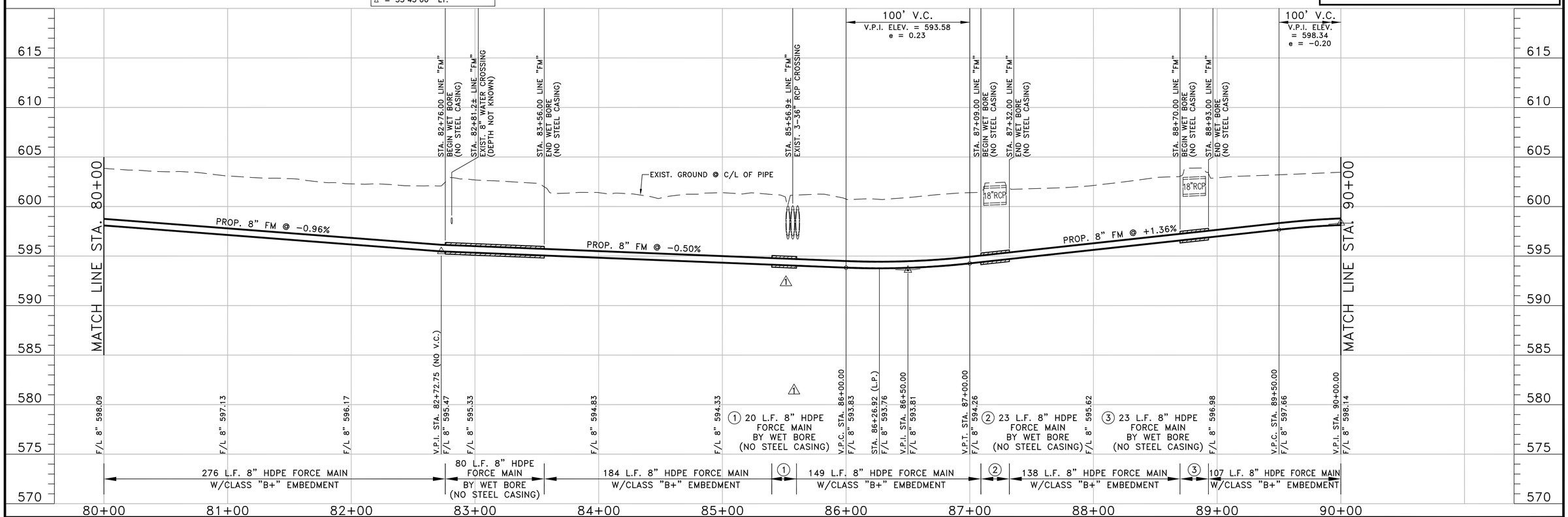
WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 70+00 TO STA. 80+00)
CITY OF LUCAS

SHEET NO. C18
OF SHEETS
JOB NO. 09-1389

C/L FORCE MAIN CURVE TABLE

NUMBER	RADIUS	DELTA ANGLE	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C7	317.00'	46°40'27"	258.23'	S 24°10'51" E	251.15'
C8	260.00'	35°01'52"	158.97'	N 71°14'52" E	156.50'





40 0 40 80
scale 1" = 40' feet

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

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NO.	DATE	REVISION	REVIEWED
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1	7/25/11	REVISED PER CONTRACTORS MARKUPS	MRB

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP09REV

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

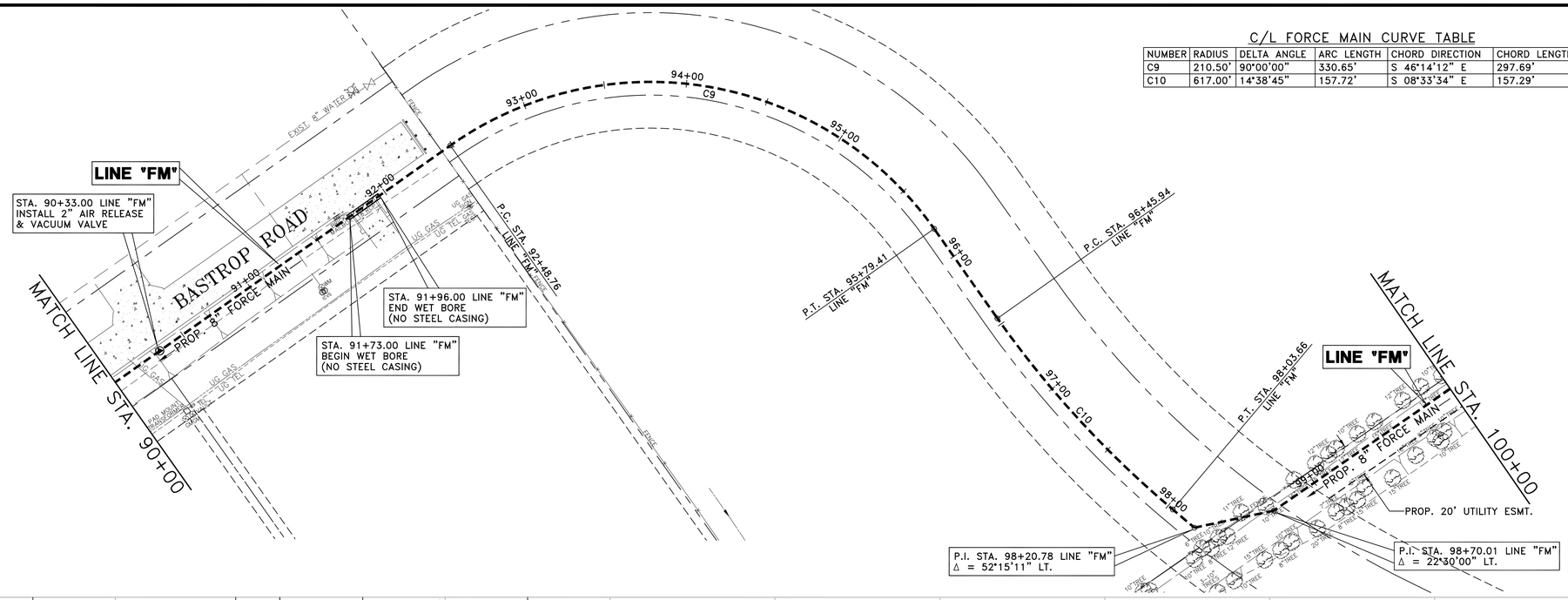
STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 80+00 TO STA. 90+00)
CITY OF LUCAS

SHEET NO. C19
OF SHEETS
JOB NO. 09-1389

C/L FORCE MAIN CURVE TABLE

NUMBER	RADIUS	DELTA ANGLE	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C9	210.50'	90°00'00"	330.65'	S 46°14'12" E	297.69'
C10	617.00'	14°38'45"	157.72'	S 08°33'34" E	157.29'



40 0 40 80
scale 1" = 40' feet

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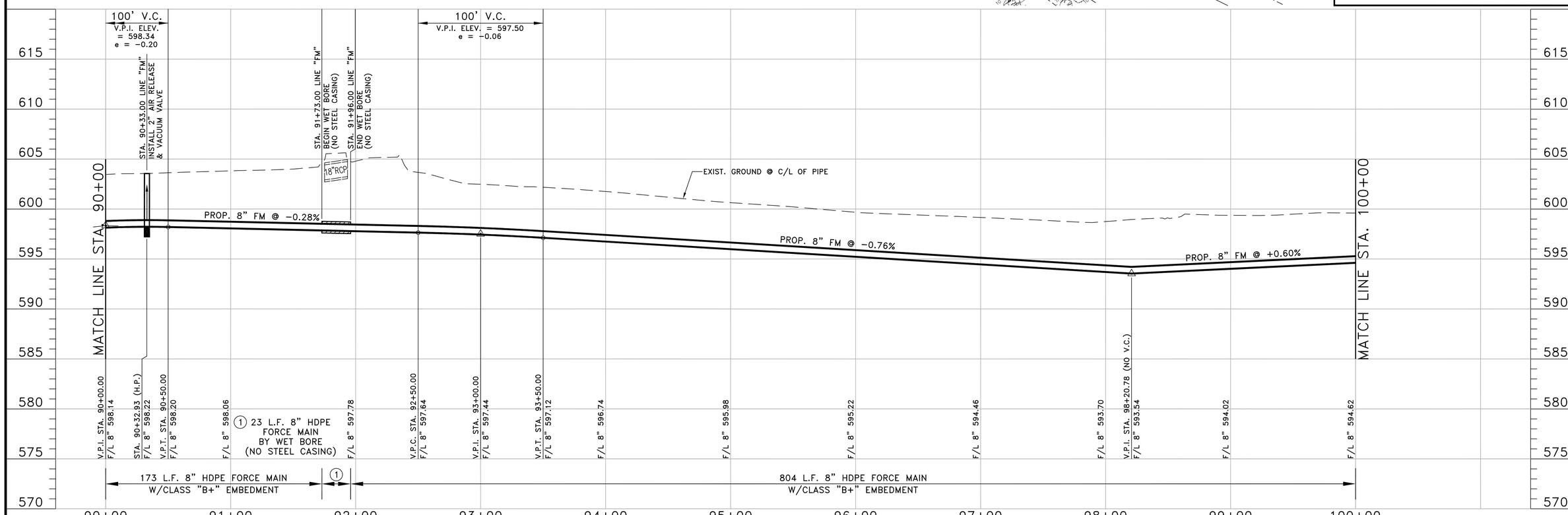

NO.	DATE	REVISION	REVIEWED
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DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP10REV

BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
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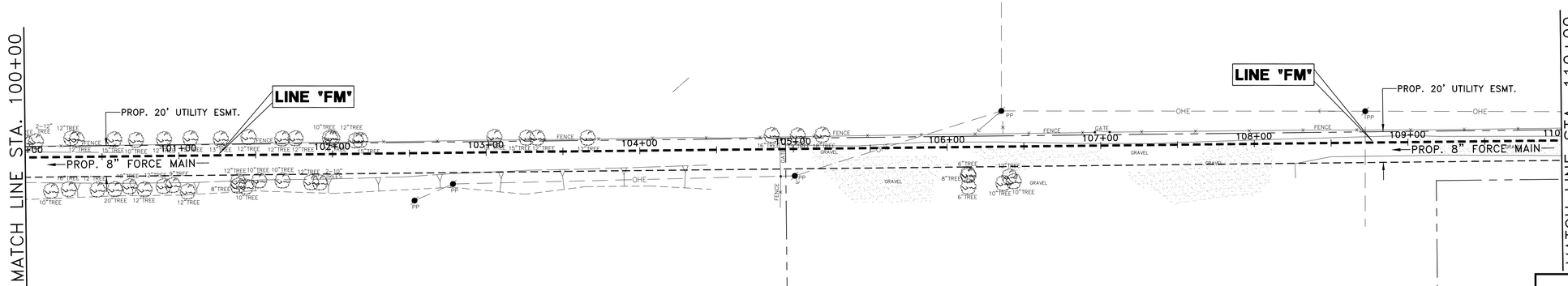
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 90+00 TO STA. 100+00)
CITY OF LUCAS

SHEET NO. C20
OF SHEETS
JOB NO. 09-1389



40 0 40 80
scale 1" = 40' feet

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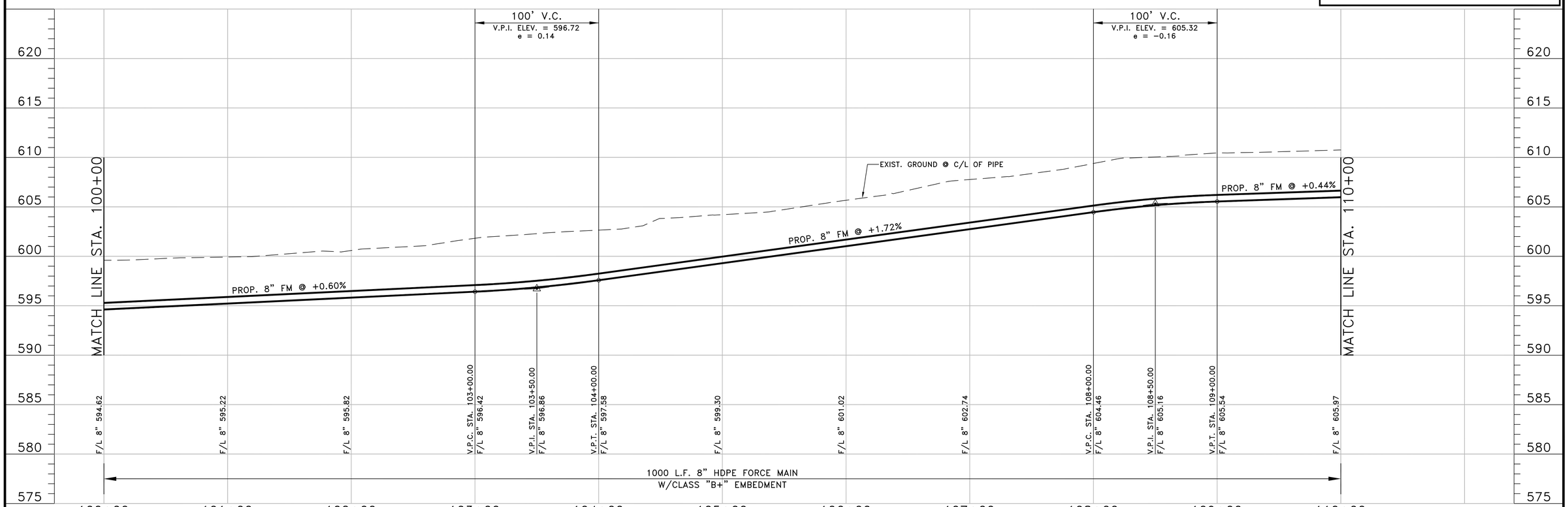

NO.	DATE	REVISION	REVIEWED
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DRAWN: BW2
DESIGN: MRB
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SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP11REV

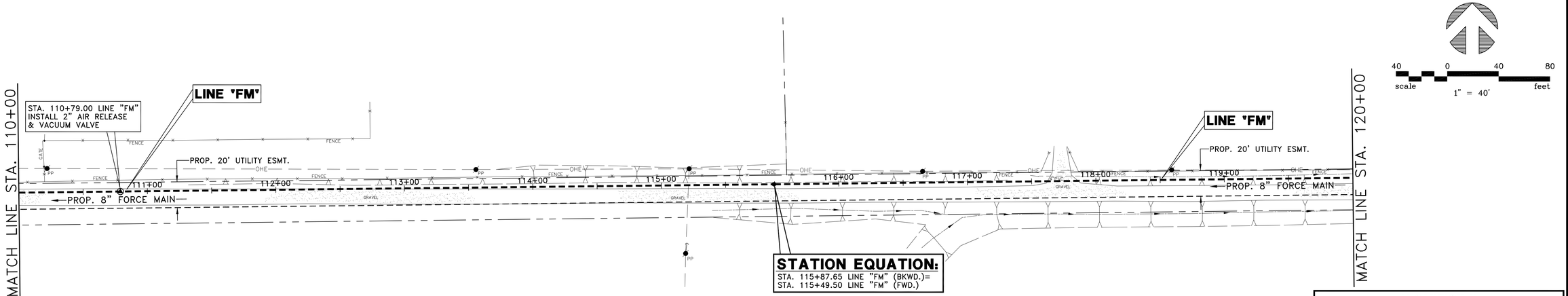
BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED
PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 100+00 TO STA. 110+00)
CITY OF LUCAS

SHEET NO. C21
OF SHEETS
JOB NO. 09-1389



!! CAUTION !!

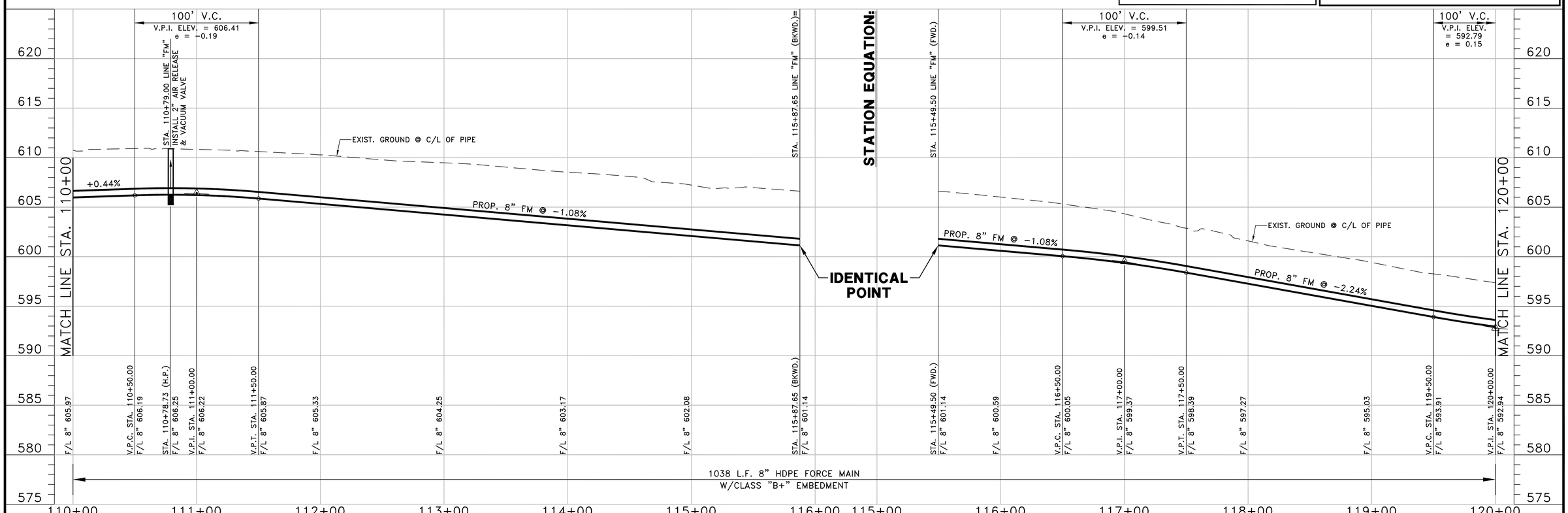
THERE ARE EXISTING AND/OR PROPOSED UTILITIES IN PROJECT AREA. UTILITY INFORMATION SHOWN ON PLANS REPRESENTS APPROXIMATE LOCATIONS OF EXISTING UTILITIES AND IS NOT NECESSARILY ALL-INCLUSIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXACT LOCATIONS OF ALL EXISTING UTILITIES AND SHALL BE REQUIRED TO PROTECT UTILITIES TO AVOID DAMAGE.

PRIOR TO ANY EXCAVATION, CONTRACTOR SHALL CONTACT DIG-TESS, TEXAS ONE CALL, LONE STAR NOTIFICATION AND OTHERS AS REQUIRED TO LOCATE EXISTING UTILITIES.

CONTRACTOR SHALL ALSO CONTACT APPROPRIATE CITY UTILITY DEPARTMENT FOR FIELD LOCATES OF MUNICIPAL INFRASTRUCTURE 48 HOURS PRIOR TO CONSTRUCTION.

RECORD DRAWING

BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.



NO.	DATE	REVISION	REVIEWED
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DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP12REV

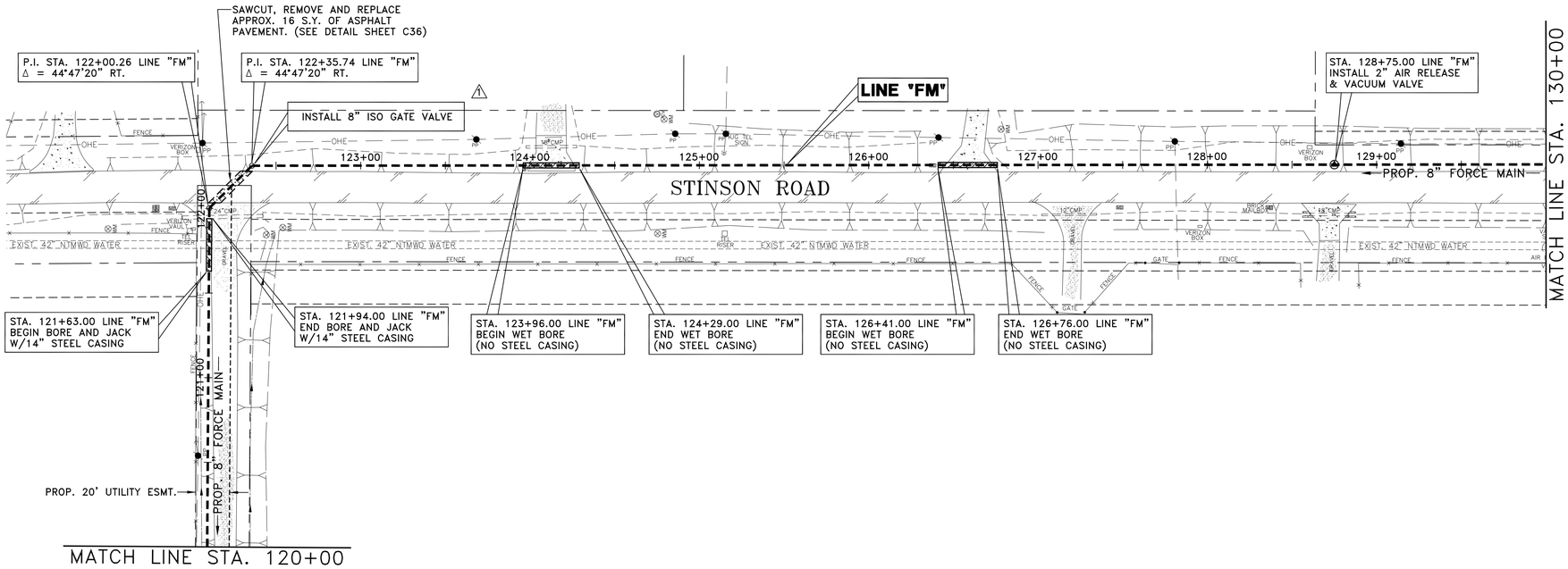
BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 110+00 TO STA. 120+00)
CITY OF LUCAS

SHEET NO. C22
OF SHEETS
JOB NO. 09-1389



40 0 40 80
scale 1" = 40' feet

RECORD DRAWING

BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

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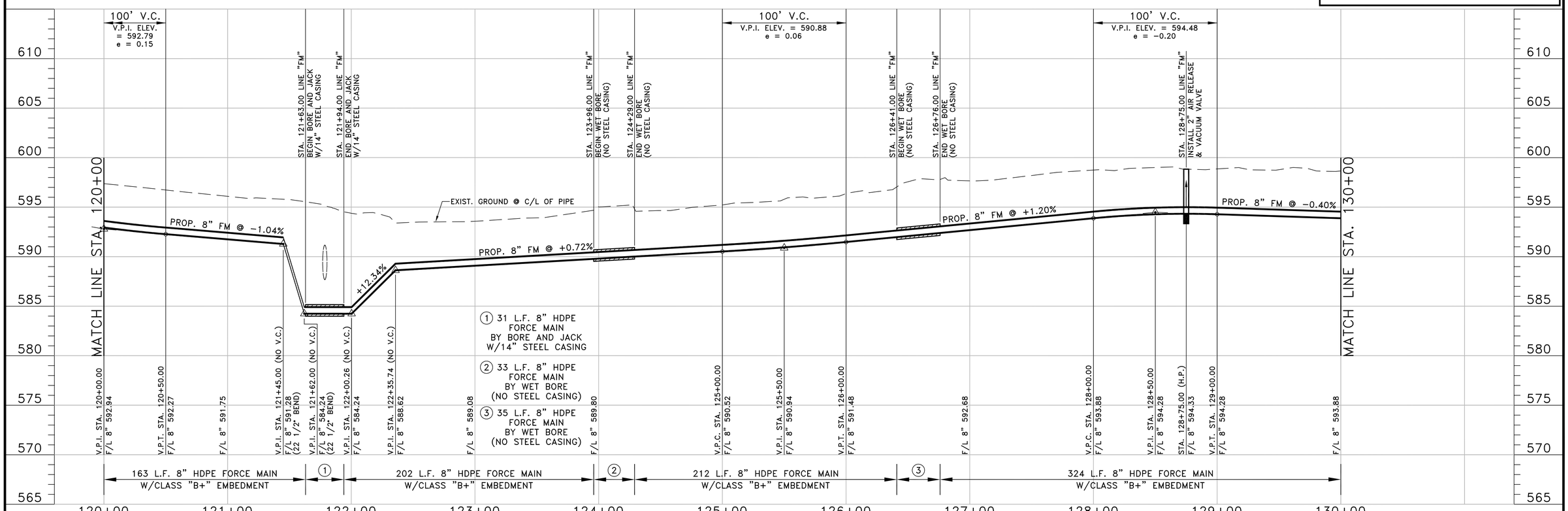

NO.	DATE	REVISION	REVIEWED
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1	7/25/11	REVISED PER CONTRACTORS MARKUPS	MRB

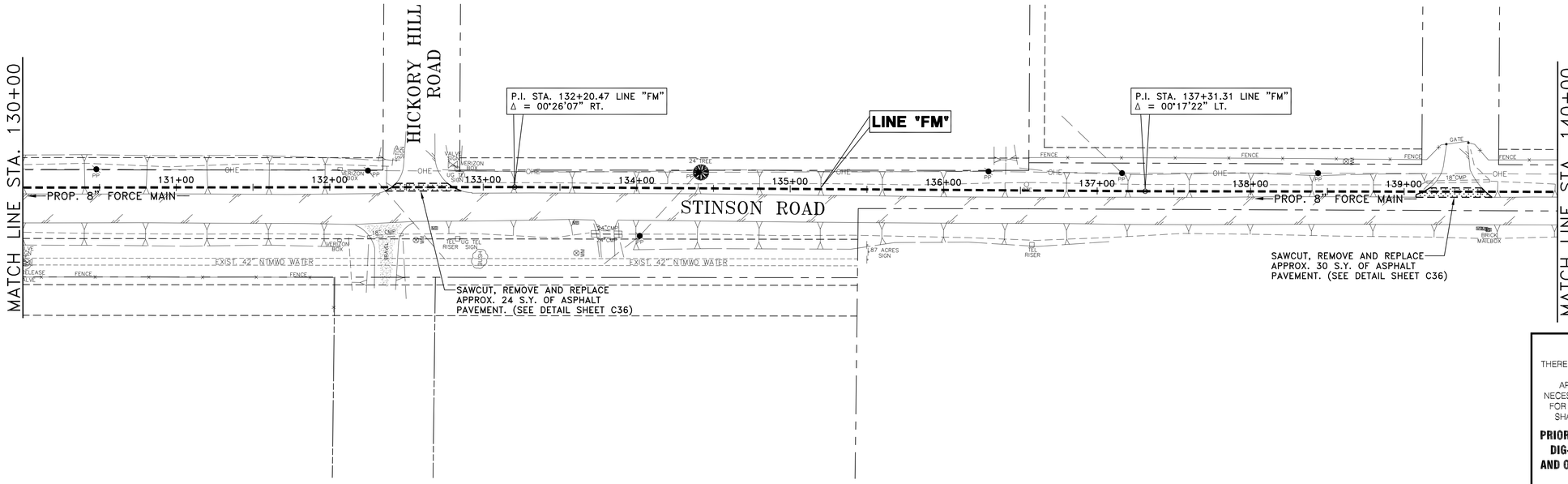
DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP13

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 120+00 TO STA. 130+00)
CITY OF LUCAS

SHEET NO. C23
OF SHEETS
JOB NO. 09-1389



40 0 40 80
scale feet
1" = 40'

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

!! CAUTION !!

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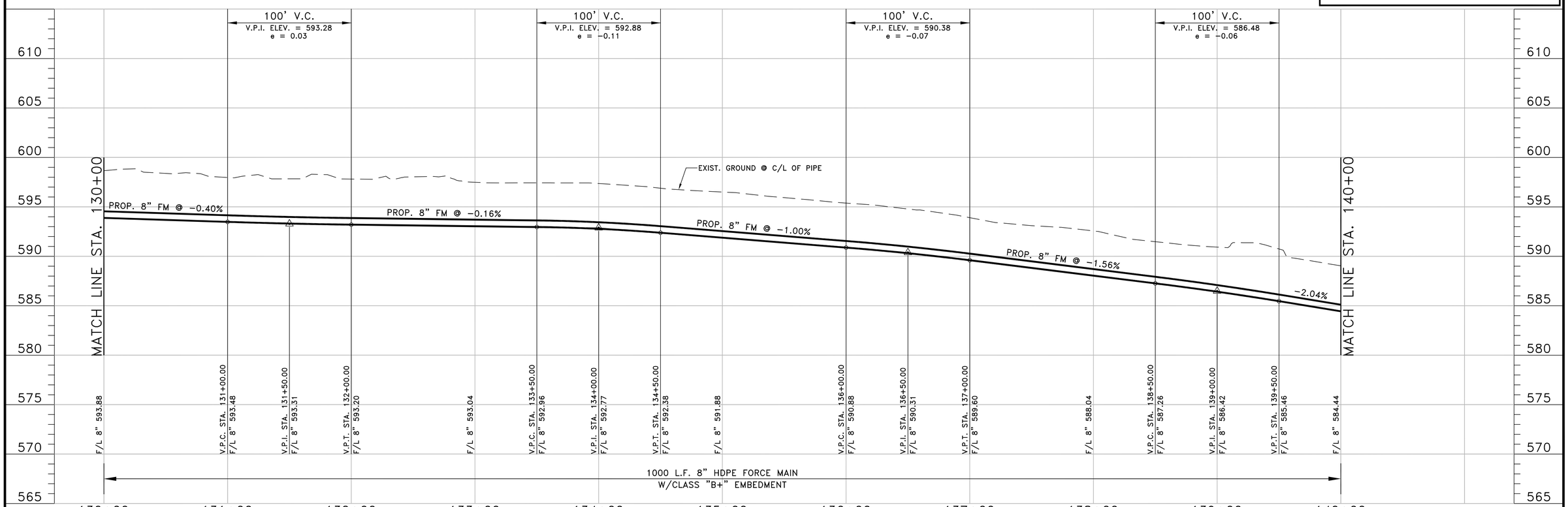

NO.	DATE	REVISION	REVIEWED
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DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP14

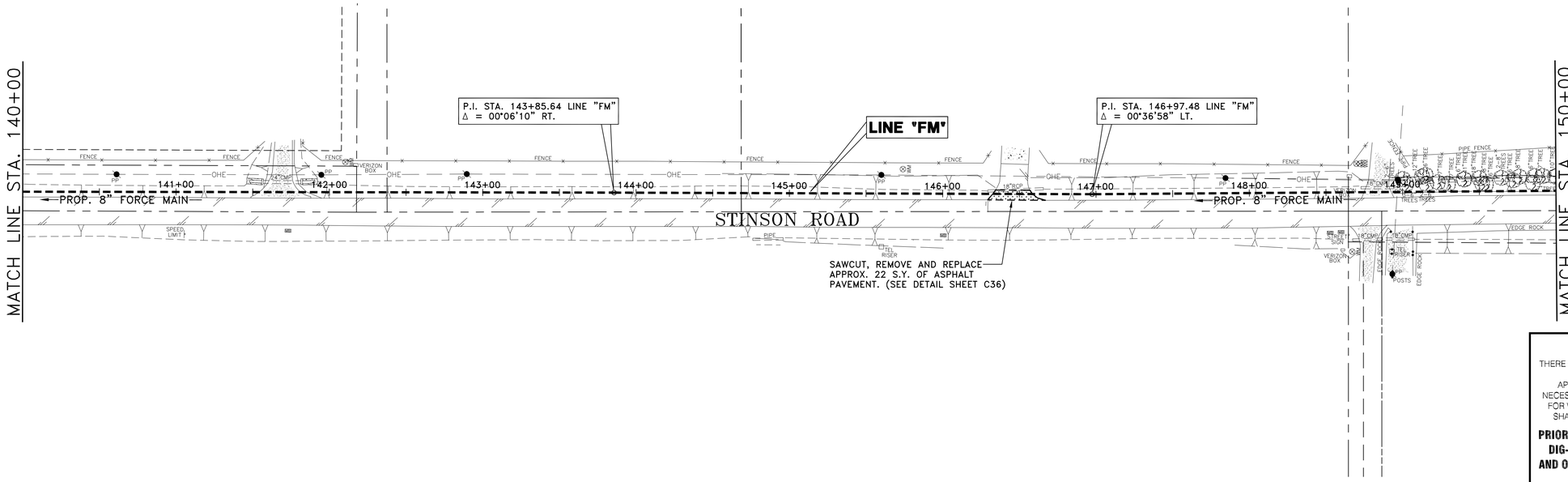
BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED
PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 130+00 TO STA. 140+00)
CITY OF LUCAS

SHEET NO. C24
OF SHEETS
JOB NO. 09-1389



40 0 40 80
scale feet
1" = 40'

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

!! CAUTION !!

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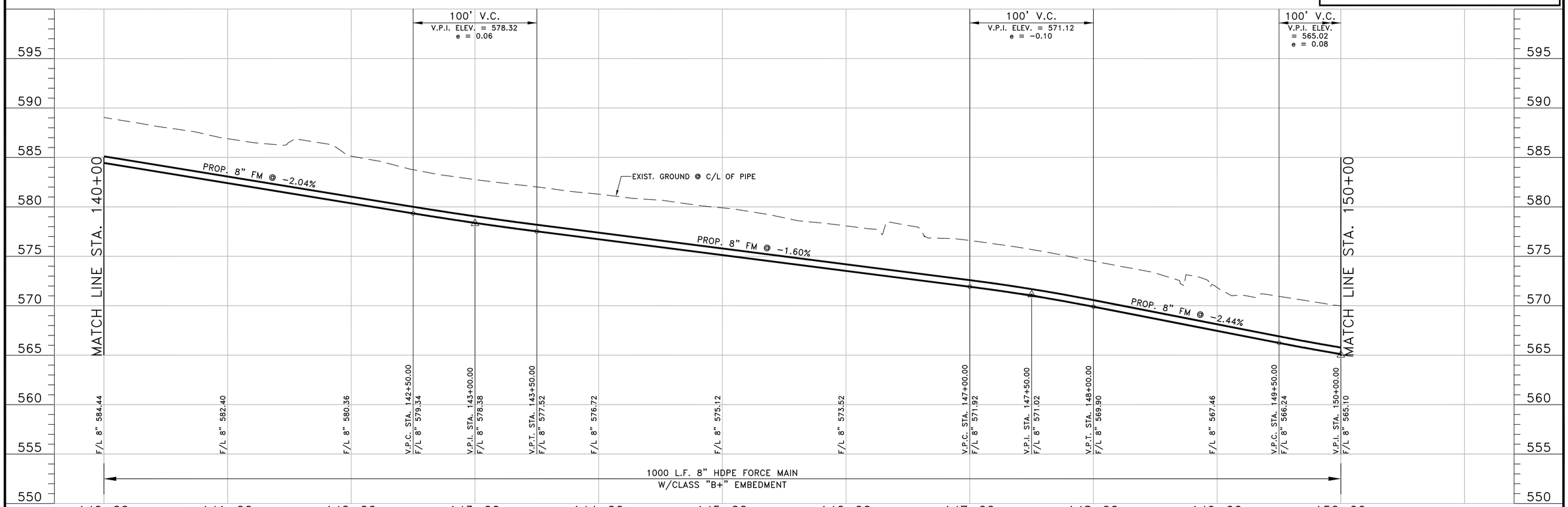

NO.	DATE	REVISION	REVIEWED
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1			

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP15

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

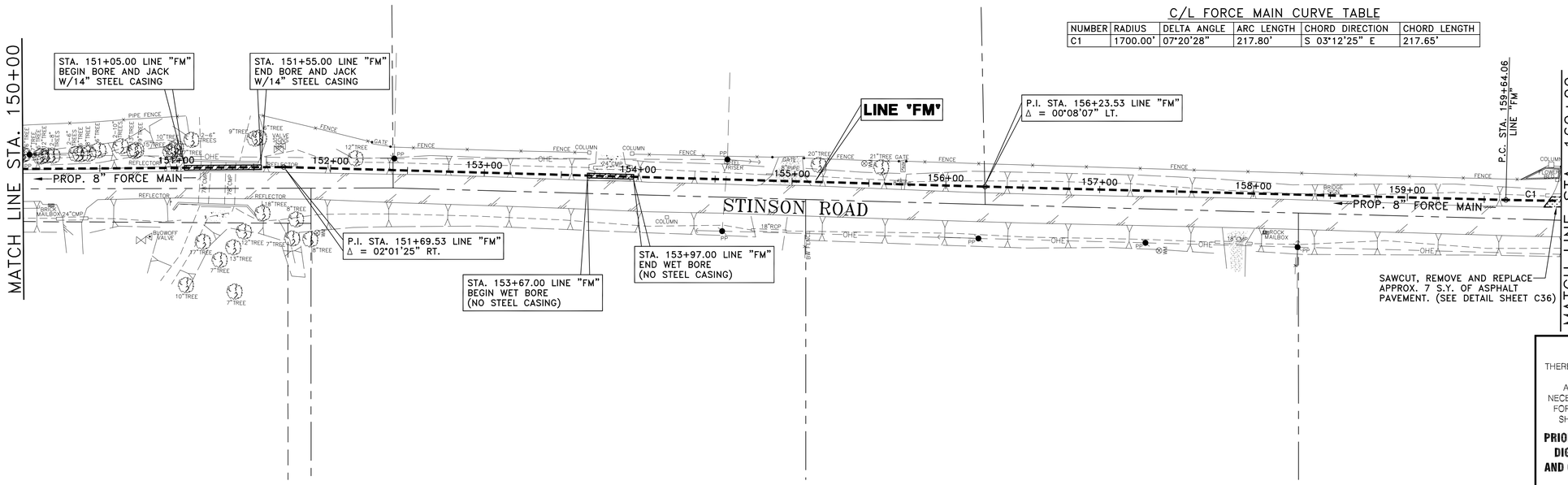
STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 140+00 TO STA. 150+00)
CITY OF LUCAS

SHEET NO. C25
OF SHEETS
JOB NO. 09-1389

C/L FORCE MAIN CURVE TABLE

NUMBER	RADIUS	DELTA ANGLE	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C1	1700.00'	07°20'28"	217.80'	S 03°12'25" E	217.65'



40 0 40 80
scale 1" = 40' feet

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

!! CAUTION !!

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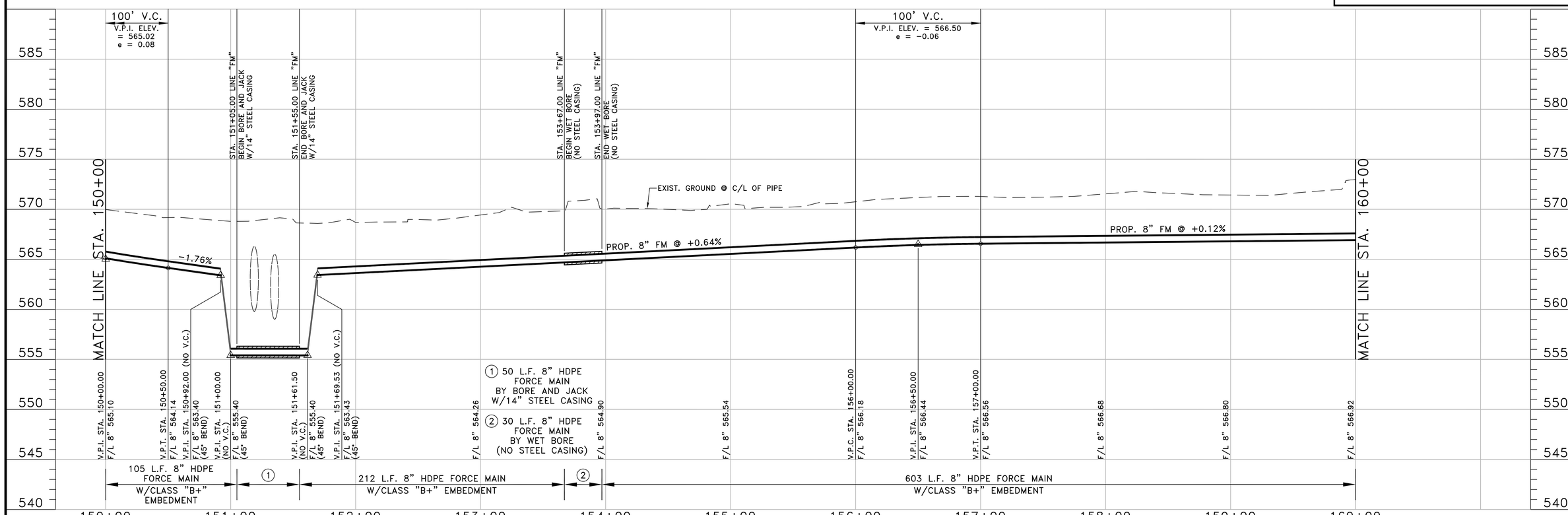

NO.	DATE	REVISION	REVIEWED
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DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP16

BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

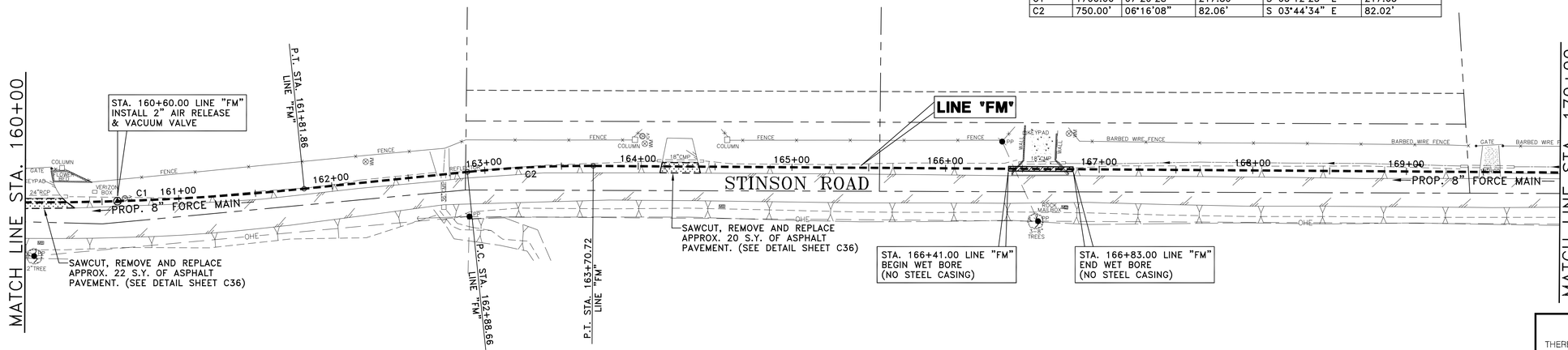
STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 150+00 TO STA. 160+00)
CITY OF LUCAS

SHEET NO. C26
OF SHEETS
JOB NO. 09-1389

C/L FORCE MAIN CURVE TABLE

NUMBER	RADIUS	DELTA ANGLE	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C1	1700.00'	07°20'28"	217.80'	S 03°12'25" E	217.65'
C2	750.00'	06°16'08"	82.06'	S 03°44'34" E	82.02'



40 0 40 80
scale 1" = 40' feet

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

!! CAUTION !!

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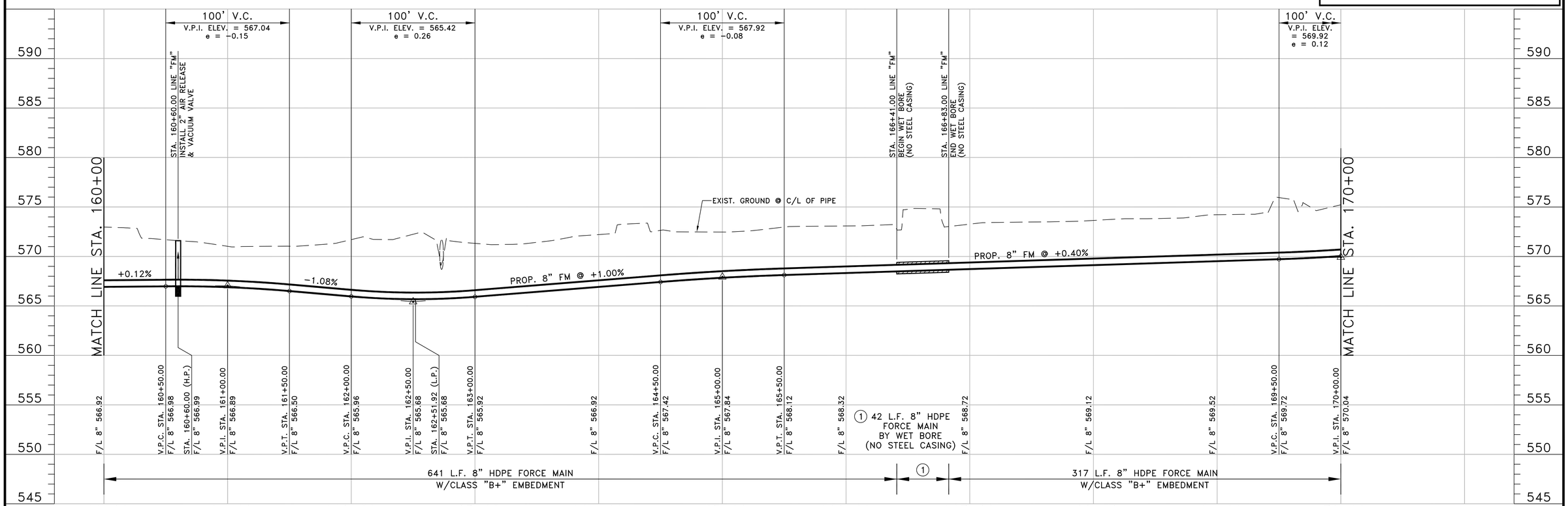

NO.	DATE	REVISION	REVIEWED
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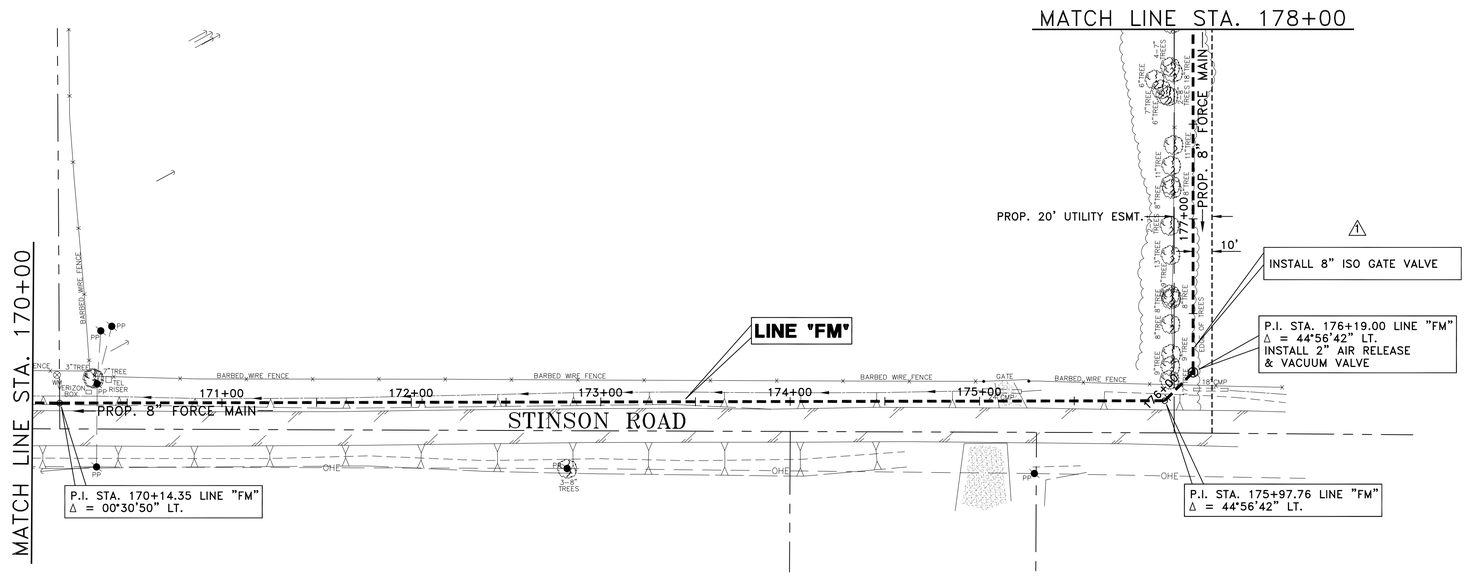
DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP17

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 160+00 TO STA. 170+00)
CITY OF LUCAS

SHEET NO. C27
OF SHEETS
JOB NO. 09-1389



RECORD DRAWING

BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

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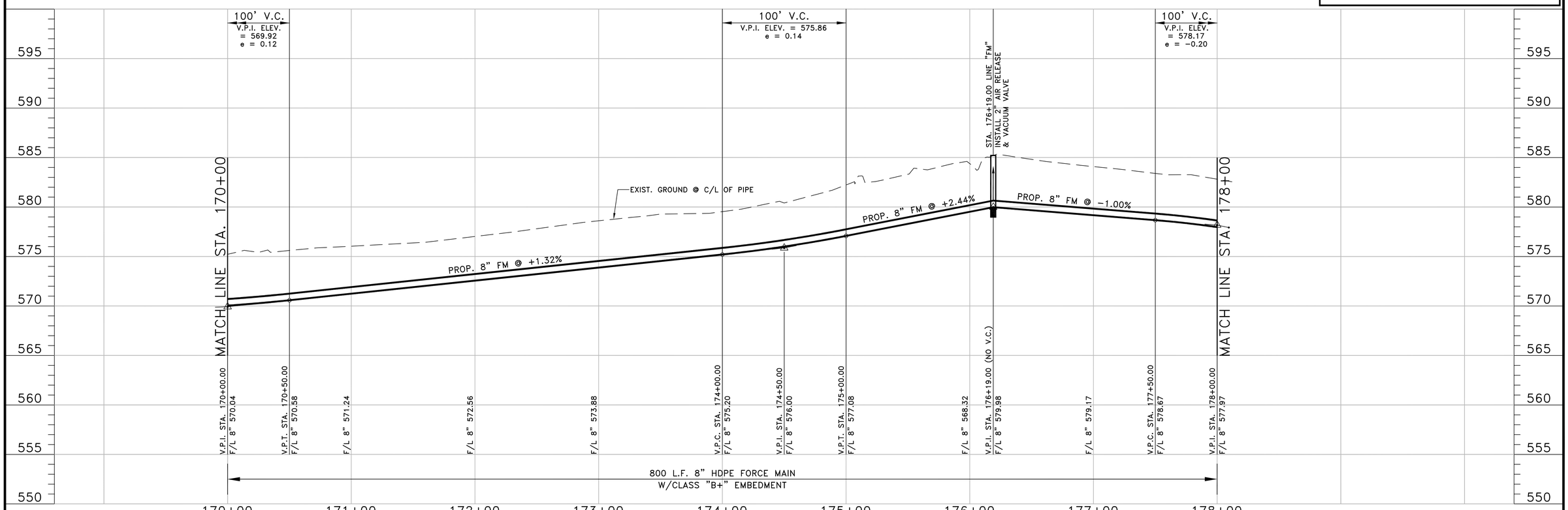

NO.	DATE	REVISION	REVIEWED
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1	7/25/11	REVISED PER CONTRACTORS MARKUPS	MRB

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP18

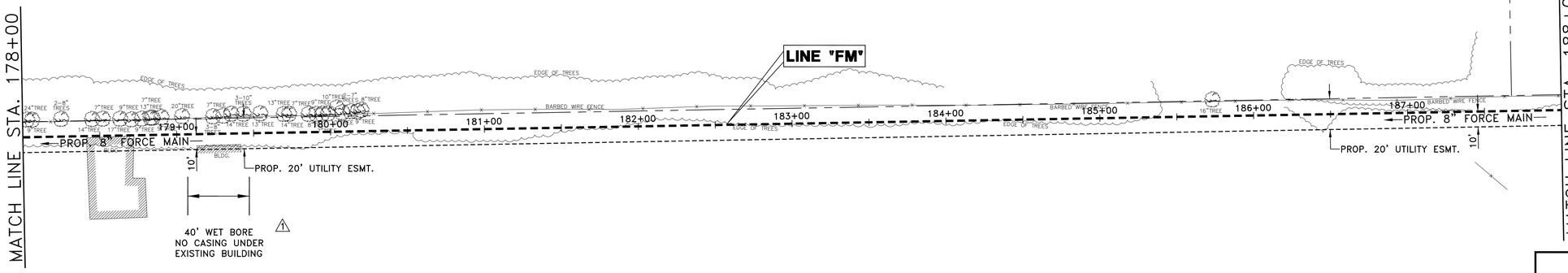
BW2

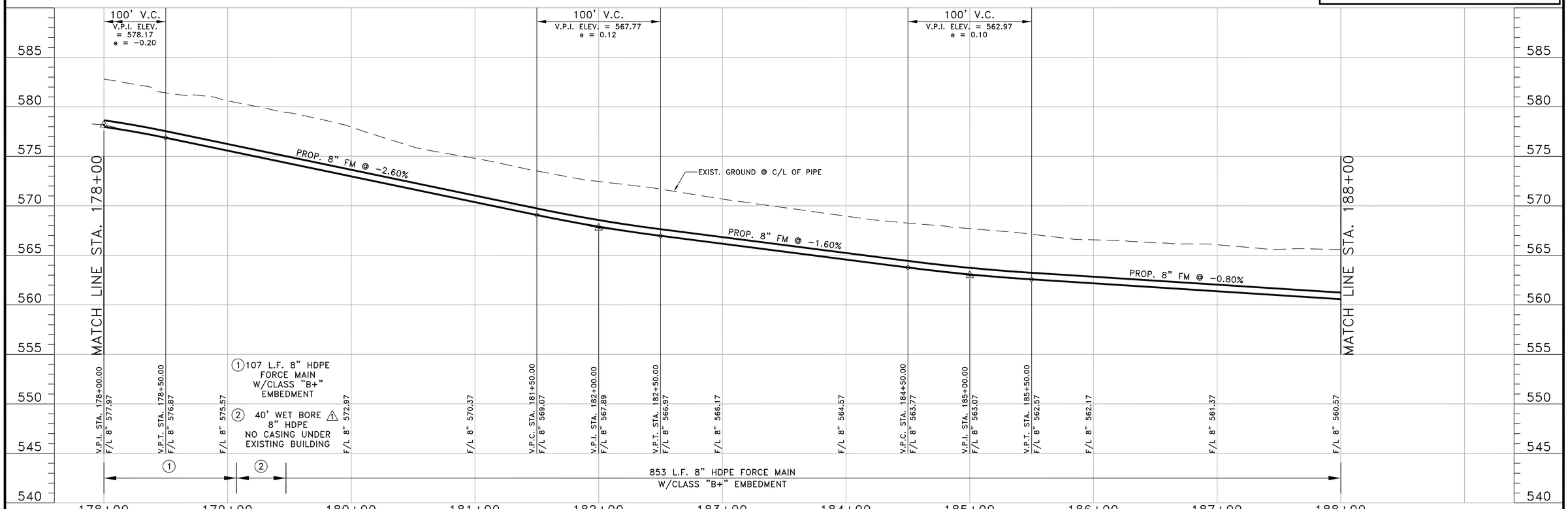
BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 170+00 TO STA. 178+00)
CITY OF LUCAS

SHEET NO. C28
OF SHEETS
JOB NO. 09-1389





40 0 40 80
scale 1" = 40' feet

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

!! CAUTION !!

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CONTRACTOR SHALL ALSO CONTACT APPROPRIATE CITY UTILITY DEPARTMENT FOR FIELD LOCATES OF MUNICIPAL INFRASTRUCTURE 48 HOURS PRIOR TO CONSTRUCTION.

NO.	DATE	REVISION	REVIEWED
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1	7/25/11	REVISED PER CONTRACTORS MARKUPS	MRB

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP19

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

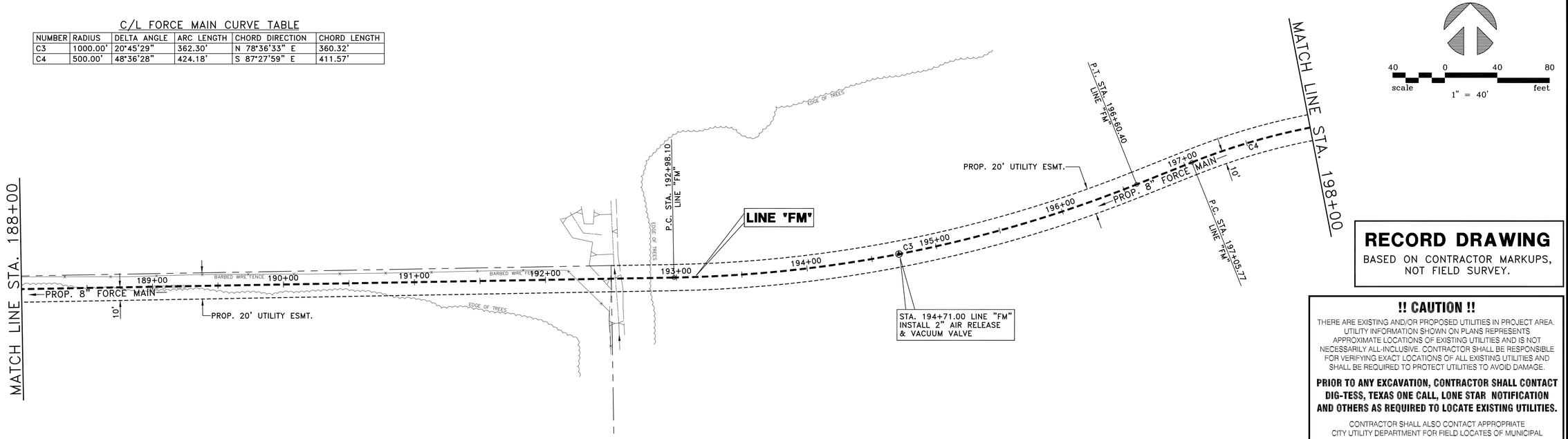
STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 178+00 TO STA. 188+00)
CITY OF LUCAS

SHEET NO. C29
OF SHEETS
JOB NO. 09-1389

C/L FORCE MAIN CURVE TABLE

NUMBER	RADIUS	DELTA ANGLE	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C3	1000.00'	20°45'29"	362.30'	N 78°36'33" E	360.32'
C4	500.00'	48°36'28"	424.18'	S 87°27'59" E	411.57'



RECORD DRAWING

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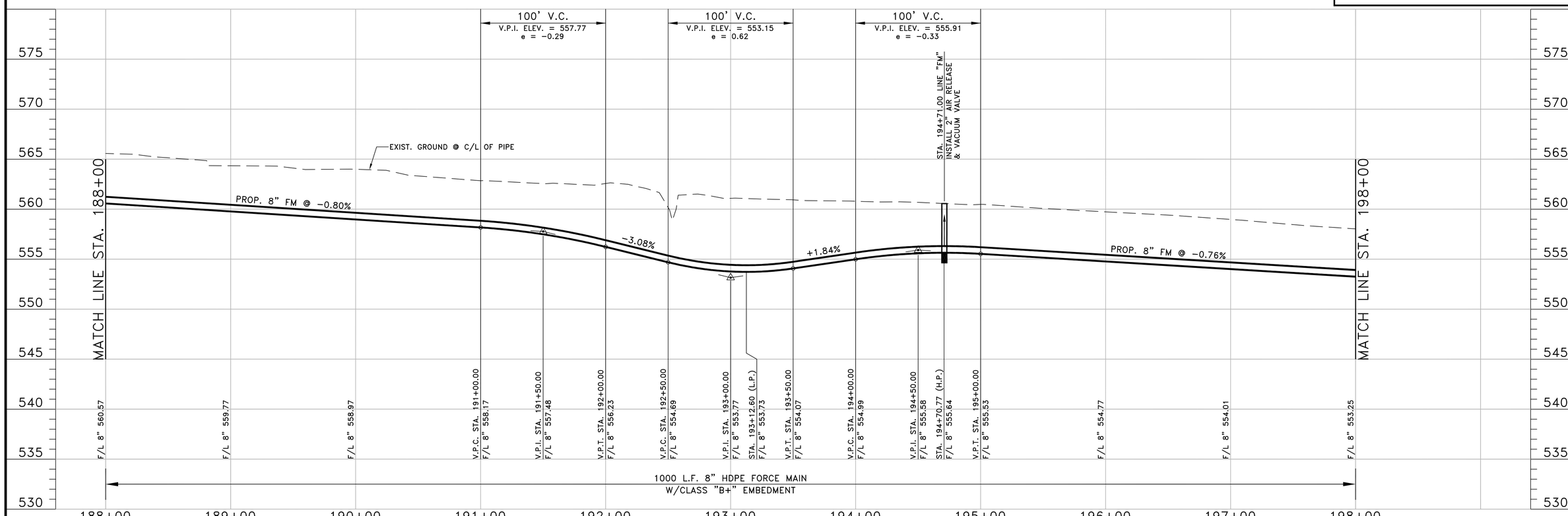

NO.	DATE	REVISION	REVIEWED
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DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP20

BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

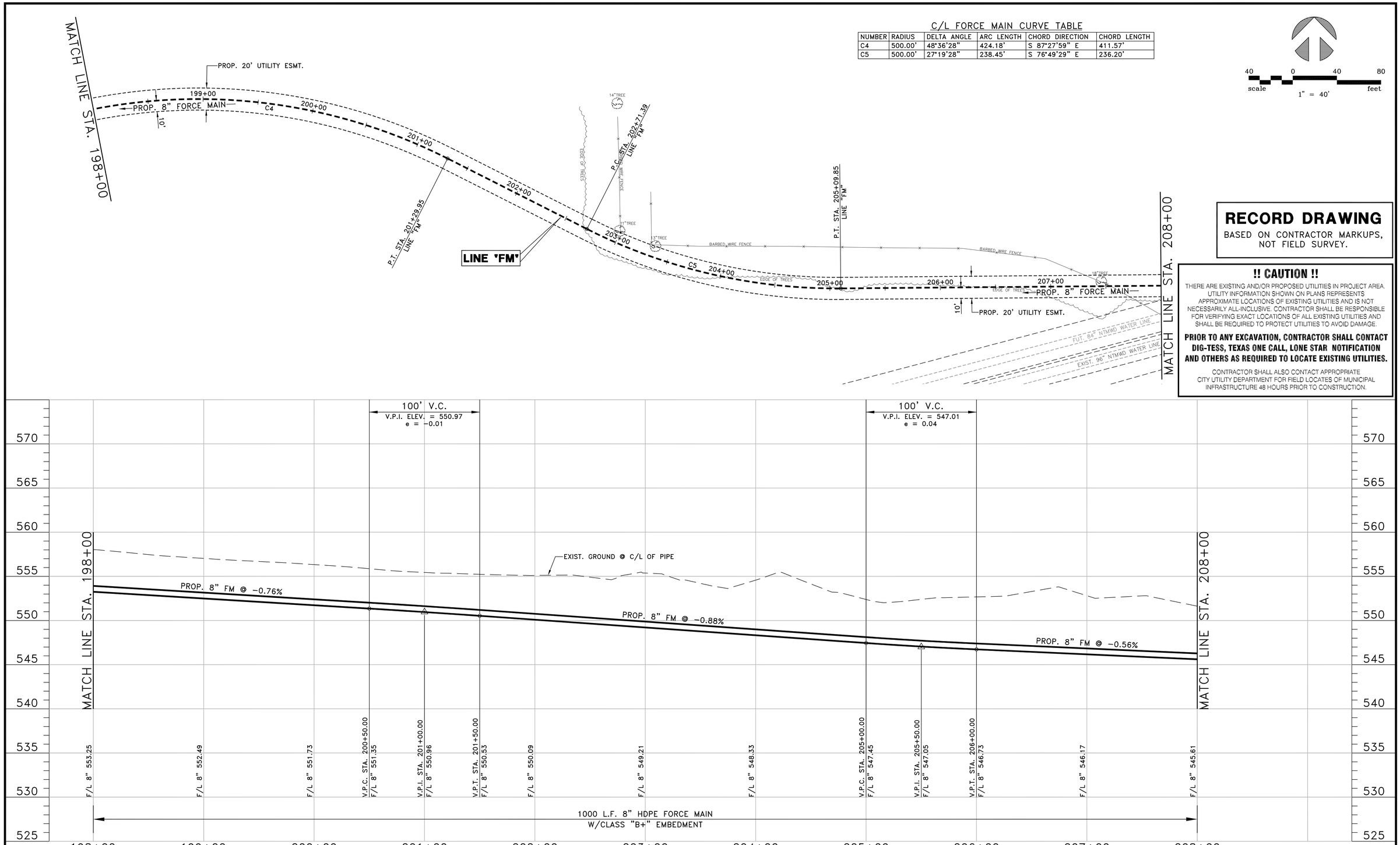
STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 188+00 TO STA. 198+00)
CITY OF LUCAS

SHEET NO. C30
OF SHEETS
JOB NO. 09-1389

C/L FORCE MAIN CURVE TABLE

NUMBER	RADIUS	DELTA ANGLE	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C4	500.00'	48°36'28"	424.18'	S 87°27'59" E	411.57'
C5	500.00'	27°19'28"	238.45'	S 76°49'29" E	236.20'



RECORD DRAWING

BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

!! CAUTION !!

THERE ARE EXISTING AND/OR PROPOSED UTILITIES IN PROJECT AREA. UTILITY INFORMATION SHOWN ON PLANS REPRESENTS APPROXIMATE LOCATIONS OF EXISTING UTILITIES AND IS NOT NECESSARILY ALL-INCLUSIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXACT LOCATIONS OF ALL EXISTING UTILITIES AND SHALL BE REQUIRED TO PROTECT UTILITIES TO AVOID DAMAGE.

PRIOR TO ANY EXCAVATION, CONTRACTOR SHALL CONTACT DIG-TESS, TEXAS ONE CALL, LONE STAR NOTIFICATION AND OTHERS AS REQUIRED TO LOCATE EXISTING UTILITIES.

CONTRACTOR SHALL ALSO CONTACT APPROPRIATE CITY UTILITY DEPARTMENT FOR FIELD LOCATES OF MUNICIPAL INFRASTRUCTURE 48 HOURS PRIOR TO CONSTRUCTION.

NO.	DATE	REVISION	REVIEWED
6			
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4			
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2			
1			

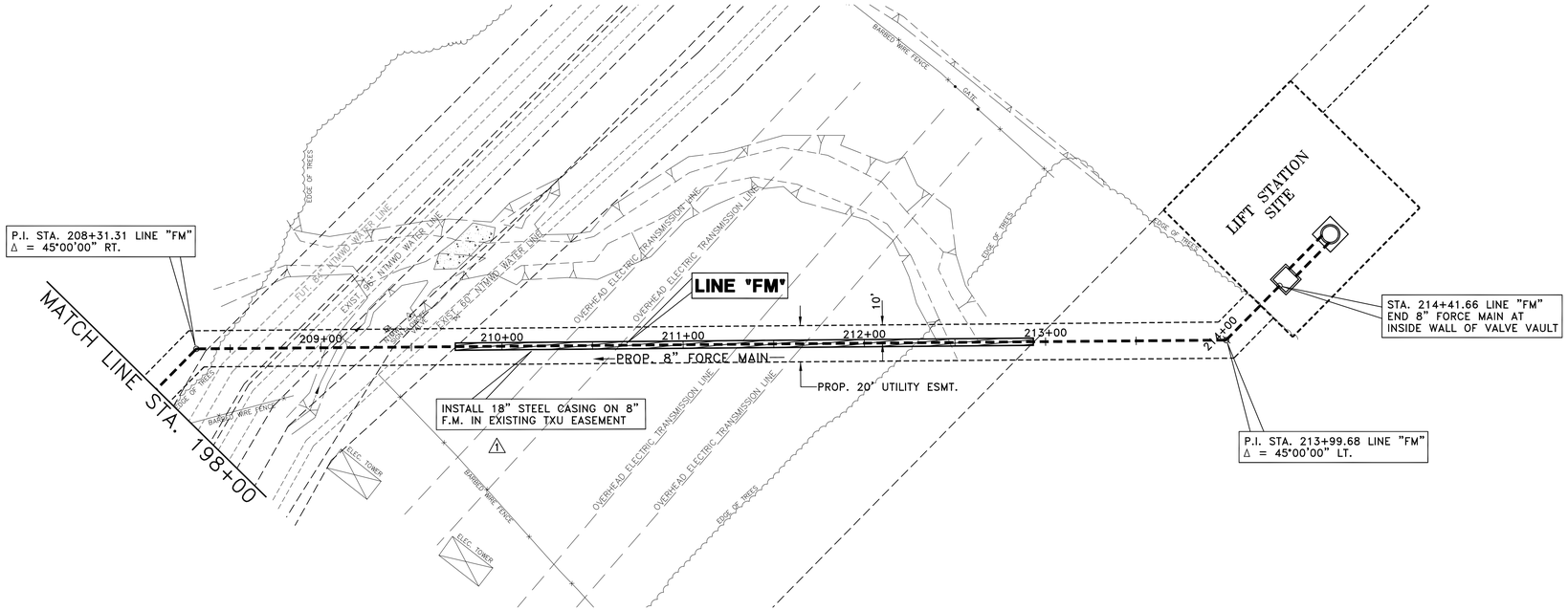
DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP21

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 198+00 TO STA. 208+00)
CITY OF LUCAS

SHEET NO. C31
OF SHEETS
JOB NO. 09-1389



40 0 40 80
scale 1" = 40' feet

RECORD DRAWING

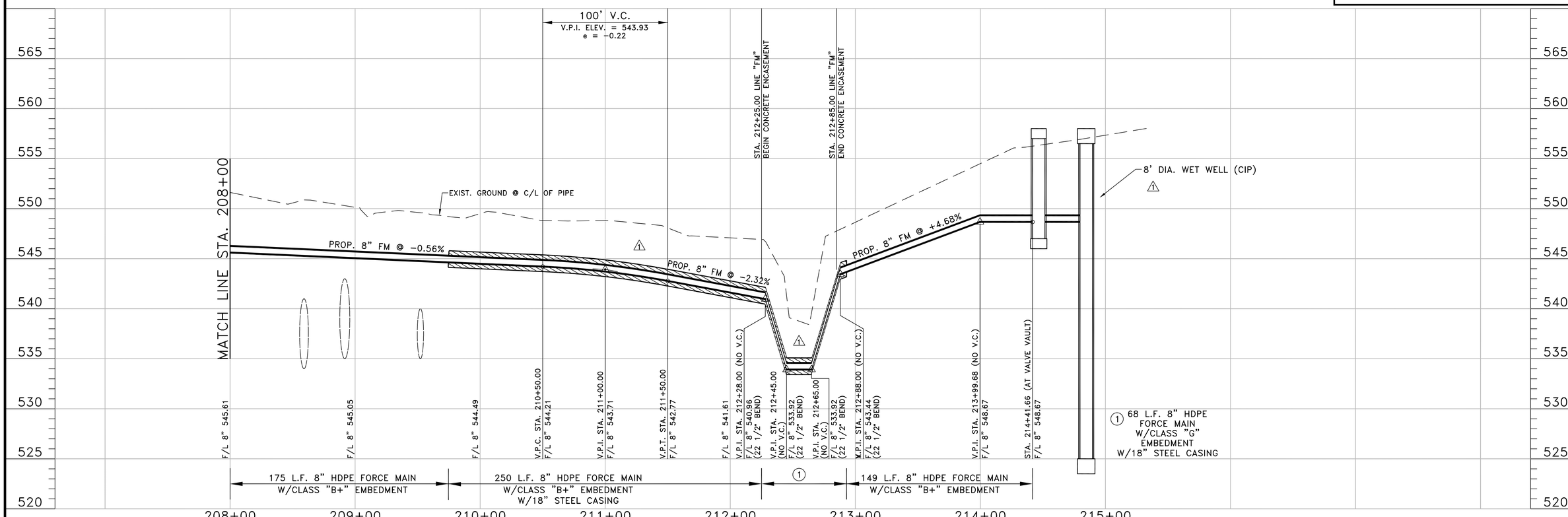
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

!! CAUTION !!

THERE ARE EXISTING AND/OR PROPOSED UTILITIES IN PROJECT AREA. UTILITY INFORMATION SHOWN ON PLANS REPRESENTS APPROXIMATE LOCATIONS OF EXISTING UTILITIES AND IS NOT NECESSARILY ALL-INCLUSIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXACT LOCATIONS OF ALL EXISTING UTILITIES AND SHALL BE REQUIRED TO PROTECT UTILITIES TO AVOID DAMAGE.

PRIOR TO ANY EXCAVATION, CONTRACTOR SHALL CONTACT DIG-TESS, TEXAS ONE CALL, LONE STAR NOTIFICATION AND OTHERS AS REQUIRED TO LOCATE EXISTING UTILITIES.

CONTRACTOR SHALL ALSO CONTACT APPROPRIATE CITY UTILITY DEPARTMENT FOR FIELD LOCATES OF MUNICIPAL INFRASTRUCTURE 48 HOURS PRIOR TO CONSTRUCTION.



NO.	DATE	REVISION	REVIEWED
6			
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2			
1	7/25/11	REVISED PER CONTRACTORS MARKUPS	MRB

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: (H)1"=40', (V)1"=5'
DATE: AUGUST 2010
DWG. NAME: 1389FMPP22

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
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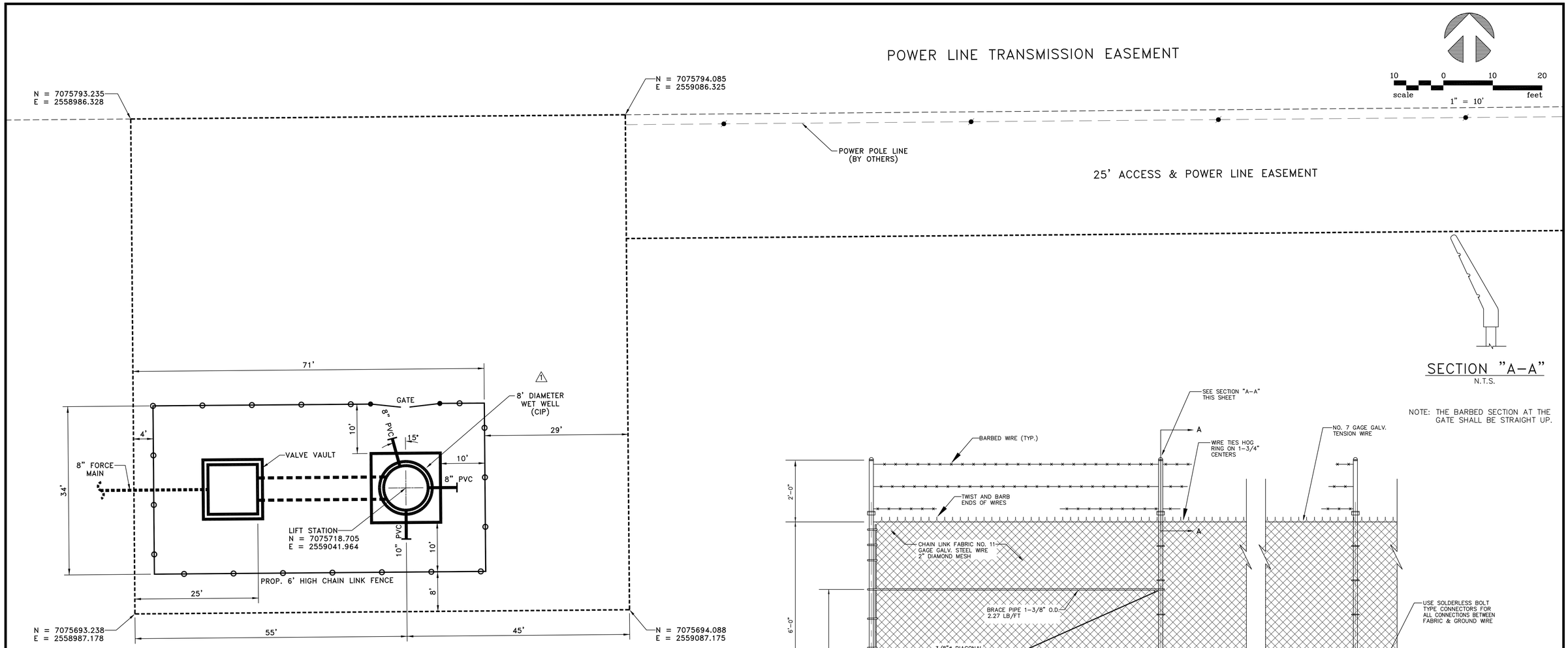
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

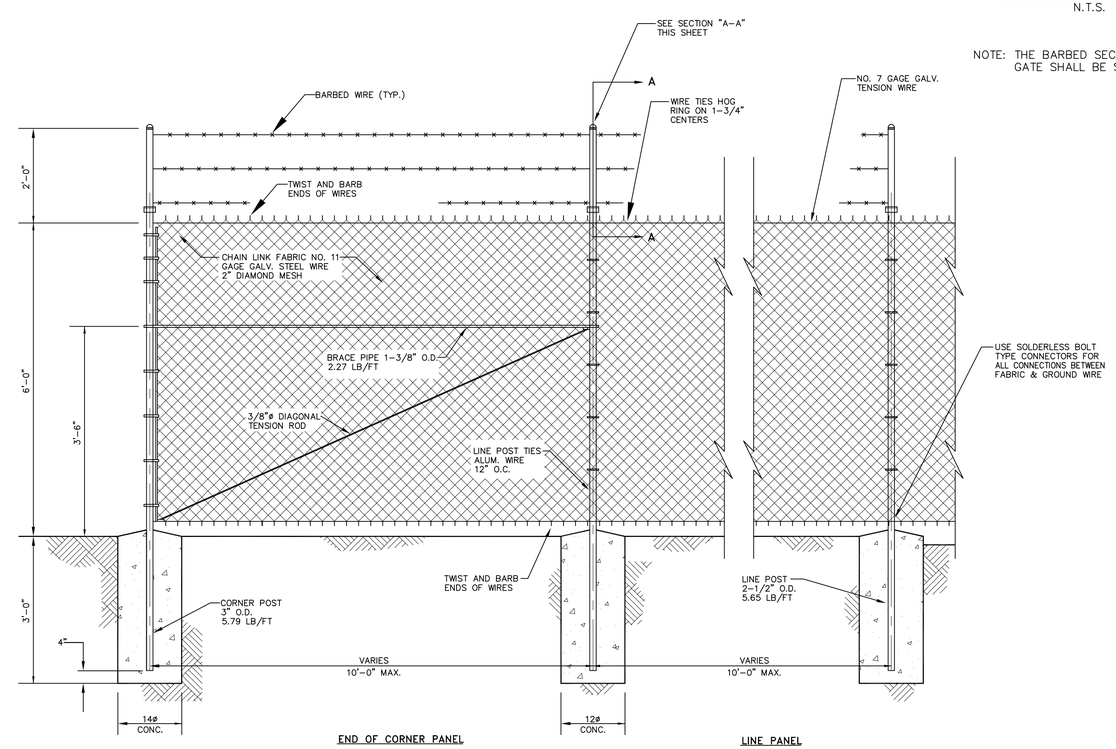
WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
FORCE MAIN - PLAN AND PROFILE
(STA. 208+00 TO STA. 214+41.66)
CITY OF LUCAS

SHEET NO. C32
OF SHEETS
JOB NO. 09-1389



SECTION "A–A"
N.T.S.

NOTE: THE BARBED SECTION AT THE GATE SHALL BE STRAIGHT UP.



TYPICAL CHAIN LINK FENCE
N.T.S.

NOTES:

1. CONTRACTOR SHALL USE ACCESS EASEMENT FOR ACCESS TO LIFT STATION SITE.
2. CONTRACTOR SHALL INSTALL A TEMPORARY CONSTRUCTION ROAD SUFFICIENT FOR HIS OWN NEEDS AND USE DURING CONSTRUCTION.
3. CONTRACTOR SHALL LEAVE MINIMUM FIVE FOOT SPACE ON NORTH SIDE OF ACCESS EASEMENT FOR POWER POLE LINE (BY OTHERS).
4. CONTRACTOR SHALL INCLUDE ANY COSTS FOR HIS TEMPORARY CONSTRUCTION ROAD IN THE PRICE BID FOR THE PROJECT.
5. AFTER CONSTRUCTION IS COMPLETED, CONTRACTOR WILL NOT BE REQUIRED TO REMOVE TEMPORARY CONSTRUCTION ROAD BUT SHALL LEAVE IT IN PLACE.
6. INCOMING GRAVITY SEWERS SHALL BE INSTALLED WITH STUB–OUTS FIVE FEET FROM OUTSIDE WALL OF LIFT STATION.

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

NO.	DATE	REVISION	REVIEWED
6			
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2			
1	7/25/11	REVISED PER CONTRACTORS MARKUPS	MRB

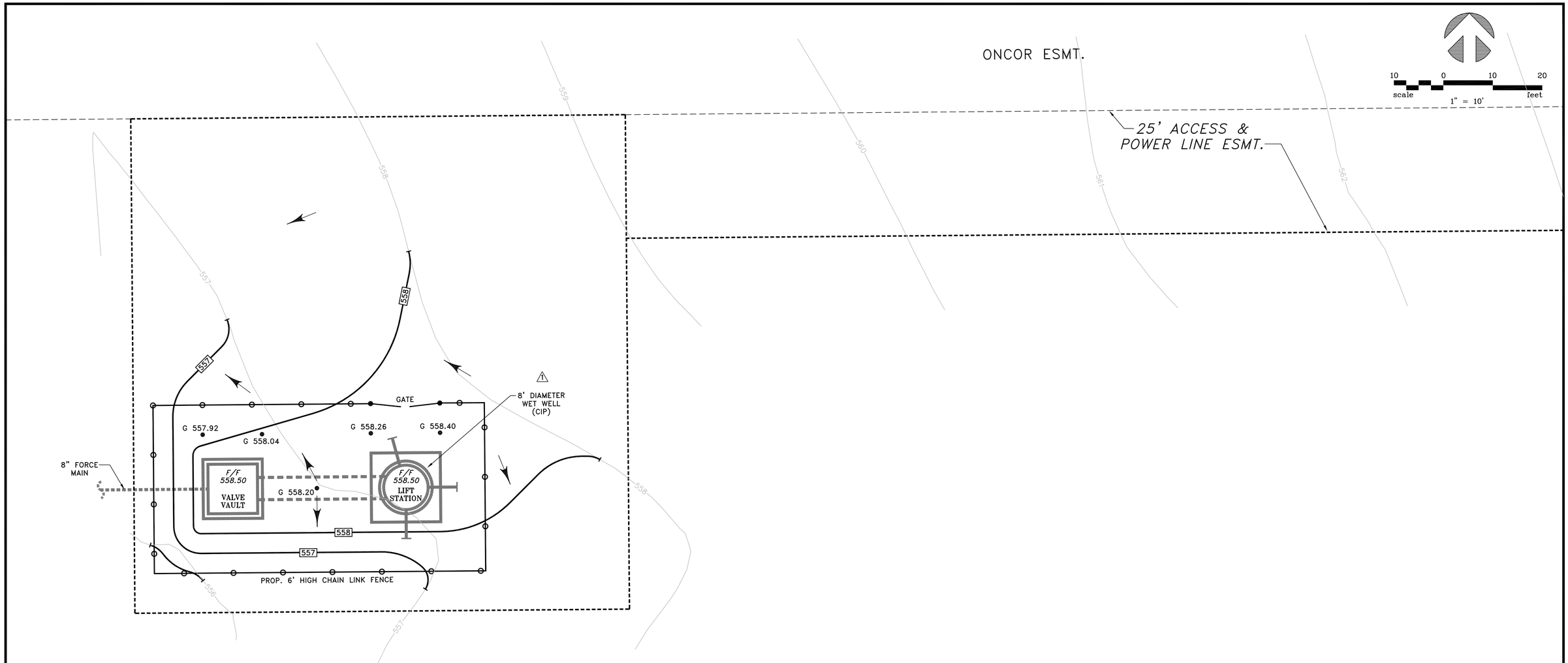
DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: 1" = 10'
DATE: AUGUST 2010
DWG. NAME: 1389SITEPLAN

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
LIFT STATION - SITE PLAN
CITY OF LUCAS

SHEET NO. C33
OF SHEETS
JOB NO. 09–1389



NOTES:

1. CONTRACTOR SHALL USE ACCESS EASEMENT FOR ACCESS TO LIFT STATION SITE.
2. CONTRACTOR SHALL INSTALL A TEMPORARY CONSTRUCTION ROAD SUFFICIENT FOR HIS OWN NEEDS AND USE DURING CONSTRUCTION.
3. CONTRACTOR SHALL LEAVE MINIMUM FIVE FOOT SPACE ON NORTH SIDE OF ACCESS EASEMENT FOR POWER POLE LINE (BY OTHERS).
4. CONTRACTOR SHALL INCLUDE ANY COSTS FOR HIS TEMPORARY CONSTRUCTION ROAD IN THE PRICE BID FOR THE PROJECT.
5. AFTER CONSTRUCTION IS COMPLETED, CONTRACTOR WILL NOT BE REQUIRED TO REMOVE TEMPORARY CONSTRUCTION ROAD BUT SHALL LEAVE IT IN PLACE.
6. INCOMING GRAVITY SEWERS SHALL BE INSTALLED WITH STUB-OUTS FIVE FEET FROM OUTSIDE WALL OF LIFT STATION.

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

LEGEND:

558	EXIST. CONTOUR
558	PROPOSED CONTOUR
● G 558.00	PROPOSED TOP OF GROUND ELEVATION

NO.	DATE	REVISION	REVIEWED
6			
5			
4			
3			
2			
1	7/25/11	REVISED PER CONTRACTORS MARKUPS	MRB

DRAWN: BW2
DESIGN: JCT
REVIEWED: MRB
SCALE: 1" = 10'
DATE: AUGUST 2010
DWG. NAME: 1389GRADING

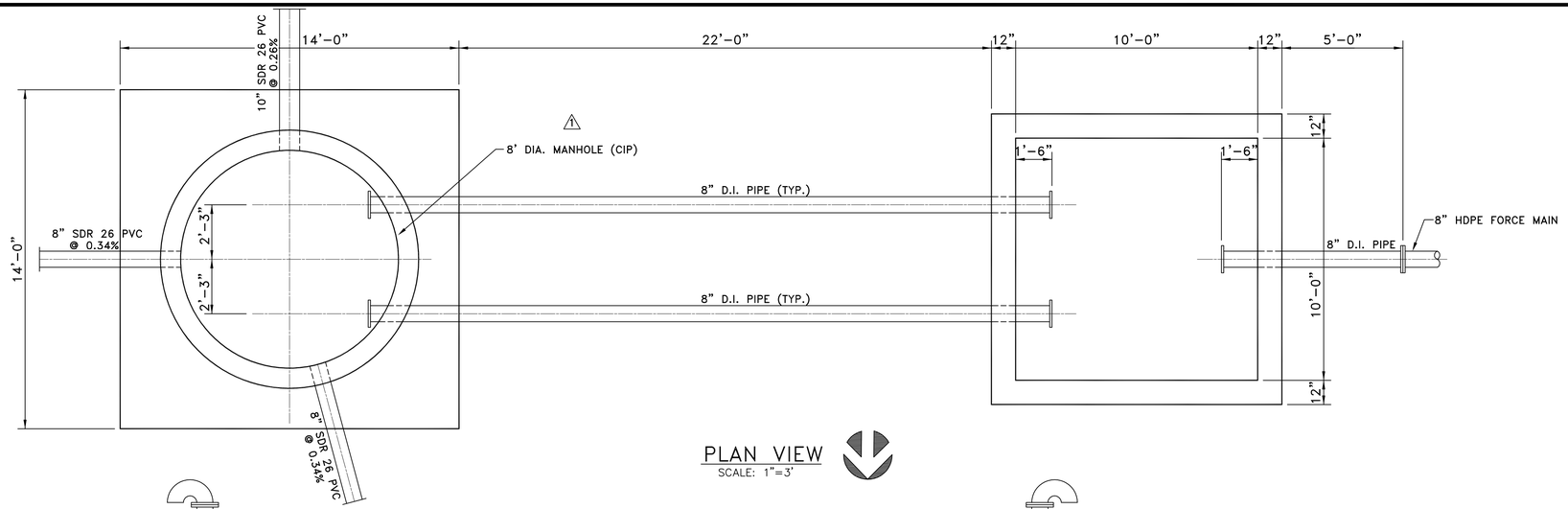
BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

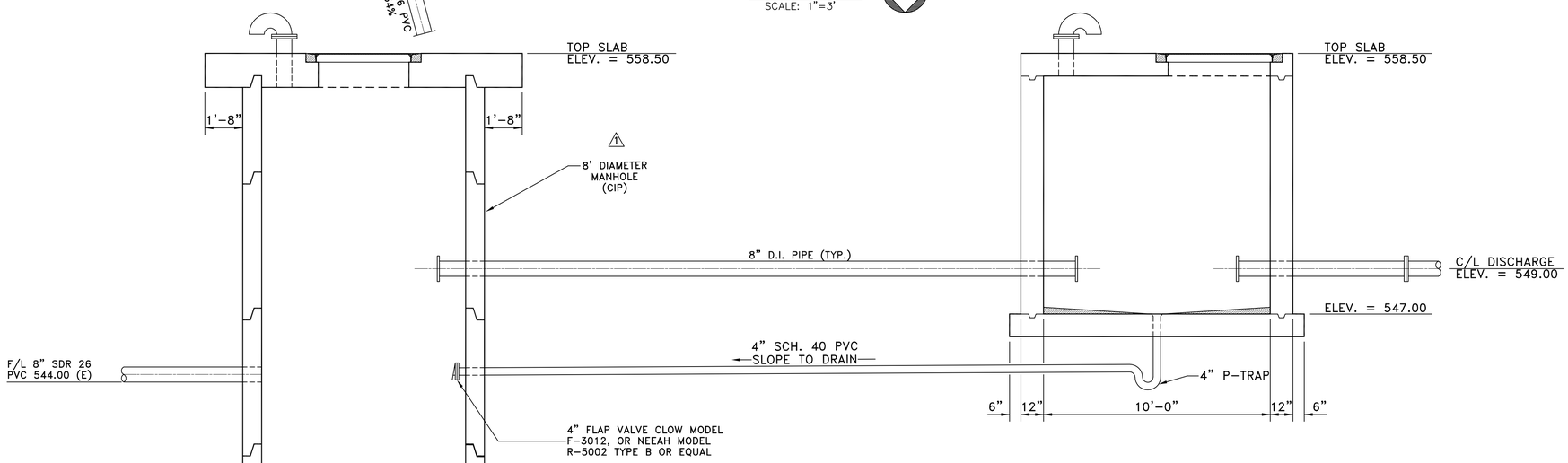
STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

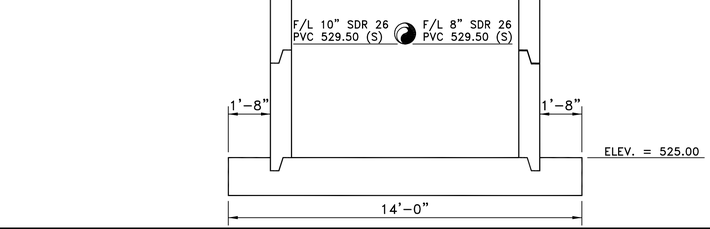
WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
LIFT STATION - GRADING PLAN
CITY OF LUCAS

SHEET NO. C34
OF SHEETS
JOB NO. 09-1389



PLAN VIEW
SCALE: 1"=3'

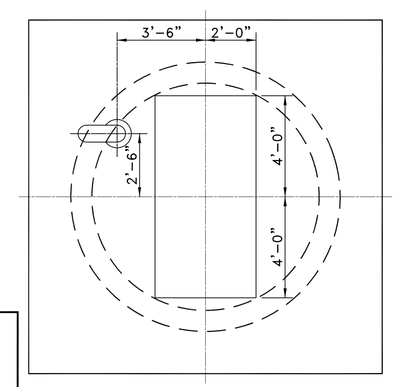


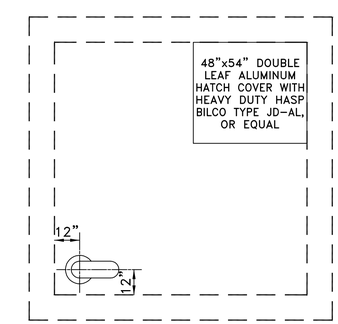


ELEVATION
SCALE: 1"=3'

NOTES:

1. A LADDER SHALL BE FURNISHED AND INSTALLED IN THE VALVE VAULT FOR ACCESS. THE LADDER SHALL BE PROPERLY SECURED TO THE WALL. THE LADDER SHALL HAVE THE FEATURE THAT ALLOWS THE TOP OF THE LADDER TO BE RAISED TO ENHANCE ACCESS TO THE VALVE VAULT."
2. ANY DUCTILE IRON PIPE INSTALLED ON THE PROJECT SHALL BE PROTECTO 401 LINED OR EQUAL. THE OUTSIDE OF THE DIP PIPE SHALL BE COATED WITH TNEMEC 66 OR EQUAL."
3. LIFT STATION STRUCTURE SHALL BE A PRECAST MANHOLE WITH O-RING GASKETS. A JOINT SHALL BE SEALED WITH A MASTIC SEALING OR APPROVED EQUAL."
4. ALL PIPING AT THE LIFT STATION SITE SHALL BE 150 PSI MINIMUM EXCEPT FOR THE GRAVITY SEWER PIPE."
5. EACH BILCO HATCH SHALL BE ALUMINUM DOUBLE LEAF WITH HEAVY DUTY HASP."





RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

NO.	DATE	REVISION	REVIEWED
6			
5			
4			
3			
2			
1	7/25/11	REVISED PER CONTRACTORS MARKUPS	MRB

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: AS SHOWN
DATE: AUGUST 2010
DWG. NAME: 1389MECH

BW2

BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
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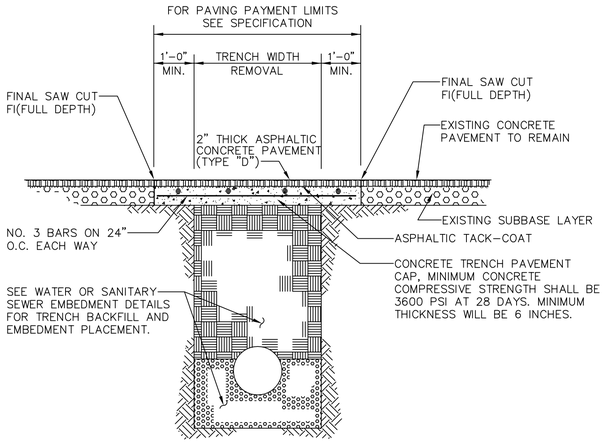
Firm Registration No. F-5290

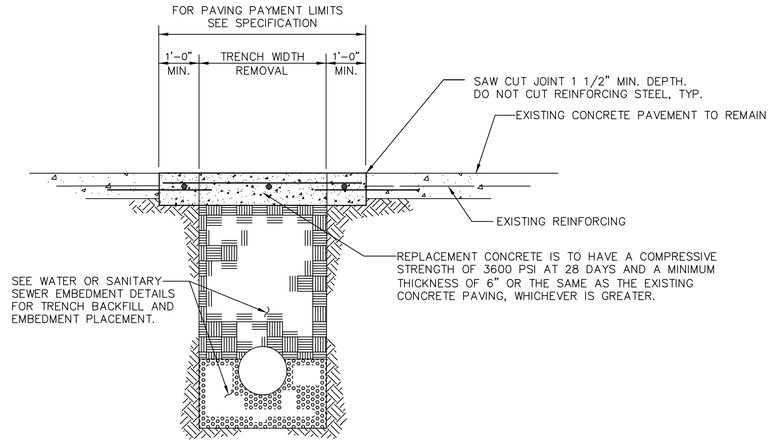
STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
LIFT STATION - MECHANICAL PLAN
CITY OF LUCAS

SHEET NO. C35
OF SHEETS
JOB NO. 09-1389



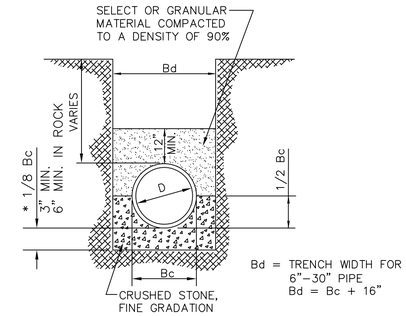
FLEXIBLE BASE AND
ASPHALTIC CONCRETE SURFACE



REINFORCED CONCRETE PAVEMENT

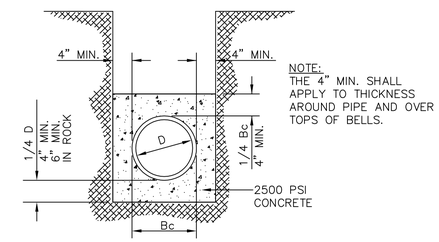
TYPICAL PAVEMENT REPAIR DETAILS

N.T.S.



CLASS "B+" EMBEDMENT

N.T.S.

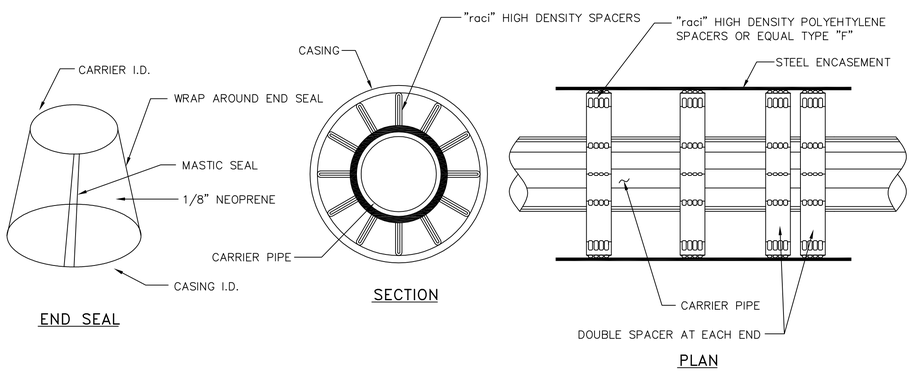


CLASS "G" EMBEDMENT (CONCRETE ENCASEMENT)

N.T.S.

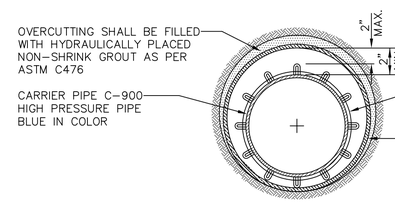
TRENCH BACKFILL AND EMBEDMENT NOTES:

1. UNLESS OTHERWISE NOTED, TRENCH BACKFILL AND EMBEDMENT SHALL BE AS SPECIFIED IN NTCOG SPECIFICATION ITEMS 2.1.8, 6.2.9, AND 6.2.10.
2. ALL TRENCH BACKFILL SHALL BE COMPACTED TO 95% DENSITY WHEN UNDER PAVEMENT.
3. SAND SHALL BE FREE FROM LUMPS, STONES, CLAY AND ORGANIC MATTER. ALL PARTICLES MUST PASS A NO. 8 SIEVE.
4. GRANULAR MATERIAL SHALL BE DEFINED AS FREE FLOWING RIVER RUN, SANDY MATERIAL, FREE FROM LARGE STONES, CLAY AND ORGANIC MATERIAL. THE EMBEDMENT MATERIAL WILL NOT BE SUCH THAT WHEN WET, THE FINE MATERIAL FORMS MUD OR MUCK. THE EMBEDMENT MATERIAL SHALL BE COMPOSED OF TOUGH DURABLE PARTICLES, REASONABLY FREE FROM THIN, FLAT AND ELONGATED PIECES, AND OF SUITABLE QUALITY TO INSURE PERMANENCE IN THE TRENCH. THE P.I. OF THE FINES SHALL NOT EXCEED 3. LIGHT WEIGHT AGGREGATE IS NOT ACCEPTABLE FOR GRANULAR EMBEDMENT. STONES LARGER THAN 2" IN DIAMETER ARE NOT ALLOWED.
5. STONES LAGER THAN 6" ARE NOT ALLOWED IN THE TRENCH BACKFILL.
6. THE TOP 12" (MINIMUM) OF ALL TRENCHES SHALL BE TOPSOIL. STONES LARGER THAN 2" ARE NOT ALLOWED.



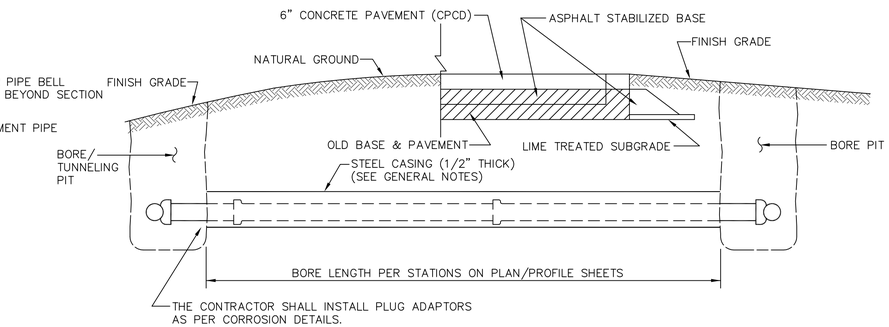
PIPE CASING SPACERS DETAIL

N.T.S.



CROSS-SECTION OF BORE WITH STEEL CASING

N.T.S.



BORING DETAIL

N.T.S.

GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITIES SHALL BE RESTRICTED TO THE EASEMENTS.
2. WHERE A BORE/TUNNELING PIT EXCEEDS FIVE (5) FEET IN DEPTH THE CONTRACTOR SHALL INSTALL SHORING OF THE PIT WALLS AS REQUIRED BY TEXAS STATE LAW (HB 662 AND HB 665) REGARDING THE SAFETY SYSTEMS TO BE USED DURING TRENCH EXCAVATION (AS STATED IN THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATIONS STANDARDS.
3. ALL BORE/TUNNELING PITS SHALL BE BACKFILLED WITHIN FORTY-EIGHT (48) HOURS OF UTILITY INSTALLATION. NO BORE/TUNNELING PIT SHALL REMAIN OPEN IN EXCESS OF SEVENTY-TWO (72) HOURS WITHOUT SHORING TO PREVENT THE CAVING OF PIT WALLS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PHYSICALLY VERIFYING ALL UTILITY CLEARANCES PRIOR TO BEGINNING INSTALLATION.
5. CONTRACTOR SHALL REMOVE UNSTABLE MATERIAL FROM THE BOTTOM OF THE BORE PITS ONCE CONSTRUCTION OF THE TUNNEL IS COMPLETE AND CARRIER PIPE HAS BEEN INSTALLED AND SHALL REPLACE THIS UNSTABLE MATERIAL WITH DRY STABLE MATERIAL THAT WILL ADEQUATELY AND SUFFICIENTLY SUPPORT THE PROPOSED PIPELINE.
6. CONTRACTOR SHALL INSTALL RACI SPACERS (OR EQUAL) IN ANNULAR SPACE BETWEEN CARRIER PIPE AND CASING PIPE.

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS,
NOT FIELD SURVEY.

NO.	DATE	REVISION	REVIEWED
6			
5			
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DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: N.T.S.
DATE: AUGUST 2010
DWG. NAME: 1389DETAIL1

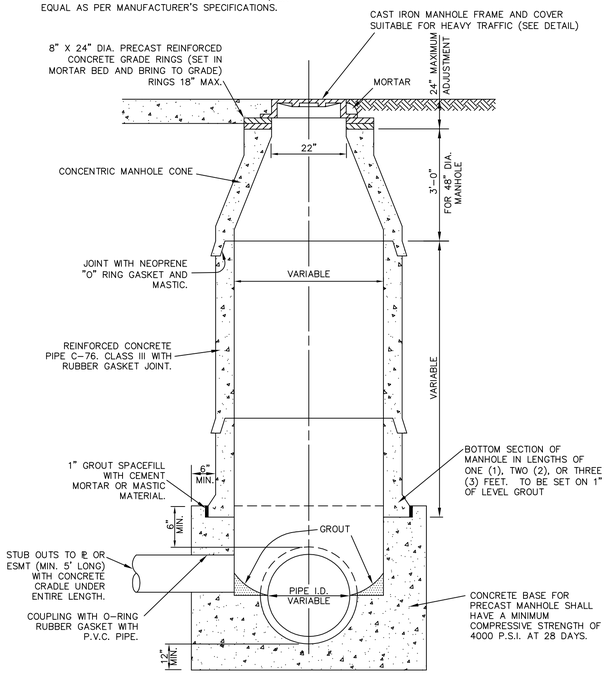
BW2 Engineers, Inc.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

STATE OF TEXAS
MICHAEL R. BURGE
41290
REGISTERED
PROFESSIONAL ENGINEER
7-25-11

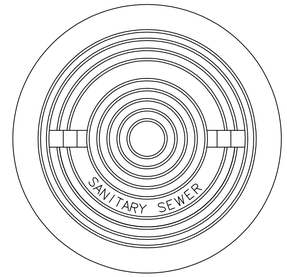
WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
GENERAL CONSTRUCTION DETAILS - SHEET 1
CITY OF LUCAS

SHEET NO. C36
OF SHEETS
JOB NO. 09-1389

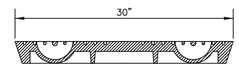
NOTE:
INSTALL INFA-SHIELD EXTERNAL MANHOLE SEAL, OR EQUAL AS PER MANUFACTURER'S SPECIFICATIONS.



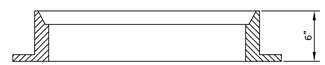
PRECAST CONCRETE PIPE MANHOLE
N.T.S.



ASSEMBLY PLAN VIEW



LID SECTION VIEW

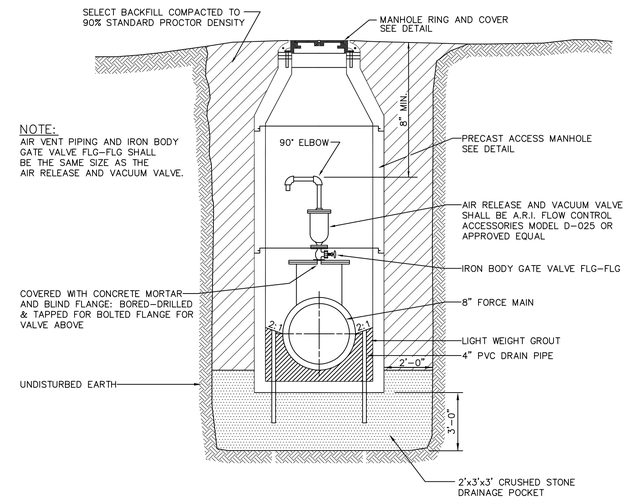


FRAME SECTION VIEW

GENERAL NOTES:

1. MANHOLE LID SHALL BE SOLID AND PROVIDED WITH PICK SLOTS ONLY
2. 30" HEAVY DUTY MANHOLE FRAME AND COVER IS TO BE AS MANUFACTURED BY THE NEENAH FOUNDRY CO. TYPE R-1687 OR EQUAL. TOTAL WEIGHT OF THE MANHOLE AND RING SHALL BE APPROXIMATELY 410 LB..
3. HORIZONTAL BEARING SURFACES ARE TO BE MACHINE FINISHED.
4. THE SOLID LID WILL BE PROVIDED WITH MANUFACTURER'S STANDARD LETTERING: "SANITARY SEWER".

CAST IRON LID (SOLID) AND FRAME DETAIL
N.T.S.



NOTE:
AIR VENT PIPING AND IRON BODY GATE VALVE FLG-FLG SHALL BE THE SAME SIZE AS THE AIR RELEASE AND VACUUM VALVE.

TRANSVERSE SECTION

AIR RELEASE AND VACUUM VALVE MANHOLE
N.T.S.

NOTES:

1. LIGHT WEIGHT GROUT UTILIZED IN MANHOLES SHALL BE OF PROPER STRENGTH AND DURABILITY TO SERVE ITS PURPOSE IN MANHOLE. MIX DESIGN FOR LIGHTWEIGHT GROUT SHALL BE SUBJECT TO REVIEW AND APPROVAL OF ENGINEER.
2. AIR RELEASE AND VACUUM VALVES SHALL BE 2-IN. VALVES SUITABLE FOR WASTEWATER SERVICE. ISOLATION VALVE FOR THE INSTALLATION SHALL BE A 2-IN. IRON BODY GATE VALVE. THE AIR RELEASE AND VACUUM SHALL HAVE A BACK FLUSHING HOSE WITH A QUICK DISCONNECT COUPLING AT THE SHUT OFF VALVE FOR BACK FLUSH PURPOSES. THE HOSE SHALL BE LONG ENOUGH TO REACH TO THE TOP AND EXTEND 2-FT. FROM THE TOP OF THE ACCESS COVER. THE BACKFLUSH SYSTEM SHALL BE CONNECTED TO TOP OF THE AIR RELEASE VACUUM SYSTEM BY A 1/2-IN. SHUT OFF VALVE, A QUICK DISCONNECT COUPLING, AND A BACK FLUSHING HOSE. THE ENTIRE SYSTEM SHALL BE APCO OR EQUAL.
3. CONTRACTOR SHALL PROVIDE RISERS TO GROUND LINE WITH NO CONES FOR THOSE MANHOLES THAT ARE OF NOT ADEQUATE DEPTH TO ALLOW THE INSTALLATION OF THE AIR RELEASE AND VACUUM VALVE WITHOUT INTERFERING WITH ACCESS TO THE MANHOLE. WHERE CONES ARE DELETED, CONTRACTORS SHALL PROVIDE A PRECAST SLAB RECOMMENDED AND FURNISHED BY THE MANHOLE MANUFACTURER. PRECAST TOP SLAB SHALL BE FURNISHED WITH MANHOLE RING AND COVER, LOCATED SUCH THAT THE MANHOLE CAN BE ENTERED WITH NO INTERFERENCE FROM THE VALVE.

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

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DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: N.T.S.
DATE: AUGUST 2010
DWG. NAME: 1389DETAIL2

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STATE OF TEXAS
MICHAEL R. BURGESS
41290
REGISTERED PROFESSIONAL ENGINEER
7-25-11

WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
GENERAL CONSTRUCTION DETAILS - SHEET 2
CITY OF LUCAS

SHEET NO. C37
OF SHEETS
JOB NO. 09-1389

GENERAL TRAFFIC CONTROL NOTES

1. ALL TEMPORARY SIGNS, MARKINGS, CONES, CHANNELIZING DEVICES, WARNING LIGHTS AND BARRICADES SHALL BE IN ACCORDANCE WITH THE CURRENT STATE OF TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
2. TYPE "A" WARNING LIGHTS SHALL BE PLACED ON ALL ADVANCE WARNING SIGNS.
3. REDUCED SPEED WARNING SIGNAGE SHOULD BE PLACED PRIOR TO AND AT REGULAR INTERVALS NEAR CONSTRUCTION AREA.

GENERAL STRUCTURAL NOTES:

FOUNDATION:

1. THE FOUNDATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE SOILS REPORT PREPARED BY .....DATED..... PROJECT NO.....
2. THE CONTRACTOR AND ALL SUBCONTRACTORS SHOULD BE TOTALLY FAMILIAR WITH THE CONTENTS OF THE SOILS REPORT.
3. ANY CONDITION FOUND, PRIOR TO OR DURING CONSTRUCTION, THAT IS DIFFERENT THAN THAT DESCRIBED IN THE SOILS REPORT AND THAT WOULD AFFECT THE FOUNDATIONS AS DESIGNED, SHALL BE BROUGHT TO THE ATTENTION OF BW2 ENGINEERS AND/OR JOE P. HILL, P. E., INC.
4. IN NO CASE SHALL CONSTRUCTION PROCEED IF THE PERFORMANCE OF THE FOUNDATIONS, AS DESIGNED, WILL BE COMPROMISED.
5. PRIOR TO ANY NEW CONSTRUCTION, THE SITE SHALL BE CLEARED OF ANY AND ALL OBSTRUCTIONS THAT WOULD HINDER THE PROPER PREPARATION OF THE SITE FOR CONSTRUCTION.
6. ALL CLEARED DEBRIS SHALL BE REMOVED AND DISPOSED OF PROPERLY.
7. ANY FILL MATERIAL USED FOR GENERAL SITE FILL SHALL CONSIST OF ON--SITE MATERIALS OR IMPORTED MATERIALS AS APPROVED BY THE SOILS ENGINEERS.
8. IMPORTED FILL SHALL HAVE A LIQUID LIMIT LESS THAN 35.
9. IMPORTED FILL SHALL BE FREE OF ROOTS, VEGETATION OR ANY OTHER UNDESIRABLE MATTER IN THE SOIL AND HAVE NO ROCKS LARGER THAN 4 INCHES IN DIAMETER.
10. THE SELECT FILL SHALL BE PLACED IN LOOSE LIFTS OF NINE (9) INCHES OR LESS AND COMPACTED TO AT LEAST 95% OF ITS STANDARD PROCTOR DRY DENSITY AT A MOISTURE CONTENT RANGING FROM -1% TO +3% ABOVE ITS OPTIMUM VALUE.
11. BEFORE PLACING THE SELECT FILL, THE SUB GRADE SHALL BE SCARIFIED TO A DEPTH OF AT LEAST NINE (9) INCHES, MOISTURE CONDITIONED TO AT LEAST 2% ABOVE THE OPTIMUM VALUE (AT A WORKABLE MOISTURE LEVEL) AND COMPACTED TO AT LEAST 95% OF THE MAXIMUM STANDARD PROCTOR DRY DENSITY.
12. SITE GRADING OPERATIONS, WHERE REQUIRED, SHALL BE PERFORMED IN ACCORDANCE WITH THE RECOMMENDATIONS PROVIDED IN THE SOILS REPORT.
13. SITE GRADING PLANS AND CONSTRUCTION SHALL STRIVE TO ACHIEVE POSITIVE DRAINAGE AROUND ALL SIDES OF THE PROPOSED STRUCTURE.
14. INADEQUATE DRAINAGE AROUND STRUCTURES BUILT ON GRADE CAN CAUSE EXCESSIVE VERTICAL DIFFERENTIAL MOVEMENTS TO OCCUR.
15. THE GEOTECHNICAL ENGINEER SHALL MONITOR FOUNDATION CONSTRUCTION TO VERIFY CONDITIONS ARE AS ANTICIPATED.
16. FOUNDATION EXCAVATION SHALL BE DRY AND FREE OF LOOSE MATERIAL.
17. EXCAVATION FOR FOUNDATIONS SHALL BE FILLED WITH CONCRETE BEFORE THE END OF THE WORKDAY OR SOONER IF NECESSARY TO PREVENT DETERIORATION OF THE BEARING SURFACE.
18. ALL EXCAVATIONS SHALL BE SLOPED, SHORED OR SHIELDED IN ACCORDANCE WITH OSHA REQUIREMENTS.

CONCRETE:

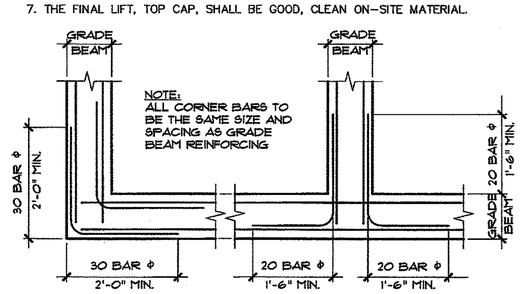
1. CONCRETE WORK SHALL BE EXECUTED IN STRICT ACCORDANCE WITH THE LATEST EDITION OF THE AMERICAN CONCRETE INSTITUTE BUILDING CODE (ACI 318-05).
2. CONCRETE AND REINFORCING SPECIFICATIONS AS FOLLOWS:

	28 DAY STRENGTH	SACK CONTENT	AGGREGATE	SLUMP
Typical	4,000 PSI	6/C.Y.	H.R.	4" TO 6"

3. PORTLAND CEMENT SHALL CONFORM TO ASTM C-33.
4. REINFORCING STEEL SHALL CONFORM TO ASTM 615, GRADE 60; GRADE 40 FOR STIRRUPS AND TIES.
5. ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM A82, GRADE 60.
6. REINFORCING STEEL SHALL BE DESIGNED, DETAILED, FABRICATED, AND PLACED IN ACCORDANCE WITH THE LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES" (ACI 315).
7. SLAB REINFORCING SHALL BE LOCATED IN THE SLABS AS NOTED ON THE DRAWINGS.
8. ALL GRADE BEAM REINFORCING TO BE AS SHOWN IN SECTIONS ON THE DRAWINGS.
9. PROVIDE 2 - #5 BARS EACH SIDE OF ALL OPENINGS. EXTEND BARS TWO (2) FEET PAST OPENINGS EACH DIRECTION.
10. CORNER REINFORCING BARS SHALL BE USED AT ALL CORNERS AND INTERSECTIONS.
11. REINFORCING SPLICES SHALL OCCUR AT POINTS OF MINIMUM STRESS AND LAP THIRTY (30) BAR DIAMETERS UNLESS OTHERWISE NOTED.
12. LAP ALL WELDED WIRE FABRIC EIGHT (8) INCHES MINIMUM.
13. THE INTERIOR FLOOR AREAS THAT DO NOT RECEIVE RESILIENT FLOORING OR SURFACE MATERIAL SHALL BE SEALED. THE TIMING OF THE APPLICATION OF THIS MATERIAL MUST BE APPROVED BY THE ENGINEER. THE MATERIAL IS TO BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED INSTRUCTIONS. (TWO COATS MINIMUM).
14. ALL INTERIOR CONCRETE FLOOR WORK SHALL BE COATED WITH CURING COMPOUND. APPLICATION SHALL BE IN STRICT ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED INSTRUCTIONS.
15. ALL EXTERIOR CONCRETE WALKS AND DRIVES SHALL BE CONSTRUCTED USING AIR-ENTRAINED CONCRETE. SUFFICIENT AIR-ENTRAINING AGENT SHALL BE USED TO REDUCE THE WEIGHT OF THE CONCRETE BY 6% TO 8%.
16. SEE ARCHITECTURAL, CIVIL AND MECHANICAL PLANS FOR VERIFICATION OF ALL DEPRESSIONS, OPENINGS, CAST-IN-PLACE ACCESSORIES, ETC.

VALVE VAULT:

1. THE EXCAVATIONS FOR VALVE VAULT SHALL BE ADEQUATE ENOUGH IN SIZE AND DEPTH TO ACCOMPLISH THE NECESSARY FORMING AND CONCRETE PLACEMENT OPERATIONS.
2. SIDE WALLS FOR ALL EXCAVATION DEEPER THAN 3'-0" SHALL BE EITHER PROPERLY SLOPED BACK OR PROPERLY BRACED PER OSHA REQUIREMENTS.
3. MEANS AND METHODS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
4. PROVIDE A SAND CUSHION BASE OF AT LEAST FOUR (4) INCHES BELOW THE BOTTOM OF THE VALVE VAULT.
5. THE SIDES SHALL BE WATERPROOFED AS REQUIRED.
6. BACKFILL AROUND THE PERIMETER OF THE VAULT, AFTER THEY ARE CONSTRUCTED, SHALL BE SELECT FILL OR GRAVEL, HAND TAMPED/COMPACTED IN PLACE, IN NINE (9) INCH LIFTS.
7. THE FINAL LIFT, TOP CAP, SHALL BE GOOD, CLEAN ON-SITE MATERIAL.



1 TYPICAL CORNER BAR DETAIL
N. T. S.

STATE OF TEXAS
JOE P. HILL
34297
REGISTERED PROFESSIONAL ENGINEER
6/11/10

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JOE P. HILL, P.E. 34297 ON JUNE 11, 2010.

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

Jph
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Jph, P.E. Job No. 10119
JOE P. HILL P.E.
TEXAS FIRM REG. No. F-2335

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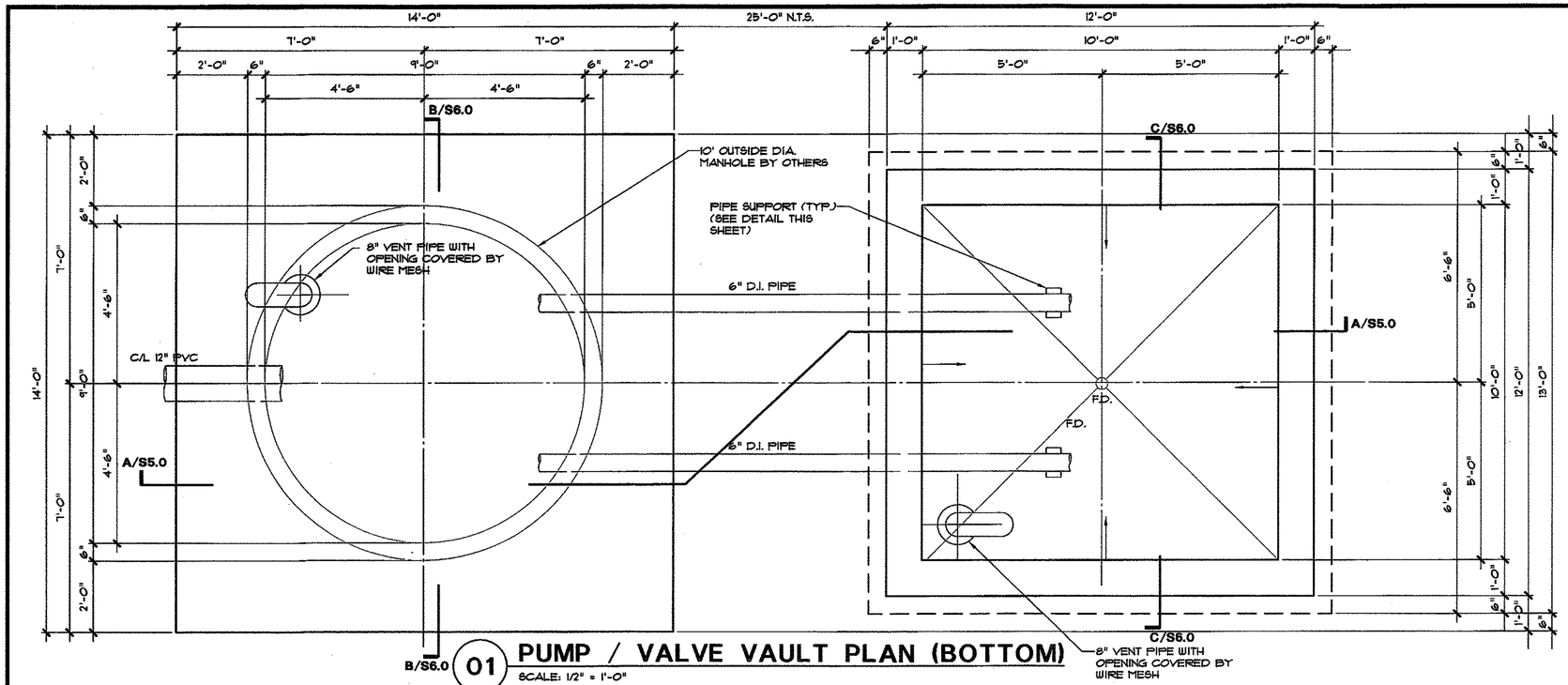
WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
GENERAL STRUCTURAL NOTES
CITY OF LUCAS

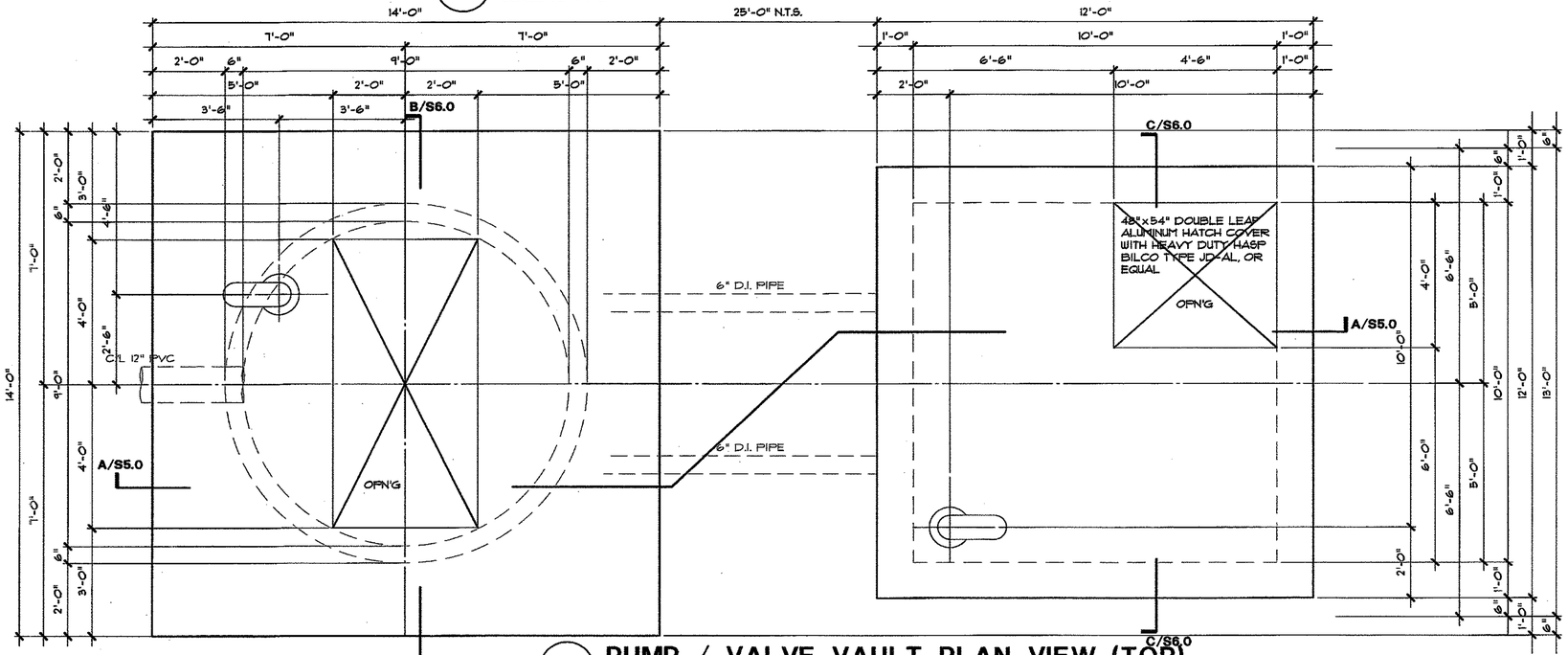
SHEET NO. **S1.0**
OF SHEETS
JOB NO.

X:\E2010\10-118 Lucas Wastewater Lift Station - Lucas, TX\CD\S1.0.dwg, 6/11/2010 9:15:16 AM, \\FS1\RICOH Aficio MP W2400 RPCS, plotted by jimmie



01 PUMP / VALVE VAULT PLAN (BOTTOM)

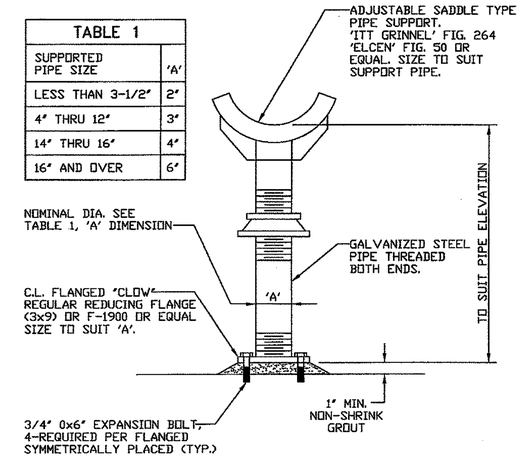
SCALE: 1/2" = 1'-0"



02 PUMP / VALVE VAULT PLAN VIEW (TOP)

SCALE: 1/2" = 1'-0"

TABLE 1	
SUPPORTED PIPE SIZE	'A'
LESS THAN 3-1/2"	2"
4" THRU 12"	3"
14" THRU 16"	4"
16" AND OVER	6"



ADJUSTABLE PIPE SUPPORT

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STATE OF TEXAS
JOE P. HILL
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REGISTERED PROFESSIONAL ENGINEER
6/11/10

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TEXAS FIRM REG. No. F-2335

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WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
PUMP / VALVE VAULT PLANS
CITY OF LUCAS

SHEET NO. **S2.0**
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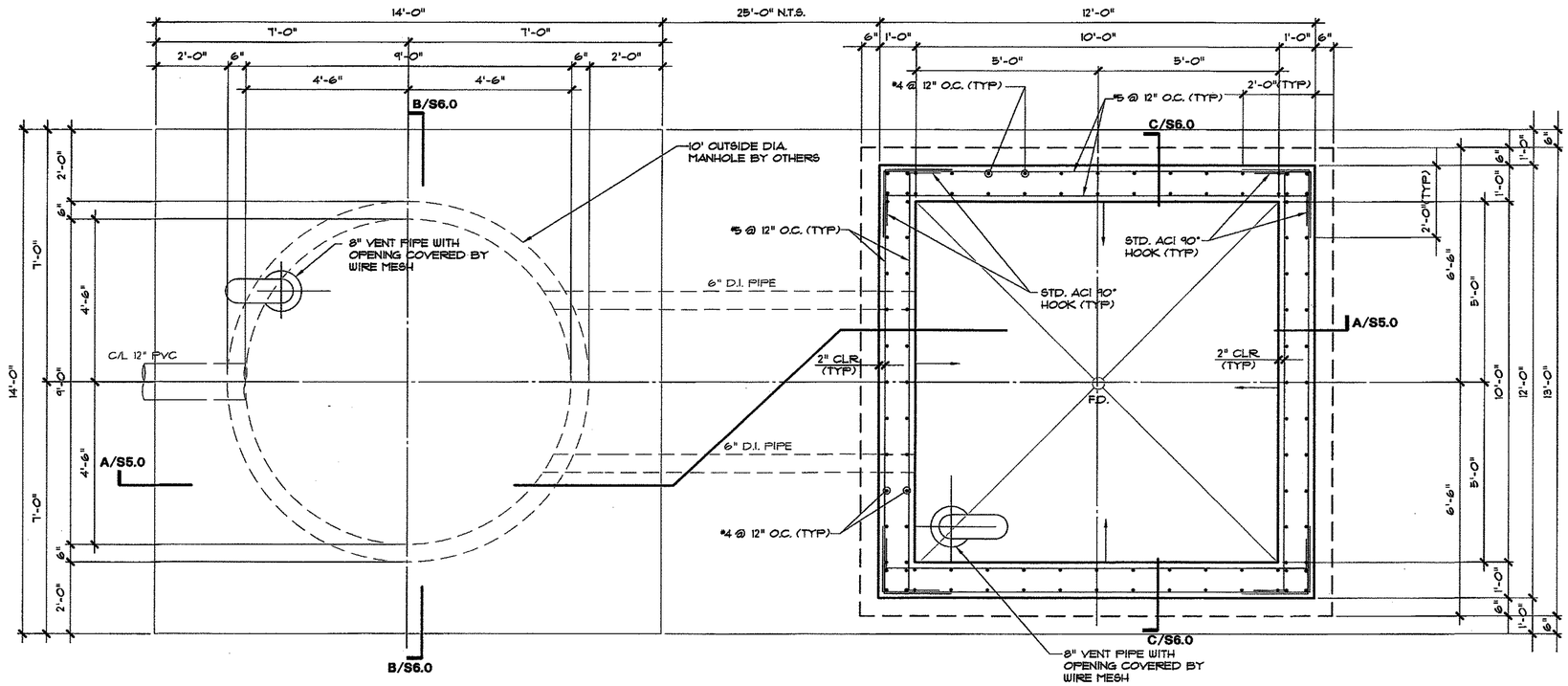
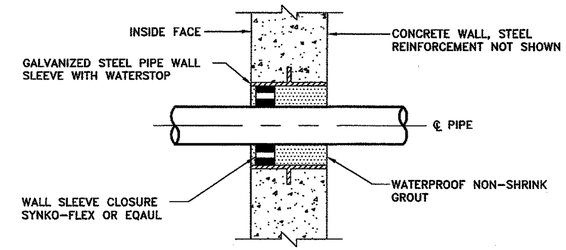


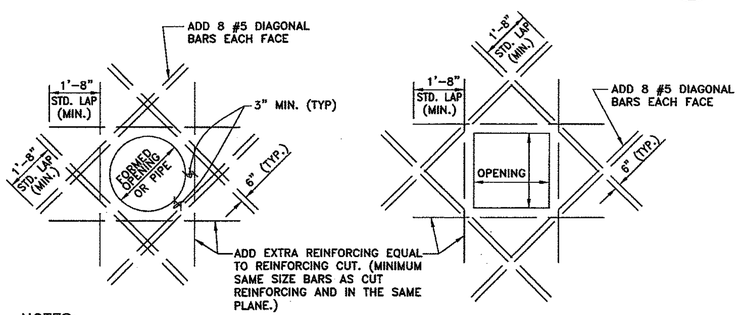
01 PUMP / VALVE VAULT WALL REINFORCING PLAN

SCALE: 1/2" = 1'-0"



WALL SLEEVE CLOSURE DETAIL

NOT TO SCALE

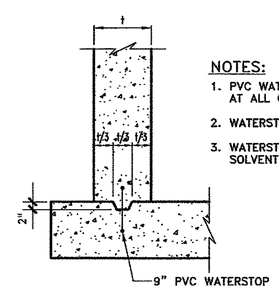


NOTES:

1. SPREAD AND/OR CUT REINFORCING AT OPENINGS. SPREAD BARS NO MORE THAN ONE HALF TYPICAL BAR SPACE.
2. TWO ADDITIONAL #5 VERTICAL BARS SHALL BE LOCATED TO EITHER SIDE OF THE OPENING, EACH FACE.

REINFORCING AT WALL AND SLAB PENETRATION

SCALE: ½" = 1'-0"



NOTES:

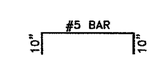
1. PVC WATERSTOP SHALL BE INSTALLED AT ALL CONSTRUCTION JOINTS.
2. WATERSTOP SHALL BE CONTINUOUS.
3. WATERSTOP SPLICES SHALL BE SOLVENT WELDED.

WATERSTOP DETAIL

NOT TO SCALE

RECORD DRAWING

BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.



STD. ACI 90° HOOK

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STATE OF TEXAS
JOE P. HILL
34297
REGISTERED
PROFESSIONAL ENGINEER
6/11/10

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jph

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WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
PUMP / VALVE VAULT WALL REINFORCING PLAN
CITY OF LUCAS

SHEET NO. **S3.0**
OF SHEETS
JOB NO.

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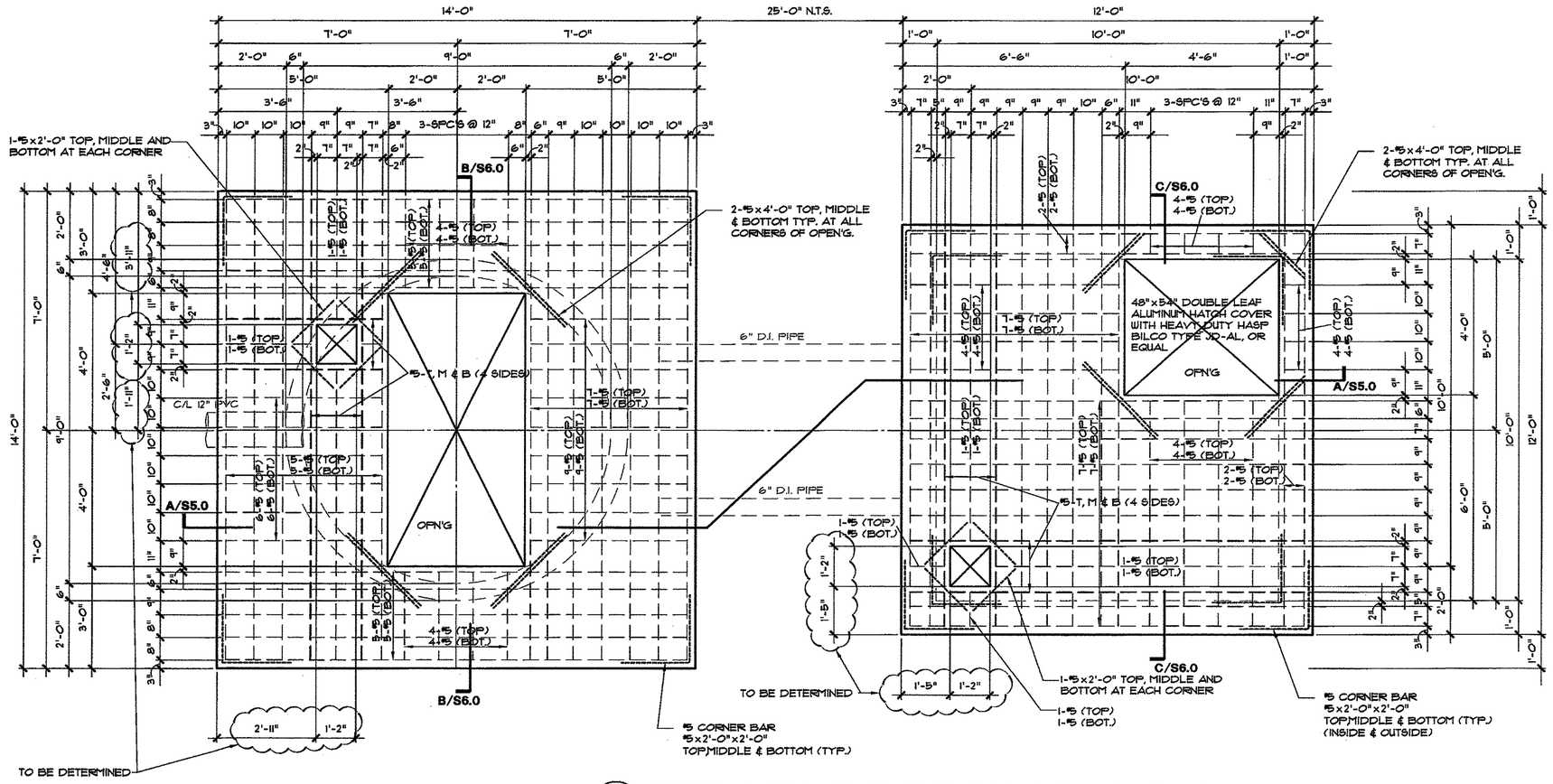

01 PUMP / VALVE VAULT TOP REINFORCING PLAN

SCALE: 1/2" = 1'-0"

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RECORD DRAWING

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TEXAS FIRM REG. No. F-2335

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WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
PUMP / VALVE VAULT TOP REINFORCING PLAN
CITY OF LUCAS

SHEET NO. **S4.0**
OF SHEETS
JOB NO.

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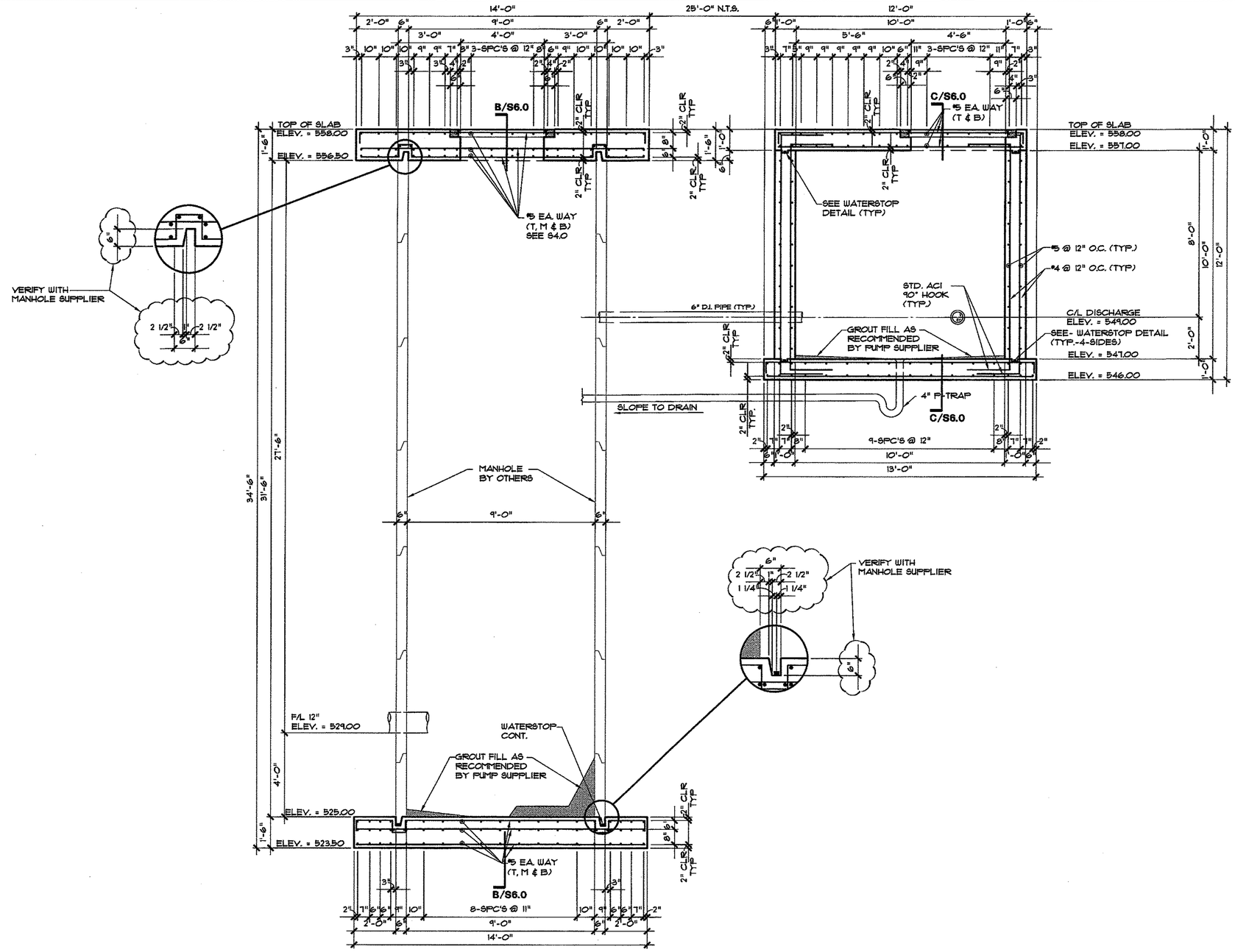

(A-A) PUMP / VALVE VAULT SECTIONS / REINFORCING

SCALE: 3/8" = 1'-0"

RECORD DRAWING

BASED ON CONTRACTOR MARKUPS, NOT FIELD SURVEY.

STATE OF TEXAS — JOE P. HILL — 34297 — REGISTERED PROFESSIONAL ENGINEER — 6/11/10

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JOE P. HILL, P.E. 34297 ON JUNE 11, 2010.

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JOE P. HILL P.E.
TEXAS FIRM REG. No. F-2335

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WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
PUMP / VALVE VAULT SECTIONS / REINFORCING
CITY OF LUCAS

SHEET NO. **S5.0**
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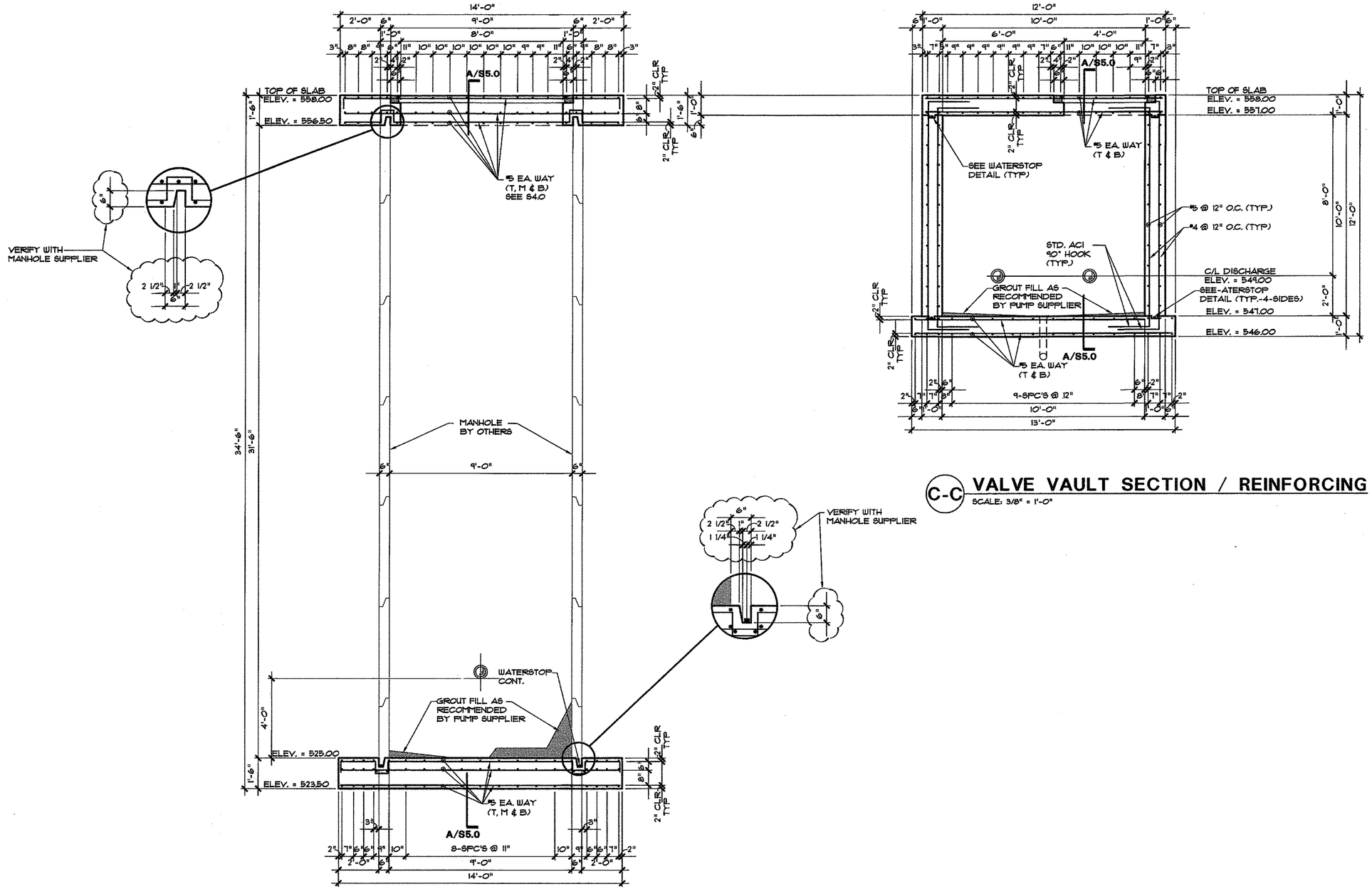

C-C VALVE VAULT SECTION / REINFORCING

SCALE: 3/8" = 1'-0"

B-B PUMP SECTION / REINFORCING

SCALE: 3/8" = 1'-0"

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STATE OF TEXAS
JOE P. HILL
34297
REGISTERED PROFESSIONAL ENGINEER
6/11/10

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JOE P. HILL P.E.
TEXAS FIRM REG. No. F-2335

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WASTEWATER SYSTEM IMPROVEMENTS
WASTEWATER FORCE MAIN AND LIFT STATION
PUMP / VALVE VAULT SECTIONS / REINFORCING
CITY OF LUCAS

SHEET NO. **S6.0**
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