

CITY OF LUCAS, TEXAS

LUCAS PUMP STATION #2 & HIGHLAND CIRCLE 8" WATERLINE

JUNE 2006

RECORD DRAWINGS

MAYOR:

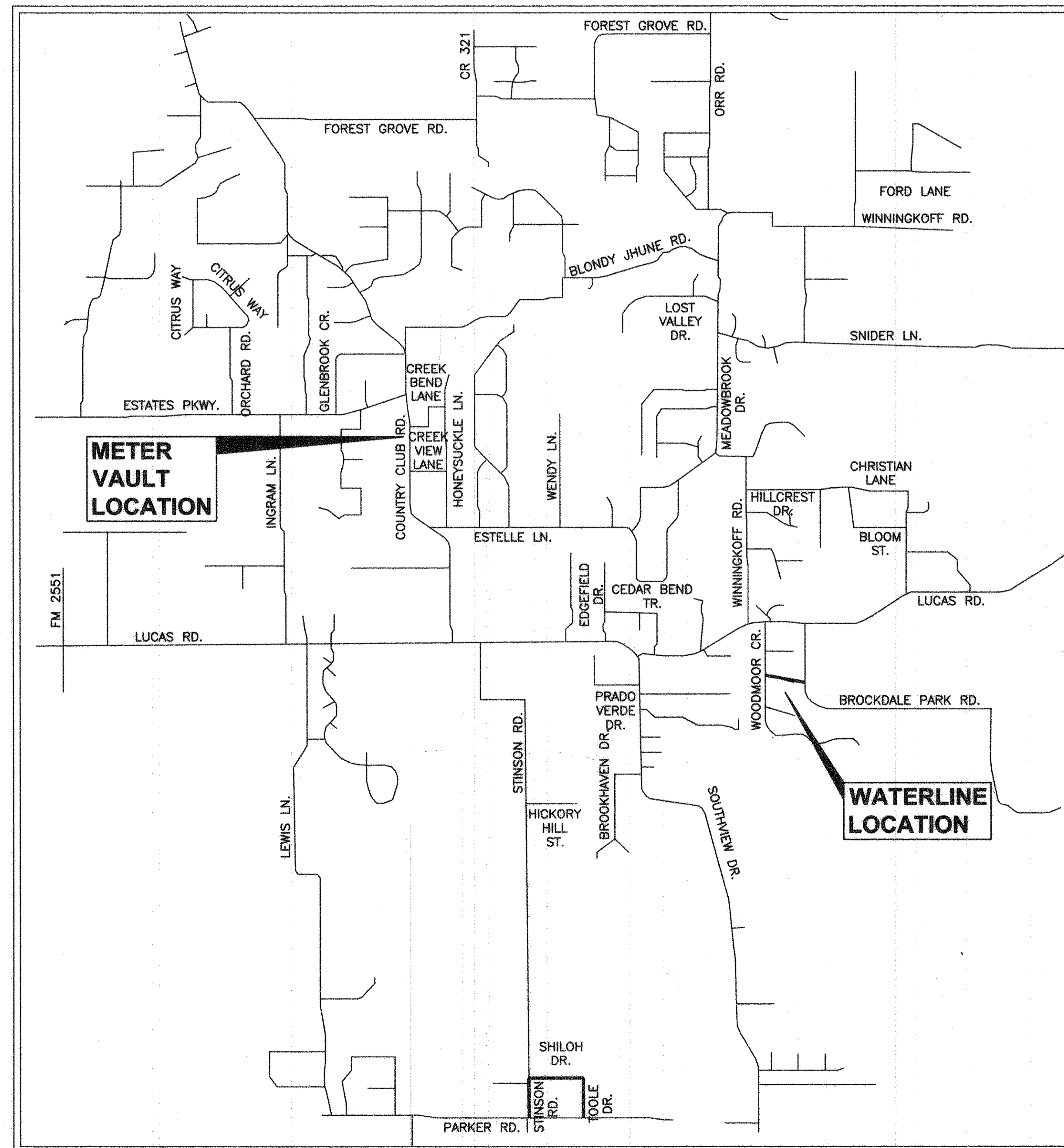
BOB SANDERS

CITY ADMINISTRATOR:

CHARLES FENNER

COUNCIL MEMBERS:

BILL CARMICKLE
DEBBIE FISHER
TONDA FRAZIER
DON ZRINY
KATHLEEN PEELE



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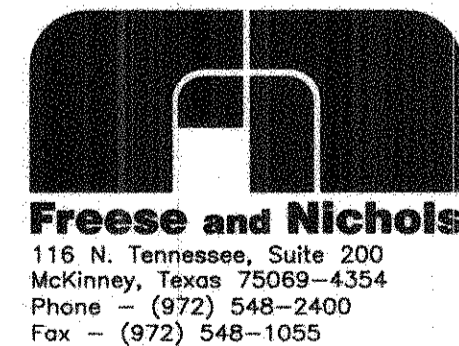
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LCA06189



This Record Drawing is a combination of the sealed engineering contract drawings for this project, modified by information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on file at the offices of
FREESE AND NICHOLS, INC.
4055 INTERNATIONAL PLAZA, SUITE 200
FORT WORTH, TEXAS 76109-4895
(817) 735-7300
RECORD DRAWINGS PREPARED ON:
11/29/2007

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VICINITY MAP

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GENERAL CONSTRUCTION NOTES:

1. PRIOR TO ANY CONSTRUCTION THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE CONTRACT DOCUMENTS AND SPECIFICATIONS, THE PLANS INCLUDING ALL NOTES, THE STANDARD SPECIFICATIONS OF PUBLIC WORKS CONSTRUCTION NORTH CENTRAL TEXAS AND THE CITY OF LUCAS STANDARDS FOR CONSTRUCTION AND ANY OTHER APPLICABLE STANDARDS AND SPECIFICATIONS RELEVANT TO THE PROPER COMPLETION OF THE WORK SPECIFIED. FAILURE ON THE PART OF THE CONTRACTOR TO FAMILIARIZE HIMSELF WITH ALL STANDARDS OR SPECIFICATIONS PERTAINING TO THIS WORK SHALL IN NO WAY RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR PERFORMING THE WORK IN ACCORDANCE WITH ALL SUCH APPLICABLE STANDARDS AND SPECIFICATIONS.

2. ALL EXISTING UTILITIES ARE AS PER AVAILABLE RECORDS. THE CONTRACTOR SHALL FIELD VERIFY DEPTH AND LOCATION OF ALL UTILITIES.

3. VERIFY LOCATIONS OF FRANCHISE UTILITIES BEFORE BEGINNING EXCAVATION. IF NECESSARY, DIG TEST DITCHES TO DETERMINE ACTUAL FIELD CONDITIONS. THE CONTRACTOR SHALL NOTIFY A REPRESENTATIVE OF THE FOLLOWING AGENCIES NOT LESS THAN 72 HOURS BEFORE BEGINNING WORK WITHIN THE AGENCIES' R.O.W.'S OR NEAR THEIR FACILITIES. IT WILL BE THE RESPONSIBILITY OF EACH CONTRACTOR TO PROTECT ALL EXISTING PUBLIC AND PRIVATE UTILITIES THROUGHOUT THE CONSTRUCTION OF THIS PROJECT. CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES FOR LINE LOCATIONS PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL ASSUME FULL LIABILITY TO THOSE COMPANIES FOR ANY DAMAGE CAUSED TO THEIR FACILITIES.

- CITY OF LUCAS 972-727-8999
- CO-SERVE ELECTRIC 940-390-8034
- CO-SERVE GAS 940-321-7800 EXT. 7555
- GRAYSON AND COLLIN COUNTY ELECTRIC CORPORATION 800-967-5235
- ATMOS ENERGY (GAS) 972-485-6270
- SOUTHWESTERN BELL TELEPHONE 800-395-0440
- COMCAST CABLE 972-416-6385
- TEXAS DEPT. OF TRANS. (TXDOT) DALLAS DISTRICT 214-320-6100
- TXU ELECTRIC DELIVERY 972-699-2920
- UTILITY LINE LOCATOR 800-DIG-TESS
- GRANDE COMMUNICATIONS 940-270-7413

4. CONTRACTOR SHALL HAVE IN HIS POSSESSION, PRIOR TO CONSTRUCTION, ALL NECESSARY PERMITS, LICENSES, ETC. CONTRACTOR SHALL HAVE AT LEAST ONE SET OF APPROVED ENGINEERING PLANS AND SPECIFICATIONS ON-SITE AT ALL TIMES. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL CAREFULLY REVIEW AND BECOME FAMILIAR WITH ALL SITE CERTIFICATES ASSOCIATED WITH THE PROJECT. THE SITE CERTIFICATES CONTAIN SPECIAL CONDITIONS THAT THE CONTRACTOR WILL BE REQUIRED TO FOLLOW. ALL WORK ASSOCIATED WITH THE SITE CERTIFICATE REQUIREMENTS WILL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE PIPELINE PROJECT AND NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE.

5. IN THE EVENT AN ITEM IS NOT COVERED IN THE CITY OF LUCAS CONSTRUCTION STANDARDS, SPECIFICATIONS, AND DETAILS, THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS (NCTCOG) STANDARDS SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION SHALL APPLY WITH CONCURRING NOTIFICATION TO THE CITY ENGINEER AND PROJECT ENGINEER. THE CITY ENGINEER SHALL HAVE THE FINAL DECISION ON ALL CONSTRUCTION MATERIALS, METHODS, AND PROCEDURES.

6. CONSTRUCTION INSPECTION WILL BE PERFORMED BY REPRESENTATIVES OF THE OWNER, ENGINEER, CITY GEOTECHNICAL ENGINEER, AND REVIEWING AUTHORITIES AND AGENCIES. UNRESTRICTED ACCESS SHALL BE PROVIDED TO THEM AT ALL TIMES. CONTRACTOR IS RESPONSIBLE FOR UNDERSTANDING AND SCHEDULING REQUIRED INSPECTIONS. TESTING SAMPLES SHALL BE COLLECTED AND PROCESSED BY CERTIFIED TECHNICIANS.

7. ALL WORK SHALL CONFORM TO THE CITY OF LUCAS CONSTRUCTION STANDARDS, SPECIFICATIONS, AND DETAILS, UNLESS SHOWN OTHERWISE IN THE PLANS AND SPECIFICATIONS.

8. ALL CONTRACTORS MUST CONFINE THEIR ACTIVITIES TO THE CONTRACTOR WORK AREA. NO ENCROACHMENTS OUTSIDE THE CONTRACTOR WORK AREA WILL BE ALLOWED. ANY DAMAGE RESULTING THEREFROM SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR.

9. THE CONTRACTOR SHALL NOTIFY THE RESIDENTS 7 WORKING DAYS PRIOR TO MOVE-IN, 24 HOURS PRIOR TO CONSTRUCTION, AND 48 HOURS PRIOR TO INTERRUPTING ANY SERVICE.

10. THE CONTRACTOR SHALL NOTIFY ALL EMERGENCY UNITS AND SCHOOL DISTRICTS OPERATING WITHIN THE AREA OF THE PROPOSED WORK OF STREET OR LANE CLOSURES AND CONSTRUCTION SCHEDULES.

11. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT ALL PUBLIC UTILITIES IN THE CONSTRUCTION OF THIS PROJECT. ALL STORM SEWER INLETS, MANHOLES, CLEANOUTS, VALVE BOXES, METER BOXES, FIRE HYDRANTS, GAS MAINS, ELECTRIC AND TELEPHONE DUCT BANKS, ETC. MUST BE ADJUSTED TO PROPER LINE AND GRADE BY THE CONTRACTOR PRIOR TO AND AFTER THE PLACING OF PERMANENT PAVING.

12. THE CONTRACTOR SHALL OBTAIN APPROVAL OF THE INSTALLATION OF ALL UNDERGROUND FACILITIES UNDER THE PROPOSED PAVEMENT PRIOR TO PLACEMENT OF ANY PAVEMENT.

13. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TRENCH SAFETY REQUIREMENTS IN ACCORDANCE WITH CITY STANDARDS, TEXAS STATE LAW, AND O.S.H.A. STANDARDS FOR ALL EXCAVATIONS IN EXCESS OF FIVE FEET IN DEPTH. TRENCH SAFETY DESIGN WILL BE THE RESPONSIBILITY OF THE UTILITY CONTRACTOR. CONTRACTOR SHALL SUBMIT A TRENCH SAFETY DESIGN APPROVED BY A PROFESSIONAL ENGINEER TO THE CITY ENGINEERING DEPARTMENT FOR REVIEW PRIOR TO THE START OF ANY UTILITY CONSTRUCTION.

14. TRAFFIC CONTROL AND PROTECTIVE DEVICES SHALL BE USED AND SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM CONTROL DEVICES FOR STREETS AND HIGHWAYS. BARRICADES, WARNING SIGNS, FLARES, FLASHING DEVICES, AND FLAG PERSONS, SHALL BE PROVIDED BY THE CONTRACTOR. TRAFFIC CONTROL SHALL INCLUDE A FLASHING ARROW BOARD, TO HELP CONTROL TRAFFIC FLOW. IF AT ANYTIME DURING CONSTRUCTION THE CONTRACTORS PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE FOR THE SAFE, COMFORTABLE MOVEMENT OF TRAFFIC, THE CONTRACTOR SHALL IMMEDIATELY CHANGE HIS OPERATIONS TO CORRECT THE UNSATISFACTORY CONDITIONS. THIS SHALL BE PAID FOR AT THE LUMP SUM BID PRICE INCLUDED IN THE BID.

15. EXISTING IMPROVEMENTS INCLUDING, BUT NOT LIMITED TO FENCES, DRIVEWAYS, SIDEWALKS, PAVEMENT, CURBS, UTILITY PIPELINES AND DRAINAGE STRUCTURES WHICH ARE REMOVED OR ALTERED TO PERMIT INSTALLATION OF THE WORK SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR, AT THE CONTRACTOR'S EXPENSE, IN THE SAME LOCATION AND IN CONDITION AS GOOD AS OR BETTER THAN THEY WERE FOUND.

16. THE CONTRACTOR SHALL AVOID DAMAGING ANY EXISTING SPRINKLER SYSTEM THAT MAY BE IN THE CONSTRUCTION AREA AND WILL BE RESPONSIBLE FOR REPAIRS TO ANY HEADS OR LINES DAMAGED. REPLACEMENT, AS NECESSARY, SHALL BE WITH LIKE OR BETTER MATERIAL INSTALLED BY A LICENSED IRRIGATOR, AT THE CONTRACTOR'S EXPENSE.

17. ALL GATES SHALL BE KEPT CLOSED TO CONTROL ACCESS TO THE PROJECT SITE. THE CONTRACTOR SHALL MAINTAIN SUITABLE CONSTRUCTION ACCESS TO THE ENGINEER AND THE CITY AT ALL TIMES DURING CONSTRUCTION.

18. THE CONTRACTOR MUST HAVE A WRITTEN AGREEMENT WITH THE PROPERTY OWNER ON FILE WITH THE CITY BEFORE THE CONTRACTOR MAY USE OR PLACE ANY MATERIALS OR EQUIPMENT ON PRIVATE PROPERTY. LETTERS OF FINAL APPROVAL AND RELEASE FROM THE AFFECTED PROPERTY OWNER(S) MUST BE SUBMITTED TO THE CITY BEFORE FINAL PAYMENT WILL BE AUTHORIZED ON THIS PROJECT. NO EXCESS EXCAVATED MATERIAL SHALL BE DEPOSITED IN LOW AREAS OR ALONG ANY NATURAL DRAINAGE WAY, WITHOUT WRITTEN PERMISSION FROM THE ENGINEER. IF THE CONTRACTOR PLACES EXCESS MATERIAL IN AREAS WITHOUT WRITTEN PERMISSION, HE WILL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM SUCH FILL AND HE SHALL REMOVE THE MATERIAL AT HIS OWN COST IF THE CITY SO DIRECTS.

19. THE CONTRACTOR IS RESPONSIBLE FOR KEEPING STREETS AND SIDEWALKS ADJACENT TO THE PROJECT FREE OF MUD AND DEBRIS FROM CONSTRUCTION AT ALL TIMES.

20. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLY WITH THE EPA'S NPDES REGULATIONS 40-CFR-122, 123, 124 CONCERNING EROSION AND SEDIMENT CONTROL.

21. ONLY THOSE ITEMS LISTED IN THE BID SCHEDULE WILL BE MEASURED AND PAID FOR AT THE UNIT PRICE. ALL OTHER WORK NOT LISTED IN THE BID SCHEDULE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE VARIOUS BID ITEMS AND ARE INCIDENTAL TO THE PROJECT.

22. THE CONTRACTOR SHALL NOTIFY THE WATER DEPARTMENT AT LEAST 48 HOURS PRIOR TO START OF ANY CONSTRUCTION THAT MIGHT AFFECT THEIR FACILITIES.

24. ALL GAS, TELEPHONE, CABLE AND POWER LINES TO BE ADJUSTED BY OTHERS. POWER POLES WITHIN PROJECT PAVING LIMITS SHALL BE ADJUSTED BY OTHERS PRIOR TO CONSTRUCTION. GAS METERS SHALL BE RELOCATED BY THE CONTRACTOR AND PAID FOR AT THE PRICE BID.

25. THE CONTRACTOR SHALL PROVIDE A CLEAR AND SAFE ROUTE FOR PEDESTRIANS THROUGHOUT THE DURATION OF CONSTRUCTION.

26. THE CONTRACTOR SHALL PROTECT THE EXISTING TREES, BUSHES, LANDSCAPING PLANTS, SPRINKLERS, AND LAWNS UNLESS NOTED OTHERWISE ON THE CONSTRUCTION DRAWINGS. ANY DAMAGE TO THE EXISTING TREES, BUSHES, LANDSCAPING PLANTS, SPRINKLERS, AND LAWNS CAUSED BY THE CONSTRUCTION SHALL BE REPLACED TO THE SATISFACTION OF THE CITY AT NO ADDITIONAL COST TO THE CITY. CONTINUOUS MAINT SERVICE SHALL BE PROVIDED DURING CONSTRUCTION.

27. ALL FILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY IN A MAXIMUM OF 6-INCHES LIFTS OR PER GEOTECHNICAL ENGINEERS REPORT.

28. ALL TRENCH BACKFILL IN UNPAVED AREAS SHALL BE PLACED TO MATCH EXISTING GRADES.

29. THE ELECTRIC COMPANIES REQUIRE THAT SHORING BE USED IN OPEN TRENCHES WITHIN 5- FEET (ANY DIRECTION) OF DISTRIBUTION POLES AND 25- FEET OF TRANSMISSION TOWERS, UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL DESIGN THE SHORING TO ACCOUNT FOR ADDITIONAL SURCHARGE LOADS OF THE POLE AND TOWER FOUNDATIONS ACTING ON THE SHORING. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DESIGNING ALL SHORING AND FOR PROTECTING ALL ELECTRICAL POLES AND TOWERS. CONTRACTOR SHALL PULL PIPE AS REQUIRED TO MAINTAIN MINIMUM DISTANCES FORM POLES AND TOWERS. SEE SPECIFICATIONS FOR MAXIMUM PIPE DEFLECTIONS.

30. THE CONTRACTOR SHALL ABIDE BY ALL TEXAS COMMISSION ON ENVIRONMENTAL QUALITY(TCEQ) STANDARDS FOR INSTALLING POTABLE WATER PIPELINES. SPECIAL ATTENTIONS SHALL BE GIVEN TO THESE STANDARDS REGARDING DISINFECTION PROCEDURES AND NEW WATER LINES CROSSING EXISTING SEWER LINES. THE CONTRACTOR SHALL PLACE ALL UNDERGROUND WATER AND WASTEWATER (SEWER) LINES IN ACCORDANCE WITH THE TCEQ'S RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS EFFECTIVE DECEMBER 1995, OR LATEST REVISION, AND DESIGN CRITERIA FOR SEWAGE SYSTEMS. WHERE THE WATER LINE CROSSES A SEWER LINE, THE WATER LINE AND SEWER LINE SEPARATION DISTANCE SHALL BE A MINIMUM OF 2- FEET 0- INCHES VERTICALLY, AND ONE JOINT (18- FEET MIN.) CENTERED OVER WATER LINE, OF EITHER DIP OR PVC (CLASS 150) PIPE SHALL BE INSTALLED IN SEWER FACILITY. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE PIPELINE PROJECT AND NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE. PAYMENT FOR CAST IRON, DUCTILE IRON OR PVC PIPE WITH 150 PSI PRESSURE RATING PIPE SHALL BE PAID FOR AT THE CONTRACT PRICE PER LINEAR FOOT OF PIPE COMPLETE IN PLACE. THE CONTRACT PRICE SHALL BE TOTAL COMPENSATION FOR THE FURNISHING OF ALL LABOR, MATERIALS, FITTINGS, JOINT MATERIALS, EXCAVATION, EMBEDMENT, BACKFILL, AND REMOVAL AND REPLACEMENT OF SOD IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. REPAIRS TO WATER OR SANITARY SERVICES BETWEEN THE WATER METER OR CLEANOUT AND THE HOUSE OR BUSINESS MUST BE PERFORMED BY A LICENSED PLUMBER AND A PLUMBING PERMIT SHALL BE OBTAINED. PERMIT FEES ARE INCIDENTAL TO THE REQUIRED WORK.

31. THE CONTRACTOR SHALL VERIFY BY TESTING ALL SERVICE CONNECTIONS TO DETERMINE IF THEY ARE ACTIVE OR INACTIVE. ONLY ACTIVE SERVICES SHALL BE CONNECTED TO THE NEW SANITARY SEWER LINE. INACTIVE SERVICE LINES SHALL BE PLUGGED WITH GROUT. THE CONTRACTOR SHALL B

32. CONCRETE ENCASE NEW UTILITIES WHICH CROSS THE NEW SEWER LINE IF THE VERTICAL CLEARANCE BETWEEN NEW UTILITY LINE AND NEW SEWER IS LESS THAN 2- FEET 0- INCHES. THERE SHALL NOT BE A SEPARATE PAY ITEM FOR CONCRETE ENCASEMENT OF NEW UTILITIES UNLESS NOTED OTHERWISE ON THE DRAWINGS.

33. ALL 6- INCH, 8- INCH AND 12- INCH WATER MAINS TO BE AWWA C900 PVC PIPE. ALL WATER LINE FITTINGS TO BE DUCTILE IRON. ALL VALVES SHALL BE AWWA APPROVED RESILIENT WEDGE GATE VALVES. MINIMUM COVER SHALL BE 3.5 FEET FOR 6- INCH LINES, 4.0 FEET FOR 8- INCH LINES AND 4.5 FEET FOR 12- INCH LINES.

34. ALL PVC WATER LINES SHALL HAVE CLASS "4" EMBEDMENT UNLESS NOTED OTHERWISE ON THE DRAWINGS.

35. PLUG EACH END OF EXISTING WATER LINE TO BE ABANDONED AFTER FINAL ACCEPTANCE OF NEW LINE AND SERVICES.

36. PROVIDE CONCRETE THRUST BLOCKING SIZED AND LOCATED AS REQUIRED.

37. ALL GATE VALVES SHALL BE RESILIENT SEATED GATE VALVES AND SHALL CONFORM TO AWWA SPECIFICATION C-509.

38. FIRE HYDRANTS WILL BE PLACED 2 TO 3 FEET FROM BACK OF CURB UNLESS OTHERWISE INDICATED ON THE PLANS, OR AS REQUIRED TO CLEAR SIDEWALKS.

39. FIRE HYDRANTS SHALL BE THREE WAY BREAKAWAY TYPE NO LESS THAN 5- 1/4 INCHES IN SIZE AND MUST CONFORM TO AWWA SPECIFICATIONS C-502. THEY SHALL BE MUELLER "CENTURION", CLOW "MEDALLION", OR WATERLOUS WITH ALL BRONZE TO BRONZE MOVING PARTS. TWO 2- 1/2- INCH NST HOSE CONNECTIONS ARE REQUIRED. THE 4- INCH STEAMER CONNECTION SHALL BE 4.800 PITCH DIAMETER WITH 4 THREADS PER INCH. THE OPERATING NUT SHALL BE 1- 1/2- INCH P TO F PENTAGON NUT, OPEN LEFT. MECHANICAL JOINT CONNECTION IS REQUIRED.

40. VALVE EXTENSIONS SHALL BE PROVIDED ON ALL VALVES WITH OPERATING NUTS GREATER THE 5" BELOW FINISHED GROUND OR PAVING GRADE.

41. ALL EXISTING WATER VALVES ON ABANDONED WATER LINES SHALL HAVE THE VALVE STACKS REMOVED AND SHALL BE FILLED WITH TYPE "B" CONCRETE. THIS SHALL BE CONSIDERED SUBSIDIARY TO THE OTHER BID ITEMS.

42. ALL WATER LINE SERVICES SHALL BE REPLACED WITH A NEW WATER LINE SERVICE (MINIMUM 1- INCH IN DIAMETER) OF THE SAME SIZE SERVICE FROM THE NEW MAIN LINE TO THE PROPERTY LINE. THE METER BOX SHALL BE PLACED SO IT CLEARS THE PROPOSED PAVING. THE SERVICE CONNECTION SHALL BE TYPE "K" COPPER PIPE CONFORMING TO ASTM B-88 AND WILL BE PAID FOR EACH CONNECTION FOR THE DIFFERENT MATERIALS, LOCATING SERVICE LINES, REMOVAL OF EXISTING SERVICE LINES, EXCAVATION, EMBEDMENT, TRENCH BACKFILLED, RESTORATION AND TESTING. ALL SERVICES SHALL HAVE NEW METER BOXES. ALL SERVICES ARE TO BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD. VACANT LOTS SHALL HAVE LINE AND BOX INSTALLED AT PROPERTY LINE; PLUG LINE.

43. EACH METER BOX WILL BE LOCATED ADJACENT TO THE PROPERTY LINE AND INSTALLED AFTER STREET PAVEMENT HAS BEEN COMPLETED AND FINAL GRADING. METER BOX SHALL MEET THE CITY OF LUCAS STANDARDS.

44. PROVIDE A NEW 1- INCH DIAMETER TYPE "K" COPPER SERVICE LINE AND METER BOX TO ALL OCCUPIED AND VACANT PROPERTIES AS SHOWN ON THE DRAWINGS. ALL WATER SERVICES SHALL BE 1 INCH MINIMUM TYPE "K" COPPER TUBING, 1 INCH MINIMUM COMPRESSION FITTING ANGLE STOP, AND METER BOX, UNLESS OTHERWISE INDICATED ON THE PLANS. ANGLE STOPS WILL BE LOCATED WITHIN THE METER BOX AND FACING TOWARD THE LOT PER CITY OF LUCAS CONSTRUCTION DETAILS.

45. ALL COPPER WATER SERVICE LINES SHALL BE EMBEDDED WITH 6" SAND BELOW AND AROUND THE PIPE AND 1" OF SAND OVER THE TOP OF THE PIPE; FROM THE WATER MAIN TO THE METER.

46. THE EXACT LOCATION OF THE EXISTING WATER LINES IS UNKNOWN. IF THE EXISTING WATER LINE IS TO BE ABANDONED, AND THE NEW WATER OR SEWER LINE CONFLICTS WITH THE EXISTING LINE, THEN REMOVE THE EXISTING LINE WHERE THERE IS LESS THAN 1- FOOT OF CLEARANCE BETWEEN THE LINES. IF THE WATER LINE IS AC, IT SHALL BE DISPOSED OF IN ACCORDANCE WITH THE CURRENT FEDERAL REGULATIONS.

47. CONTRACTOR SHALL INSTALL ALL PIPE ON GRADUAL VERTICAL CURVATURES TO PRECLUDE THE NECESSITY OF USING FITTINGS FOR BENDS TO ACCOMMODATE VERTICAL DEFLECTIONS AND TO ELIMINATE THE USE OF VERTICAL THRUST BLOCKING, EXCEPT WHERE SHOWN ON PLANS. PIPE MANUFACTURER SHALL ASSIST CONTRACTOR IN INSTALLATION OF PIPE BY PROVIDING PIPE LAY SCHEDULES WHICH ALLOW FOR VERTICAL CURVATURE DEFLECTION AND DO NOT REQUIRE FITTINGS AND/OR VERTICAL THRUST BLOCKING.

48. UNLESS SPECIFICALLY STATED ON A DRAWING, THE CONTRACTOR SHALL NOT REMOVE, CUT OR DAMAGE TREES OR LIMBS WITHOUT WRITTEN APPROVAL OF THE CITY.

49. CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING ALL EXISTING UTILITIES IN SERVICE DURING CONSTRUCTION.

50. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING WATER CONNECTIONS TO ALL HOMES AND BUSINESSES IN WORKING ORDER AT ALL TIMES, EXCEPT FOR BRIEF INTERRUPTIONS IN SERVICE FOR WATER SERVICES TO BE REINSTALLED. IN NO CASE SHALL SERVICES BE ALLOWED TO REMAIN OUT OF SERVICE OVERNIGHT.

51. NO FIRES WILL BE ALLOWED. BRUSH AND CONSTRUCTION DEBRIS SHALL BE REMOVED FROM THE SITE.

52. THE CONTRACTOR SHALL RESTORE, AT HIS OWN EXPENSE, TEMPORARY ROADS AND CONSTRUCTION WORK AREAS TO PRECONSTRUCTION CONDITIONS OR BETTER.

53. CONTRACTOR SHALL RESEED ALL AREAS THAT HAVE BEEN DISTURBED BY CONSTRUCTION ACTIVITIES, INCLUDING STAGING AND BORROW AREAS. RESEEDING SHALL BE IN ACCORDANCE WITH PROJECT SPECIFICATIONS SECTION 02488.

LEGEND OF SYMBOLS

— 12W —	EX. WATERLINE & SIZE		CONCRETE PAVING
	GATE VALVE		ASPHALT PAVING
---	LIMITS OF TEMPORARY EASEMENT		GRAVEL PAVING
---	LIMITS OF PERMANENT EASEMENT		TREE
— R —	PROPERTY LINE AND / OR R.O.W.		
	EXISTING WATER VALVE		
	WATER METER OR GAS METER		
	FIRE HYDRANT		
— OHE —	OVERHEAD ELECTRIC		
— UGT —	UNDERGROUND TELEPHONE LINE		
--- UE ---	UNDERGROUND ELECTRIC LINE		
— F/O —	FIBER OPTIC LINE		
	POWER POLE		
	BARBED WIRE FENCE		
	CHAIN LINK FENCE		
	WOOD FENCE		
	VAULT		
	REDUCER		

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CITY OF LUCAS, TEXAS
LUCAS PUMP STATION #2
 & HIGHLAND CIRCLE 8" ATERLINE
 DETAILS

THE SEAL, WHEN PROBABLY APPLIED ON THIS DOCUMENT WAS AUTHORIZED BY STATE ENGINEER, J. L. ...
 AUTHORIZING OF A SEALED DOCUMENT WITHOUT PROPER EXAMINATION OF THE SAME BY THE STATE ENGINEER IS UNLAWFUL UNDER THE TEXAS ENGINEERING PROVISIONS ACT.

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 McKinney, Texas 75069-4354
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NO.	ISSUE	BY	DATE	FILE NO.	DATE	DESIGNED	CCB	DRAWN	CLL	CHECKED	KRU
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VERIFY SCALE

SHEET **GN-1**

1 OF 13

ACAD: Rel: 17.0s (LMS Tech) User: ofm
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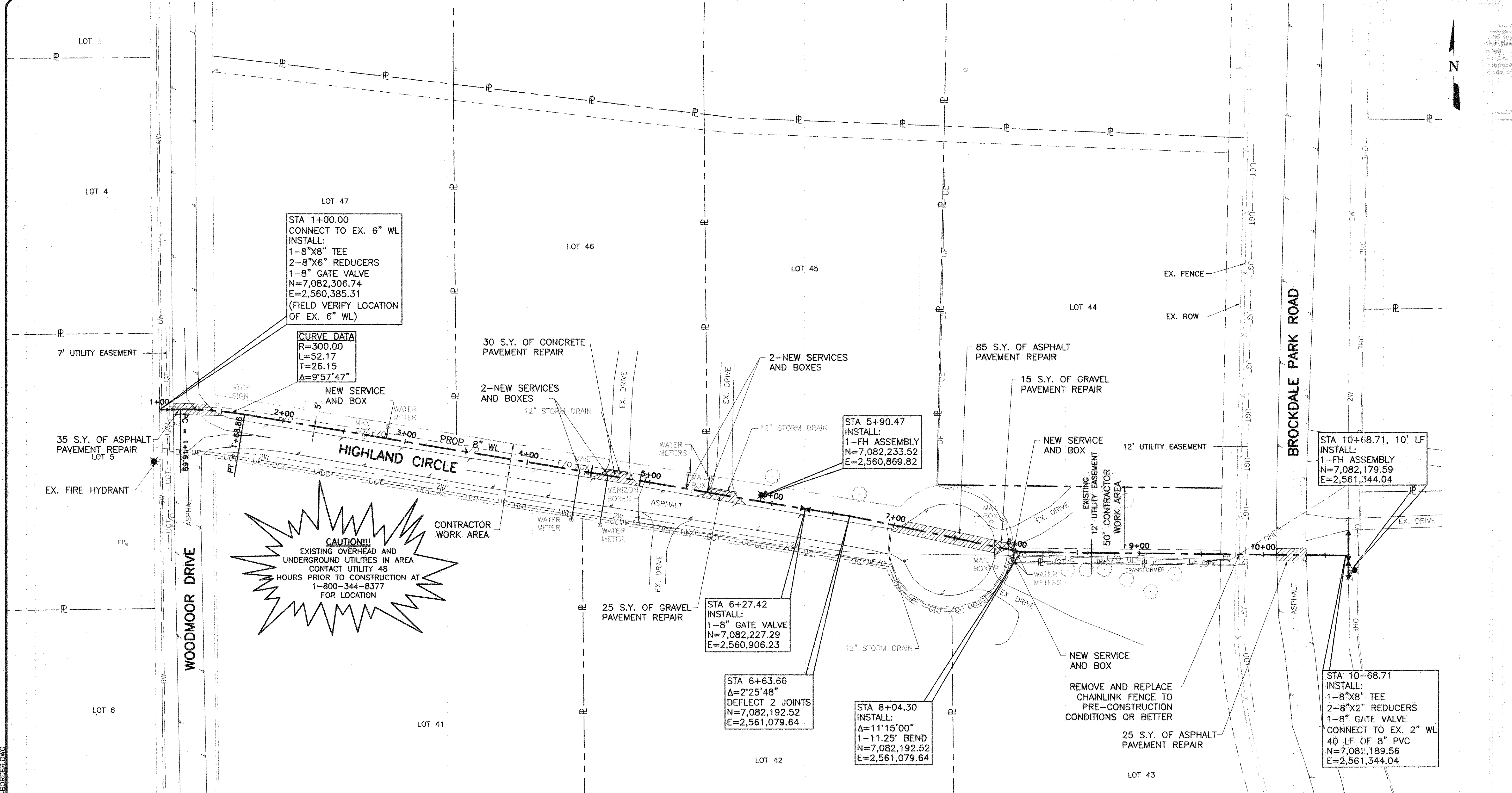
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CITY OF LUCAS, TEXAS
LUCAS PUMP STATION #2
 & HIGHLAND CIRCLE 8" ATERLINE
 8" WATERLINE
 HIGHLAND CIRCLE

NO.	ISSUE	DATE	BY	DESCRIPTION
1	ISSUED FOR CONSTRUCTION	11/29/07	CCB	
2	REVISED		JDT	
3	REVISED		SJL	
4	REVISED		KRU	

VERIFY SCALE: Bar is one inch on original drawing, not one inch on this sheet, adjust scale.

SHEET: **C-1**
 SEQ: 2 OF 13



- NOTE:**
1. PROPOSED WATERLINE SHALL BE MINIMUM 4' BELOW GROUND LINE.
 2. OFFSET 4' FROM EXISTING UTILITIES IN 12' UTILITY EASEMENT.
 3. CONTRACTOR TO CONTACT ALL UTILITY COMPANIES PRIOR TO CONSTRUCTION TO VERIFY DEPTH, LOCATION OF UTILITIES AND TO COORDINATE WITH EXISTING FRANCHISE UTILITIES FOR RELOCATION IF NECESSARY.
 4. CONTRACTOR TO SURVEY AND STAKE EASEMENT AND PROPERTY CORNERS PRIOR TO CONSTRUCTION.
 5. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL RESIDENCES AT ALL TIMES, AND MAINTAIN ONE LANE OF TRAFFIC ON HIGHLAND CIRCLE, WOODMOOR DRIVE AND BROCKDALE PARK ROAD BY UTILIZING TRAFFIC CONTROL MEASURES THAT MEET TEXAS MUTCD.
 6. CONTRACTOR TO COORDINATE WITH THE CITY OF LUCAS FOR TIME OF DAY AND PROCEDURES FOR SHUT DOWN OF EXISTING WATER METERS FOR CONNECTION.
 7. WATERLINE CONSTRUCTION SHALL BE SUBSTANTIALLY COMPLETE 30 DAYS AFTER NOTICE TO PROCEED.

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0 20' 40' 80'
 SCALE IN FEET

PLAN VIEW
 1" = 40'

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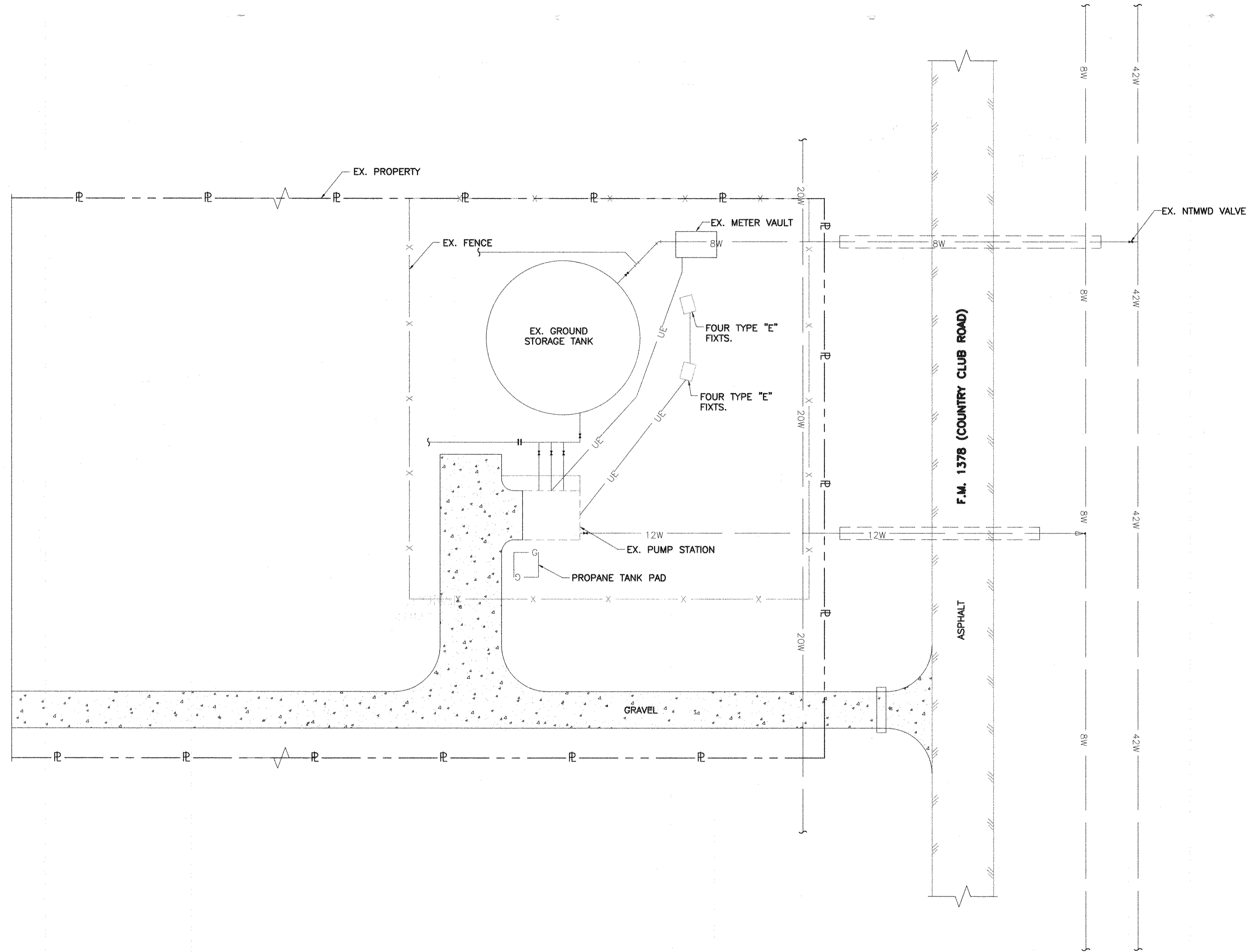
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 Fax (972) 548-1058

CITY OF LUCAS, TEXAS
LUCAS PUMP STATION #2
 & HIGHLAND CIRCLE 8" ATERLINE

EXISTING
OVERALL SITE LAYOUT



NOTES:

1. VALVE MUST BE CLOSED BY NTMWD IN ORDER FOR CONTRACTOR TO PERFORM WORK IN METER VAULT. CONTRACTOR TO COORDINATE WITH NTMWD AND CITY OF LUCAS DATE OF SHUTDOWNS 7 DAYS IN ADVANCE.
2. CONTRACTOR IS RESPONSIBLE FOR PROPER REMOVAL AND DISPOSAL OF ANY WATER THAT LEAKS PAST EXISTING VALVES.
3. METER UPGRADE MUST BE DONE BETWEEN OCTOBER 15, 2006 AND NOVEMBER 15, 2006. SUBSTANTIAL COMPLETION MUST BE REACHED BY NOVEMBER 15, 2006.

PLAN VIEW
 1"=20'

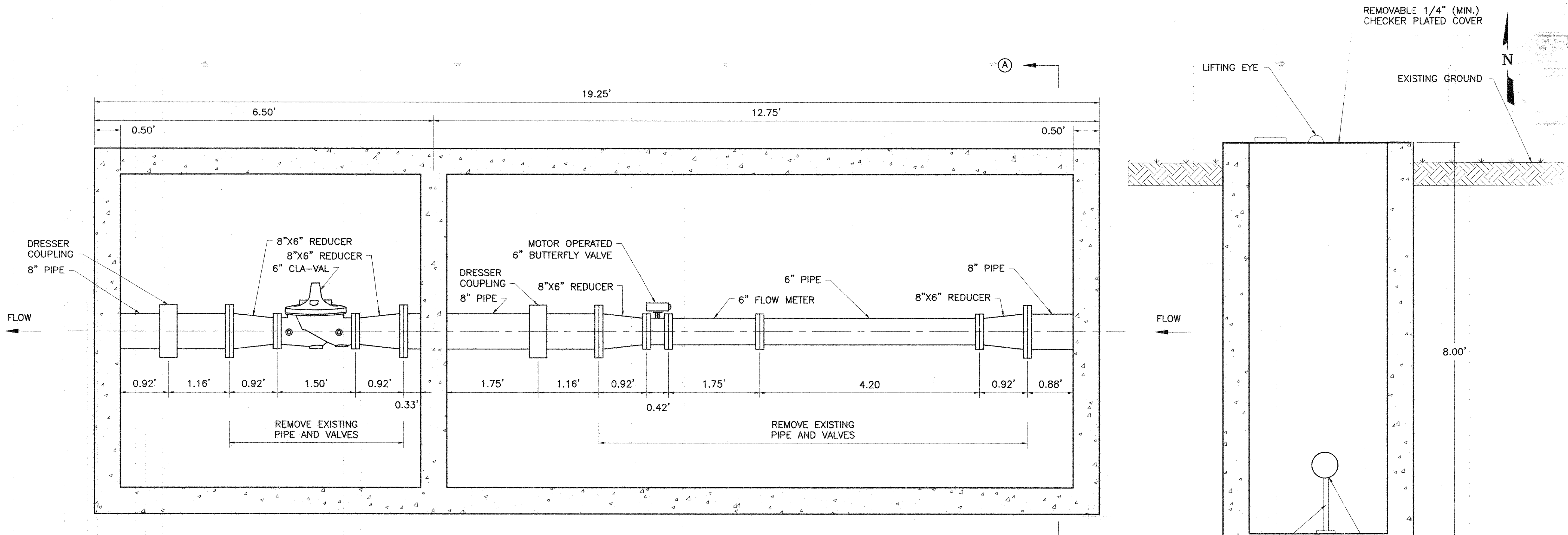
0 10' 20' 40'
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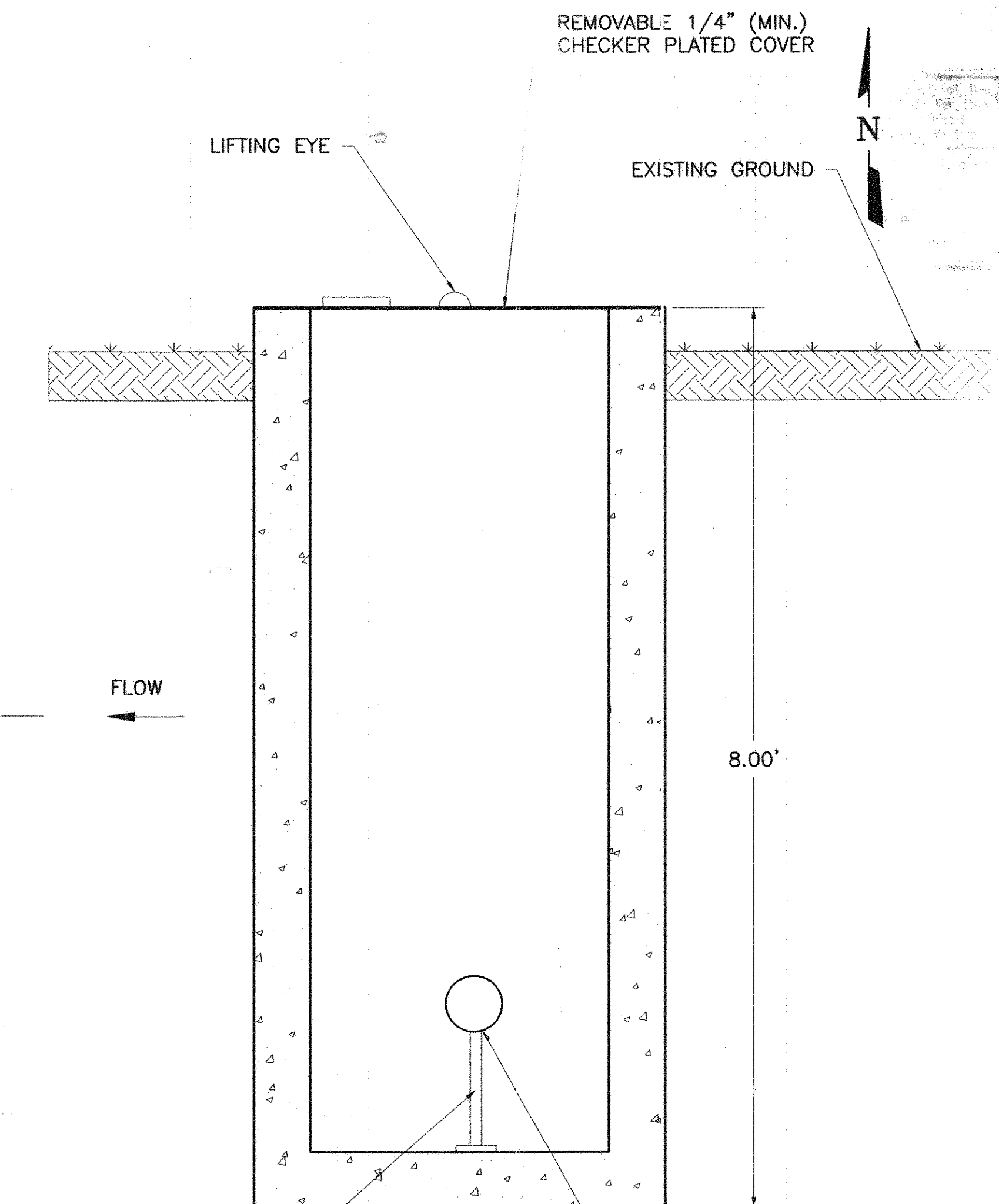
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 Bar is one inch on original drawing. If not, one inch on this sheet, adjust scale.

SHEET **C-2**
 SEQ. 3 OF 13

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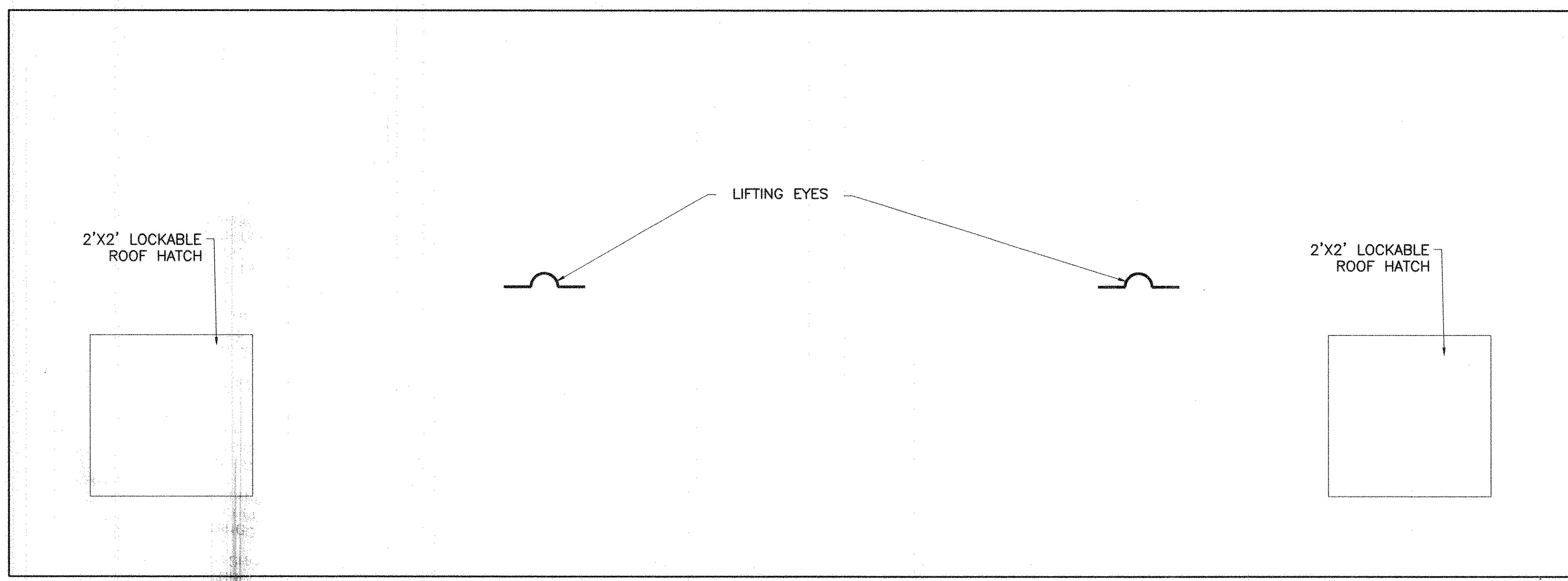


SECTIONAL PLAN
EXISTING METER VAULT
1"=2'



EXISTING METER
CROSS SECTION
1"=2'

NO PIPE SUPPORTS EXISTING.
FOR NEW INSTALLATION. INSTALL
NEW ADJUSTABLE PIPE SUPPORTS
ON 2" THICK NON-SHRINK GROUT
AS SHOWN ON C-4



EXISTING METER VAULT
TOP PLAN VIEW
1"=2'

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0 1' 2'
SCALE IN FEET

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CITY OF LUCAS, TEXAS
LUCAS PUMP STATION #2
 & HIGHLAND CIRCLE 8" ATERLINE
 EXISTING
METER VAULT LAYOUT

NO.	ISSUE	BY	DATE	REV. NO.	DATE	DESIGNED	CCB	DRAWN	JDT	REVISED	SLI	CHECKED	KRU	FILE NAME
														CV-VAL-DT-PIPE01.dwg

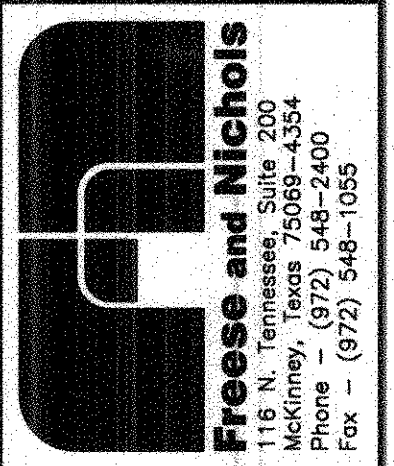
VERIFY SCALE: Bar is one inch on original drawing, if not one inch on this sheet, adjust scale.

SHEET: **C-3**
 SEQ.: 4 OF 13

ACAD: Rel 17.0s (LMS Tech) User: afm
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 Jan 10, 2008 - 9:31am LIS: 1 PSLTS: 1 TWIST: DALSRVZ
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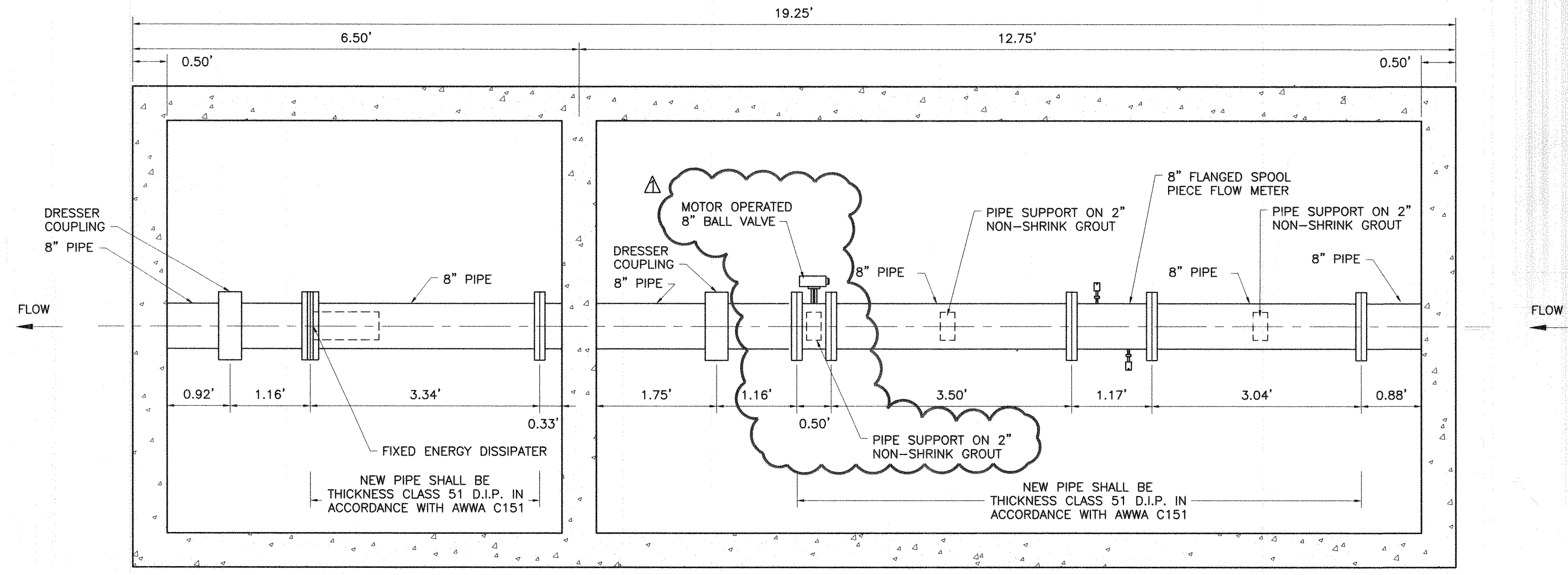
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CITY OF LUCAS, TEXAS
LUCAS PUMP STATION #2
 & HIGHLAND CIRCLE 8" ATERLINE

PROPOSED
METER VAULT LAYOUT



NOTES:

- CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED TO EXISTING INSTRUMENTATION STRUCTURE AND ANY OTHER ITEMS THAT MIGHT BE DAMAGE DUE TO CONSTRUCTION. FACILITIES SHOULD BE LEFT IN PRE-CONSTRUCTION CONDITION OR BETTER.
- UPGRADE OF METER VAULT WILL REQUIRE SHUT DOWN. THE CONNECTION IS DEFINED AS A CRITICAL OPERATION AS DESCRIBED IN SPEC. 01030.
- CONTRACTOR SHALL KEEP PIPE CLEAN AND DISINFECT PER AWWA C651.
- NEW PIPE AND VALVES WILL BE CHECKED FOR HYDROSTATIC LEAKS ONCE PIPE IS BACK IN SERVICE. CONTRACTOR IS RESPONSIBLE FOR CORRECTING ANY LEAKS.
- CONTRACTOR SHALL COORDINATE WITH THE CITY OF LUCAS AND NTMWD TO SCHEDULE A SHUT DOWN AT LEAST SEVEN DAYS PRIOR TO PERFORMING WORK.
- CONTRACTOR SHALL COORDINATE NEW AND EXISTING FLANGE PATTERNS WITH PIPE AND FIXED ENERGY DISSIPATER MANUFACTURERS.

**SECTIONAL PLAN
 PROPOSED METER VAULT**
 1"=2'



NO.	ISSUE	DATE	BY	DATE	FOR JOB NO.
					LCA06189
		11/29/07			DATE
					DESIGNED CCB
					DRAWN JDT
					REVISION SU
					CHECKED KRU
					FILE NAME
					CV-VAL-DT-PIPE02.dwg

REVISION
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SHEET **C-4**
 SEQ. 5 OF 13

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 Jan 10, 2008 - 9:31am LIS: 1
 PSLTS: 1 TWIST: DALSRVZ
 REFERENCES: NA Standard\44BORDER.DWG

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 TEXAS BOARD OF PROFESSIONAL ENGINEERING EXAMINERS
 LICENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT

GENERAL NOTES:

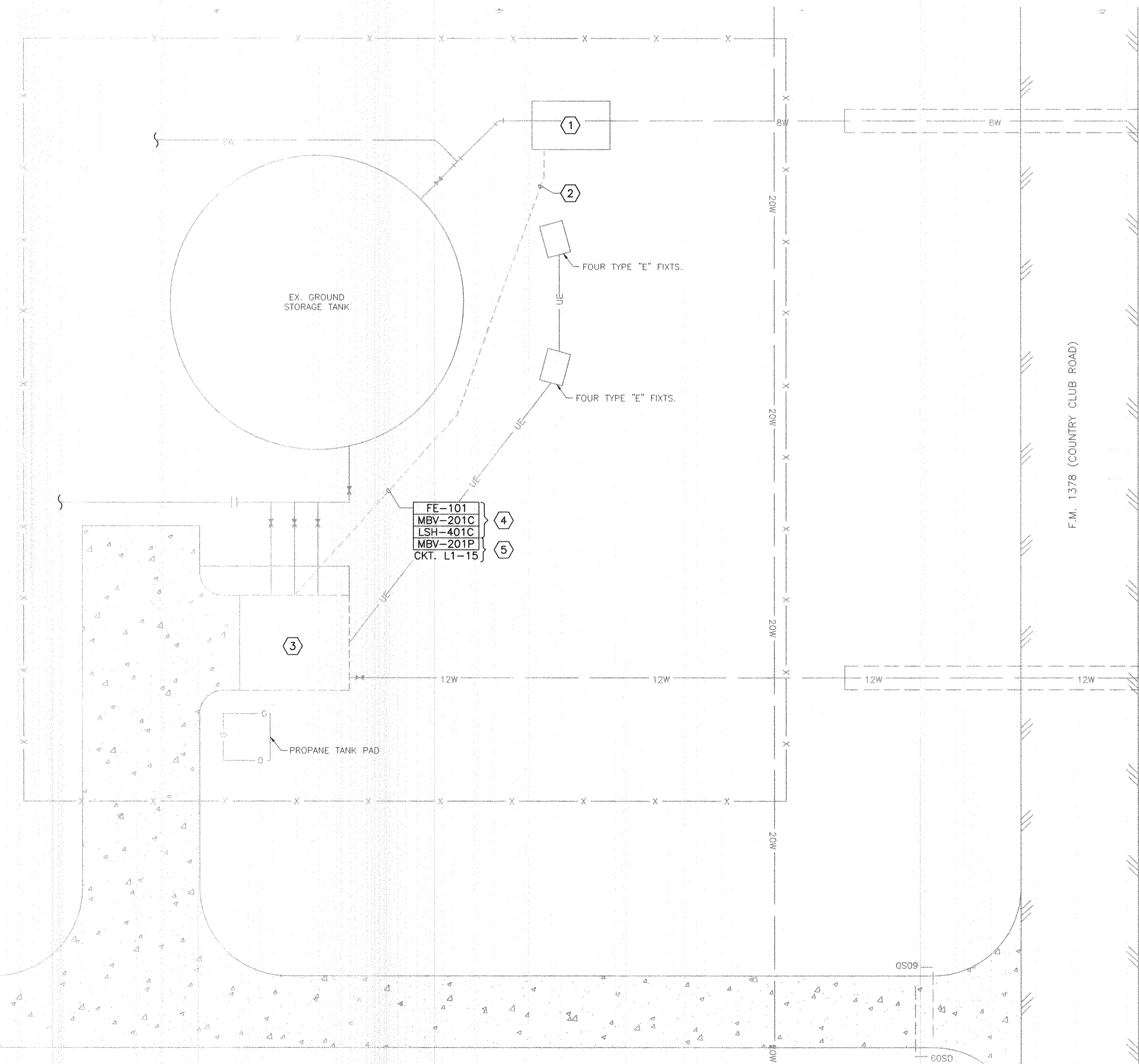
- CONTRACTOR SHALL REMOVE CABLES NOT BEING REUSED FROM EXISTING CONDUITS IN UNDERGROUND DUCT BANK. CONTRACTOR SHALL FIELD VERIFY WHERE CABLES ARE TERMINATED TO AND COORDINATE WITH THE CITY OF LUCAS AND NORTH TEXAS MUNICIPAL WATER DISTRICT BEFORE REMOVING ANY CABLES.

NOTES BY SYMBOL "⬡"

- EXISTING FLOW METER VAULT. RE: 1/E-3.
- EXISTING UNDERGROUND ELECTRICAL DUCT BANK.
- EXISTING PUMP STATION/NTMWD TELEMETERING ROOM. RE: 1/E-4
- CONTRACTOR SHALL ROUTE NEW CABLES IN EXISTING CONDUITS. FIELD VERIFY EXISTING CONDUITS TO USE.
- EXISTING. SHOWN FOR INFORMATION ONLY.

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 116 N. Tennessee, Suite 200
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CITY OF LUCAS, TEXAS
LUCAS PUMP STATION #2
 & HIGHLAND CIRCLE 8" ATERLINE
 ELECTRICAL
SITE PLAN



SITE PLAN
 1"=10'

0 10' 20'
 SCALE IN FEET

NO. ISSUE	DATE	BY	REV. JOB NO.	DATE	DESIGNED	DRAWN	REVISION	CHECKED	FILE NAME
			LCA06189	11/29/07	JNH	JAF		SL	EL-LCA-PL-SITE.dwg
VERIFY SCALE: Bar is one inch on original drawing, not one inch on this sheet, adjust scale.									
SHEET E-2									
8 OF 13									

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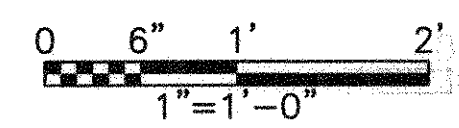
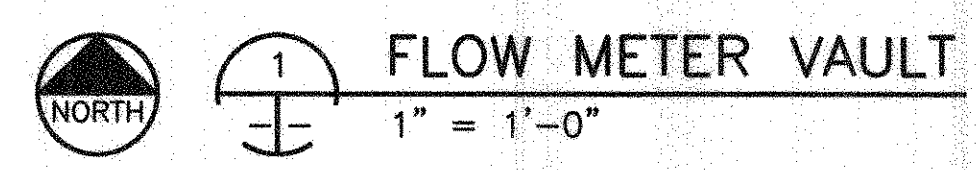
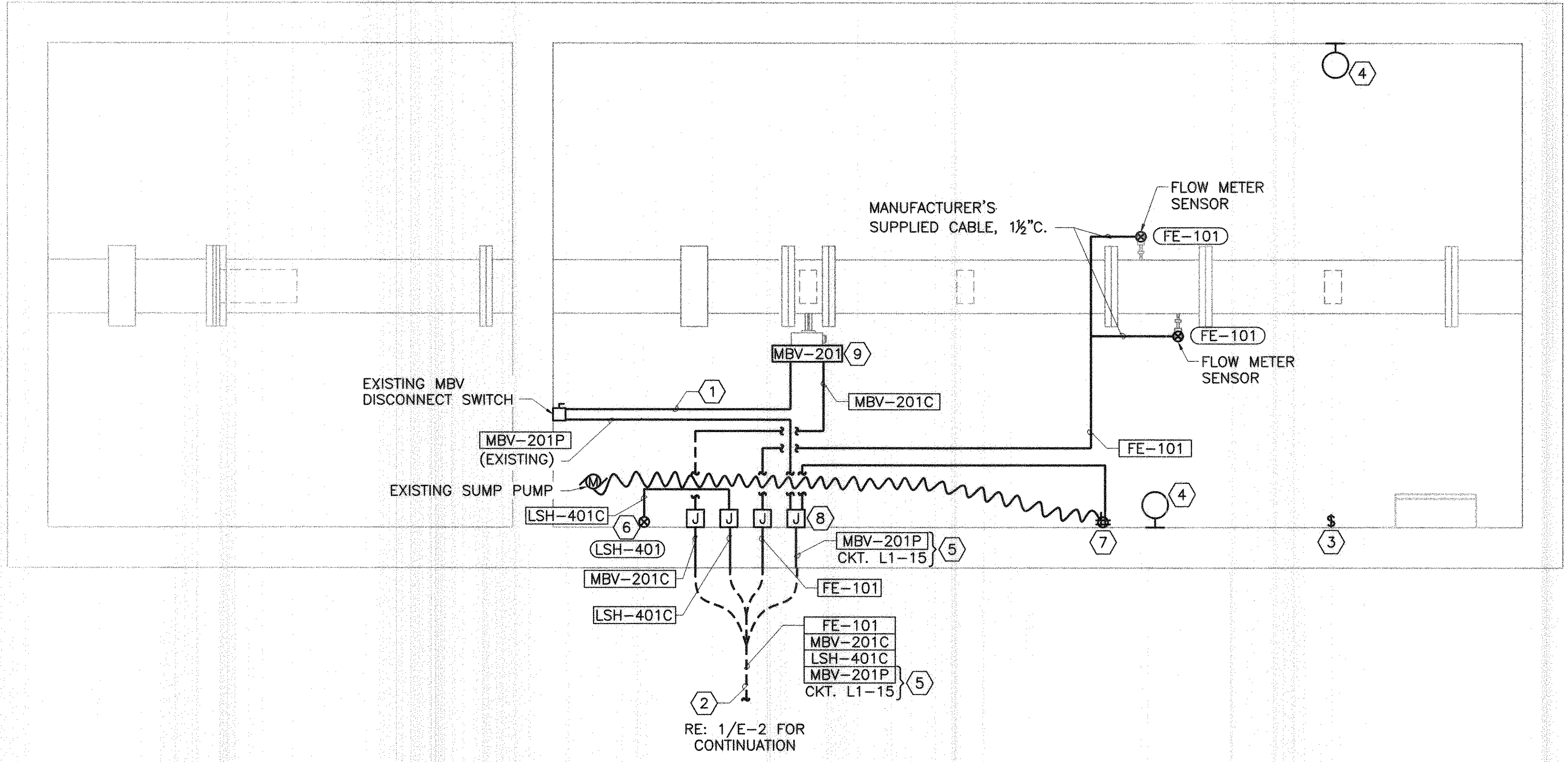
Freeze and Nichols
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 McKinney, TX 75069
 Phone - (972) 548-2400
 Fax - (972) 548-1055

GENERAL NOTES:

1. ALL JUNCTION BOXES, CONDUIT SUPPORTS, AND FITTINGS SHALL BE 316 STAINLESS STEEL IN FLOW METER VAULT. JUNCTION BOXES AND INDIVIDUAL CONDUITS SHALL BE PROVIDED WITH DRAIN FITTINGS. ALL CONDUITS SHALL EXIT FROM BOTTOM OF JUNCTION BOX.
2. ALL NEW CONDUIT INSTALLED IN FLOW METER VAULT SHALL BE ALUMINUM.
3. CONTRACTOR SHALL CHECK AND VERIFY EXISTING LIGHTS, RECEPTACLES AND SUMP PUMP ARE WORKING PROPERLY. IF NOT, CONTRACTOR SHALL REPAIR/REPLACE AS NECESSARY.

NOTES BY SYMBOL "⬡"

1. CONTRACTOR SHALL PROVIDE 3 #12, #12G., 3/4"C. FROM EXISTING DISCONNECT SWITCH TO MOTOR OPERATOR. CONTRACTOR SHALL REPLACE FUSES IN DISCONNECT SWITCH AS REQUIRED. COORDINATE FUSE SIZE WITH MOTOR OPERATOR MANUFACTURER.
2. EXISTING UNDERGROUND ELECTRICAL DUCT BANK.
3. EXISTING FLOW METER VAULT LIGHT SWITCH.
4. EXISTING LIGHT.
5. EXISTING CABLES SHOWN FOR REFERENCE ONLY. 120V CKT. L1-15 FEEDS FLOW METER VAULT LIGHTS AND QUADPLEX RECEPTACLE.
6. MOUNT LEVEL SWITCH 12" AFF.
7. EXISTING QUADPLEX RECEPTACLE.
8. EXISTING JUNCTION BOX.
9. MOTOR OPERATED BALL VALVE



CITY OF LUCAS, TEXAS
LUCAS PUMP STATION #2
 & HIGHLAND CIRCLE 8" ATERLINE
 ELECTRICAL
FLOW METER VAULT

NO.	ISSUE	BY	DATE	REV. NO.	DATE	DESCRIPTION
				1	11/29/07	DESIGNED
				2		DRAWN
				3		REVISION
				4		SCALE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

FILE NAME: EL-LCA-PL-VALT.dwg

SHEET: **E-3**

9 OF 13

ACAD: Rel: 17.0s (LMS Tech) User: afm File: N:\Record\elec\EL-LCA-PL-VALT.dwg LAYOUT: E-3 METER VAULT
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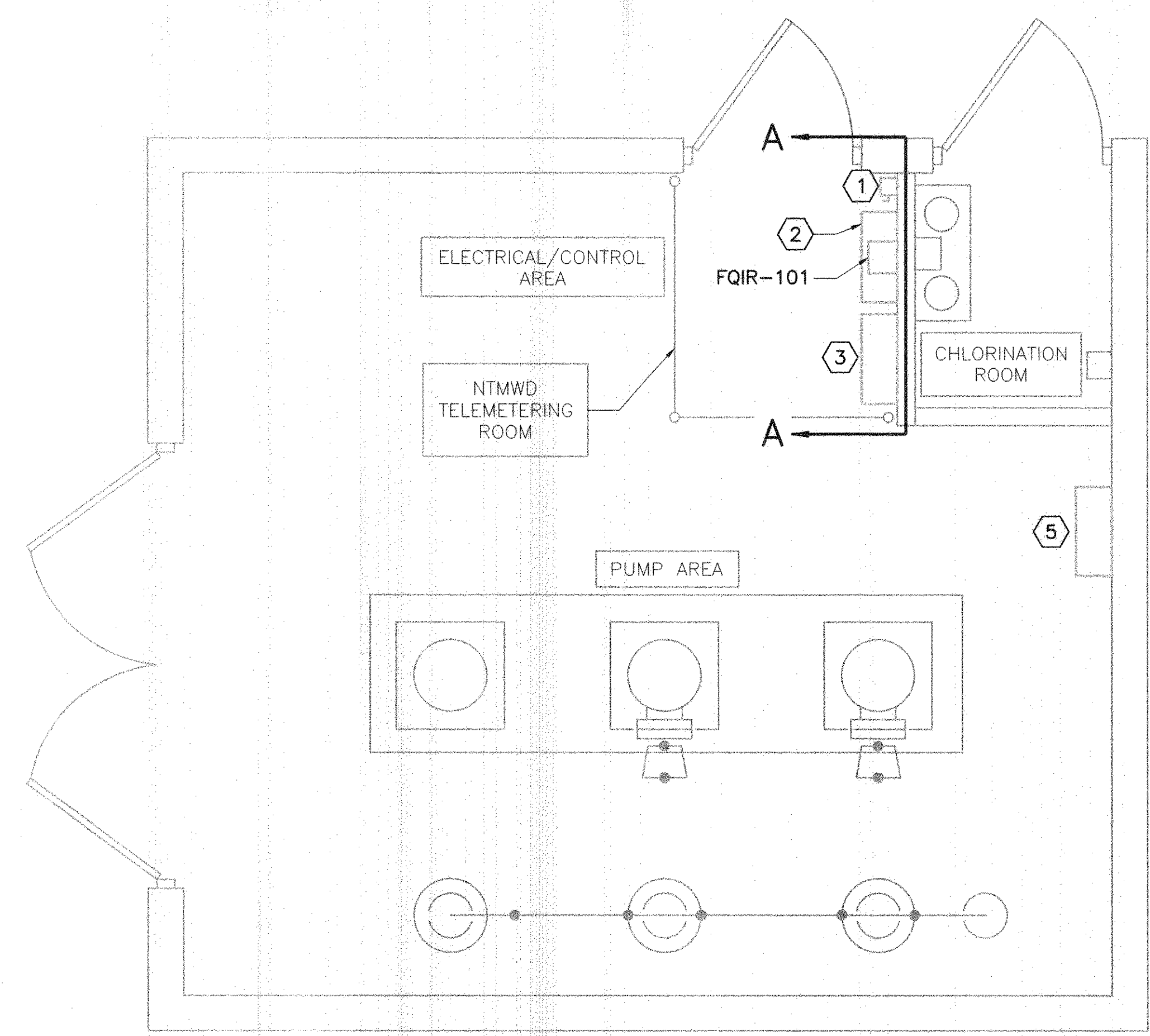
Freeze and Nichols
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 McKinney, TX 75069
 Phone: (972) 548-9200
 Fax: (972) 548-1055

GENERAL NOTES:

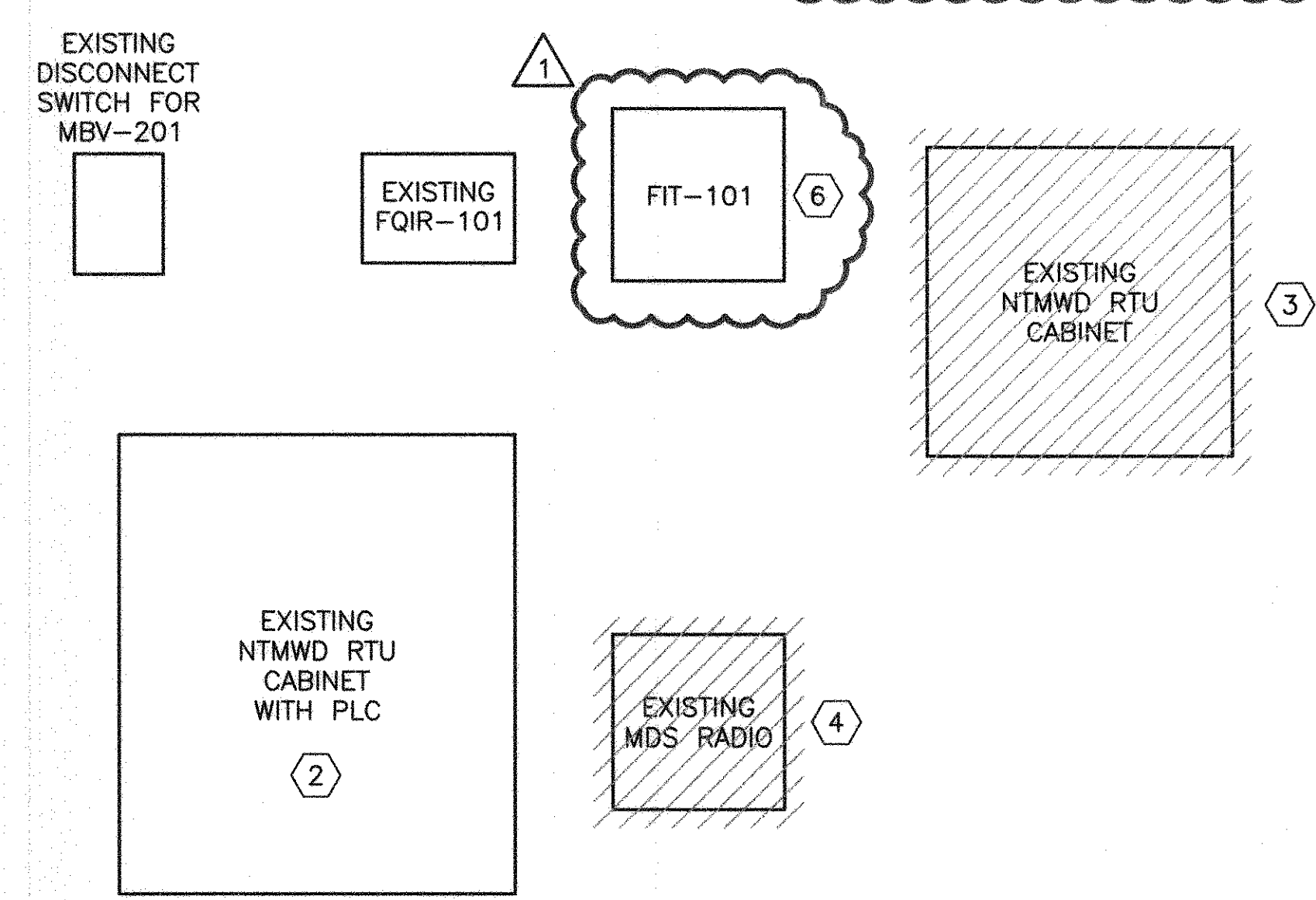
- CONTRACTOR SHALL COORDINATE WITH THE CITY OF LUCAS AND NORTH TEXAS MUNICIPAL WATER DISTRICT (NTMWD) FOR THE INSTRUMENTATION SIGNALS TO BE TRANSMITTED/RECEIVED BETWEEN THE CITY OF LUCAS RTU CABINET AND THE NORTH TEXAS MUNICIPAL WATER DISTRICT RTU CABINET AND PROVIDE CABLE/CONDUIT AS REQUIRED. CONTRACTOR SHALL PROGRAM PLC'S AS REQUIRED. COORDINATE ALL MODIFICATIONS WITH THE CITY OF LUCAS AND NORTH TEXAS MUNICIPAL WATER DISTRICT.
- SEE INTERCONNECTION DIAGRAM ON SHEET E-5 FOR CONTROL AND INSTRUMENTATION CABLE/CONDUIT BETWEEN DEVICES.

NOTES BY SYMBOL "⬡"

- EXISTING MBV-201 FUSED DISCONNECT SWITCH. CONTRACTOR SHALL FIELD VERIFY FUSES ARE SIZED CORRECTLY FOR NEW MOTOR OPERATED BALL VALVE AND REPLACE FUSES AS NECESSARY.
- EXISTING RTU CABINET. CONTRACTOR SHALL REMOVE EXISTING PLC AND RELAYS AND DELIVER TO NTMWD. CONTRACTOR SHALL REUSE EXISTING CABINET AND INSTALL NEW PLC AND EXISTING MDS RADIO IN CABINET. CONTRACTOR SHALL REWIRE AND EXTEND EXISTING WIRING/CONDUIT AS REQUIRED TO RTU CABINET/PLC/RADIO. CONTRACTOR SHALL PROVIDE RELAYS, POWER SUPPLIES, ISOLATORS, SURGE PROTECTION, TERMINALS, ETC. AS REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM. CONTRACTOR SHALL COORDINATE WITH NTMWD ON LOCATION TO RELOCATE EXISTING RTU CABINET IN TELEMETERING ROOM.
- CONTRACTOR SHALL REMOVE EXISTING RTU CABINET AND EXTEND CABLE/CONDUIT AS REQUIRED TO THE RTU CABINET HOUSING THE PLC.
- CONTRACTOR SHALL REMOVE ENCLOSURE HOUSING RADIO AND RELOCATE MDS RADIO TO THE RTU CABINET HOUSING THE PLC. CONTRACTOR SHALL EXTEND COAX CABLE TO RADIO AS REQUIRED.
- EXISTING CITY OF LUCAS RTU CABINET.
- NEW FLOW METER FIT-101. CONTRACTOR SHALL PROVIDE 120V POWER TO FLOW METER AND ALL ASSOCIATED CABLE/CONDUIT AS REQUIRED. COORDINATE LOCATION WITH NTMWD.



PUMP STATION/NTMWD TELEMETERING ROOM PLAN
 1/2" = 1'-0"



SECTION "A-A" - EQUIPMENT LAYOUT DIAGRAM
 (EAST WALL OF NTMWD TELEMETERING ROOM)
 NOT TO SCALE

0 1' 2' 4' 8'
 1/4" = 1'-0"

CITY OF LUCAS, TEXAS
LUCAS PUMP STATION #2
 * HIGHLAND CIRCLE 8" ATERLINE
 ELECTRICAL
PUMP STATION PLAN

REV	ISSUE	DATE	BY	DATE	FILE NAME
1	ISSUE	11/29/07	JAF	11/29/07	EL-LCA-PL-PSTA.dwg
2	REVISION				

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10 OF 13

ACAD: Rel 17.0s (LMS Tech)
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 Jan 10, 2008 10:00am
 REFERENCES: N:\elec\Bases\JLN-STAMP.dwg N:\Standards\449ORDER.dwg 84677.dwg N:\Standards\BFBORDER.dwg

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CITY OF LUCAS, TEXAS
LUCAS PUMP STATION #2
 & HIGHLAND CIRCLE 8" ATERLINE
 ELECTRICAL

CONTROL SCHEMATIC

NO.	ISSUE	DATE	BY	DATE	FOR JOB NO.	FILE NAME
		11/29/07	JNH		LOA06189	EL-LCA-DG-CTRL.dwg
			JAF			
			SLI			

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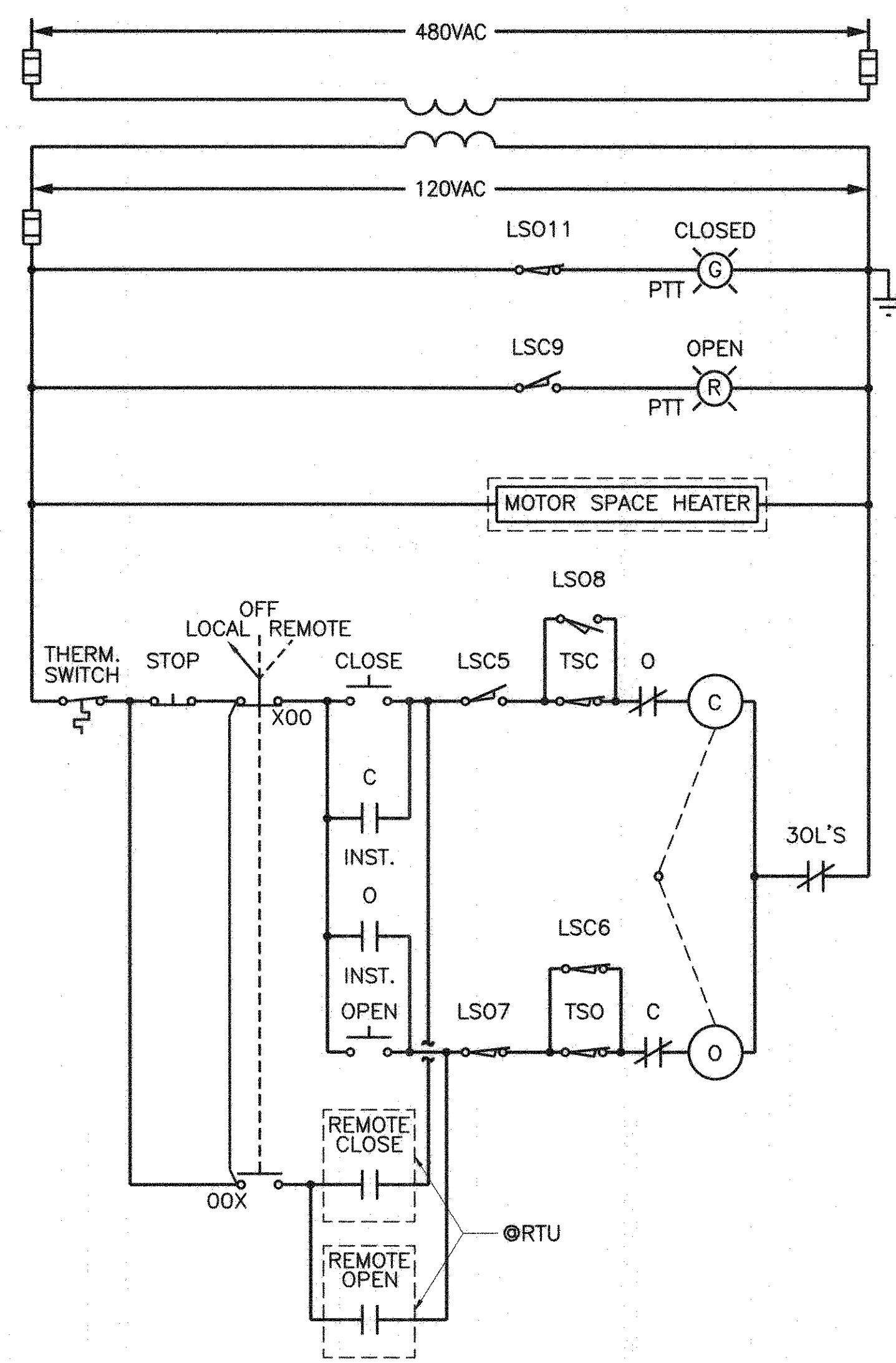
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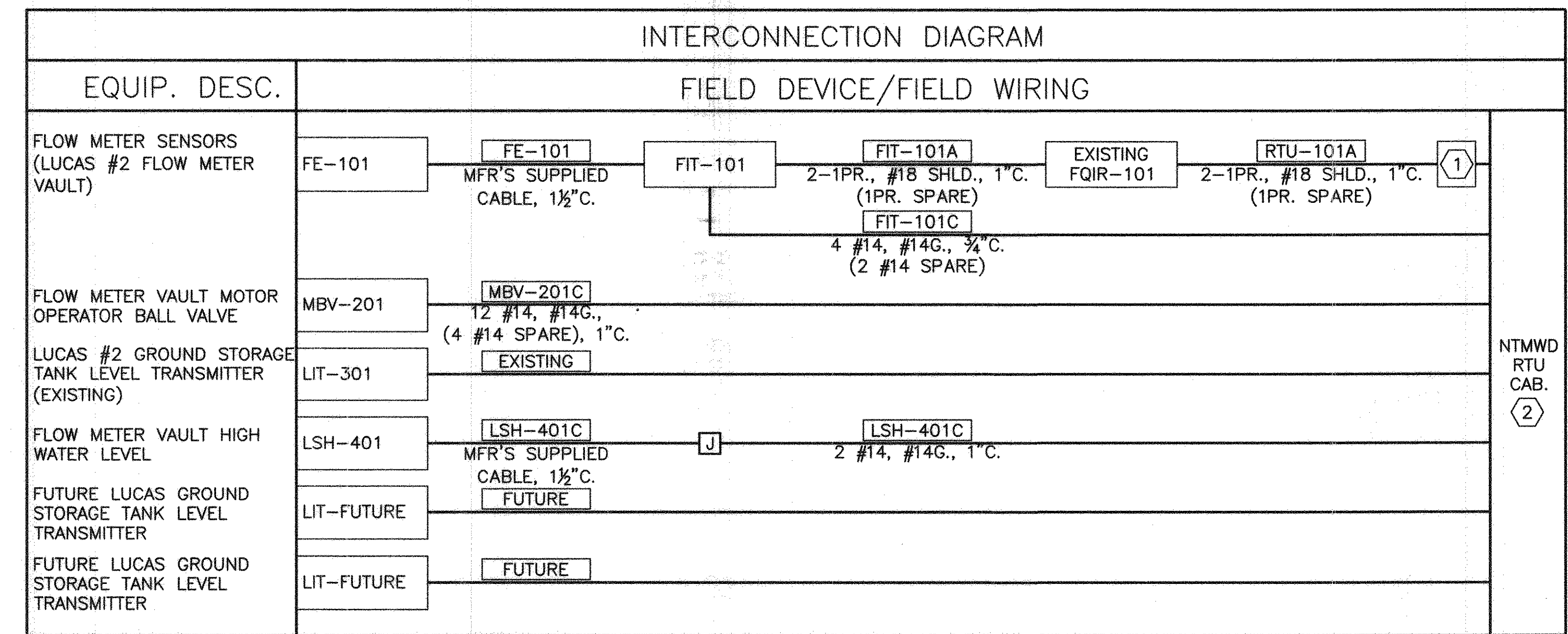
11/29/2007

NOTES BY SYMBOL "⬡"

- CONTRACTOR SHALL INTERCEPT FLOW METER SIGNAL AND SPLIT SIGNAL INTO TWO ISOLATED SIGNALS. ONE SIGNAL SHALL BE WIRED AS AN INPUT TO NORTH TEXAS MUNICIPAL WATER DISTRICT'S (NTMWD) RTU CABINET AND THE OTHER SIGNAL SHALL BE WIRED OUT TO TERMINAL BLOCKS FOR USE BY THE CITY OF LUCAS. ISOLATOR SHALL BE AGM ELECTRONICS MODEL 4000-5 OR APPROVED EQUAL. ISOLATOR SHALL BE LOCATED IN RTU CABINET. CONTRACTOR SHALL PROVIDE ALL WIRING, POWER SUPPLIES, ETC. FOR ISOLATOR AS REQUIRED.
- CONTRACTOR SHALL PROVIDE ADDITIONAL ISOLATORS AS REQUIRED FOR ANY ADDITIONAL SIGNALS TRANSMITTED BETWEEN THE NTMWD RTU CABINET AND THE CITY OF LUCAS RTU CABINET. COORDINATE WITH NTMWD AND THE CITY OF LUCAS FOR EXACT REQUIREMENTS.

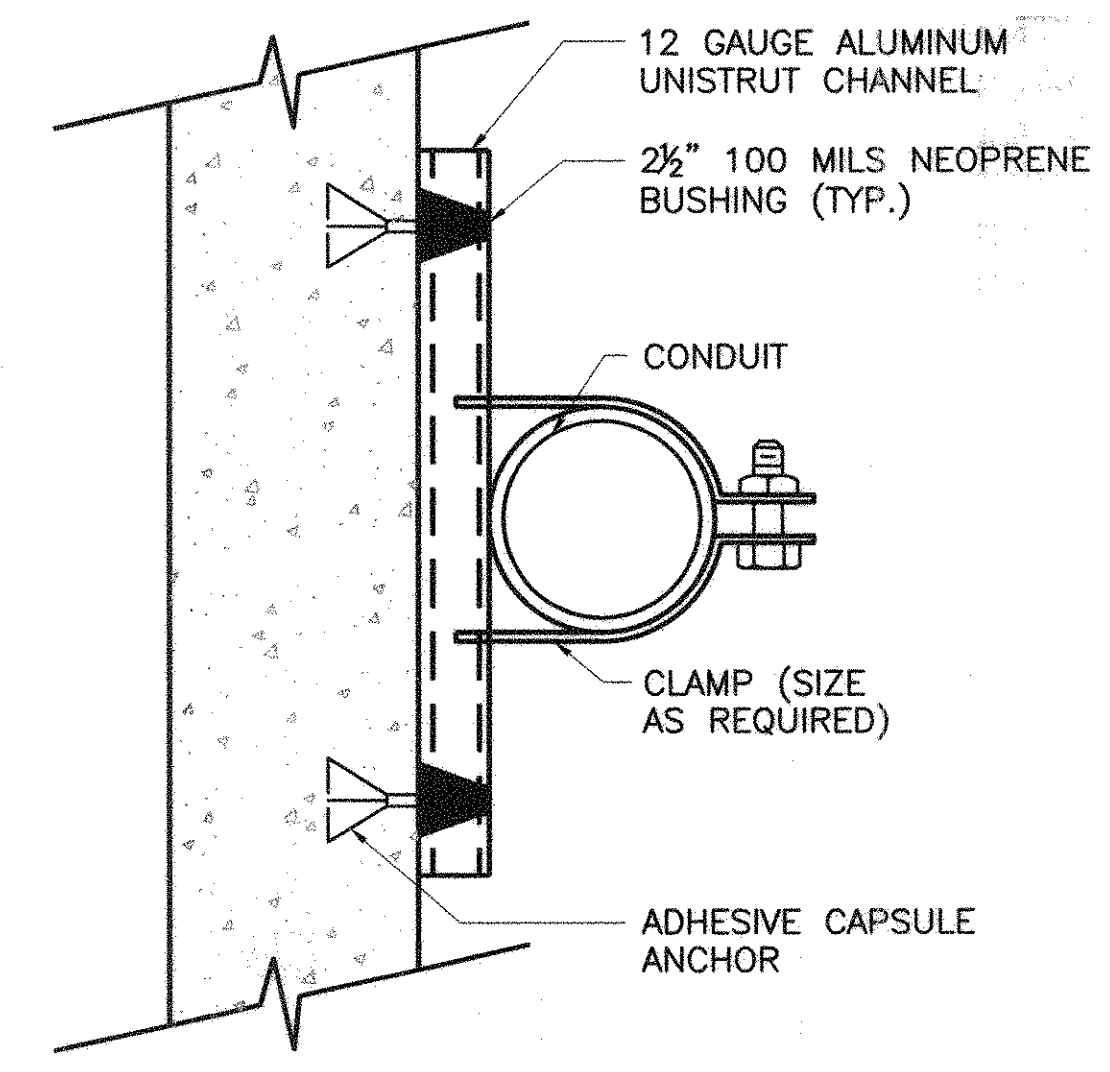


MOTOR OPERATED BALL VALVE CONTROL SCHEMATIC
 NOT TO SCALE (TYP. MBV-201)



SWITCH NUMBERS	VALVE POSITION				FUNCTION
	LIMIT CLOSE	INTERMEDIATE	LIMIT OPEN	PERCENT OPEN	
LS011	█				VALVE CLOSED
LSC9		█			VALVE OPEN
LS015	█				VALVE CLOSED
LSC13		█			VALVE OPEN

- NOTES:**
- INDICATES OPEN CONTACTS.
 - █ INDICATES CLOSED CONTACTS.
 - SET LIMIT SWITCHES LSC5, LS08, LS07 AND LSC6 AS REQUIRED.



CEILING OR WALL EXPOSED CONDUIT INSTALLATION
 NOT TO SCALE

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User: afm
 [LCA06189] [MCSRV2] N:\Record\elec\EL-LCA-DG-CTRL.dwg LAYOUT: EL-LCA-DG-CTRL
 Jan 10, 2008 - 9:59am
 PSLOTS: 1 TWIST: DALSRV2
 LIS: 1
 REFERENCES: N:\Standard\4490ORDER.DWG, N:\elec\Bose\JNH-STAMP.dwg, 84677.dwg

INSTRUMENT SOCIETY OF AMERICA TABLE

LETTER	FIRST LETTER (S)		SUCCEEDING LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (+)		ALARM		
B	BURNER, COMBUSTION		USERS CHOICE (+)	USERS CHOICE (+)	USERS CHOICE (+)
C	USER'S CHOICE (+)			CONTROL	
D	USER'S CHOICE (+)	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE (+)		GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	MOTOR	MOMENTARY			MIDDLE, INTERMEDIATE
N	USERS CHOICE (+)		USERS CHOICE (+)	USERS CHOICE (+)	USERS CHOICE (+)
O	USERS CHOICE (+)		ORIFICE, RESTRICTION		
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION (+)
V	VIBRATION MECH. ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED (+)	X AXIS	UNCLASSIFIED	UNCLASSIFIED (+)	UNCLASSIFIED (+)
Y	EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

(+) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL. SEE ABBREVIATIONS AND LETTER SYMBOLS.

INSTRUMENT IDENTIFICATION

	PRIMARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR (2)	FIELD MOUNTED	AUXILIARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR (2)
DISCRETE INSTRUMENTS			
SHARED DISPLAY SHARED CONTROL			
COMPUTER FUNCTION			
PROGRAMMABLE LOGIC CONTROL			
		INSTRUMENT WITH LONG TAG NUMBERS	INSTRUMENTS SHARING COMMON HOUSING
	PILOT LIGHT	PANEL MOUNTED PATCHBOARD POINT 12	PURGE OR FLUSING DEVICE
	RESET FOR LATCH-TYPE ACTUATOR	DIAPHRAGM SEAL	UNDEFINED INTERLOCK LOGIC

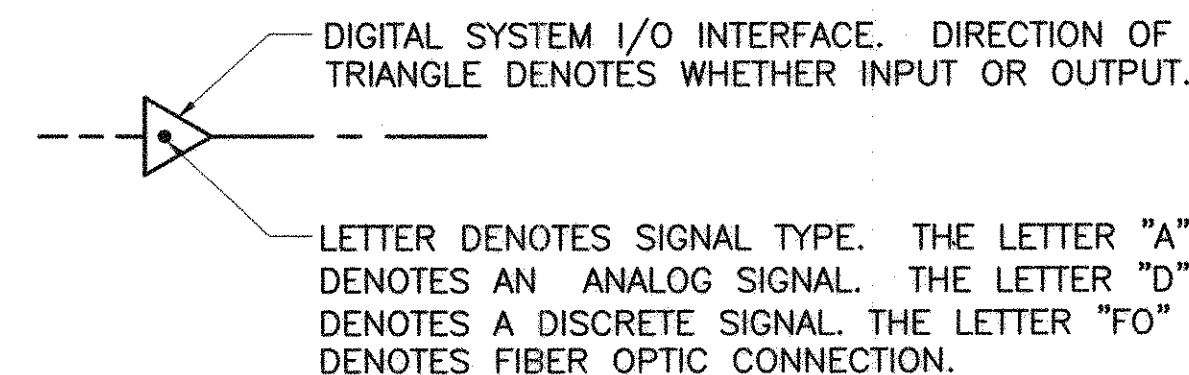
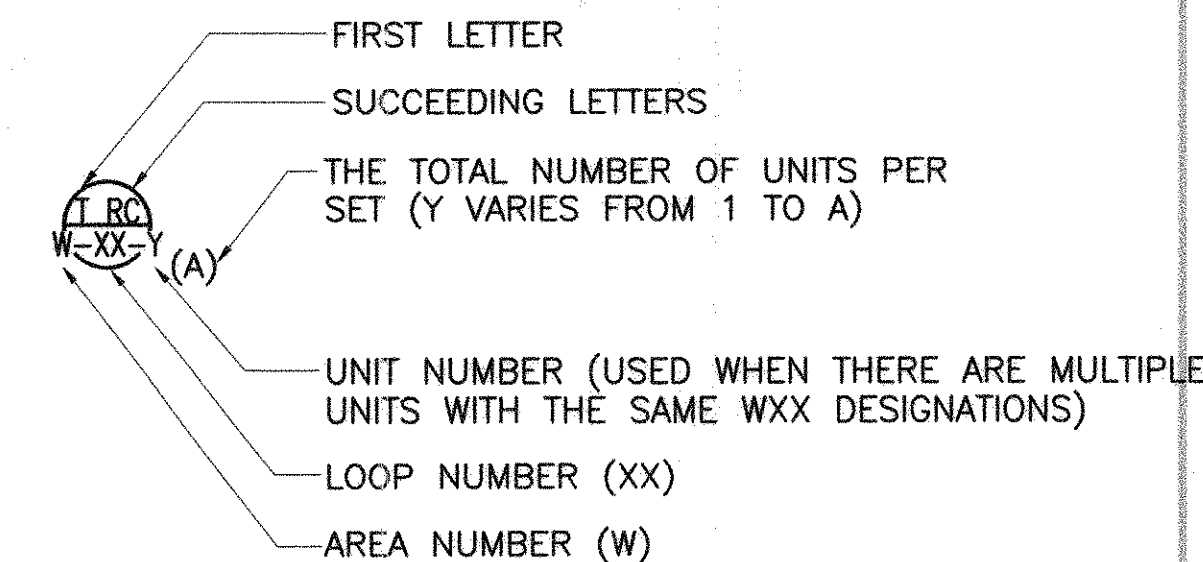
- (1) ABBREVIATIONS OF THE USER'S CHOICE SUCH AS IP1 (INSTRUMENT PANEL #1), IC2 (INSTRUMENT CONSOLE #2), CC3 (COMPUTER CONSOLE #3), ETC., MAY BE USED WHEN IT IS NECESSARY TO SPECIFY INSTRUMENT OR FUNCTION LOCATION.
- (2) NORMALLY INACCESSIBLE OR BEHIND-THE-PANEL DEVICES OR FUNCTIONS MAY BE DEPICTED BY USING THE SAME SYMBOLS BUT WITH DASHED HORIZONTAL BARS, I.E.



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FRESE AND NICHOLS, INC.
4055 INTERNATIONAL PLAZA, SUITE 200
FORT WORTH, TEXAS 76109-4895
(817) 735-7300
RECORD DRAWINGS PREPARED ON:
11/29/2007

EXAMPLE SYMBOLS



PROCESS SYMBOLS

- SOLENOID OPERATED VALVE
- MOTOR OPERATED VALVE
- KNIFE GATE
- SLIDE GATE
- GATE VALVE
- PINCH VALVE
- BALL VALVE
- PLUG VALVE
- CHECK VALVE
- BUTTERFLY VALVE
- PUMP
- HOSE BIB
- Y-STRAINER
- PRIMARY ELEMENT
- TELESCOPING VALVE
- MAGNETIC FLOW METER
- MOTOR
- MOTOR-ARROW DENOTES VARIABLE SPEED
- MIXER
- CHEMICAL METERING PUMP
- VERTICAL TURBINE PUMP

LINE SYMBOLS

- (1) INSTRUMENT SUPPLY OR SOLENOID OPERATED VALVE (1)
- (2) UNDEFINED SIGNAL
- (3) PNEUMATIC SIGNAL (2)
- (4) ELECTRIC SIGNAL
- (5) HYDRAULIC SIGNAL
- (6) CAPILLARY TUBE
- (7) ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED) (3)
- (8) ELECTROMAGNETIC OR SONIC SIGNAL (NOT GUIDED) (3)
- (9) INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)
- (10) MECHANICAL LINK
- (11) PNEUMATIC BINARY SIGNAL (ON-OFF)
- (12) ELECTRIC BINARY SIGNAL (ON-OFF)
- (13) ELECTRIC ANALOG SIGNAL
- CONNECTING LINES
- NON-CONNECTING LINES

GENERAL NOTES

- (1) THE FOLLOWING ABBREVIATIONS ARE SUGGESTED TO DENOTE THE TYPES OF POWER SUPPLY. THESE DESIGNATIONS MAY ALSO BE APPLIED TO PURGE FLUID SUPPLIES.
- | | |
|-------------------------------|-----------------------|
| AS - AIR SUPPLY | HS - HYDRAULIC SUPPLY |
| IA - INSTRUMENT AIR } OPTIONS | NS - NITROGEN SUPPLY |
| PA - PLANT AIR | SS - STEAM SUPPLY |
| ES - ELECTRIC SUPPLY | WS - WATER SUPPLY |
| GS - GAS SUPPLY | |
- THE SUPPLY LEVEL MAY BE ADDED TO THE INSTRUMENT SUPPLY LINE, E.G. AS-100, 100-PSIG AIR SUPPLY; ES-24DC, A 24-VOLT DIRECT CURRENT POWER SUPPLY.
- (2) THE PNEUMATIC SIGNAL SYMBOL APPLIES TO A SIGNAL USING ANY GAS AS THE SIGNAL MEDIUM. IF A GAS OTHER THAN AIR IS USED, THE GAS MAY BE IDENTIFIED BY A NOTE ON THE SIGNAL SYMBOL OR OTHERWISE.
- ELECTROMAGNETIC PHENOMENA INCLUDE HEAT, RADIO WAVES, NUCLEAR RADIATION AND LIGHT.

FUNCTION SYMBOLS AND ABBREVIATIONS

- k PROPORTIONAL GAIN OR ATTENUATE (INPUT:OUTPUT)
 - K REVERSE PROPORTIONAL GAIN OR ATTENUATE (INPUT:OUTPUT)
 - Σ SUMMING
 - Σ/n AVERAGING
 - Δ SUBTRACTING
 - √ EXTRACT SQUARE ROOT
 - ÷ DIVIDE
 - X MULTIPLY
 - ∫ INTERGATE
 - + BIAS POSITIVE
 - BIAS NEGATIVE
 - F(x) NONLINEAR OR UNSPECIFIED FUNCTION
 - > HIGH SELECT
 - < LOW SELECT
 - ⤴ HIGH LIMIT
 - ⤵ LOW LIMIT
 - */* SIGNAL TRANSDUCER OR CONVERTER (INPUT:OUTPUT) DEFINED AS FOLLOWS:
- | | |
|-------------------|--------------------------|
| E-VOLTAGE | H-HYDRAULIC |
| I-CURRENT | O-ELECTROMAGNETIC, SONIC |
| P-PNEUMATIC | R-RESISTANCE (ELECTRIC) |
| PD-PULSE DURATION | |
- CHEMICAL ABBREVIATIONS:
STANDARD CHEMICAL FORMULAS ARE USED.

GENERAL ABBREVIATIONS

- AS AIR SUPPLY
- CPU CENTRAL PROCESSOR UNIT
- DCU DISTRIBUTED CONTROL UNIT
- ES ELECTRIC SUPPLY
- FOC FIBER OPTIC CABLE
- FOM FIBER OPTIC MODEM
- FLP FAIL LAST POSITION
- FO FAIL OPEN
- FREQ FREQUENCY
- HDC HISTORICAL DATA COLLECTION
- IO INPUT OUTPUT
- MC MOTOR CONTROLLER
- NC NORMALLY CLOSED
- NO NORMALLY OPEN
- ORP OXYGEN REDUCTION POTENTIAL
- OWS OPERATOR WORK STATION
- PE PRESSURE SENSOR
- PIT PRESSURE INDICATOR SWITCH
- PLC PROGRAMMABLE LOGIC CONTROLLER
- PS POWER SUPPLY
- PSH PRESSURE SWITCH HIGH
- PSL PRESSURE SWITCH LOW
- PW PROCESS WATER
- RIO REMOTE INPUT OUTPUT
- RTU REMOTE TERMINAL UNIT
- SE SPEED SENSOR
- SIK SPEED INDICATE CONTROL STATION
- SL SLUDGE
- SP SET POINT
- μ MICROPROCESSOR
- VFD VARIABLE FREQUENCY DRIVE
- SS SOFT STARTER

NOTE:
THIS IS A STANDARD LEGEND. THEREFORE, NOT ALL OF THIS INFORMATION MAY BE USED ON THIS PROJECT.

CITY OF LUCAS, TEXAS
LUCAS PUMP STATION #2
& HIGHLAND CIRCLE 8" ATERLINE
PROCESS & INSTRUMENTATION

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		11/29/07			PI-LCA-GN-LGND.dwg
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PI-1					
12 OF 13					

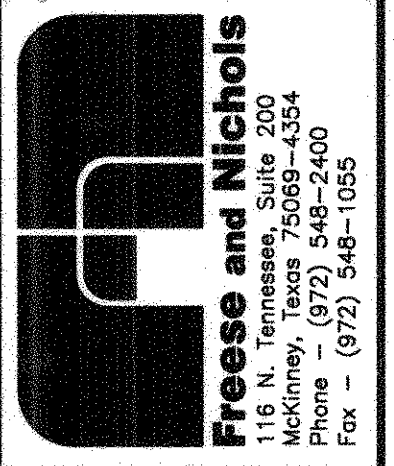
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116 N. Tennessee, Suite 200
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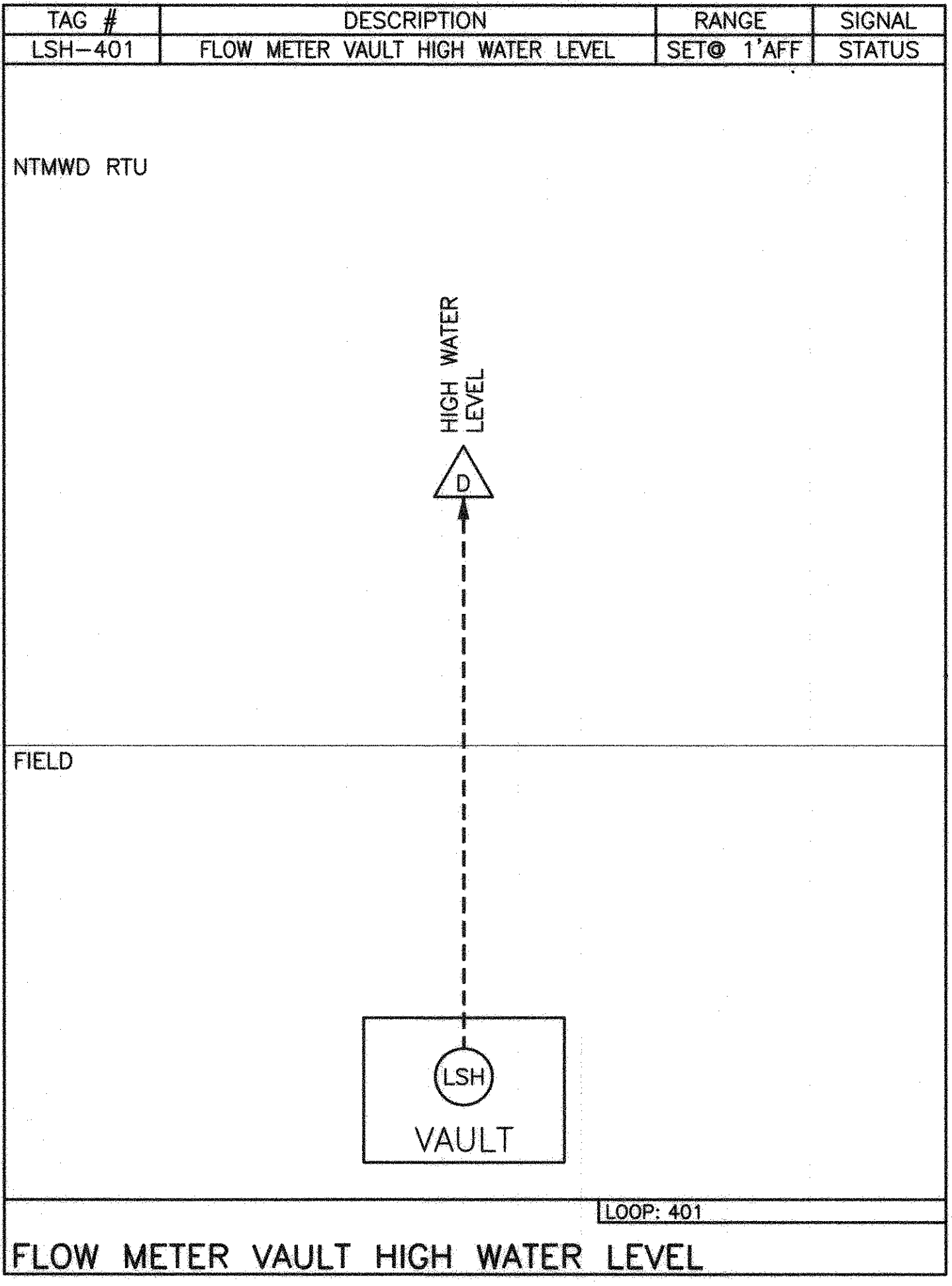
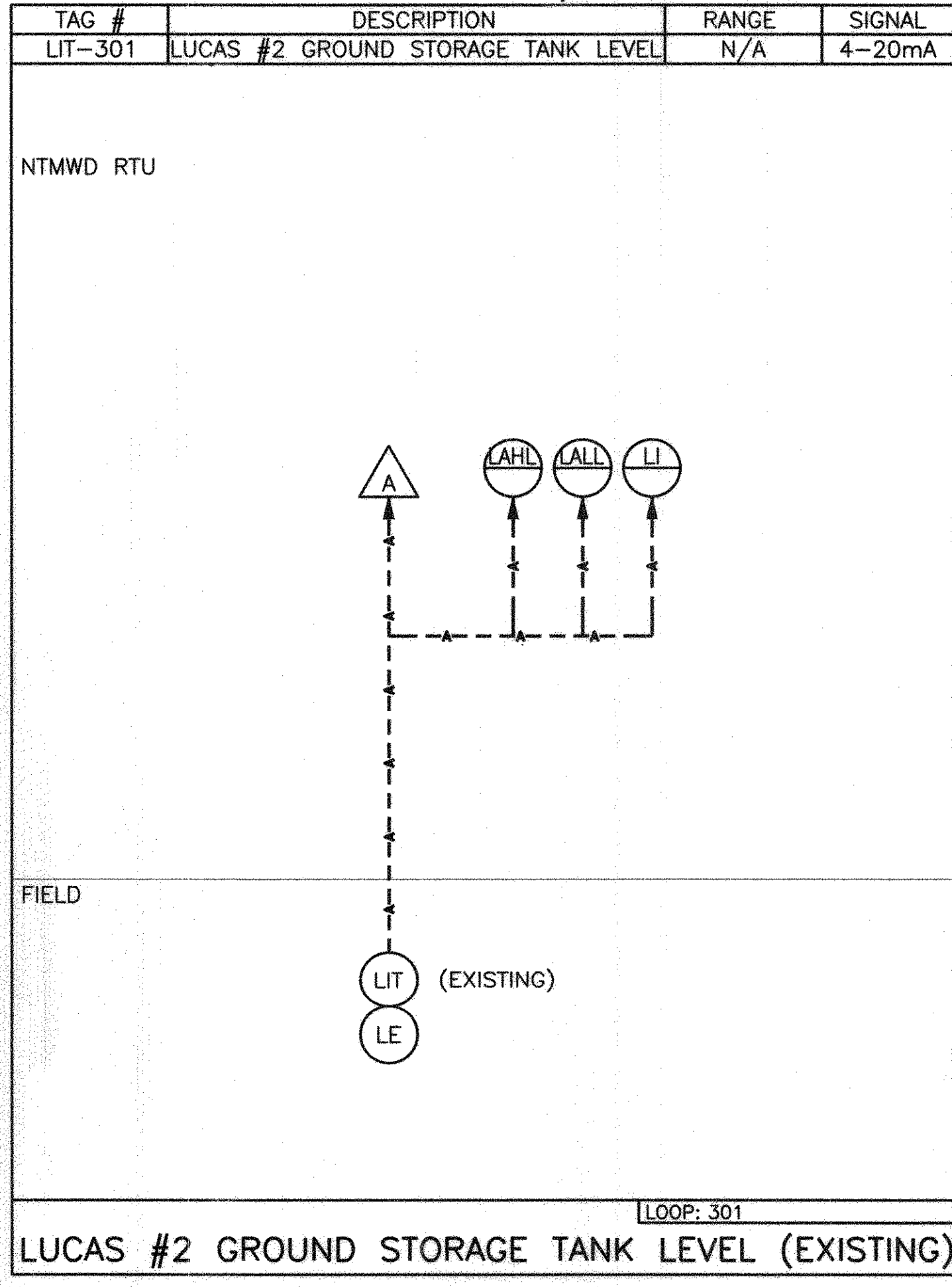
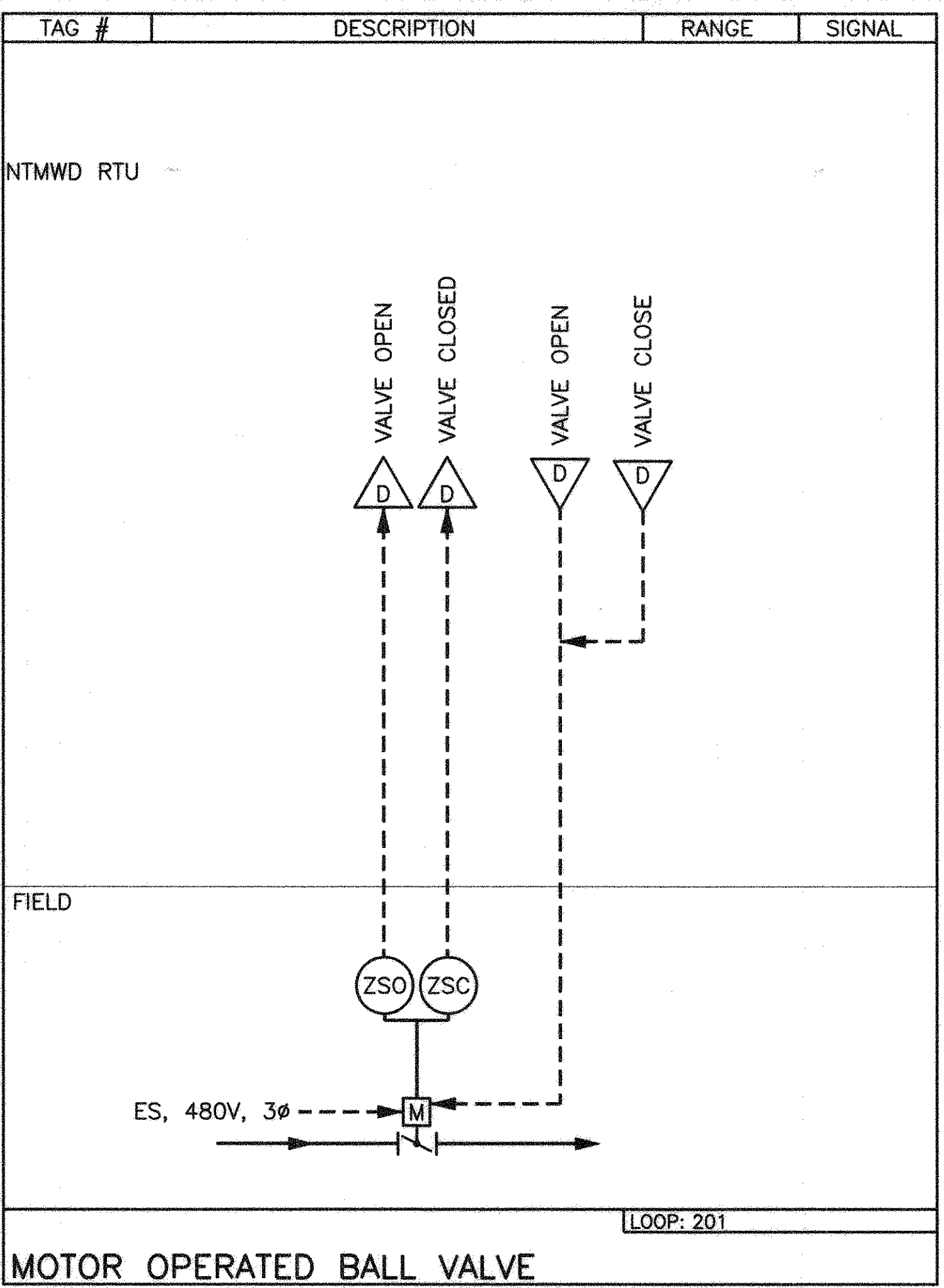
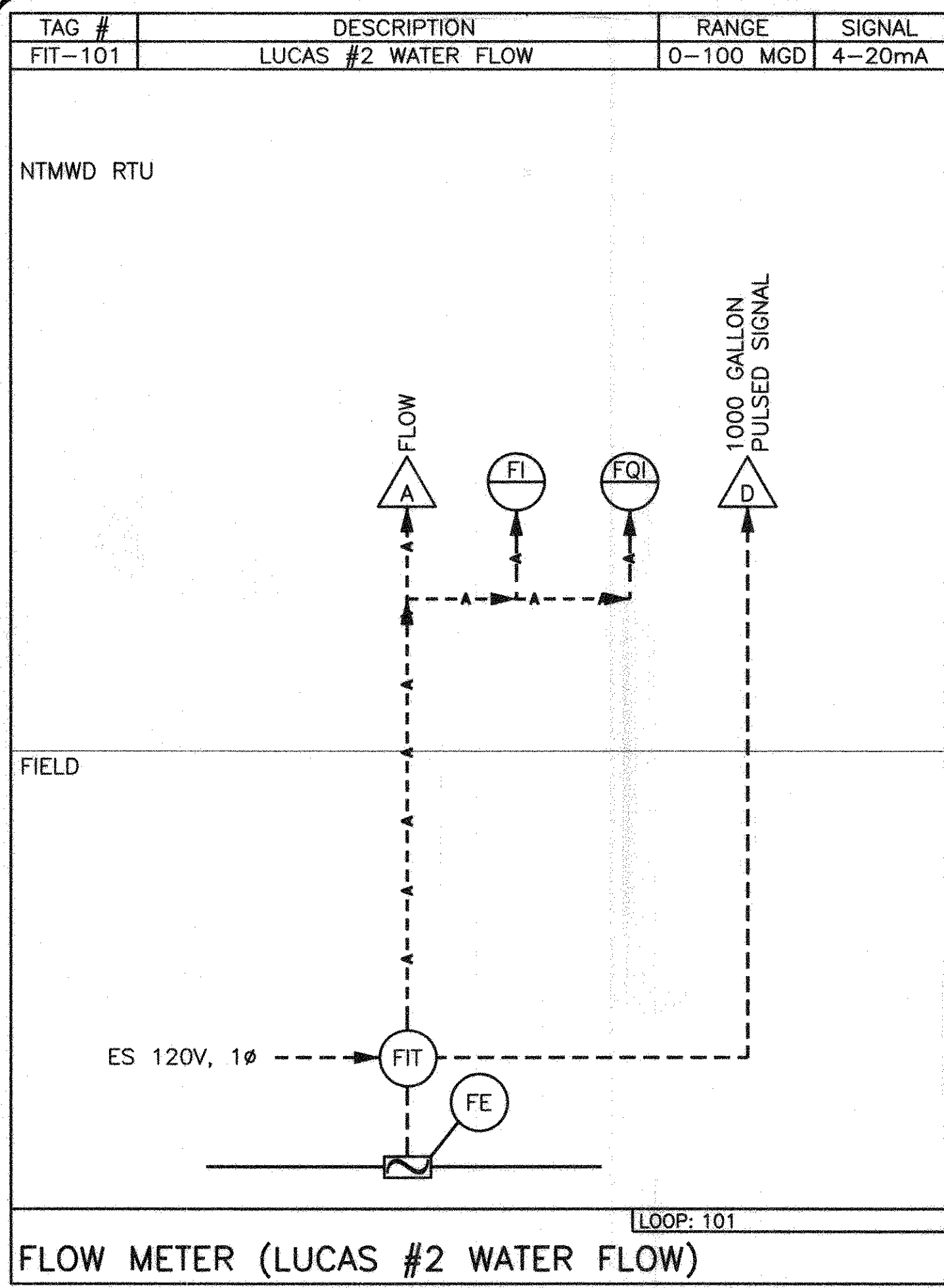
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CITY OF LUCAS, TEXAS
LUCAS PUMP STATION #2
 & HIGHLAND CIRCLE 8" ATERLINE
 PROCESS & INSTRUMENTATION
LOOP DIAGRAMS



NO.	ISSUE	DATE	BY	FOR	JOB NO.
		11/29/07			LCA06189
				DESIGNED	JNH
				DRAWN	JAF
				REVISED	JAF
				CHECKED	SLI

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